Self-Study Report – PART II
Department Evaluative Reports – Goa Campus

Submitted for Re-accreditation
To
The National Assessment & Accreditation Council
Bangalore

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI.
RAJASTHAN

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Table of Contents

Goa Campus: Evaluative Report of the Department
BIOLOGICAL SCIENCES

1. **Name of the Department** : Biological Sciences

2. **Year of establishment of the Department**: July 2004

3. **Is the Department part of a School/Faculty of the university?**
   Departments function as independent entities in the university and are not part of any school or faculty.

4. **Names of programmes offered:**
   M.Sc. Biological Sciences; M.E. Biotechnology; Ph.D.

5. **Interdisciplinary programmes and departments involved**
   i) M.Tech Environmental Engineering for working professionals is being offered by the Chemical Engineering Department through Work Integrated Learning Programmes (WILP). Biological Sciences Department is involved in taking courses in the area of Environmental Biotechnology and Biological Treatment processes for this program

   ii) The Doctoral Training Center in Computational Biology at BITS Pilani, K K Birla Goa Campus, is an interdisciplinary initiative combining expertise in Biologicial Sciences, Computer Science, Physics and Mathematics. Currently the core research project teams involve one faculty from Biological sciences and one from CS, Physics, or Mathematics. This four year Ph D program aims to enable the future generation to tackle and solve major computational biology challenges. Currently there are two students enrolled in this program.

6. **Courses in collaboration with other universities, industries, foreign institutions, etc.**
   i) Developed two courses i. Environmental Biotechnology and ii. Biological Treatment Principles and Design of Wastewater Systems for M.Tech Environmental Engineering for working professionals from Goa Pollution Control Board.

   ii) Short course on Wastewater Treatment October 11 - 13 2011 for public works department, Goa in collaboration with Dr. Michel Torrijos Laboratoire de Biotechnologie de l'Environnement, INRA, Narbonne, France.

7. **Details of programmes discontinued, if any, with reasons** Nil

8. **Examination System:** Semester and Credit based System

9. **Participation of the department in the courses offered by other departments**
   o Several faculty were involved in teaching Introduction to Environmental Sciences was owned by Electrical and Electronics Department
   o Dr Judith Braganca was involved in teaching part of Comparative Indian literature course offered by Humanities Department

10. **Number of teaching posts sanctioned, filled and actual (Professors/Associate Professors/Asst. Professors/others). (Refer Support document for calculation)**

	Sanctioned	Filled (includes offer letters given)	Actual number
Professor	Note:**	0	0
Associate Professors		06	06
Asst. Professors		10	10
Others			

Note**:The faculty positions for the University is broadly governed by Growth plan which also covers designation-wise breakup with a larger vision. Keeping in mind the fluidity of movement of faculty and proposed student to faculty ratio in each campus for first degree, higher degree as well as Ph.D. programmes, individual department needs are not fixed. Besides, as we are in expansion plan which calls for new programmes, courses being introduced, the demand on faculty in terms of numbers, for each department, is broadly governed by all the above factors and hence it is not possible to have a fixed number of faculty for each department. Recruitment of faculty, therefore, varies, based on departmental needs.

11. **Faculty profile with name, qualification, designation, area of specialization, experience and research under guidance**

Name	Qualification	Designation	Specialization	No of Years of Experience	No of Phd students guided for the last 4 years
Dibakar Chakrabarty	Ph.D.	Associate Professor	Drug leads from animal toxins	22	01 (awarded) 04 (pursuing)
Utpal Roy	Ph.D.	Associate Professor	Applied and Theoretical Research on Antimicrobials	18	03 (awarded) 05 (pursuing)
Meenal Kowshik	Ph.D.	Associate Professor	Nanobiotechnology	13	01 (awarded) 04 (pursuing) 02(as co-guide)
Srikanth Mutnuri	Ph.D.	Associate Professor	Bioremediation	10	02 (awarded) 07 (pursuing)
Judith Braganca	Ph.D.	Associate Professor	Biodiversity and Biotechnology of Archaea	13	01 (awarded) 02(pursuing)
Vijayashree Nayak	Ph.D.	Associate. Professor	Tissue engineering, cancer biology	16	02 (awarded) 04 (pursuing)
Anasuya Ganguly	Ph.D.	Asst. Professor	Cell and Molecular Biology	13	03 (pursuing)

Angshuman Sarkar	Ph.D.	Asst. Professor	Cell biology, cell and tissue culture technology, Cancer biology	11	03 (pursuing) 04 (Co-Guide)
Sumit Biswas	Ph.D.	Asst. Professor	Structural Biology, Biophysics, Bioinformatics, Molecular Biology	14	03 (pursuing)
Veeky Baths	Ph.D.	Asst. Professor	Computational Systems Biology, Computational Neuroscience and Network Modeling	10	02 (pursuing)
Sukanta Mondal	Ph.D.	Asst. Professor	Bioinformatics and Computational Biology	8	01 (pursuing)
Kundan Kumar	Ph.D.	Asst. Professor	Plant Biotechnology	3	02 (pursuing)
Malabika Biswas	Ph.D.	Asst. Professor	Molecular Biology and Biotechnology	4	01 (pursuing)
Indrani Talukdar	Ph.D.	Asst. Professor	RNA Biology, Stem cell research	8	01 (pursuing)
Arnab Banerjee	Ph.D.	Asst. Professor	Biology of reproduction	4.5	01 (pursuing)
Raviprasad Aduri	Ph.D.	Asst. Professor	Biophysics and Computational Biology	8	01(pursuing)

12. List of senior Visiting Fellows, adjunct faculty, emeritus professors Nil

13. Percentage of classes taken by temporary faculty – programme-wise information: Nil

14. Programme-wise Student Teacher Ratio (Refer to Support document for calculation):
MSc Biological Sciences: 174/16=10.88
ME Biotechnology: 18/12=1.5

15. Number of academic support staff (technical) and administrative staff: sanctioned, filled and actual
One Technical Assistant; One Office Assistant; One Technical attendant; One Attendant (Adhoc)

16. Research thrust areas as recognized by major funding agencies
- o Environmental Biotechnology
- o Therapeutic Biology
- o Structural Biology and Bioinformatics
- o Extremophiles
- o Nanobiotechnology

17. Number of faculty with ongoing/completed projects in the last five years from a) national b) international funding agencies and c) Total grants received. Give the names of the funding agencies, project title and grants received project-wise.

Completed projects:

SL No	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration
1.	Preparation and characterization of nanosized TiO_2 and studies on its photodegradation capability of model organic pollutants	Meenal Kowshik	DST, Nanomission	18.28	2007-2010
2.	Isolation & screening of microorganism from extreme & unusual environment for new & novel antimicrobial peptides to combat some clinically important multi-drug resistant fungal pathogens	Utpal Roy	CSIR	17	2007- 2011
3.	Expression of cyclodextringlucosyltransferase gene in hydrocarbon degrading bacteria for enhancing bio remediation	Srikanth Mutnuri	DBT	17	2008-2011
4.	Anaerobic digestion of food waste in a horizontal plug flow reactor	Srikanth Mutnuri	UGC	11	2008-2011
5.	Studies of Haloarchaea producing polyhydroxyalkanoates	Judith Braganca	UGC	8.9	2009-2012
6.	Experimental pilot scale horizontal plug flow reactor for anaerobic digestion of food waste	Srikanth Mutnuri	Goa Energy Development Agency	10	2010-2013
7.	Screening of extremophile isolates for novel antimicrobial substances against selected multi-drug resistant human pathogens	Utpal Roy	DST	11.38	2010- 2012

innovate   achieve   lead

8.	Biological Synthesis of Metal Sulfide and Metallic Nanoparticles Using HalophilicArchaebacteria	Meenal Kowshik	Ministry of Earth Science	8.28	2011-2014
9.	Study the effect on nanopoarticles on protein synthesis and expression of small GTPases	Angshuman Sarkar and Co – PI: Meenal Kowshik	BRNS	21.1	2011-2014
10.	A novel scaffold for cartilage tissue engineering	Vijayashree Nayak	BRNS	23.6	2011-2015
11.	Structure elucidation of VC0395_300 protein from *Vibrio cholerae* (leading to an alternate method of checking Cholera epidemics)	Sumit Biswas	BRNS, DAE	23	2011-2015
12.	Physicochemical characterization of the Primary Sigma Factor of *Vibrio cholerae*	Sumit Biswas	DBT	31.75	2011-2015
13.	Biochemical and genetic characterization of antimicrobial (Candidacidal) peptides produced by the anatarctic strain Enterococcus faecalis APR 210	Utpal Roy, Co-PIs: Angshuman Sarkar and Sumit Biswas	UGC	7.3	2011-2014
14.	Testing novel and existing materials for manufacturing Tissue Engineered Heart Valves (TEHVs)	Anasuya Ganguly	Aditya Birla Group	20.0	2011-2013
15.	Waste to Energy project in Nashik	Srikanth Mutnuri	GIZ, New Delhi	20.77	2011 -2014
16.	Studies on putative GGEEF/Sensory box domain of *Vibrio cholerae*	Sumit Biswas	DST	21.8	2012-2015
17.	Associatoin of chronic infection between S. typhi and Gall bladder Cancer	Vijayashree Nayak and Co-PI: Rajani Gaind	ICMR, New Delhi Aditya Birla Group	10.0	2012 - 2014
18.	Tissue engineering of human placental stem cells into a functional pancreas	Anasuya Ganguly	DST	22.1	2012-2015

19.	Setting up of pilot project at Hazira for biofixation of carbon dioxide and greenhouse gas abatement with microalgae	Srikanth Mutnuri	ONGC, New Delhi	6.32	2013
20.	To establish COD(Cr) quality testing method for sea water	Srikanth Mutnuri	Hitachi India Pvt Ltd	32.79	2013-2014

BITS Grants

	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration
1	Study the effect of Cadmium Toxicity in human cells	Angshuman Sarkar and Co PI: Dibakar Chakrabarty	BITS Seed Grant	12.8	2011-2013
2	Studies on Anticoagulant Toxins and Disintegrins from Indian Snake Venoms	Dibakar Chakrabarty and Co PI: Angshuman Sarkar	BITS Seed Grant Project	13.35	2011-2013
3	Screening and Characterization of Hydrolytic extremo-enzymes from Halophilic archaea having biotechnological potential.	Judith M. Braganca	BITS Seed Grant	11	2013-2015

Ongoing projects:

SL No	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration
1.	Study the effect of Nanoparticles on small GTPase and protein synthesis	Angshuman Sarkar	BRNS-DAE	22.8	2011-2015
2.	A new biodegradable polymer scaffold for cartilage tissue engineering	Vijayashree Nayak	IIT, Kanpur BRNS-DAE	22.6	2011-2015
3.	Identification and characterization of abiotic stress responsive With No Lysine (WNK) kinase in rice (*Oryzasativa* L.)	Kundan Kumar	SERB	22.65	2013-2016
4.	Cloning and characterization of the promoters of *Staphylococcysaureus* temperate bacteriophage, φ 11 .	Malabika Biswas	BRNS	24	2013-2016

5.	Project Title: Protein-Ranking and Novel Intervention Strategies against Mycobacterium tuberculosis using Graph Theory and Bioinformatics Resources	Veeky Baths	DST	8.6	2013-2016
6.	Analysis Of Metabolically Active Bacterial Species In Anaerobic Digesters	Srikanth Mutnuri	CSIR	17	2013-2016
7.	Bio-Catalytic Production of a Commercial Textile Dye-Indigo	Srikanth Mutnuri	DSTE, Goa	5	2013-2016
8.	Alternative splicing in signal transduction and diseases; a genome wide approach	Indrani Talukdar	DST SERB	20.0	2013- 2016
9.	Role of environmental toxin in kidney related diseases in CanaconaTaluk, Goa	Anasuya Ganguly	CSIR	10.0	2013-2016
10.	Regulation of hypothalamic gonadotropin releasing hormone expression by putrescine	Arnab Banerjee	SERB	22.3	2014-2017
11.	Microbial Diversity & Biotechnological Potentials of some Polar	Utpal Roy	DST-WOS	17.65	2014-2017
12	EMT regulation and TGF βcell signalling in gall bladder disease	Vijayashree Nayak	DST	37.6	2014-2017
13	Biotransformation of Phosphogypsum by sulphate reducing bacteria	Srikanth Mutnuri	DBT	5.8	2014-2015
14	Empowered septic tank as decentralized wastewater treatment system	Srikanth Mutnuri	DBT BIRAC - Bill and Mellinda Gates foundation	67	2014-2016
15	Purification & Characterization of Antimicrobial Compound with special reference to *Candida albicans* and *Cryptococcus neoformans*	Utpal Roy	DST	11	2015-2016
16	Study the effects of quinacrine (QC) on regulation of Rho like small-GTPase and apoptosis in human lung and breast cancer cell lines cultured in vitro	Angshuman Sarkar and Co PI: Indrani Talukdar	DBT	24.55 (Initial)	2015-2018

17	Home automation and smart wheel chair based on Electroencephalography (EEG) signals produced in brain	Veeky Baths	Cognitive Science Research Initiative DST	39	2015-2018
18	Studies on Anticoagulant and Platelet Aggregation Inhibitors from Indian Cobra Venoms.	Dibakar Chakrabarty and Co PI: Angshuman Sarkar	DBT	36.544	2014-17

On-going Projects Funded by BITS

1.	Development and Demonstration of two decentralized wastewater treatment plants	Srikanth Mutnuri	Centre of Research Excellence in Waste, Water and Energy Management (CORE WWE) - BITS Pilani	32	2014-2017
2.	Role of alternate splicing modulators in differentiation of embryonic stem cells into specific lineages	Indrani Talukdar	BITS- "additional competitive grant for new faculty"	8	2015-17
3.	"Development of a Field-deployable Biosensor for Bacterial sensing inpotable water" Water Core Project	Co-PI Utpal Roy	BITS CORE WWE) - BITS Pilani	41	2014- 2017

18. **Inter-institutional collaborative projects and associated grants received**
Physicochemical Characterization of Primary Sigma Factor of *Vibrio cholera*, in collaboration with Nagaland University- Dr Sumit Biswas, 31.75 lakhs; (2012-2015)

 International collaboration
Microbial Diversity in bilge oil contaminated sites using Stable isotope probing under Prof Max Haggblom, Rutgers University, USA under Indo US Research Professorship programme of American Society for Microbiology- Dr Srikanth Mutnuri; $5000, Completed.

"Empowered septic tank as decentralized wastewater treatment system" DBT BIRAC – Bill& Mellinda Gates foundation Principal Investigator in collaboration with Ghent University. Prof. Srikanth Mutnuri; 67 lacs (2014-2016)

Waste to Energy project in Nashik in collaboration with German Technical cooperation, India; Prof. Srikanth Mutnuri; Rs 20,77,530 (2010 – 2014)

19. **Departmental projects funded by DST-FIST:**41 lakhs.

20. Research facility / centre with

- state recognition **Nil**
- national recognition **Nil**
- international recognition **Nil**

21. Special research laboratories sponsored by / created by industry or corporate bodies Nil

22. Publications:

Sl No.	Details	Specify number here
1	Number of papers published in peer reviewed journals (national / international)	111
2	Monographs	0
3	Chapters in Books	9
4	Edited Books	0
5	Books with ISBN with details of publishers	0
6	Number listed in International Database (For *e.g.* Web of Science, Scopus, Humanities International Complete, Dare Database - International Social Sciences Directory, EBSCO host, etc.)	111
7	Citation Index – range / average	127.5(Average) 778(Highest) 9 (Lowest)
8	SNIP	0.9964 (Average) 3.786 (Highest) 0.031 (Lowest)
9	SJR	1.059 (Average) 11.427 (Highest) 0.0104 (Lowest)
10	Impact Factor – range / average	Range: 5.33 to 0.01 Average: 2.54
11	h-index	11

Details of the publications as per the number give above (Give details in the last five years Journal Publications

Sr No	Authors	Title of the Publications	Details of the Journal	National/Inter national	Year
1	Pai PP, Ranjani SSS, Mondal S	PINGU: Prediction of eNzyme catalytic residues using seqUence information	PLoS ONE10(8) :e0135122	International	2015
2	Bhakti B. Salgaonkar and Judith M. Bragança	Biosynthesis of Poly(3-hydroxybutyrate-co-3-hydroxyvalerate) by Halogeometricumborinquens e strain E3.	International Journal of Biological Macromolecules 78:339-346. (10.1016/j.ijbiomac. 2015.04.016).	International	2015

3	PallaveeSrivastava, Edarapalli VR Nikhil, Judith M Bragança, MeenalKowshik	Anti-bacterial TeNPs biosynthesized by haloarcheaonHalococcussalifodinae BK3	Extremophiles, DOI: 10.1007/s00792-015-0767-9	International	2015
4	Subhadeep Banerjee, AnjanChattopadhyay, Arnab Banerjee, MeeraHaridas, Praveen Saini, Moitreyi Das, Mahesh S. Majik, Yogesh Kr. Maurya	Synthesis and photophysical characterization of quasi push–pull dicyanodibenzodioxins and their anti-tumor activity against glioma cell line C6.	Bioorganic & medicinal chemistry letters: 25(4):753-7.	International	2015
5	Priyanka Dwivedi, Vijayashree Nayak, Meenal Kowshik	Role of gold nanoparticles as drug delivery vehicles for chondroitin sulfate in the treatment of osteoarthritis,	Biotechnology Progress, doi: 10.1002/btpr.2147	International	2015
6	M Monsoor Shaik and Meenal Kowshik	Novel melt-down neutralization method for synthesis of chitosan–silver scaffolds for tissue engineering applications	Polymer Bulletin, DOI 10.1007/s00289-015-1522-1	International	2015
7	Chakrabarti P, Biswas S	Analysis of interactions and dissection of interfaces involved in RNA-protein recognition.	Protein Peptlett. 2015 DOI:10.2174/0929866652266615011511 2654	International	2015
8	Kothandan R, Biswas S	Identifying micrornas involved in cancer pathways using support vector machines.	Computational biology and chemistry, 2015 apr;55:31-6	International	2015
9	Mir MA, Arumugam M, Mondal S, Rajeswari HS, Ramakumar S, Ajitkumar P	Mycobacterium tuberculosis Cell Division Protein, FtsE, is an ATPase in Dimeric Form.	Protein J. 34:35-47.	International	2015
10	Saddhe A.A. and Kumar, K	In silicoidentification and expression analysis of MscS like gene family in rice	Plant Gene 1:8-17	International	2015

11	Bhakti B. Salgaonkar, Deepthi Das and Judith M. Bragança	Resistance of extremely halophilicarchaea to zinc and zinc oxide nanoparticles.	Applied Nanoscience (DOI 10.1007/s13204-015-0424-8).	International	2015
12	G. Mishra, G. Bacher, Utpal Roy, Sunil Bhand	A label free impedemetricimmunosensor for detection of E.coli in water.	SCIENCEJET 4:76-83	International	2015
13	Sakurai K*, Talukdar I*, Patil VS*, Dang J, Li Z, Chang KY, Lu CC, Delorme-Walker V, Dermardirossian C, Anderson K, Hanein D, Yang CS, Wu D, Liu Y, Rana TM.	Kinome-wide Functional Analysis Highlights the Role of Cytoskeletal Remodeling in Somatic Cell Reprogramming.	Cell-Stem Cell. 3;14(4):523-34. doi: 10.1016/j.stem.2014.03.001.	International	2014
14	Srivastava, Pallavee, Judith Braganca, Sutapa Roy Ramanan, and Meenal Kowshik	Green Synthesis of Silver Nanoparticles by Haloarchaeon Halococcus salifodinae BK6	Advanced Materials Research Vol 938, 236-241	International	2014
15	Jiang J, Aduri R, Chow CS, Santa Lucia J Jr.	Structure modulation of helix 69 from *Escherichia coli* 23S ribosomal RNA by psedouridylations	Nucleic Acids Res. doi: 10.1093/nar/gkt1329	International	2014
16	Priyanka Dwivedi, Sumrita Bhat, Vijayashree Nayak, Ashok Kumar	Study of Different Delivery Modes of Chondroitin Sulfate Using Microspheres and Cryogel Scaffold for Application in Cartilage Tissue Engineering	International Journal of Polymeric Materials. Nov 2014, Vol. 63: 859-872	International	2014
17	Deepthi Das, B. B. Salgaonkar, K. Mani and Judith M. Braganca	Cadmium resistance in extremely halophilicarchaeonHaloferax strain BBK2	Chemosphere Elsevier. Science Direct. 112:385-392	International	2014
18	Kumar, K. Mosa, K.A. Chikara, S. Musante, C. White, J.C. and Dhankher, O.P	Two rice plasma membrane intrinsic proteins	Planta 239:187-198	International	2014

19	Jadalannagari, Sushma, KetakiDeshmukh, Anita KamraVerma, RichaVohra Meen alKowshik, and Sutapa Roy Ramanan	Lanthanum-Doped Hydroxyapatite Nanoparticles as Biocompatible Fluorescent Probes for Cellular Internalization and Biolabeling	Science of Advanced Materials No 2: 312-319	International	2014
20	Rajesh Pasumarthi, Vikash Kumar, Sivaraman Chandrasekharan, Anasuya Ganguly, Mainak Banerjee and Srikanth Mutnuri	Biodegradation of Aliphatic hydrocarbons in the presence of HydroxyCucurbit[6]uril	Marine Pollution Bulletin 09/2014; 88(1-2).	International	2014
21	Archana Sharma, Sumrita Bhat, Vijayashree Nayak , Ashok Kumar	Efficacy of supermacroporous poly(ethylene glycol)–gelatincryogel matrix for soft tissue engineering applications	Materials Science and Engineering C 47 (2015) 298–312	International	2014
22	Naik, Kshipra, and Meenal Kowshik	Anti-biofilm efficacy of low temperature processed AgCl–TiO2 nanocomposite coating	Materials Science and Engineering34: 62-68	International	2014
23	Jane C Fanelon, Arnab Banerjee, Bruce D Murphy. 2014	Embryonic diapause: development on hold	Int. J. Dev. Biol. 58: 163-174	International	2014
24	Yogesh D. Walwalkar, Rajni Gaind and Vijayashree Nayak	Study on *Salmonella typhi* occurrence in gall bladder of patients suffering from chronic cholelithiasis- a predisposing factor for carcinoma of gall bladder	Diagnostic Microbiology and Infectious Disease;2013,77,1, 69–73	International	2014
25	Naik, Kshipra, and Meenal Kowshik	Anti-quorum sensing activity of AgCl-TiO2 nanoparticles with potential use as active food packaging material	Journal of applied microbiology 4:972-983	International	2014
26	Dhole K, Singh G, Pai PP, Mondal S	Sequence-based prediction of protein-protein interaction sites with L1-logreg classifier	J Theor Biol. 348:47-54.	International	2014

27	Mondal S, Pai PP	Chou's pseudo amino acid composition improves sequence-based antifreeze protein prediction.	J Theor Biol. 356:30-35.	International	2014
28	Vikash Kumar, Amrita Chatterjee, Nupur Kumar, Anasuya Ganguly, Indranil Chakraborty and Mainak Banerjee;	D-Glucose Derived Novel Gemini Surfactants: Synthesis and Study of Their Surface Properties, Interaction with DNA, and Cytotoxicity	Carbohydrate Research Final version published online: 6-SEP-2014, Carbohydrate Research 10/2014; 397	International	2014
29	Subhenjit Hazra, Shruti Balaji, Mainak Banerjee, Anasuya Ganguly, Narendr aNath Ghosh and Amrit a Chatterjee	A PEGylated-Rhodamine based sensor for "turn-on" fluorimetric and colorimetric detection of Hg2+ ions in aqueous media	Anal. Methods, DOI: 10.1039/C4AY00265B	International	2014
30	Chamarthi, S.K. Kumar, K. Gunnaiah, R. Kushalappa, A.C. Dion, Y. and Choo, T.M.	Identification of *Fusarium* head blight resistance related metabolites specific to doubled-haploid lines in barley	European Journal of Plant Pathology 138:67-78	International	2014
31	Vidhya Prabhudessai, Bhakti Salgaonka r, Judith Braganca and Srikanth Mutnuri	Pre-treatment of Cottage Cheese to Enhance Biogas production	BioMed Research International: doi: 10.1155/2014/374562	International	2014
32	Banerjee A Meenakumari Kaustab and Krishna A.	Testicular glucose and its transporter GLUT 8 as a marker of Age-dependent variation and its role in steroidogenesis in mice.	J Exp Zool. 321(9):490-502	International	2014
33	Ramya R, A Chalsani, Ram Lal and Utpal Roy	A Broad-Spectrum Antimicrobial Activity of B. subtilis RLID 12	The Scientific World Journal 2014: 968487 doi: 10.1155/2014/968487	International	2014
34	Kabilan M, Chandrashekaran Sivaraman, Bhakti Salgaonkar,	Comparison of bacterial diversity from solar salterns and a simulated laboratory study	Ann Microbiol. DOI 10.1007/s13213-014-0944-6	International	2014

	Srikanth Mutnuri and Judith M. Braganca				
35	Veeky Baths, Tarkeshwar Singh and Anil Kumar.	Disruption of Cell Wall Fatty Acid Biosynthesis in Mycobacterium tuberculosis Using the Concept of Minimum Robust Domination Energy of Graph	Annual Research & Review in Biology 4(12): 2037-2044	International	2014
36	Kumar, K. and Sinha, A.K	Genome-wide transcriptome modulation in rice transgenic lines expressing engineered mitogen activated protein kinase kinase 6	Plant Signaling and Behavior 9: e28502	International	2014
37	Singh G, Dhole K, Pai PP	Prediction of Protein-Protein Interaction Sites Using Artificial Neural Networks	J Proteomics Computational Biol. 1(1):7.	International	2014
38	Meghanth Prabhu and Srikanth Mutnuri	Cow urine as a potential source for struvite production	International Journal of recycling of organic waste in agriculture. DOI 10.1007/s40093-014-0049-z	International	2014
39	Aduri R	Editorial: To be Read or Not	Enliven: Microb. Microbial Tech: 1(1):E1	International	2014
40	Yogesh D. Walawalkar and Vijayashree Nayak	Role of Bile in Regulating Small RNAs in Salmonella typhi; A Factor for Chronic Infection within Gallbladder?	.J.Curr.Microbiol.App.Sci 4(2): 183-197; ISSN: 2319-7706	International	2014
41	Adit Chaudhary, Imran Pasha M., Bhakti B. Salgaonkar and Judith M. Braganca	Cadmium Tolerance by Haloarchaeal Strains Isolated from Solar Salterns of Goa, India	International Journal of Bioscience, Biochemistry and Bioinformatics. DOI: 10.7763/IJBBB.2014.V4.299	International	2014
42	Srivastava, Pallavee, Judith M. Braganca, and MeenalKowshik	In vivo synthesis of selenium nanoparticles by *Halococcussalifodinae* BK18 and their anti-proliferative properties against HeLa cell line	Biotechnology Progress: doi: 10.1002/btpr.1992.	International	2014

43	Arunkarthick, S., M. M. Bijeesh, Geetha K. Varier, MeenalKowshik, and P. Nandakumar	Laser scanning photothermal microscopy: fast detection and imaging of gold nanoparticles	Journal of microscopy DOI: 10.1111/jmi.12164	International	2014
44	Jadalannagari, Sushma, Ketaki Deshmukh, Sutapa Roy Ramanan, and MeenalKowshik	Antimicrobial activity of hemocompatible silver doped hydroxyapatite nanoparticles synthesized by modified sol–gel technique	Applied Nanoscience No 2:133-141	International	2014
45	Naik, Kshipra, Amrita Chatterjee, Halan Prakash, and Meenal Kowshik	Mesoporous TiO2 Nanoparticles Containing Ag Ion with Excellent Antimicrobial Activity at Remarkable Low Silver Concentrations	Journal of biomedical nanotechnology No.4 : 9(4):664-73.	International	2013
46	Desai, Vilas, Bhanudas Naik, NarendraNath Ghosh, and Meenal Kowshik	Functionalization of AgCl/TitaniaNanocomposite with Folic Acid: A Promising Strategy for Enhancement of Antimicrobial Activity.	Science of Advanced Materials No. 5: 431-439	International	2013
47	Rajesh Pasumarthi, Sivaraman Chandrasekharan, Srikanth Mutnuri	Biodegradation of crude oil by *Pseudomonas aeruginosa* and *Escherichia fergusonii*isolated from Goan coast	Marine Pollution Bulletin: doi: 10.1016/j	International	2013
48	Bandekar Divya R, Singh D and Biswas S*.	GGD(/E)EF Domain: A Ubiquitous Eubacterial Domain Confers Cell Toxicity	Int J Biotech Res. 3(1): 73-80	International	2013
49	Kumar, K and Sinha A.K.	Overexpression of constitutively active mitogen activated protein kinase kinase 6 enhances tolerance to salt stress in rice	Rice 6:25	International	2013
50	Kumar, K. Kumar, M. Kim, S.R. Ryu, H. and Cho Y.G.	Insights into genomics of salt stress response in rice	Rice 6:27	International	2013
51	Wankhede, D.P. Kumar, K. Singh, P. and Sinha A.K	Involvement of mitogen activated protein kinase kinase 6 in UV induced transcripts accumulation of	Rice 6:35	International	2013

		genes in phytoalexin biosynthesis in rice.			
52	Vidhya Prabhudesai, and Srikanth Mutnuri	Biochemical Methane Potential of Agro Wastes	Journal of Energy vol. 2013, Article ID 350731, 7 pages	International	2013
53	B. B. Salgaonkar, K. Mani and Judith M. Braganca	Characterization of polyhydroxyalkanoates accumulated by a moderately halophilic salt pan *isolate Bacillus megaterium* strain H16	Journal of Applied Microbiology. 114, 1347—1356	International	2013
54	Chandrasekhar Chanda, AngshumanSarkar, Srinivas Sistla, Dibakar Chakrabarty	Anti-Platelet Activity Of A Three-Finger Toxin (3ftx) From Indian Monocled Cobra (NajaKaouthia) Venom	Biochemical and biophysical research communication Nov 22; 441 (3):550-4	International	2013
55	Srivastava, Pallavee, Judith Bragança, Sutapa Roy Ramanan, and MeenalKowshik	Synthesis of silver nanoparticles using haloarchaeal isolate Halococcussalifodinae BK3	Extremophiles No 5: 821-831	International	2013
56	B. B. Salgaonkar, K. Mani and Judith M. Braganca	Accumulation of polyhydroxyalkanoates by halophilicarchaea isolated from traditional solar salterns of India	Extremophiles. 17:787-795	International	2013
57	P. Srivastava, Judith M. Braganca, S. Roy Ramanan and MeenalKowshik	Synthesis of silver nanoparticles using haloarchaeal isolate *Halococcussalifodinae BK3*	Extremophiles. DOI 10.1007/s00792-013-0563-3	International	2013
58	Srivastava, Pallavee, and MeenalKowshik	Mechanisms of metal resistance and homeostasis in haloarchaea	Archaea : Volume 2013 (2013), Article ID 732864, 16 pages	International	2013
59	Santimano, Maria Celisa, and MeenalKowshik	Altered growth and enzyme expression profile of ZnO nanoparticles exposed non-target environmentally beneficial bacteria	Environmental monitoring and assessment No 9: 7205-7214	International	2013
60	Purnima Singh, Masaharu Tsuji, Shiv Mohan Singh, Utpal Roy,	Taxonomic characterization, adaptation strategies and biotechnological potential of cryophilic yeasts from ice	Cryobiology: 66(2):167-75	International	2013

		cores of MidreLovénbreen glacier, Svalbard, Arctic.			
61	Desai, Vilas, and MeenalKowshik	Synthesis and Characterization of Fumaric Acid Functionalized AgCl/TitaniaNanocomposite with Enhanced Antibacterial Activity	Journal of nanoscience and nanotechnology No. 4: 2826-2834	International	2013
62	Ram K, Biswas S	Search for signatures in miRNAs associated with cancer	Bioinformation. 9(10): 524-527	International	2013
63	G. Chithralekha and Srikanth Mutnuri	Study of a Marine Microbial Fuel Cell on a Pilot Scale	Chemical Sciences Transactions : 2(S1), S316-S322	International	2013
64	Celisa Santimano, Maria, Ansie Martin, Meenal Kowshik, and Angshuman Sarkar	Zinc Oxide Nanoparticles Cause Morphological Changes in Human A549 Cell Line Through Alteration in the Expression Pattern of Small GTPases at mRNA Level.	Journal of Bionanoscience No 3: 300-306	International	2013
65	Sarkar A., Ravindran G. And Krishnamurthy V	A brief review on the effect of cadmium toxicity: from cellular to organ level	International journal of bio-technology and research (ijbtr) issn 2249-6858 vol. 3, issue 1, 17-36	International	2013
66	P.Arulazhagan, I.T. Yeom, Sivaraman C, SrikanthMutnuri and Rajesh Banu	Role of additional carbon substrate on biodegradation of 1,4 dioxane using bacterial consortium enriched from industrial sludge	Advances in Environmental Biology : 7(9): 2081-2090	International	2013
67	Judith M. Braganca and I. Furtado	Resistance of Halobacterium strain R1 to cadmium during growth in mineral salts medium devoid of growth factors	Asian Jr of Microbiol. Biotech. Env. Sc. 15(2): 299-302	International	2013
68	Geethanjali Ravindran, DibarkarChakrabarty, AngsumanSarkar	Cadmium toxicity alters mRNA expression of Rho-like genes in A549 cell lines	Journal of Cell and Molecular Biology. 11(1&2):13-20	International	2013

69	Archana Sharma, SumritaBhat, TanusreeVishnoi, VijayashreeNayak and Ashok Kumar	Three dimensional supermacroporous carrageenan-gelatincryogel matrix for tissue engineering applications	Biomed Research International: Volume 2013 (2013), Article ID 478279, 15 pages	International	2013
70	Krishnamurthy Nayak, VijayashreeNayak and Deccaraman M	Formulating a Mathematical Model for the E-Nose Application through Genetic Algorithm (GA).	International Journal of Computer Applications 51(1):7-13	International	2012
71	RaeeshShekh and Utpal Roy	Biochemical characterization of a promising anti-Candida factor produced by Enterococcus faecalis	BMC Microbiology 12:132-147	International	2012
72	Kumar, N., Ponnaluri, C.V.K., Putarjunan, A., Ranganathan, S., Roy Utpal., Das A.	Characterization of temperature inducible promoters from a novel rolling circle replicating plasmid of *Enterococcus faecium* DJ1	PLASMID 67(3):211-26	International	2012
73	Banerjee A, Anjum S, Verma R, Krishna A.	Alteration in expression of estrogen receptor isoforms alpha and beta, and aromatase in the testis and its relation with changes in nitric oxide during aging in mice .	Steriod.77(6):609-20.	International	2012
74	Manjuri K. Koley, Seshadri C. Sivasubramanian, SumitBiswas, Periakaruppan T. Manoharan & Aditya P. Koley	Dioxygen binding and activation by a highly reactive cr(ii) compound containing s,n-donors derived fromo-aminothiophenol	Journal of coord chem. 2012; 65(19): 3329-3351	International	2012
75	Krishnamurthy Nayak, Supreetha B.S., DeccaramanM,VijayashreeNayak	E-Nose System to Detect *E coli* in Drinking Water of UdupiDistrict	International journal of Engineering Research and Development, ISSN;2278:067X, Vol 1, issue 12 (July 2012), PP 58-64	International	2012
76	P. Singh, Lisette D' Souza L, Utpal Roy and S M Singh	Chemical constituents & antioxidant activity of Arctic Mushroom *Lycoperdonmolle*	Polar Research: DOI: 10.3402/polar.v31i0.17 329	International	2012

77	R. K. Sinha, K.P.Krishnan And A Sarkar,	Heat shock response as a cue for phenotypic variability: a study from the psychrotrophic and mesophilic strains of *Cellulosimicrobiumcellulans*	Annals of microbiology, (doi 10.1007/s13213-011-0411-6)	International	2012
78	C.Sivaraman, AnasuyaGanguly and SrikanthMutnuri	Cloning and expression of catechol 2, 3 dioxygenase and cyclodextringlucanotransferase gene in *E.Coli* and its role in biodegradation	International Journal of life Science and Pharma Research" Vol 2/Issue 3/ pp L10 – L19.	International	2012
79	B. B. Salgaonkar, K. Mani, A. Nair, S. Gangadharan and Judith M. Braganca	Interspecific Interactions Among Members of Family *Halobacteriaceae* from Natural Solar Salterns	Probiotics &Antimicro. Prot. DOI: 10.1007/s12602-012-9097-8	International	2012
80	C.Sivaraman, AnasuyaGanguly and SrikanthMutnuri	Role of cyclodextringlucanotransferase enzyme in biodegradation	Advances in Environmental Research, Vol. 1, No. 2 pp97-108.		2012
81	Kabilan M, Bhakti Salgaonkar, Deepthi Das and Judith M. Braganca	Community solar salt production in Goa, India	BMC Aquatic Biosystems. 8:30	International	2012
82	Kabilan M, Bhakti Salgaonkar and Judith M. Braganca	Culturable halophilicarchaea at the initial and crystallization stages of salt production in a natural solar saltern of Goa, India	BMC Aquatic Biosystems. 8:15	International	2012
84	Benjamin Parrott, Yuting Chiang, A. Sarkar, A. Hudson, A. Guichet and C. Schulz.	The nucleoporin 98-96 function is required for transit amplification divisions in the germ line of Drosophila melanogaster	Plos one. ;6(9): e25087	International	2011
84	Talukdar I*, Sen S*, Urbano R, Thompson J, Yates JR 3rd, Webster NJ (* Both authors contributed	hnRNP A1 and hnRNP F modulate the alternative splicing of exon 11 of the insulin receptor gene.	PLoS One. 6(11):e27869.	International	2011

	equally to the work.)				
85	Veeky Baths, and Utpal Roy	Identification of distant coevolving residues in Antigen 85C from Mycobacterium tuberculosis using statistical coupling analysis of esterase family proteins	Journal of Biomedical Research 25(3): 1-5	International	2011
86	Jadalannagari, Sushma, Sandeep More, MeenalKowshik, and Sutapa Roy Ramanan	Low temperature synthesis of hydroxyapatite nano-rods by a modified sol–gel technique.	Materials Science and Engineering No. 7:1534-1538	International	2011
87	Shekh RM, Singh P, Singh SM, and Roy Utpal	Antifungal activity of Arctic Antarctic bacteria isolates	Polar Biology 34: 139-143	International	2011
88	C. Chandra Sekhar and Dibakar Chakrabarty	Fibrinogenolytic Toxin from Indian Monocled Cobra (*Najakaouthia*) Venom	J. Biosci 36, 355-361	International	2011
89	Seshadri, Sachin, K. Saranya, and MeenalKowshik	Green synthesis of lead sulfide nanoparticles by the lead resistant marine yeast, *Rhodosporidium diobovatum*	Biotechnology progress No. 5: 1464-1469	International	2011
90	Sivaraman C, AnasuyaGanguly, MarcellNikolausz and SrikanthMutnuri	Isolation of Hydrocarbonoclastic bacteria from Bilge oil contaminated water	International Journal of Environmental Science and Technology Volume 8, Issue 3, pp 461-470	International	2011
91	Naik, Bhanudas, Vilas Desai, MeenalKowshik, VadakkethonippurathuSivankutty Prasad, Gerard Franklyn Fernando, and NarendraNathGhosh	Synthesis of Ag/AgCl–mesoporous silica nanocomposites using a simple aqueous solution-based chemical method and a study of their antibacterial activity on E. coli	Particuology No. 3: 243-247	International	2011

92	B. B. Salgaonkar, M. Kabilan and Judith M. Braganca	Sensitivity of Haloarchaea to Eubacterial Pigments Produced by *Pseudomonas aeruginosa SB1*	World J MicrobiolBiotechnol. 27(4): 799-804	International	2011
93	Singh DeeptiTripathiAnuj, NayakVijayashree, Kumar Ashok	Proliferation of Chondrocytes on a 3-D Modelled Macroporous Poly(Hydroxyethyl Methacrylate)-GelatinCryogel	Journal of Biomaterials Science, Polymer Edition, Volume 22, Number 13, june2011 , pp. 1733-1751(19)	International	2011
94	Veeky Baths, Utpal Roy, Tarkeshwar Singh	Disruption of cell wall fatty acid synthesis in Mycobacterium tuberculosis using a graph theoretic approach	Theoretical Biology and Medical Modelling 8:5-19	International	2011
95	Banerjee A, Singh A, Srivastava P, Turner H and Krishna A.	Effects of chronic bhang (cannabis) administration on the reproductive system of male mice.	Birth Defects Reproductive and Developmental toxicology. 92(3): 185-205.	International	2011
96	Sharma S, Biswas S*.	Sequence trademarks in oncogene associated microRNAs.	Bioinformation., 6(9): 364-365	International	2011
97	L. Nirmala*, Vijayashree NayakandDeecaraman	Immunoevaluation of typhoid antigen by using potato starch natural biodegradable polymer as a single contact used as an adjuvant	International Journal of Pharmacy and Pharmaceutical Sciences, ISSN- 0975-1491, vol 3, issue 4	International	2011
98	Saranya, K., MeenalKowshik, and Sutapa Roy Ramanan	Synthesis of hydroxyapatite nanopowders by sol-gel emulsion technique.	Bulletin of Materials Science No 7: 1749-1753	International	2011
99	Seshadri, Sachin, and MeenalKowshik	Deoxyribonucleic Acid Functionalized with Gold Nanoparticles: A Golden Route to Molecular Biology	Journal of Bionanoscience No.1: 18-25	International	2011
100	Veeky Baths and Utpal Roy	Novel Intervention Strategy against Tuberculosis: Insights from Graph Theory and Systems Biology	Science against microbial pathogens: communicating current research and technological advances Vol 1: pp 378-385	International	2011

101	Veeky Baths and Utpal Roy	Graph Theoretic Approach for metabolism disruption and developing a drug targeting methodology for the cure of Tuberculosis	International Research Journal of Biological Chemistry and Bioinformatics 1(3): 66-70	International	2011
102	L. Nirmala, VijayashreeNayak, SanjayKumarDhaker and Deecaraman	Immunization strategies and enhanced immunity of typhoid vaccine using potato starch polymer as an Adjuvant	Indian Journal of Science and Technology, Vol. 4 No. 4,ISSN: 0974- 6846	National	2011
103	P.VenkateswaraRao, RanjayDey, S SBaral and SrikanthMutnuri.	Biogas generation potential by anaerobic digestion for sustainable energy development in India	Renewable and Sustainable Energy reviews Volume 14, Issue 7, Pages 2086-2094.	International	2010
104	Sen S, Talukdar I, Liu Y, Tam J, Reddy S, Webster NJ.	Muscleblind-like 1 (Mbnl1) promotes insulin receptor exon 11 inclusion via binding to a downstream evolutionarily conserved intronic enhancer.	J Biol Chem.13;285(33):25426-37.	International	2010
105	DeeptiSingh,VijayashreeNayak and Ashok Kumar	Proliferation of Myoblast cellson three dimensional supermacroporous-cryogels.	Internatioal journal of Biological Sciences. July 2010, 6(4), 371-381.	International	2010
106	Banerjee A and Krishna A.	Altered glucose transport to utero-embryonic unit in relation to delayed embryonic development in the Indian short-nosed fruit bat, Cynopterus sphinx.	Molecular and Cellular Endocrinology. 333: 28-36.	International	2010
107	Banerjee, A, Udin, S and Krishna, A.	Regulation of leptin synthesis in white adipose tissue of female fruit bat, Cynopterus sphinx: Role of melatonin with or without insulin.	Experimental Physiology. 96:216-25.	International	2010
108	Banerjee, A, Meenakumari KJ and Krishna, A.	Role of leptin in delayed embryonic development in the Indian short nosed fruit bat, *Cynopterus sphinx.*	General and Comparative Endocrinology. 168: 36–45.	International	2010

109	Debnath A, Gomes A, Saha A, Biswas S, Chakrabarti P, Giri B, BiswasAk, Dasgupta S, Gomes A	A lethal cardiotoxic-cytotoxic protein from the indianmonocellate cobra (*Najakaouthia*) venom.	Toxicon: 56(4):569-79.	International	2010
110	Mondal S, Nagao C, Mizuguchi K	Detecting subtle functional differences in ketopantoatereductase and related enzymes using a rule-based approach with sequence-structure homology recognition scores.	Protein Engineering Design and Selection (PEDS) 23:859-869.	International	2010
111	Sivaraman C, AnasuyaGanguly and SrikanthMutnuri	Biodegradation of hydrocarbons in the presence of cyclodextrins	World Journal of Microbiology and Biotechnology" Vol 26, pp 227 - 232.	International	2010

Conference proceedings

Serial Nos.	Authors	Title of the Publications	Details of the proceedings
1	KratarthGoel, RaunaqVohra, AnantKamath, and Veeky Baths.	Home Automation Using SSVEP & Eye-Blink Detection Based Brain-Computer Interface. 2014	IEEE International Conference on Systems, Man, and Cybernetics, October 5-8, 2014, San Diego, CA, USA
2	Ramya R, and Utpal Roy	Antimicrobial prowess of a soil isolate *Bacillus subtilis*	Worldwide Research Efforts in the Fighting against Microbial Pathogens: From Basic Research to Technological Developments pp. 72-77

Details of Book Chapters

	Authors	Title of the Publications	Details of the Book	National/International	Year
1	DibakarChakrabarty And Chandrasekhar Chanda	Snake Venom Disintegrins	Snake venoms (Springer), DOI 10.1007/978-94-007-6648-8_14-1	International	2015

2	Utpal Roy, Ravinder Kumar, Sanjeev Kumar, and Anil K. Puniya,	Enzymes in Milk, Cheese, and Associated Dairy Products	Enzymes in Food and Beverage Processing, (CRC Press), page 327-338	International	2015
3	DibakarChakrabarty and AkritiRastogi	Hemotoxic Activity Of Jellyfish	Clinical toxinology in Asia Pacific and Africa (Springer), DOI 10.1007/978-94-007-6386-9_3	International	2015
4	Pai PP and Mondal S	Computational approaches for animal toxins to aid drug discovery.	Toxinology. Toxins and Drug Discovery, (Springer), doi: 10.1007/978-94-007-6726-3_20-1	International	2015
5	Pallavee Srivastava and Meenal Kowshik	Biosynthesis of Nanoparticles from Halophiles	Halophiles: Biodiversity and Sustainable Exploitation. (Springer), 6	International	2015
6	Kumar, K. and Mosa, K.	Ion Transporters: A Decisive Component of Salt Stress Tolerance in Plants. Managing Salt Tolerance in Plants	Molecular and Genomic Perspectives (CRC Press, Taylor & Francis Group), ISBN 978-1482245134	International	2015
7	M. Prabhu, M. Horvat, L. Lorenz, R. Otterpohl, T. Bettendorf and S.Mutnuri	Effect of terra preta compost on growth of Vigna radiate	In: Bettendorf, T Wendland, C.; Otterpohl, R. Terra Preta Sanitation handbook. (Publisher: Deutsche Bundesstiftung Umwelt), ISBN 978-3-00-046586-4.	International	2014
8	Meenal Kowshik	Bionano-magnetic materials: synthesis and Applications	Nanotechnology for Biomedical applications, Edited by Thomas Varghese (Atlantic Publishers), 117-152.	National	2014

9	SrikanthMutnuri	Terra Preta as an Alternative for the Management of Sludge from Waste Water Treatment Plant	In: Bettendorf, T Wendland, C.; Otterpohl, R. Terra Preta Sanitation handbook. (Publisher : Deutsche Bundesstiftung Umwelt), ISBN 978-3-00-046586-4.	International	2013

23. **Details of patents and income generated:**

Three patents filed

- o Dibakar Chakrabarthy, Spectrophotometric Real Time method for Assessment of Fibrinolytic Activity (Application No.1370/MUM/2013)
- o Meenal Kowshik, Nanomaterial based DNA Delivery vehicle for bacterial transformation, Provisional Indian patent application number 1529/MUM/2013
- o Veeky Baths, A system and method for controlling a plurality of household appliances Patent Application No: 2643/DEL/2014

24. **Areas of consultancy and income generated:**

- o Bioremediation, Bioenergy, Waste management and wastewater treatment – Rs 63,14,681/-
- o Stem Cell Biology Rs 10,000/-

25 **Faculty selected nationally / internationally to visit other laboratories / institutions industries in India and abroad**

(i) Prof. Srikanth Mutnuri received "Reinvent the Toilet Challenge Grant award 2014 from DBT BIRAC and Bill & Mellinda Gates foundation under which funds to visit Prof. Dr. Ir. Korneel Rabaey;Laboratory of Microbial Ecology and Technology, Ghent University were received.

(ii) Prof. Srikanth Mutnuri is recipient of American Society for Microbiology & Indo US Science and Technology Forum (ASM IUSSTF) Indo US Research Professorship October 2010. Carried out Stable isotope probing at Rutgers University in summer (June – July 2011).

(iii) Prof. Utpal Roy : Selected for "Microbial Systematics : Soil to sequences" by CSIR-Institute of Microbial technology (IMTECH) in February 2015.

26 **Faculty serving in National committees b) International committees c) Editorial Boards d) any other (please specify)**

i. Dr. Angshuman Sarkar is involved in project review of Govt. funding agencies and also in National level examination group (due to confidential agreement details can not be provided).

ii. Dr. Raviprasad Aduri isEditor of Enliven: Microbes and Microbial Techniques. An open access journal.

iii. Prof. Utpal Roy: Empanelled in examiner's committee for recruitment of scientific staff at National Centre for Antarctic & Ocean Research (NCAOR), Vasco-Da-gama,

iv. Prof. Srikanth Mutnuri appointed Member of Goa University's "Internal Quality Assurance Cell"

v. Prof. Meenal Kowshik is member of Board of Studies, Biotechnology Department, Goa University.

vi. Prof. Srikanth Mutnuri appointed by the Government of Goa as the Member of Expert committee constituted for technical evaluation of bids for the Municipal solid waste (MSW) processing facility going to be set up at Bainguinim, North Goa.

vii. Dr Sumit Biswas : Served as member of a committee for DBT (name withheld due to essential reasons)

viii. Several faculty from the Department have delivered invited talks in National and International Conferences.

ix. Faculty are member of various Scientific societies such as Association of Microbiologists of India, American Society for Microbioloyg; Society for Applied Microbiology; Toxinological Society of India; Society of Biological chemists of India; Molecular Pathology Association of India; Indian Society of Cell Biology; Indian Crystallography Association, Proteomics Society of India, CHOLDINET (Global Laboratory Network for Cholera and other Diarrheal Infections; Indian Society for the Study of Reproduction and Fertility; Material Research Society of India.

27 Faculty recharging strategies (UGC, ASC, Refresher / orientation programs, workshops, training programs and similar programs).

University Immersion:
i. Dr. Sumit Biswas, Freie Univ, Berlin, 2015
ii. Dr. Meenal Kowshik, University of Missouri, 2014
iii. Dr. Dibakar Chakrabarty, National University of Singapore, 2014
iv. Dr. Judith Braganca, Frankfurt University, Germany, 2013

Industry Immersion:
i. Dr Utpal Roy: Department of Medical Microbiology, PGIMER, Chandigarh, 2015.
ii. Dr. Anasuya Ganguly, Shankara Netralaya, 2014

Seed Grant:
i. Angshuman Sarkar: 12.8 lakhs; 2011-13
ii. Dibakar Chakrabarty: 13.35 lakhs; 2011-13
iii. Judith Braganca: 11 lakhs; 2013-15

Research Initiation grant:
i. Sumit Biswas
ii. Vijayashree Nayak
iii. Kundan Kumar
iv. Malabika Biswas
v. Sukanta Mondal
vi. Indrani Talukdar

      vii.   Arnab Banerjee

      viii.   Raviprasad Aduri

Additional Competitive Grant
i.   Indrani Talukdar: 8 lakhs; 2015-17

Sabbatical
i.   Dr. Srikanth Mutnuri, Semester II 2014-15

28   Student projects

- percentage of students who have done in-house projects including inter-departmental projects

  MSc Biological Sciences Students: 100%
  ME Biotechnology: 100%

- percentage of students doing projects in collaboration with other universities /industry / institute
  MSc Biological Sciences Students:**100%**
  ME Biotechnology:**38%**

29   Awards / recognitions received at the national and international level by Faculty:

i.   Utpal Roy: Awarded "Certificate of excellence in Reviewing" (2014) by Senior Editors of 'Fungal Biology' and Elsevier .

Doctoral/Post Doctoral Students:

i)   **Fulbright-Nehru doctoral and professional research fellowship**
a.   Shruti Balaji, Year of award: 2012-2013, Wake Forest Institute for Regenerative Medicine, Winston-Salem, NC, USA. Host lab: Prof. Emmanuel C. Opara and Prof. Shay Soker
b.   Ketaki Deshmukh, Year of award 2014-2015, University of Missouri, Columbia, USA, Host Lab: Dr. Kattesh Katti, Research area: Radiology and cancer nanotechnology (Could not avail the followship as she did not get the visa)

ii)   Kabilan Mani was awarded the **Raman Charpak fellowship** by Indo - French Centre for the Promotion of Advance Research (IFCPAR)in earth sciences 10 th June to 4 th December 2014. to work with Prof. Didier Debroas, Team LMGE, University Blaise Pascal, Clermont Ferrand, France.
iii)   Shardul Atul Bhusari (Undergraduate student) was awarded the **Erasmus Mundus Student Scholarship**to carry out his dissertation at Groningen University, Netherlands

iv) **Best Poster Awards in Conferences were received by the following PhD students**

Name	Conference Details	
Akriti Rastogi	4th Annual conference of the Toxinological Society of India at Calcutta School of Tropical Medicine, Kolkata. November 2014	Best Oral Presentation Award
Akriti Rastogi	National Seminar on Advances in Zoology and Life Processes", Goa University, Goa. February 2012	Best Poster Award
Archana Sharma	INDO-UK International Workshop on Advanced Materials and their Applications in Nanotechnology (AMAN 2014) May 17-19, 2014.	Best Poster Award
Archana Sharma	5th Annual International Conference on Advances in Biotechnology (BIOTECH 2015) 13-15th March 2015 at Indian Institute of Technology Kanpur, India.	Second Best Poster Award
Ram K	BIOFEST 2012, Hyderabad	Best poster Award
Mohammed Monsoor Shaik	International Conference on Nanomaterials (ICNM 2013), December 5-7th, 2013, at B S A R University, Chennai.	Best oral presentation award
Priyanka Dwivedi	5th Annual International Conference on Advances in Biotechnology (BIOTECH 2015) I.I.T Kanpur	Second best poster Award
Kshipra Naik	Select Biosciences, Nanomedicine Conference held at Rey Juan Carlos Hotel, Barcelona on 11-12 April 2013	Best Poster Award
Subhasish Sahoo	World Congress of Biotechnology, 2013	Best Poster Award

v) **Travel grants for attending International Conferences were received by the following PhD students**

Name	Travel grant	Conference attended	month and year
Akriti Rastogi	DBT	17th World Congress of International Society on Toxinology and Venom Week 2012 at Honolulu, Hawaii.	July 2012
Akriti Rastogi	DST SERB	22nd Meeting of the French Society of Toxinology, Toxins: New Targets and New Functions at Pasteur Institute, Paris, France.	December 2014

Ramya R	DBT	International Conference In Antimicrobial Research (ICAR-12), LISBON.	21st -23rd November 2012
Mansi Baveja	DBT	22nd Meeting of the French Society of Toxinology, Toxins: New Targets and New Functions at Pasteur Institute, Paris, France	December 2014
Archana Sharma	ICMR	TERMIS, Washington DC	December 2014
Archana Sharma	DBT	TERMIS, Washington DC	December 2014
Shruti Balaji	DST-SERB	TERMIS, Atlanta, GA, USA	November 2013
Priyanka Dwivedi	DST	International Conference-Advances in Functional Materials, Stony Brook University, NY, USA	June-July,2015
Purnima Singh	DST	National Institute of Polar Research (NIPER 2014)-Tokyo, Japan, 5th Symposium on Polar Science	2-5 December, 2014
Purnima Singh	ICMR	Polar and Alpine Microbiology Conference, Ceske Budejovice, Czech Republic	6-10 September, 2015
Maria Celisa Santimano	DST	1st International Symposium on nanomedicine in drug delivery and cancer diagnosis, University of Delaware, USA.	August 16-17th 2012

o   Twelve PhD students were awarded CSIR SRF
o   One PhD student (Manasi Baveja) was awarded DST Inspire
o   One PhD student (Jigni Saida) was awarded UGC Maulana Azad National fellowship
o   One PhD student (Poornima Singh)was awarded DST WOS
o   Two students were awarded ICMR SRF

30   Seminars/ Conferences/Workshops organized and the source of funding (national/ international) with details of outstanding participants, if any.

Seminars/ Conferences/Workshops organized	source of funding (national/ international)	Year	outstanding participants

innovate   achieve   lead

"Decentralized biogas digesters and their slurry management" Convener Prof. Srikanth Mutnuri	National conference, in collaboration with Institute of Agricultural and Urban Ecological Projects affiliated to Berlin Humboldt-University (IASP), Department of BiogeneResources, Berlin, Germany,	November 20 – 21, 2014	Padmashri Dr.Sharad Kale
3rd Annual Conference of the Toxinological Society of India (TSI) along with 1st International Conference on Biology of Natural Toxins Convener Dr. Dibakar Chakrabarty	Supported by BITS Pilani, DST, DBT, ICMR, CSIR, DSTE& INSA. International Conference,	Dec 19th -21st , 2013	1. Prof. Anthony T Tu, Professor Emeritus, Biochemistry, Colorado State University and Advisor to NASA. 2. Prof. Alan Harvey Editor-in Chief, Toxicon and President International Society of Toxinology 3.Prof. P. Gopalakrishnakone, Professor Emeritus, National University Health Sciences, NUS, Singapore
Meeting of SERB FAST TRACK YS Committee	Supported by SERB, DST	Sept 13-14, 2013	Prof. Rajan Sankaranarayanan, CCMB Prof. Paturu Kondaiah,IISc
Short course on "Wastewater Treatment" for public works department, Goa Convener Prof. Srikanth Mutnuri	In collaboration with Dr. Michel Torrijos Laboratoire de Biotechnologie de l'Environnement, INRA, Narbonne, France,	October 11 – 13, 2011	Officials at Public Works Department, (PWD), Goa
RNA to Protein : A Comprehensive Workshop Convenor: Dr Sumit Biswas	Supported by DSTE, Goa and BRNS,DAE	June 3-9, 2012	Prof. Jayanta K Pal, Pune University Dr. N Sriram, Director, Tulip Group Dr. Indrajit Bose, VP, Lupin
"Microbes in Wastewater & Waste	International Water Association's international	January 24 – 27, 2011	Dr. Hoysall Chanakya, IISc, Bangalore

Treatment, Bioremediation and Energy Production" Convener Prof. Srikanth Mutnuri	conference,		Dr.Michel Torrijos and Dr.Jean Jacques Godon, INRA, Narbonne, France
American Society for Microbiology sponsored International Workshop on Bioremediation. Convener Prof. Srikanth Mutnuri	in association with Prof. Max Haggblom, Rutgers University,	Jan 4 – Jan 16th 2010	Prof. Max Haggblom, Rutgers University, USA

31 Code of ethics of research followed by the Department.

The department follows the code of ethics specified by the Institute

32 a) Student profile programme-wise:

Year	Name of the Programme	Applications Received	Selected		Pass percentage*	
			Male	Female	Male	Female
2010-11	M.Sc.(Hons.) Biological Sciences	123677 Applications Received for FD, 4571 Applications received for HD & 461 Applications received for PhD	24	11	100%	100%
	M.E. Biotechnology		5	5	100%	100%
	Ph.D. (Sem I)		4	5	2	0
	Ph.D. (Sem II)		3	3		
2011-12	M.Sc.(Hons.) Biological Sciences	136904 Applications Received for FD, 4825 Applications received for HD & 1173 Applications received for PhD	22	13	100%	100%
	M.E. Biotechnology		3	9	100%	100%
	Ph.D. (Sem I)		2	6		
	Ph.D. (Sem II)		1	1		
2012-13	M.Sc.(Hons.) Biological Sciences	166260 Applications Received for FD, 5549 Applications received for	26	5	100%	100%
	M.E. Biotechnology		2	5	100%	100%

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	Ph.D. (Sem I)	HD 13 16	0	2		
	Ph.D. (Sem II)		3	1	2	
2013-14	M.Sc.(Hons.) Biological Sciences	186181 Applications Received for FD, 5172 Applications received for HD 11 14	27	5	100%	100%
	M.E. Biotechnology		3	4	100%	100%
	Ph.D. (Sem I)		1	1		
	Ph.D. (Sem II)		2	0	1	1
2014-15	M.Sc.(Hons.) Biological Sciences		40	4	100%	100%
	M.E. Biotechnology		2	3	100%	100%
	Ph.D. (Sem I)	2	6	2		
	Ph.D. (Sem II)	6				

BITS follows a credit based system and cafeteria approach in offering of courses. Students not performing well are monitored by ACB (Academic Counselling Board), HDCC (Higher Degree Counselling Cell) and ACC (Academic Counselling Cell). Their pace is slowed down. Normally not more than 3% students (including all programmes, B.E., M.Sc, and M.E) at a given point of time are under the purview of ACB.

33   b) Diversity of students

Name of the Programme (refer to question no. 4)	% of students from the same university	% of students from other universities within the State	% of students from universities outside the State	% of students from other countries
MSc	--			
ME	0	1/58	57/58	
PhD	7/45	5/45	33/45	

34   How many students have cleared Civil Services and Defense Services examinations, NET, SET, GATE and other competitive examinations? Give details category-wise.
(i)   As per the information available with us two students cleared civil services (Sanskriti Jain ranked 11th in IAS 2015)
(ii)   Several students have cleared GATE and NET, however, the data is not available.

35   Student progression

Student progression	Percentage against enrolled
UG to PG	Data not available
PG to M.Phil.	Data not available
PG to Ph.D.	*20%
Ph.D. to Post-Doctoral	2/7= *28%
Employed • Campus selection • Other than campus recruitment	80%
Entrepreneurs	Two students have a start-up.

* Approximate data. We do not capture this data through any formal process

36   Diversity of staff

Percentage of faculty who are graduates	
of the same university	1/16 (6.25%)
from other universities within the State	1/16 (6.25%)
from universities from other States from universities outside the country	12/16 (75%) six have postdoctoral experience abroad) 2/16 (12.5%)

37   **Number of faculty who were awarded M.Phil., Ph.D., D.Sc. and D.Litt. during the assessment period :** One

38   **Present details of departmental infrastructural facilities with regard to**

- o **Library**

The Library has a good collection of over 34,000 books on a wide range of subjects. This Campus subscribes to 96 print journals, domestic as well as international. The total Number of In print Journals in the area of Biological Sciences are 21 and the total No of Books are 2141. In the Digital Library section we have access to Science Direct - Biotechnology, Springer Link, Taylor and Francis and Blackwell. The textbook section provides all prescribed texts and reference books. Some of our faculties are actively involved in the Library Committee which decides policies and allocations and oversees their implementation.

- o **Internet facilities for staff and students**

Internet facilities to Staff (and faculty): Unlimited access is provided to staff and faculty at their office as well as residence. WiFi connectivity is provided to the complete academic area. The bandwidth provided to faculty is 100Mbps on a 10Gbps backbone (for intranet).

Internet facilities to Students: All students are provided intranet (10Gbps back bone), internet (300Mbps provided by Vodafone, GWave and TATA) and WiFi in all hostels with per day download limit of 800MB for under graduate students and 1GB for post graduate students and Ph.D. scholars.

- o **Students' laboratories**
  - o Measurement Techniques I Lab (C 103): Gas Chromatograph, Spectrophotometer,
  - o Biotechnology Lab (C 104): Multichannel Thermal cycler; Gel Doc; High speed centrifuge; Sonicator; -80 C freezer; Platelet counter; Ice flaker; Tissue homogenizer
  - o Genetic Engineering Lab (C 105): Tissue culture rooms with isolated hoods; benchtop centrifuges; UV/Vis spectrophotometer
  - o Microbiology Lab (C 106): Cold room; Variable temperature incubator shakers; Microbiological culture laminar air systems; Flame photometer
  - o Bioinformatics Lab (C 107): Server and workstation

- o **Research laboratories**
  - o Applied and Environmental Biotechnology Lab (C 101): Inverted Fluorescence Microscope; Ultra centrifuge; Glove box; Biofermenter, TOC analyser, Orbital Shaker, Lyophilizer, DGGE, PCR,
  - o Proteomics Lab (C 102): Vibration free crystal incubator; Fluorimeter; 2-D gel electrophoresis system
  - o Advanced Bio Lab (C112): HPLC; FPLC; Microtome; Plant tissue culture room, Animal tissue culture room, Dark room, ELISA reader
  - o Molecular Characterization Lab : Atomic Absorption Spectrophotometer

39 List of doctoral, post-doctoral students and Research Associates

a) from the host institution/university

Sr No	Name	ID No	Completed/Pursuing
1	Ketaki R Deshmukh	2010PH29011G	Pursuing
2	Gautam Krishna	2010PHXF813G	Pursuing
3	Deepthi Das	2010PG29008G	Pursuing
4	Kablian M	2008PH29009G	Pursuing
5	Akriti Rastogi	2009PH29004G	Pursuing
6	Mansi Baveja	2010PH29405G	Pursuing
7	Chandrasekhar Chanda	2008PH29002G	Completed

b) from other institutions/universities :

Sr.No	Name	ID No	Completed/Pursuing
1	Shruti Balaji	2009PHXF418G	Pursuing
2	Rajesh Pasumarthi	2010PHXF443G	Pursuing
3	Mohmmed Moonsoor Shaik	2011PHXF404G	Pursuing
4	Yogesh Walawalkar	2012PHXF016G	Pursuing

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5	P. Priyadarshini Pai	2012PHXF007G	Pursuing
6	Om Prakash chouhan	2012PHXF405G	Pursuing
7	Merina Dhara	2013PHXP014G	Pursuing
8	Gautam kumar Baboo	2013PHXP404G	Pursuing
9	Pallavee Srivastava	2011PHXF002G	Pursuing
10	Priyanka Dwivedi	2011PHXP401G	Pursuing
11	Bandekar Divya Ramesh	2012PHXP005G	Pursuing
12	Ansie Martins	2012PHXP009G	Pursuing
13	Ajay Ghosh Chalasani	2011PHXF015G	Pursuing
14	Geethanjali R	2011PHXP007G	Pursuing
15	Ramya.R	2011PHXP005G	Pursuing
16	Prabhu Meghnath Shambhu	2011PHXF012	Pursuing
17	Avijit Das	2013PHXP401G	Pursuing
18	Rakesh Manuka	2014PHXP002G	Pursuing
19	Ankush Shaddhe	2013PHXP403G	Pursuing
20	Starlaine Mascarenhas	2013PHXF402G	Pursuing
21	Anant Yadhav	2014PHXP407G	Pursuing
22	Archana Sharma	2010PHXF434G	Pursuing
23	Rehan Deshmuk	2015PHXP012G	Pursuing
24	Anumeha Vats	2015PHXP004G	Pursuing
25	Joseph fernandes	2015PHXP014G	Pursuing
26	Purnima Singh	2010PHXF841G	Pursuing
27	Guruprasad V. Talekar	2015RSBIOL01	Pursuing
28	Priya Sharma	2015PHXP003G	Pursuing
29	Navodita Bhatnagar	2015RSBIOLO4	Pursuing
30	Jigni Saida	2011PHX F006G	Pursuing
30	Bhubhudutta Mishra	2015PHXP013G	Pursuing
31	Makhan Kumar	2015PHXP011G	Pursuing
32	Laxminarayan Rawat	2015PHXP010G	Pursuing
33	Ravindra Mane	2015PHXP027G	Pursuing (Part Time)
34	Kshipra Naik	2009PHXF417G	Submitted
35	Ram K	2011PHXF013G	Completed
36	Vidya Prabhudesai	2010PHXF440P	Completed
37	Mohd. Raeesh Shekh	2008PHXF028G	Completed
38	Vilas S Desai	2007PHXF446G	Completed
39	Salgaonkar Bhakti Balkrishna	2010PHXF810G	Completed
40	Sivaraman	2008PHXF009P	Completed
41	Veeky Baths	2007PHXF406	Completed

Post Doctoral Students/Scientists

Sr No	Name	Position
1	Dr. Maria Celisa Santimano	DBT RA
2	Dr. V.Gowdaman	Research Associate
3	Dr. Nimali Prabhu	DST Young Scientist

40   Number of post graduate students getting financial assistance from the university.
43 out of 58 students

41   Was any need assessment exercise undertaken before the development of new programme(s)? If so, highlight the methodology.

The exercise undertaken before the development of a new programme usually begins with a Department airing its intention to float a new programme, CDC or elective proposed by the faculty concerned. Discussions are held regarding its merits/demerits at the DCA level and later at a CCDCA level. Once the necessary inputs and unanimity have been reached on all the aspects regarding the operational aspects related to the course, it is sent to the ARP so that it can be passed up to Senate to it to be approved. Two such programmes have been initiated and proposed in the Department of Biological Sciences. 1) A three year ME programme with BSc input and 2) A Minor in Computational Biology. Cross campus discussions are underway.

42   Does the department obtain feedback from

- **faculty on curriculum as well as teaching-learning-evaluation? If yes, how does the department utilize the feedback?**

   Yes. There is a periodical peer review system in place to get feedback on faculty. The curriculum for each course is discussed among the faculty members to reduce redundancy. As a whole, this feedback is utilized in offering of new electives and discontinuing overlapping courses (electives). Curriculum for new courses and modifications for existing courses are also discussed among across all campuses

- **students on staff, curriculum and teaching-learning-evaluation and how does the department utilize the feedback?**
   Yes, students offer feedback for each course at the end of the semester. In case of multiple faculty teaching the same course, feedback is given faculty wise. The feedback has a questionnaire including curriculum and evaluation besides faculty competence. The department discusses the feedback during its periodic meetings to further improve the curriculum and evaluation components as well as include any suggestions provided.

   The department also conducts "Faculty student council" meetings on a periodic basis to obtain feedback from the students on pedagogical issues and takes appropriate steps to addresses the same.

- **alumni and employers on the programmes offered and how does the department utilize the feedback?**
   Yes, the department obtains feedback from Alumni on the programmes offered.
   Upcoming trends in various technical industries are also discussed. Some of the alumni also pitch in ideas for newer courses to be introduced as part of the curriculum. These issues are reviewed in detail with the concerned department

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faculty. Suitable measures for implementation of the feedback are considered and followed accordingly.

Employers
Yes, it does. Each Campus conducts a Placement Faculty Advisory council meeting once a month. The member consists of The Director, the Deputy Director, The Dean, Head of the Departments and a Faculty representing each department. Suitable measures for implementation of the feedback are considered and followed accordingly.

43   List the distinguished alumni of the department (maximum 10)

- The department is only ten years old. Many of our students are pursuing their PhDs in Institutes of repute such as Cornell University, Max Planck Institute of Molecular Cell Biology and Genetics, Brown University, University of Pennsylvania, University of California at San Diego, University of Illinois at Chicago, University of Georgia at Athens; University Of Illinois at Urbana-Champaign, National University of Singapore, University of Texas, University of Florida, Institute of Microbial Technology, National Center for Biological Sciences, Indian Institute of Science, ETH Zurich.
- Dr. Vaishnavi Ananthanarayanan is an INSPIRE Faculty Fellow at Indian Institute of Science, Bangalore.
- Some of our students have pursued entrepreneurship and started new ventures such as:
  o Sustainable Biosolutions LLP , a BITS incubate company providing technologies and solutions in the field of Solid and Liquid waste management.
  o Idyll…. Creating chimerical cognizance: a start-up on customized merchandise and aims at standardizing the entire merchandize scenario. Other than making profits it works towards developing Green Technologies and promoting the same.

44   Give details of student enrichment programmes (special lectures / workshops / seminar) involving external experts.
  i.   One day workshop on MATLAB: Title: MATLAB in Life Sciences Presenter: Viju Ravichandran, PhD

  ii.   List of special Lectures

Speaker	Affiliation	Topic	Date
Dr. Gopal Pande	CCMB, Hyderabad	Cell-Cell Interactions and Stem Cells	9-16 September 2010
Prof S. P. Gupta	Professor , MIET,UP	Novel approaches for drug designing and screening	7 September 2010
Prof. Shun Hirota	NAIST, Japan	Investigation and regulationof protein and peptidestructural changes	25 October 2010

Dr. Gopal C. Kundu	National Center for CellScience, Pune and recipientof Shanti SwarupBhatnagarPrize in Biological Sciences	Diagnostic and Therapeutic Significance of Osteopontin andother associated Genes in Breastand other Cancers	21 March2011
Professor (Dr.) Manas Mandal	Roseman Institute ofPharmacy, Nevada, USA	Bacterial toxins invaccine development	15 December 2011
Prof. Willy Verstraete	Ghent University, Belgium	Series of talks on environmentalBiotechnology	15 – 19 January 2012
Dr. Nuria Jimenez Garcia	Scientist, HelmholtzCentre for EnvironmentalResearch, Leipzig,Germany	Oil spill fingerprinting	16 February 2012
Prof. D. Balasubramanian	Director, LV Prasad EyeInstitute, Hyderabad	Stem Cell Biology	17 February 2012
Mr. Suresh Arya	Program Director, NCI,NIH, US	(i)We and The Human Genomics (ii)HIV Discovery and Prevention	19 March 2012 20 March 2012
Dr. Ashok Kumar	Professor of Bioengineering IIT,Kanpur	Biomaterials and Tissue Engineering	21 April 2012
Prof. Anita Kar	Director, School of Health Science, Pune University	Molecular genetics to public health genetics: Hemophilia as a case study	14 September 2012
Dr Santanu Datta	Cell Works, Banglore(formerly at Astra Zeneca)	Drug Discovery:Yesterday today and tomorrow	23 November 2012
Prof. Ulhas Naik	Director, Delaware Cardiavascular Research Center and Professor of Biology, Biochemistry and Chemical Engineering	Molecule to Medicine: a Scientific Journey	19 July 2013
Prof. Bikramjit Basu	Laboratory for Biomaterials, Materials Research Center, Indian Institute of Science	Development of Multifunctional Bioceramics and External Field Stimulated Cell Functionality Modulation:A New Paradigm	10 December 2013

Dr. A. C. Banerjea	National Institute of Immunology, New Delhi-1	HIVBiology, Replication, Pathogenesis and Stem cell Based Gene therapy	7 December 2013
Dr. Akshara Kaginalkar	C-DAC Pune (Associate Director & HOD, Computational Earth Sciences	Joint projects on high performance computing and applications in biology, physics, chemistry, mathematics; joint partnership program for students to work at C-DAC.	6 December 2013
Dr. D. P. Kasbekar	Senior Scientists from CCMB, BITS Pilani alumnus and the editor of "the Journal of Bioscience	Chromosome rearrangements in Neurospora	4 November 2013
Dr. Michel Torrijos	Head - Technology Transfer, INRA, France	Anaerobic digestion	25 September 2013
Dr. Samit Chattopadhyay	FNA, FNASc. Scientist G from NCCS	Orchestration of gene regulation: Implications in cancer metastasis	19 September 2013
Prof. J. R. Bandekar	Secretary (BSC), BRNS, BARC and Head, Radiation Biology Division	Microbiological Aspects of Radiation Processing of Foods	23 August 2013
Dr. Arun Kumar	Department of Health Sciences University of Delaware	Targeted Drug Delivery to the Lungs	17 August 2013
Dr. Manas Saha	Consultant Orthopaedic Surgeon at J. N. Roy Hospital, Kolkata.	The current status of bone cancer in India	16 August 2013
Prof. Katti Kateesh	Professor, University of Missourie	Green Nanotechnology Connecting Western Medicine with Traditional Herbal Medicine ; Oncological Implications of Tea-Based Gold Nanoparticles for Treating Prostate and other Cancers	5 August 2013
Prof. Gopal Kundu Theragnostic	Scientist-G, NCCS, Pune	Significance of osteopontin and associated Genes in Cancer	17 February 2014
Prof. Manfred Schneider	Professor of Organic Chemistry at the BergischeUniversitätin Wuppertal, Germany	Biocatalysis For Bio-based Materials:Using Lipases and Novel Oleochemicals For the Preparation Of Combination Products From Renewables	20 February 2014
Prof. Paul A. Millner	Professor of Bionanotechnology and Head of School of Biomedical Science University of Leeds, U.K.	Biosensors, Nanoparticles and Nanofibers: How surface structure affects their performance	21 February 2014

Dr. Tim Gibson	Chief Scientist, Roboscientific Ltd., UK	Bloodhound® Electronic nose Technology:Applications in diagnosis of Tuberculosis	21 February 2014
Prof. D. Velmurugan	Director, Centre for Advanced Studies in Crystallography and Biophysics, University of Madras	Design of Anti-virals for Dengue NS2B-NS3 Protease	01 March 2014
Prof. Rataboli	Director, Medicine, Goa Medical College	How to Tackle Life Style Diseases	22 March 2014
Dr. Nivedita Chatterjee	Lecturer,Stem Cell Lab and Department of PathologyVision Research Foundation, SankaraNethralaya, Chennai	Immunity at the retina: modulating the innate response	14 April 2014
Dr. Hemanta K. Majumdar	Director- Grade Scientist of CSIR at Indian Institute of Chemical Biology, Kolkata	Kinetoplast DNA, DNA Topoisomerases and Drug development against Leishmania parasite	26th June, 2015
Dr. Shohini Ghosh Roy	Visiting Assistant Professor, Framingham State University, Massachusetts, USA	Nitrogen metabolism in marine phytoplanktons: evolution and controls	July 14, 2015

45   List the teaching methods adopted by the faculty for different programmes.

All the courses have a handout describing the course layout and the scheduled plan of lectures. Students are also provided details of the prescribed textbooks and reference books and evaluation components. Faculty are available for clarification of doubts and additional help required by students during their respective chamber consultation hours besides by email, phone, walk-in appointments etc.

The teaching methods followed by the department can be broadly summarized into:
- For MSc students all the disciplinary courses have an additional tutorial hour per week.
- For teaching we have regular chalk and board lectures accompanied by power point slides, animations and smart board (moodle).
- We adopt concept based teaching and many of the courses have a practical component.
- Students are encouraged to participate in seminars and group discussions which are part of their evaluation component.
- Assignments based on reading of recent literature are encouraged
- In certain courses Field trips are organized to give a hands with the classroom teaching.
- In addition to textbook, lecture components include recent research papers for higher degree courses.

- Talks by experts from Industries/academia are oragnized for the benefit of the students.
- Telepresence facility is used whenever courses are offered across campuses.
- Distance learning methods: Some courses of the department are offered to the entire BITS Pilani university. Here faculty use "Telepresence" and "Webex" as platforms to teach the entire campus.

46   How does the department ensure that programme objectives are constantly met and learning outcomes are monitored?

c) Collection of students' feedback every semester—Individual feedbacks are studied and appropriate actions to address the issues are decided by the concerned faculty, HoD and other senior faculty members.
d) Regular meetings of Department-wise Faculty-student Council address pedagogical issues and takes appropriate steps.
e) Learning outcomes are monitored through course specific assignments and three examinations every semester.

47   Highlight the participation of students and faculty in extension activities.

i. Students of the department take active participation in the several University wide outreach program:
ii. **Abhigyaan**, the students of BITS-Pilani, Goa Campus, act as teachers and teach the under privilege of the campus - the working staff, construction staff, their children and just about anyone who cannot afford formal education.
iii. **Nirmaan**, an organization that has been working to bring about a change in the slum of Zari, near the campus, spread over 6.2 acres of land adjoining the Zuari Industries Limited. The chapter has expanded since with a current strength of 70 active members.
iv. **Biological Sciences Department Day**: This is an outreach program where high school and college students from Goa are invited to participate in Biology related trivia among other things. Students are also exposed to the current research happening in Biology on this annual day of the department.
v. Students and faculty of the department also take part in the TEDx of Goa and Quark, the technical festival of BITS Pilani, Goa campus.
vi. Several students with **DST inspire** have been hosted for their summer training by faculty from the department

48   Give details of "beyond syllabus scholarly activities" of the department.

i)   Department has been instrumental in organizing workshops and conferences. Moreover students are also encouraged to attend such meetings/conferences/workshops hosted by other institutions.

ii) Organization of field trips which involve sample collection, and increases love for Biology is being encouraged for certain courses such as (a) Ecology and Environmental Sciences and (b) Integrated Biology.

iii) As a department, in our attempts to provide various study and research topics to the students for their projects, we have also made efforts to enhance their soft skills and professional aptitude in problem solving. A plethora of opportunities and possible exposure have been presented to them for their next-level orientation to the outside world after degree completion. As a result of which, during their studies with us, in addition to fulfilling the syllabus requirements, they have been able to hone their talents and begin their industry/academic journey in experimental &/computational at internationally reputed places. For example: from computational background, students have been able to make a mark in research areas of protein structural biology, biological/medical image processing and biostatistical analysis at University of Heidelberg, Germany; Vlaams Instituut voor Biotechnologie (VIB), Brussels and Tata Institute of Fundamental Research (TIFR), India.

iv) Regular weekly departmental seminars are being held where Faculty and PhD students present their research work or discuss recent research publications.

v)   Students of the department form an association called Symbionts which is used as a forum for discussions and presentations.

vi) All the faculty have been actively involved in reviewing manuscripts of International and National Journals such as: Biotechnology Progress; Applied Surface Science; Colloids and Surfaces B: Biointerfaces; PLOS One European Journal of Medicinal Plants; Bioresource Technology; Journal of Nanobiotechnology; FEMS Microbiology Ecology; Journal of Food Science and Technology; Journal of Hazardous Materials; Journal of Biomedical Research; Advance in Microbiology; Journal of medicine and medical sciences; World Journal of Microbiology and Biotechnology; ; Drug development and Industrial Pharmacy, Current Nanotechnology, Journal of Materials Chemistry B, Toxicology Research, Research on Chemical Intermediates, Nanoscale, Journal of Nanoparticle Research, Environment Science and Pollution Research; International Journal of Biotechnology Research; Journal of Nanotechnology Research; Ecotoxicology and Geomicrobiology; British Journal of Pharmaceutical Research; Fungal Biology; Steroid Biochemistry; Molecular Biology; Andrology; Journal of Medicine and Medical Sciences; African Journal of Microbiology Research; Journal of Scientific Research and Reports; International Journal of Plant and Social Science; International Journal of Agricultural Policy and Research; International Journal of Environmental Science and Technology; International Journal of Anaerobic Digestion and Renewable Energy; Journal of Petroleum Technology and Alternative Fuels; Journal of Steroid Biochemistry and Molecular Biology; Andrology; Journal of Scientific Research and Reports; International Journal of Plant and Social Science; International Journal of Agricultural Policy and Research.

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vii)Dr. Sumit Biswas was selected to undergo the Radiation Safety Officer Course at BARC, Mumbai, 2014

49 **State whether the programme/ department is accredited/ graded by other agencies? If yes, give details.**

No

50 **Briefly highlight the contributions of the department in generating new knowledge, basic or applied.**

The department of biology here has been generating new knowledge through research activities, visits to other institutions, industries and through workshops and applying knowledge from nano- to macro- scale using both experimental and computational approaches.

Our research findings are mainly based on theoretical, practical and computational methods. We have reported our research outcomes in the areas of protein functional classification and identification of protein interaction sites with eventual applications in drug discovery, therapeutic biology, environmental biotechnology, extremophiles, and nanobiotechnology.

51 **Detail five major Strengths, Weaknesses, Opportunities and Challenges (SWOC) of the department.**

Strengths	Weaknesses
• Young, enthusiastic, and approachable faculty, several of whom with post-doctoral training abroad • Faculty expertise covering the entire spectrum of Biological Sciences • Faculty able to attract national and international research funding • A strong Ph.D program • Involvement of undergraduate students in Research and successful placement of the same in reputed graduate schools to pursue Ph D.	• Shortage of faculty with Industry experience. • Active collaborations with Industry and local Government Institutes are still in the nascent stage • Lack of dedicated students who want to pursue Biological Sciences/Biotechnology as a career option. • Strong International collaborative programmes (including student/faculty exchange) have not yet been established • Lack of sufficient funds to upgrade research facilities to the desired level of sophistication (e.g. Genome sequencing facility, NMR , Radioactivity laboratory etc) to enable full utilization of faculty knowledge base

Challenges	Opportunities
• Attract good higher degree students as well as NET / GATE qualified Ph.D students • Govt. funding in establishing national facilities • Co-ordination with local Govt. agencies to setup State level centers of excellence • Expansion of lab space • Providing job placements for Biology/Biotechnology students	• Collaborative inter-departmental as well as inter-campus research. • Online course as well as program development to suit Industry needs • Based on our faculty expertise we envisage possible creation of state level collaborative centres of excellence in "Waste Water Management" ; "Halophilic archaea" and "Snake venom research" • Empowering the undergraduates to seek Biology as a career option Approaches to diversify Bioscience Research e.g. Biomedical Engineering, Computational Systems Biology, Nanobiotechnology, Big Data in Biology and Biomedical Signal Processing

52   Future plans of the department.

- Plans are underway to incorporate intake of B Sc students into a three year integrated ME (Biotechnology) program
- Steps are being taken to start new programs (e.g. M E Computational Biotechnology program) to suit the industry needs
- Efforts are underway to further the participation of Biotechnology industry in practice school training for the undergraduate as well as graduate level programs.
- Strengthen national and international collaborations and improve industry relations with the in-state Biotechnology R&D labs (e.g. Cipla Pharmaceuticals at Verna)
- Develop centres of excellence suiting the faculty expertise
- Improve lab-based curriculum as well as new elective courses to enable Biology students to be industry-ready

53   Any other information regarding your department which you would like to include.

Travel Grants received by Faculty

Angshuman Sarkar	DBT-CTEP	EMBO Workshop and Conference on Cell Cytoskeleton, Stockholm, Sweden	October 2014
Sumit Biswas	DBT-CTEP	International Work Conference on Bioinformatics and Biomedical Engineering, Spain	April 2015
Sumit Biswas	EMBL	EMBL Cancer Genomics, Heidelberg, Germany	November 2013
Judith Braganca	DST SERB ITS	Halophiles 2013, University of Connecticut, Storrs, CT, USA	June 2013
Srikanth Mutnuri	Organizers -	*AD Technology and Microbial Ecology for*	*3-6 February,*

	invited talk	*Sustainable Development, Chiang Mai, Thailand*	*2015*
Srikanth Mutnuri	Society for Applied Microbiology	12th Specialized Conference on Small Water and Wastewater Systems & 4th Specialized Conference on Resources Oriented Sanitation, Muscat, Sultanate of Oman	November 2-4, 2014
Srikanth Mutnuri	AP - ISMET, organizers, invited talk	2nd AP-ISMET held at National University of Singapore,	21- 24th July 2014.
Srikanth Mutnuri	Organizers, invited talk	1st International Terra Preta Conference at Hamburg University of Technology,	29 – 30 August 2013
Srikanth Mutnuri	Society for Applied Microbiology	Elsevier's Water Research conference held in Singapore	20th January 2013 – 23rd January 2013
Srikanth Mutnuri	DST -SERB	1st International conference on Biogas Microbiology" held at Leipzig, Germany	September 14 – 16th 2011
Srikanth Mutnuri	American Society for Microbiology	Gordon Research Conference on Applied and Environmental Microbiology - Functional Interactions from Molecules to Biomes" held at Mount Holyoke College, South Hadley, Massachusetts,	July 10-15, 2011
Kundan Kumar	SERB-DST	10th International symposium on rice functional genomics, Chiang Mai Thailand	December 2012
Meenal Kowshik	SERB-DST	1st International Symposium on nanomedicine in drug delivery and cancer diagnosis, University of Delaware, USA.	August 16-17th 2012

GOA CAMPUS: EVALUATIVE REPORT OF THE DEPARTMENT
CHEMICAL ENGINEERING

1. **Name of the Department :**CHEMICAL ENGINEERING

2. **Year of establishment of the Department:**2004

3. **Is the Department part of a School/Faculty of the university?**
   Departments function as independent entities in the university and are not part of any school or faculty.

4. **Names of programmes offered (UG, PG, M.Phil., Ph.D., Integrated Masters; Integrated Ph.D., D.Sc. D.Litt., etc.).**

On-Campus	B. E. (Hons.)	Chemical Engineering
	M. E.	Chemical Engineering
Off-Campus (Work Integrated Learning Programmes: WILP)	M.Tech.	Environmental Engineering For Goa State Pollution Control Board
	B. Tech.	Process Engineering (Shared across Campuses)

5. **Interdisciplinary programmes and departments involved**

Off-Campus (Work Integrated Learning Programmes: WILP)	M.Tech. in Environmental Engineering For Goa State Pollution Control Board	Department of Biological Sciences, Department of Mathematics, Department of Chemistry

6. **Courses in collaboration with other universities, industries, foreign institutions, etc.**
   Note: some of our structure courses like Practice School and thesis dissertation are done by our students in industries and universities outside BITS.

7. **Details of programmes discontinued, if any, with reasons:** NIL

8. **Examination System:** Semester and Choice Based Credit System

9. **Participation of the department in the courses offered by other departments**
   Faculty participated in courses such as: Engineering Graphics and Mechanics of Solids,Structure and Properties of Materials, Thermodynamics of Department of Mechanical Engineering

10. **Number of teaching posts sanctioned, filled and actual (Professors/Associate Professors/Asst. Professors/others).**

	Sanctioned	Filled (includes offer letters given)	Actual number
Professors	Note: **	3	3
Associate Professors		2	2
Assistant Professors		5	5
Others**		6	6

** Others: 4 lecturers, 1 Honorary Visiting Professor, 1 Adjunct Professor

Note**:The faculty positions for the University is broadly governed by Growth plan which also covers designation-wise breakup with a larger vision. Keeping in mind the fluidity of movement of faculty and proposed student to faculty ratio in each campus for first degree, higher degree as well as Ph.D. programmes, individual department needs are not fixed. Besides, as we are in expansion plan which calls for new programmes, courses being introduced, the demand on faculty in terms of numbers, for each department, is broadly governed by all the above factors and hence it is not possible to have a fixed number of faculty for each department. Recruitment of faculty, therefore, varies, based on departmental needs.

11. **Faculty profile with name, qualification, designation, area of specialization, experience and research under guidance**

Name	Qualification	Designation	Specialization	No. of years of experience	No. of Ph.D./ M.Phil Students guided for the last 5 years
Srinivas Krishnaswamy	Ph. D	Professor	Condensation Heat transfer	19	Ph.D 4 (on-going)
Sutapa Roy Ramanan	Ph. D	Professor	Material Science, Nanoscience and Technology	20 yrs	Ph.D: 1 completed , 1 ongoing
Saibal Ganguly	Ph. D	Professor	Process Systems Engineering, Real Time Intelligent Process Systems, Cryogenics, Energy & Energy Materials, Oil and Natural Gas, Coal and Mineral Processes	27	Ph. D (2 completed)* Ph. D (2 continuing), Post Doc. (1 completed) All outside BITS
Sampatrao Dagu Manjare	Ph. D	Associate Professor	Separation processes, Environmental Pollution Control, Fuel Cell	22.5 years	None
Saroj Sundar Baral	Ph. D	Associate Professor	Separation processes, Wastewater treatment	9	Ph. D (1 completed) 2 ongoing

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Manjuri Kumar	Ph. D	Assistant Professor	Coordination complexes	16	None
Jegatha Nambi Krishnan	Ph. D	Assistant Professor	Micro/Nano Systems Engineering	2	None
Asima Shaukat	Ph. D	Assistant Professor	Rheology of complex fluids	1	None
Dhanya Ram V	Ph. D	Assistant Professor	Chemical Process Control	6	None
Rajagopal Vellingiri	Ph. D	Assistant Professor	Interfacial flows	4.5	None
Amol Deshpande	M. E.	Lecturer	Transport Phenomena, Unmixed combustion, Reaction engineering	4	NA
Parul Sahu	M. Tech.	Lecturer	Chemical Engineering	4	NA
G. Surendran	M. Tech.	Lecturer	Petroleum Refining and Petrochemicals	15	NA
Vaishnavi Unde	M. E.	Lecturer	Bio-Chemical Engg	9	NA

* Before joining BITS

12. **List of senior Visiting Fellows, adjunct faculty, emeritus professors**

Dr. M. O. Garg	(2010 & 2012)
Prof. Aniruddh Pandit	(2015)
Prof. K. N. Ponnani	(2015)

13. **Percentage of classes taken by temporary faculty – programme-wise information**

Prof. A. Khanna, (Guest faculty from IIT Kanpur): M. E. Chemical, 12.5 % of a course

14. **Programme-wise Student Teacher Ratio**

	No of Students	No of faculty	Student Teacher Ratio
BE (Hons)	264	14	18.9
ME (Hons)	37	8	4.62

15. **Number of academic support staff (technical) and administrative staff: sanctioned, filled and actual.**

	Technical	Administrative
Sanctioned		
Filled	1	3
Actual	1	3

16. **Research thrust areas as recognized by major funding agencies**

- Material Science and Nano technology
- Process Systems Engineering
- Separation Processes
- Thermodynamics of Phase equilibria
- Energy and Environmental Engineering
- Interfacial Science and Engineering
- Reaction Engineering and Catalysis
- Biochemical Engineering

17. **Number of faculty with on-going/completed projects in the last five years from a) national b) international funding agencies and c) Total grants received. Give the names of the funding agencies, project title and grants received project-wise.**

COMPLETED PROJECTS

S. No	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration
1.	A Parametric Study of the Proton Exchange Membrane (PEM) Fuel Cell Performance	S D Manjare	Ministry of New and Renewable Energy (MNRE)	10.47	08/2007 - 03/2011
2.	Coke reduction and selectivity increase using novelreactor configurations for allyl chloride process	Srinivas Krishnaswamy	Aditya Birla Group	10.0	2 years (2011 – 2013)
3.	Studies on an enhanced efficiency contactor and once-through aqueous ammonia based flue gas CO_2 capture process scheme for reuse in fertilizer production	Srinivas Krishnaswamy	Aditya Birla Group	10.0	2 years (2011 – 2013)
4.	Synthesis of improved ferroelectric materials by sol-gel emulsion technique"	Sutapa Roy Ramanan	DRDO	17.0	3 years (08/2007-09/2010)
5.	Preparation and characterization of nano-sized TiO_2 and studies on its photo-degradation capability of model organic pollutant,	PI: Meenal Kowshik; Co-PI: Sutapa Roy Ramanan	DST	19.00	3 years (08/2007-09/2010
6.	"Biological synthesis of metal sulphides and metallic nanoparticles using halophilic Archaebacteria"	PI: Meenal Kowshik; Co-PI: Sutapa Roy Ramanan	Ministry of Earth Sciences	23.00	3 years (08/2011-09/2014)

ONGOING PROJECTS

S. No	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration (years)
1.	High - efficiency energy conversion in steam boilers using unmixed combustion	Srinivas Krishnaswamy	DST / Thermax Ltd. Pune	31.05(Thermax) (DST) and 4.00 (Thermax)	3 years (Jan 12 - Jan 15) extended (till Jul 2015)
2.	Seawater desalination using refrigeration	Srinivas Krishnaswamy	GAIL (India) Limited	382.21	3 years (Aug 12 – Jul 15) –extended (till Jan 2016)
3.	Experimental and Simulation Studies on Coke Mitigation in Petroleum Refinery Systems	Srinivas Krishnaswamy	Centre for High Technology (CHT)	132.97	3 years (Mar 2015 – Feb 2018)
4.	Development of efficient bioleaching process for the metal recovery from spent catalyst	Saroj Sundar Baral, Co-PIs: Vaibhav Gaud(IIT Guwahati), P.V.Rao (NIT Warangal)	Department of Biotechnology	26.56 (total sanctioned amount)	3 years (Dec 2013 – Dec 2016)
5.	Rheological dynamics of polymer –layered silicate/graphene nano-composites	Asima Shaukat	INSA INSPIRE, DST	35 (7 lakhs per year)	5 (2014-19)
6.	The role of rheology in defining the tribological properties (lubrication) of bio-greases	Asima Shaukat	Additional Competitive Grant, BITS Pilani	8	2 years (2015 - 2017)

18. Inter-institutional collaborative projects and associated grants received

(a) National collaboration

S. No	Project Name	Principal Investigator	Collaboration with	Funding Agency
1.	Investigating the effect of co-digestion and advanced sludge pre-treatment methods on the anaerobic conversion potential of the organic wastes	PI: P.V. Rao (NIT Warangal) Co-PIs: Sampatrao Dagu Manjare, Saroj Sundar Baral	NIT Warangal, IIT Guwahati	Department of Biotechnology
2.	Development of efficient bioleaching process for the metal recovery from spent catalyst	PI: Saroj Sundar Baral, Co-PIs: Vaibhav Gaud(IIT Guwahati), P.V.Rao (NIT Warangal)	NIT Warangal, IIT Guwahati	Department of Biotechnology

(b). International collaboration: **None**

19. **Departmental projects funded by DST-FIST; UGC-SAP/CAS, DPE; DBT, ICSSR, AICTE, etc.; total grants received.**

DST-FIST Grant: Amount Rs. 62 lakhs, 2014-2019, for setting up of "Phase-Equilibria laboratory" and Computational Facility including purchase of software.

20. **Research facility / Centre with**

- ☐ state recognition **None**
- ☐ national recognition **None**
- ☐ international recognition **None**

21. **Special research laboratories sponsored by / created by industry or corporate bodies**

None

22. **Publications:**

SL .	Details	Specify number here
1.	Number of papers published in peer reviewed journals (national / international)	78
2.	Monographs	0
3.	Chapters in Books	4
4.	Edited Books	2
5.	Books with ISBN with details of publishers	2
6.	Number listed in International Database (For *e.g*. Web of Science, Scopus, Humanities International Complete, Dare Database - International Social Sciences Directory, EBSCO host, etc.)	190
7.	Citation Index – range / average	(0 – 627) / 124.7
8.	SNIP	Tot:79.47, Ave: 0.806
9.	SJR	Tot: 56.482, Ave: 0.57
10.	Impact Factor – range / average	(0 – 5.51) / 1.255
11.	h-index	12*

*(Outside BITS, Inside BITS it is 11)

Details of the Journal publications as per the number give above (Give details in the last five years.

S. No.	Authors	Title of the Publications	Details of the Journal	National/ International	Year
1.	Manigandan, S., Majumder, S. Asaithambi, S. Ganguly, S*. Kargupta, K. and Banerjee, D	Electric field Induced De-wetting and Pattern Formation in Thin Conducting Polymer Film	Sensor and Actuators: B. Chemical, B144, 170-175	International	2010
2.	Majumder, S., Ray, P., Kargupta, K., Ganguly, S.*	Detailing Ionic Ingress and Charge Neutralization Phenomenon for Conducting Polymeric Film	Chem. Phys. Chem., 11, 211-219	International	2010

3.	Manjuri K. Koley, P.T. Manoharan, A.P. Koley	Synthesis and characterization of a stable paramagnetic hexacoordinated oxochromium (IV) complex with dianionic tetradentate Schiff base ligand salen	Inorg. Chim. Acta, Elsevier, vol.363, 3798-3802 (2010).	International	2010
4.	P. Venkateswara Rao, S. S. Baral, Ranjan Dey, M. Srikanth	Potential for biogas generation by anaerobic digestion for sustainable energy development in India	Renew. & Sust. Energy Rev. 14, 2086–2094	International	2010
5.	Jegatha Nambi Krishnan, B.C. Lee, H.J. Shin, and S.K. Kim*	Fabrication and Characterization of Noble Metal Nanowires for Nanogap devices	ECS Transactions, 25 (41),41-47	International	2010
6.	A Shaukat, A Sharma, YM Joshi*	Time–aging time–stress superposition in soft glass under tensile deformation field	Rheologica Acta 49,(11-12) 1093-1101	International	2010
7.	Saptarshi Majumdar,Kajari Kargupta, Saibal Ganguly, Partha Ray*	Studies on the Performance of Conducting Polymer Based Molecular Release System	Polymer Engineering and Science, 51, 10, 2001-2012	International	2011
8.	KrishanuChatterjee, Saibal Ganguly, Kajari Kargupta, Dipali Banerjee*	Bismuth nitrate doped polyaniline–Characterization and properties for thermoelectric application	Synthetic Metals, Elsevier,161, 275–279	International	2011
9.	P. V. Rao, S. S. Baral	Experimental design of mixture for the anaerobic co-digestion of sewage sludge	Chemical Eng. J. 172, 977– 986	International	2011
10.	P. V. Rao, S. S. Baral	Attribute based specification, comparison and selection of feed stock for anaerobic digestion using MADM approach	Journal of Hazardous Materials, 186, 2009-2016	International	2011
11.	N. Das, R. Das, S.N. Das, Y. V. Swamy , G. Roy Chaudhury, S. S. Baral	Comparative studies of chemical composition of particulate matter between sea and remote location of eastern part of India	Journal of Atmospheric Research, 99, 337-343	International	2011
12.	L. Selva Roselin, Rosilda Selvin, P. Aneesh, Mohamed Bououdina, S.Krishnaswamy	Highly active and reusable catalyst for Fries rearrangement of phenyl acetate	Kinetics and Catalysis Vol. 52 (6), 823 -827	International	2011
13.	Saranya K, Meenal Kowshik, Sutapa R Ramanan	Synthesis of hydroxyapatite nano powders by sol-gel emulsion technique	Bull of Material Science, 34(7) 2011, 1749-53.	National	2011
14.	Sushma Jadalannagari, Sandeep More, Meenal Kowshik, Sutapa Roy Ramanan	Low temperature synthesis of hydroxyapatite nano-rods by a modified sol-gel technique	Material Science and Engineering C, 31, 2011, 1534-1538.	International	2011
15.	Rajagopal Vellingiri,	Droplet spreading on	Physical Review E,	International	2011

		chemically heterogeneous substrates	84, 036305.	nal	
16.	Ganguly, S., Das, S., Kargupta, K. and Banerjee, D*	Optimization of Performance of Phosphoric Acid Fuel Cell (PAFC) Stack using Reduced Order Model withIntegrated Space Marching and Electrolyte inferencing	Computer Aided Chemical Engineering, 31 , 1010-1014	Internatio nal	2012
17.	C. K. Dhole, A. Nanda, K. Kargupta, S. Ganguly*	Synthesis, Characterization and Performance Study of Phosphosilicate Gel-Sulfonated Poly (EtherKetone) Nanocomposite Membrane for Fuel Cell Application	Journal of Nano and Electronic Physics, Vol. 4 No 1, 01015 (4pp)	Internatio nal	2012
18.	KajariKargupta, Swati Saha, Dipali Banerjee, Mrinal Seal, Saibal Ganguly*	Performance enhancement of phosphoric acid fuel cell using phosphor silicate gel based electrolyte,	Journal of Fuel Chemistry and Technology, Vol. 40, 6, June 2012.	Internatio nal	2012
19.	Manjuri K. Koley, Seshadri C. Sivasubramanian, Babu Varghese, Periakaruppan T. Manoharan , and Aditya P. Koley	A paramagnetic octahedral trans-dihydroxy chromium(IV) complex with dianionic tetradentate Schiff base ligand salophen, and crystal structure of its transdiisothiocyanato analogue.	Journal of Coordination Chemistry, Taylor & Francis, vol. 65, 3623–3640, (2012).	Internatio nal	2012
20.	Manjuri K. Koley, Seshadri C. Sivasubramanian, Sumit Biswas, Periakaruppan T. Manoharan and Aditya P. Koley	Dioxygen binding and activation by a highly reactive Cr(II)compound containing S,N-donors derived from o-aminothiophenol .	Journal of Coordination Chemistry, Taylor & Francis, vol. 65, 3329–3351 (2012).	Internatio nal	2012
21.	Manjare S D, Mohite R J	Application of Life Cycle Assessment to Di-ammonium Phosphate Production	Advanced Materials Research, Vols. 354 - 355(2012), 256-265.	Internatio nal	2012
22.	N. Das, S. S. Baral, P. S. Mahapatra, T. Das, G. R. Chaudhury, S. N. Das	Trend in chemical composition of precipitation during 2005–2009 at a rural station of Bhubaneswar, eastern India	Theoretical and Applied Climatology, 110, 55–63	Internatio nal	2012
23.	Zubeda Aga and Sutapa Roy Ramanan	Electrical and structural characterization of PTCR pure barium titanate nanopowders synthesized by sol-gel emulsion technique	J. of Electroceramics, 28(2) 2012 109-117.	Internatio nal	2012
24.	Yu Chen, Chee Chung Wong, Tze Sian Pui, Revanth Nadipalli, Roshan Weerasekara, Jegatha Chandran, Hao Yu and Abdur Rub Abdur	CMOS high density electrical impedance biosensor array or tumor cell detection	Sensors and Actuators B: Chemical,173, 903-907	Internatio nal	2012

	Rahman*				
25.	A Shaukat, M Kaushal, A Sharma, YM Joshi*	Shear mediated elongational flow and yielding in soft glassy materials	Soft Matter 8 (39),10107-10114	International	2012
26.	A Shaukat, A Sharma, YM Joshi*	Squeeze flow behavior of (soft glassy) thixotropic material	Journal of Non-Newtonian Fluid Mechanics,167-168, 9-17	International	2012
27.	Saibal Ganguly, Sonali Das, Kajari Kargupta, Dipali Banerjee*	Reduced Order Inferential Model-Based Optimization of a Phosphoric Acid Fuel Cell (PAFC) Stack	Industrial & Engineering Chemistry Research, Volume 52, Issue 22, Pages 7104-7115	International	2013
28.	Krishanu Chatterjee, Palash Dhara, Saibal Ganguly, Kajari Kargupta, Dipali Banerjee*	Morphology dependent ammonia sensing with 5-sulfosalicylic acid doped nanostructured polyanilinesynthesized by several routes	Sensors and Actuators B: Chemical Actuators B: Chemical, Volume 181, Pages 544–550	International	2013
29.	Pratik Swarup Dash, S. Santosh Kumar, P. K. Banerjee and Saibal Ganguly	Chemical Leaching of High-Ash Indian Coals for Production of Low-Ash Clean Coal	Mineral Processing and Extractive Metallurgy Review, Taylor and Francis, Volume 34, 4, pages 223-239	International	2013
30.	Krishanu Chatterjee, Mousumi Mitra, Kajari Kargupta, Saibal Ganguly and Dipali Banerjee,*	Synthesis, characterization and enhanced thermoelectric performance of structurally ordered cable-like novelpolyaniline–bismuth telluride nanocomposite	Nanotechnology 24, (21),215703 (10pp), IOP Publishing Limited	International	2013
31.	Krishanu Chatterjee, Mousumi Mitra, Kajari Kargupta, Saibal Ganguly and Dipali Banerjee,*	Thermoelectric performance of electrodeposited nanostructured polyaniline	Journal of Applied polymer science, 131 (4) (2014) 39920	International	2013
32.	Mousumi Mitra, Krishanu Chatterjee, Kajari Kargupta, Saibal Ganguly, Dipali Banerjee,*	Reduction of graphene oxide through a green and metal-free approach using formic acid	Diamond & Related Materials, pp. 74-79	International	2013.
33.	Deshpande V.K. Manjare S.D.,	Determination of Heat Transfer Coefficient in Solar Collector Tube under Simulated Operating Conditions	Journal of Alternate Energy Sources and Technology, Vol. 4 (1), 2013, pp 7-12.	International	2013
34.	G. Surendran, B. V. Sasank, S. S. Baral	Modeling and simulation for the adsorptive removal of Cr(VI) from aqueous solution	Desalination and Water Treatment, 52, 5652-5662.	International	2013
35.	S. S. Baral, G. Surendran, N. Das, P.V. Rao	Statistical design of experiments for the Cr(VI) adsorption on weed Salvinia cucullataII	Environmental Engineering and Management journal, 12, 1535-1544	International	2013

36.	P. V. Rao, S. S. Baral	Biogas in India	Akshay Urja, 6, 48-51.	National	2013
37.	Sushma Jadalannagari, Ketaki Deshmukh, Sutapa Roy Ramanan, Meenal Kowshik	Antimicrobial activity of hemocompatible silver doped hydroxyapatite nanoparticles synthesized by modified sol-gel technique	Applied Nanoscience February, DOI 10.1007/s13204-013-0197-x, 2013.	International	2013
38.	Pallavee Srivastava, Judith Braganca, Sutapa Roy Ramanan, Meenal Kowshik	Synthesis of silver nanoparticles using haloarchaeal isolate Halococcus salifodinae BK	Extremophiles DOI: 10.1007/s00792-013-0563-3), 2013	International	2013
39.	Jegatha Nambi Krishnan, I.T. Kim, S.-H. Ahn, Z. H. Kim, S.-H. Cho and S. K. Kim*	Electroless Deposition of SERS active Au-nanostructures on variety of metallic substrates	BioChip Journal, 7(4),375-385	International	2013
40.	Rajagopal Vellingiri, Dmitri Tseluiko, Nikos Savva and Serafim Kalliadasis*	Dynamics of a liquid film sheared by a co-flowing turbulent gas.	International Journal of Multiphase Flow, 56, 93-104	International	2013
41.	Khuram Maqsood, Jayita Pal, Dhanaraj Turunawarasu, Anindya Jyoti Pal, Saibal Ganguly*	Performance enhancement and energy reduction using hybrid cryogenic distillation networks for purification ofnatural gas with high CO_2 content	Korean Journal of Chemical Engineering, Springer, US, 31(7), 1120-1135	International	2014
42.	Khuram Maqsood, Aditi Mallick, Kajari Kargupta, Abulhassan Ali, Saibal Ganguly*	Cryogenic carbon dioxide separation from natural gas: a review based on conventional and novel emerging technologies	Reviews in Chemical Engineering, Walter De Gruter, Germany, 30, 453-477	International	2014
43.	Abulhassan Ali, Khuram Maqsood, Nor Syahera, Azmi B. M. Shariff, and Saibal Ganguly*	Energy Minimization in Cryogenic Packed Beds during Purification of Natural Gas with High CO2 Content	Chemical Engineering & Technology, Wiley, 37, 1675-1685	International	2014
44.	PS Dash, SK Sriramoju, DN Prasad, PK Banerjee, S Ganguly, K Kargupta*	Formation of Carbon Nanostructures During Chemical Demineralization of Indian Coals	International Journal of Coal Preparation and Utilization, Taylor and Francis, 34,5,276-283	International	2014
45.	PS Dash,DN Prasad, SK Sriramoju, RK Lingam, A Suresh, PK Banerjee, S Ganguly*	Maximizing demineralization during chemical leaching of coal through optimal reagent addition policy	Chemical product and process modelling, 10 (1), DOI: 10.1515/cpm	International	2014
46.	Ananta Kr Sarkar, Shubhanwita Saha, Saibal Ganguly, Dipali Banerjee, Kajari Kargupta*	Hydrogen storage on graphene using Benkeser reaction	International Journal of Energy Research, 38(14), 1889-1895, John Wiley	International	2014

	Authors	Title	Journal		Year
47.	Krishanu Chatterjee, Mousumi Mitra, Saibal Ganguly, Kajari Kargupta, Dipali Banerjee*	Thermoelectric performance of electrodeposited nanostructured polyaniline doped with sulfo-salicylic acid	Journal of Applied Polymer Science, 131, 4.	International	2014
48.	Tanmoy Paul, Mrinal Seal, Dipali Banerjee, Saibal Ganguly, Kajari Kargupta and Pavitra Sandilya*	Analysis of Drying and Dilution in Phosphoric Acid Fuel Cell (PAFC) Using Galvanometric Study and Electrochemical Impedance Spectroscopy	Journal of Fuel Cell Science and Tech., American Society of Mechanical Engg., 11(4), 041001, Feb 27, 2014; No: FC-13-1004.	International	2014
49.	Subhanwita Saha, Vashwar Basak, Dipali Banerjee, Saibal Ganguly, Kajari Kargupta*	Graphene supported bimetallic G-Po-Pt nano hybrid catalyst for enhanced and cost effective Hydrogen generation	International Journal of Hydrogen Energy, 39 (22) 2014 11566-11577.	International	2014
50.	P. Ghosh, D. Halder, S Ganguly, D Banerjee, K Kargupta*	Phosphosilicate gel-polybenzimidazole nanocomposite novel membrane for fuel cell application	International Journal of Plastics Technology, December 2014, Volume 18, Issue 3, pp 403-408	International	2014
51.	Khuram Maqsood, Abulhassan Ali, Azmi B. M. Shariff and Saibal Ganguly,*	Techno-economic Evaluation of Cryogenic Networks for Separation of CO2 from Natural Gas	Applied Mechanics and Materials, Trans Tech, Switzerland, 625, 635-638, 2014.	International	2014
52	Abulhassan Ali, Azmi B. M. Shariff and Saibal Ganguly,*	Simulation of Cryogenic packed bed using one dimensional pseudo homogeneous model	Journal of Applied Sciences, Asean Network , 14(22), 3118-3121,	International	2014
53.	Khuram Maqsood, Azmi B. M. Shariff and Saibal Ganguly*	Synthesis of Conventional and Hybrid Cryogenic Distillation Sequence for purification of natural gas	Journal of Applied Sciences, Asean Network, 14 (21) 2722-2729	International	2014
54.	Abulhassan Ali, Atif M. Ashraf, b, Azmi B. M. Shariff and Saibal Ganguly*	Study of simultaneous mass transfer and nucleation in cryogenic packed bed for the removal of CO2 from natural gas	Applied Mechanics and Materials, Trans Tech, Switzerland, 625, 229-232	International	2014.
55.	PS Dash, RK Lingam, S Santosh Kumar, A Suresh, PK Banerjee, S Ganguly*	Effect of elevated temperature and pressure on the leaching characteristics of Indian coals	Fuel, Elsevier, Volume 140, 302–308	International	2014
56.	Sujan Chowdhury, Abrar Inayat, Abdullah Bawadi, Abdul Aziz Omar, Saibal Ganguly*	Hydrogen and Syngas Generation from Gasification of Coal in an Integrated Fuel Processor, Applied Mechanics and Materials	Trans Tech, Switzerland, 625, 644-647	International	2014

57.	Abul Hassan Ali, Saibal Ganguly, Azmi Shariff,*	Simulation of Cryogeni1c packed bed using 1-dimensional pseudo homogeneous model	Journal of Applied Sciences, Asean Network, 14 (22) 3118-3121, 2014.	International	2014
58.	S. S. Baral, K. Raja Shekar, Megha Sharma, P.V. Rao	Optimization of leaching parameters for the extraction of rare earth metal using decision making method	Hydrometallurgy, 143, 60-67	International	2014
59.	Sushma Jadalannagari, Ketaki Deshmukh, Sutapa Roy Ramanan, Meenal Kowshik, Anita K. Verma, R. Vora	Lanthanum-Doped Hydroxyapatite Nanoparticles as Biocompatible Fluorescent Probes for Cellular Internalization and Bio labeling	Science of Advanced Materials 01/2014; 6:312-319.	International	2014
60.	Pallavee Srivastava, Judith Braganca, Sutapa Roy Ramanan and Meenal Kowshik	Green Synthesis of Silver Nanoparticles by Haloarchaeon Halococcus salifodinae BK6	Advanced Materials Research Vol. 938 (2014) pp 236-241.	International	2014
61.	Zubeda Bi H. Aga and Sutapa Roy Ramanan	Effect of doping on the structural parameters of pure and doped barium titanate nano powders synthesized by sol-gel emulsion technique	Int. J. Nanoparticles, Vol. 7, Nos. 3/4, 2014 pp331-340	International	2014
62.	Probal Guha, Vaishnavi Unde	Mathematical modelling of spiral heat exchanger	International journal of engineering research, Issue 4, Volume 3,226-229	International	April 2014
63.	Vaishnavi Unde , Srikanth Mutnuri	Bio- catalytic production of indigo using biphasic organic solvent	Discovery Biotechnology, 5(13), 3-10	International	March 2014
64.	V. Dhanya Ram, A. Karlmarx, M. Chidambaram*	Identification of Unstable Second Order Transfer Function Model with a Zero by Optimization Method	*Indian Chemical Engineer,* 1-11 (on-line)	National	2014
65.	PS Dash, SK Sriramoju, K Kargupta, PK Banerjee, S. Ganguly;*	Characterization of chemically beneficiated Indian Coals	International Journal of Coal Preparation and Utilization, Taylor & Francis (online 21/2/2015)	International	2015
66.	Khuram Maqsood, Azmi B.M. Shariff, Saibal Ganguly,*	Synthesis of Energy Efficient Cryogenic Distillation Networks for Maximum Methane Recovery from Natural Gas with Carbon Dioxide and Heavy Hydrocarbons	Journal of Applied Sciences, 15,3,492-499	International	2015
67.	Mousumi Mitra, Chiranjit Kulsi, Krishanu Chatterjee,	Reduced graphene oxide-polyaniline composites—synthesis, characterization and	RSC Advances, Royal Society of Chemistry, 39, 5, 31039-31048,	International	2015

		optimization for thermoelectric applications			
68.	Shubhanwita Saha, Saibal Ganguly, Dipali Banerjee and Kajari Kargupta*	Novel bimetallic graphene–cobalt–nickel (G–Co–Ni) nano-ensemble electro-catalyst for enhanced borohydride oxidation	International Journal of Hydrogen Energy, 40,4,1760-1773, 2015.	International	2015
69.	Manjuri K. Koley , Amrita Chatterjee, Anjan Chattopadhyay, Periakaruppan T. Manoharan , and Aditya P. Koley	Spectroscopic studies for the changes of a Cr(II) compound in solution triggered by the deprotonation of an aqua ligand.	Journal of Coordination Chemistry, Taylor & Francis, Vol. 68, No. 12, 2065–2095, (2015)	International	2015
70.	S. S. Baral, Kaustub Singh, Prabudh Sharma	The potential of sustainable algal bio-fuel production using CO_2 from thermal power plant in India	Renewable and Sustainable Energy Reviews, 49, 1061–1074	International	2015
71.	S. Bhagavathula, S. R. Ramanan, S. K. Kim and Jegatha Nambi Krishnan	Fabrication of Electroless Plated Nano Porous Gold Film for Heavy Metal Ion Detection in Sensor Applications	Advanced Materials, Tech Connect Briefs,1,277-278	International	2015
72.	A Shaukat, A Sharma, YM Joshi*	Dynamics of Soft Glassy Materials under Tensile and Squeeze Flow Fields	Nanoscale and Microscale Phenomena, 261-305	International	2015
73.	V. Dhanya Ram, C. Rajapandiyan and M. Chidambaram*	Steady State Gains Identification and Control of Multivariable Unstable Systems	Chemical Engineering Communication, 202:151–162	International	2015
74.	V. Dhanya Ram M.Chidambaram*	On-line Controller Tuning for Critically Damped SOPTD Systems	Chemical Engineering Communication, 202:1, 48-58	International	2015
75.	V. Dhanya Ram M.Chidambaram*	Simple method of designing centralized PI controllers for multivariable systems based on SSGM	ISA Transactions, 56,252-260	International	2015
76.	V. Dhanya Ram, M. Chidambaram*	Closed loop Identification of Two Input Two Output Critically Damped Second Order Systems with Delay	Indian Chemical Engineer,1-22 (on-line)	National	2015
77.	V. Dhanya Ram M.Chidambaram*	Identification of Centralised Controlled Multivariable Systems	Indian Chemical Engineer, 1-15 (on-line)	National	2015
78.	Rajagopal Vellingiri, Dmitri Tseluiko and Serafim Kalliadasis*	Absolute and convective instabilities in counter-current gas-liquid film flows.	Journal of Fluid Mechanics, 763, 166-201	International	2015

* These papers correspond to research work carried outside BITS.

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SL No	Authors	Title of the Publications	Details of the Conference (Name of the conference, Venue, Date)	National /International	Page no
1.	PS Dash, S.K. Sriramoju, P.K. Banerjee and S. Ganguly*	"Production of low ash clean coal from high ash Indian coals using chemical beneficiation"	IAS Iron making Conference, 10-12 November, Buenos Aires, Argentina, 2010.	International	
2.	PS Dash, S.K. Sriramoju, P.K. Banerjee and S. Ganguly*	,"Production of low ash clean coal from high ash Indian coals through chemical leaching at elevated temperature"	International Mineral Processing Congress (IMPC), Brisbane, Australia, September, 2010	International	
3.	Krishanu Chatterjee, Saibal Ganguly*, Kajari Kargupta and Dipali Banerjee	Nanostructures and properties of PANI-Bi_2Te_3 nanocomposite and its constituent- A comparison,	YOUNG SCIENTISTS Conference, BESU, Kolkata, India, 29th October, 2010	National	
4.	R. Dey, P. V. Rao, S. S. Baral,	Potential of biogas from biomass for sustainable energy development in India,	80th Annual Session of NASI and Symposium on Climate Change, 2-4 December 2010.	National	
5.	P. V. Rao, S. S. Baral	Anaerobic Co-Digestion of Organic Wastes, System Solutions for Global Challenges	Energy, Environment and Security 10-12 December, 2010.	National	
6.	Shareq Mohd. Nazir & Srinivas Krishnaswamy,	"Understanding Process Condensate Stripper Performance using CHEMCAD",	CHEMCAD Process Simulation Conference, Mumbai, 22nd February 2010	National	
7.	Shaukat A*., Joshi Y. M., Sharma A	Tensile deformation and failure of thin films of aging Laponite suspension	ICTS conference on Non-equilibrium statistical physics, Indian Institute of Technology Kanpur, 2010		
8.	Shareq Mohd. Nazir & Srinivas Krishnaswamy,	"Understanding Process Condensate Stripper Performance using CHEMCAD",	CHEMCAD Process Simulation Conference, Mumbai, 22nd February 2010	National	
9.	Shaukat A*., Joshi Y. M., Sharma A	Tensile deformation and failure of thin films of aging Laponite suspension	ICTS conference on Non-equilibrium statistical physics, Indian Institute of Technology Kanpur, 2010		
10.	Shaukat A*., Sharma A. and Joshi Y. M.	Shear flow mediated elongational flow in soft glassymaterials	Society of Rheology 82nd Annual Meeting, Santa Fe, USA, 2010		
11.	Shaukat A*., Sharma A. and Joshi Y. M.	Time–aging time–stress superposition in soft glass under elongational flow	Society of Rheology 82nd Annual Meeting, Santa Fe, USA, 2010		

12	Chandan Dhole, Aniket Nando, Kajari Kargupta, Saibal Ganguly*	Synthesis characterization and performance study of phosphosilicate gel sulfonated poly (ether ether ketone) nanocomposite membrane for fuel cell application	Proceedings NAP 2011, September, Ukraine	International	
13	Manjare S. D. and Mohite R. G.,	"Application of Life Cycle Assessment to Di-ammonium Phosphate Production"	Energy, Environment and Sustainable Development, held at Shanghai, China, October 21-23, 2011	International	32
14	Jadhav A. B. and Manjare S. D.	"Experimental Investigation of Single Proton Exchange Membrane (PEM) Fuel Cell Performance"	Recent Advances in Chemical Engineering and Technology, held at Cochin University of Science and Technology, Kochi, India, March 10-12, 2011	International	97
15	P. V.Rao, S.S. Baral, and Dey. R.	Multiple Attribute Decision Making for Anaerobic Digestion	Presented at 81st Annual session of National Academy of Sciences and National Symposium on Sustainable Management of Biodiversity using Science and Technology at Kerala University, Thiruvananthapuram, Kerala, 24th – 26th November 2011.	National	
16	P.V. Rao, S.S. Baral, and R. Dey.	Anaerobic digestion of biomass in context with the Indian energy scenario	Poster presented at First International Water Association - Conference On "Microbes in Wastewater & Waste Treatment, Bioremediation and Energy Production".Organized jointly by Institut National de la RechercheAgronomique (INRA), France and Bits Pilani- K.K . Birla Goa Campus, Goa. 24th – 26th January-2011.	International	
17	Srinivas Krishnaswamy and Krishnaswamy Ponnani	"Water Pollution in Goa! Myths, Realities and Possible Solutions",	National Conference on "Frontiers in Technologies For Conservation Of Environment", Feb. 10th and 11th 2011, Organized by Dhempe College of Arts and Science, Sponsored by Department Of Science and Technology, Govt. of India		

18	Zubeda Aga and Sutapa Roy Ramanan	Synthesis of submicron size barium titanate powders by sol-gel emulsion technique	CHEMSTORM 2011, 10th National Level Technical Symposium, Department of Chemical Engineering, Pravara Rural Engineering College, Loni, Tal.Rahata, Dist. Ahmednagar(Maharashtra), March 31,2011	National	
19	Sushma Jadalannagari, Sandeep More, Meenal Kowshik, Sutapa Roy Ramanan	Synthesis of Hydroxyapatite nano rods using a modified sol - gel method at a low temperature and its Biocompatibility studies"	World Congress on Biotechnology - 2011 ", HITEX, Hyderabad. 21-23 March 2011	International	
20	Zubeda Aga and Sutapa Roy Ramanan	Synthesis of submicron size pure and doped barium titanate powders by sol-gel emulsion technique",	Third International Conference on frontiers in Nano science and Technology, Cochin Nano 2011, Aug 14-17 2011.	International	
21	Zubeda Aga and Sutapa Roy Ramanan,	Strontium doped Barium titanate nanopowders synthesized by sol-gel emulsion technique	ICNANO, Conf. Centre, University of Delhi. 18-21 Dec 2011	International	
22	Dhanya Ram*.V, S.K. Manu, Resmi Balachandran, Praseetha P Nair	Synthesis of Multiwalled Carbon Nanotubes and their Characterization	Second International Conference On Materials for Future (ICMF 2011) (23rd - 25th February), at Government Engineering College, Thrissur.	International	
23	Rajagopal Vellingiri*, Nikos Savva and Serafim Kalliadasis	Two dimensional droplet spreading on chemically heterogeneous substrates	64th Annual Meeting of the APS - Division of Fluid Dynamics, Baltimore, MD, USA, November 20-22, 2011	International	
24	Amol Deshpande, S. Sachdev, S. Pareek, B. Mahadevan	Modeling and Simulation of Single Phase Fluid Flow and Heat Transfer in Packed Beds	COMSOL-2012 Conference, Bangalore, November 2-3, 2012	International	
25	PS Dash, RK Lingam, SS Kumar, PK Banerjee, S Ganguly* ,	Pressure leaching of Indian coals at elevated temperature for producing low ash clean coal	Proceedings International Mineral Processing Congress, September 24-28, 2012, New Delhi, India.	International	
26	R.Das, S.Majumdar, S. Kundu, P Bose, K Kargupta, D Banerjee and S. Ganguly*	Cyclic Voltametry driven controlled drug release through conducting polymer membrane	Proceedings International Conference, ICPEAM2012, Kualalampur, June 2012	International	

27	D Banerjee, K Chatterjee, S Ganguly*, K Kargupta and J Pal	Investigation of Thermoelectric properties of nanostructured polyaniline doped with organic and inorganic dopants	Proceedings International Conference, ICPEAM2012, Kualalampur, June 2012	International	
28	S. Ganguly*,K. Kargupta,D. Banerjee,	Nanotechnology and Nanomaterials for New and Sustainable Energy Engineering	Proceedings of the International Conference on Nanomaterials: Applications and Properties, vol. 1 no 1, Ukraine, September 2012	International	
29	S. Saha, K. Kargupta, S. Ganguly*	"A Review on Synthesis, Characterization and Application of Graphene Nano-sheet in green Energy Generation and Storage"	CHEMCON 2012, 27-30th December 2012, 436 (paper id P-473).	National	
30	S. Saha, V. Basak, K. Kargupta, S. Ganguly*	"GRAPHENE BASED NANOCOMPOSITES AND ITS APPLICATION IN HYDROGEN ENERGY SYSTEM"	1st International Workshop on Nanomaterials (IWoN): Engineering Photon and Phonon Transport 14 – 15 December 2012, 187.	International	
31	S. Saha, C.K. Dhole, B. Kamila, A.K. Sarkar, K. Kargupta, S. Ganguly*	Performance Enhancement Of Fuel Cell System Using Inorganic Organic Nanocomposite Membrane And Graphene Supported Platinum Nanocatalyst based Electrode	National Conference on Sustainable Development through Innovative Research in Science and Technology 28 – 29th September 2012,	National	
32	S.Ganguly*, S. Das, K.Kargupta, D. Banerjee	Optimization of PAFC Fuel cell stack	International Conference on Process Systems Engineering PSE, 2012,, July 15-19, 2012, Singapore.	International	
33	S.S. Baral,Deepak Kumar Ojha, Akriti Singh, SnehaChoudhury and Megha Sharma,	Desalination of Brineusing Humidification-Dehumidification Technique	National Seminar cum Workshop on Water and Energy: Sustainability and Security for Future needs, Dwarkadas. J. Sanghavi College of Engineering, Mumbai, September 27-28, 2012.	National	
34	Zubeda Bi H. Aga., Sutapa Roy Ramanan	Effect of Lanthanum Doping on Barium Titanate Nano-Powders Synthesized by Sol-gel Emulsion Technique.	National Seminar NANOMATERIALS: SYNTHESIS CHARACTERISATION AND APPLICATIONS, Chowgule College, Goa, 2-3Feb, 2012	National	

35	Ketaki Deshmukh, Meenal Kowshik, Sutapa Roy Ramanan.	Prevention of bacterial biofilm using silver doped hydroxyapatite nanoparticles coating for medical implant	National Seminar NANOMATERIALS: SYNTHESIS CHARACTERISATION AND APPLICATIONS, Chowgule College, Goa, 2-3Feb, 2012	National	
36	Deshmukh K, Ramanan S R, Kowshik M	Biocompatible Silver Hydroxyapatite Nanoparticles Based Thin Film Coatings With Good Antimicrobial And Antibiofilm Activity	1st International Symposium on nanomedicine in drug delivery and cancer diagnosis, University Of Delaware, 16-17th August, 2012.	International	
37	Shaukat A*., Mattsson J., Olmsted P. D. and Read D.	Entangled cis-polyisoprene under oscillatory and steady shear: a rheo-dielectric study	BASF workshop at Ludwigshafen, Germany, 2012		
38	Shaukat A*., Mattsson J., Olmsted P. D. and Read D	Entangled cis-polyisoprene under oscillatory and steady shear: a rheo-dielectric study	Dynacop Final Conference at Leeds, UK, 2012		
39	Rajagopal Vellingiri*, Dmitri Tseluiko, Nikos Savva and Serafim Kalliadasis	Solitary waves in a falling laminar liquid film sheared by a co-flowing turbulent gas	British Applied Mathematics Colloquium, London, UK, March 27-29, 2012	National (UK)	
40	S. Ganguly*, K. Maqsood, and Azmi B. Mohd. Shariff	Synthesis of Cryogenic Distillation Networks for Maximum Methane Recovery from Natural Gas with Minimum Energy	International Oil and Gas Symposium and Exhibition (IOGSE 2013), Sabah, Malaysia, 2013.	International	
41	S. Ganguly*, A.H.A.Quddusi, and Azmi B. Mohd. Shariff,	Simulation of Cryogenic packed bed using one dimensional pseudo homogeneous model	International Oil and Gas Symposium and Exhibition (IOGSE 2013), Sabah, Malaysia, 2013.	International	
42	Syed Faizan Ali, N. Yusoff, Saibal Ganguly*, M. Zainal Abidin, Khairiyah Siraj	Operational Optimization and profit maximization of a Crude Distillation Unit using Taguchi method	6th Process Systems Engineering Asia 2013 Conference, Kualalampur, 2013.	International	

43	Shubhanwita Saha, Kajari Kargupta and Saibal Ganguly*	Synthesis and Characterization of Electrocatalytically Active Graphene-Cobalt Nanocatalyst for Fuel Cell Application,	ICFCE, India, 2013.	International	
44	Aditi Mullick, Kajari Kargupta, Khuram Maqsood, Saibal Ganguly*	Recent advances in cryogenic separation of carbon dioxide from natural gas	ICFCE, India, 2013	International	
45	Shubhanwita Saha, Kajari Kargupta and Saibal Ganguly*	Synthesis and Characterization of Graphene Nanosheet through a chemical based approach using Hydrzine hydrate	CHEMCON 2013.	National	
46	Aditi Mullick, Kajari Kargupta, Saibal Ganguly*	Study of Purification of Natural Gas Based on Cryo-separation: A review	CHEMCON 2013.	National	
47	Pranav Kulkarni, Amey Avhad, Manjare S D	"Distillation of a Multicomponent Mixture: Performance Analysis using Equilibrium Based Method,	Frontiers in Chemical Engineering, held at NIT Rourkela, December 9-12 , 2013.	International	64
48	Pranav Kulkarni, Manjare S D,Amey Avhad	"Performance Analysis of Multicomponent Absorption System using Sum Rates Method	Innovations in Chemical Engineering, held at BITS Pilani, Hyderabad Campus, November 15, 16 , 2013.	National	154-156
49	P.V. Rao, S.S. Baral	Pre-treatment of organic composite waste mixtures for enhanced bio-methanantion	3rd International Engineering Symposium, Kumamoto University, Japan, March 4-6, 2013.	International	
50	Jegatha Nambi Krishnan*, S.H. Park, S. K. Kim	Aptamer based single step Thrombin assay by the Fluorescence enhancement on a nano Au substrate	13th Asia Pacific International Symposium on Microscale Separation and Analysis (APCE) 2013, Jeju Island, South Korea.	International	
51	V. Dhanya Ram* and M.Chidambaram,	SSGM Based Multivariable Control of Unstable Non-Square Systems	International Conference on Mathematics in Chemical kinetics and Engineering (MacKiE 2013) (4th -6th February), IIT Madras.	International	

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52	Rajagopal Vellingiri*, Dmitri Tseluiko and Serafim Kalliadasis	Absolute and convective instabilities in countercurrent gas-liquid film flows	British Applied Mathematics Colloquium, Leeds, UK, April 9-12, 2013	National (UK)	
53	Rajagopal Vellingiri*, Dmitri Tseluiko and Serafim Kalliadasis	Absolute and convective instabilities in countercurrent gas-liquid film flows	66th Annual Meeting of the APS - Division of Fluid Dynamics, Pittsburgh, PA, USA, November 24-26, 2013	International	
54	Amol Deshpande, Srinivas Krishnaswamy, K.N. Ponnani	MICRO-PULSED DIFFERENTIAL REACTORS: A VIABLE ALTERNATIVE FOR ESTIMATING KINETICS OF GAS-SOLID REACTIONS	67th Annual session of IIChE, CHEMCON – 2014, Chandigarh, December 27-30, 2014.	National	
55	Abulhassan Ali, A.M. Ashraf, A.B.M. Shariff and Saibal Ganguly*,	"Study of Simultaneous mass transfer and nucleation in cryogenic packed bed for removal of CO_2 from natural gas",	3rd international conference on process engineering and advanced materials, Kualalampur, Malaysia, June 2014	International	
56	Khuram Maqsood, Abulhassan Ali, A.B.M. Shariff and Saibal Ganguly*,	"Studies on Cryogenic flash vaporization of CH4-CO2 binary mixture",	Post Graduate Conference Malaysia, Tronoh, November 2014		
57	Khuram Maqsood, Abulhassan Ali, A.B.M. Shariff and Saibal Ganguly*, "	Techno-economic evaluation of cryogenic networks for separation of CO_2 from natural gas"	3rd international conference on process engineering and advanced materials, Kualalampur, Malaysia, June 2014.	International	
58	Neh Vivek Kovale, Manjare S D	"Mathematical Modeling of the Dispersion of Air Pollutants from Multiple Sources for the City of Bokaro, Jharkhand,	Green Technology for Environmental Pollution Prevention and Control, held at NIT Tiruchirappalli, September 27-29 , 2014	International	24
59	S. S. Baral, Kaustub Singh, Prabudh Sharma,	Carbon Capture and Biofuel Production through Microalgae,	AIChE Annual Meeting, Atlanta, Georgia USA, 16th - 21st November, 2014	International	

60	G. Surendran and Dr. S. S. Baral	Treatment of Cr(VI) contaminated waste water by natural grass"	ICEM 328, International Conference on Green Technology for Environmental Pollution Prevention and Control (ICGTEPC) 2014, National Institute of Technology, Tiruchirapalli on 27th-29th September, 2014.	International	
61	Srinivas Krishnaswamy and Krishnaswamy Ponnani	An Alternative Energy Efficient and Zero Emission Process Scheme For Process Condensate Treatment in Ammonia Fertilizer Plants",	9th World Congress of Chemical Engineering (WCCE) incorporating the 15th Asian Pacific Confederation of Chemical Engineering Congress (APChE) Congress & 3rd Asia - Pacific Chemical and Biological Micro - fluidics (APCBM) Conferences and The 11th International Conference on Gas -Liquid & Gas – Liquid - Solid Reactor Engineering (GSL – 11), August 18 -23, 2014, Seoul, South Korea	International	
62	Sampada Bokade, Satish Kumar Dasari, Sutapa Roy Ramanan and Jegatha Nambi Krishnan,	"Fabrication of Gold Nanostructure Arrays Using Modified nanosphere Lithography"	International Conference on MEMS and Sensors (ICMEMSS 2014), IIT Madras, Chennai, India.	International	
63	Satish Kumar Dasari, Bhakti Digambar Kulkarni, Suprabhat Bhagavathula, Sampada Bokade and Jegatha Nambi Krishnan	Fabrication of Complex nanostructures using Electroless plating for Sensor applications	International Conference on Chemical Engineering-Emerging Dimensions and Challenges Ahead (CHEMCON 2014), Chandigarh, India	International	
64	Parul Sahu, Srinivas K., K.N. Ponnani	A theoretical approach to selection of suitable hydrate former for seawater desalination	Proceedings of the 8th International Conference on Gas Hydrates (ICGH8-2014), Beijing, China, 28 July - 1 August, 2014	International	

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65	V. Dhanya Ram* and M.Chidambaram	Closed Loop Reaction Curve Method for the identification of TITO system	Third International conference on Advances in Control and Optimization of Dynamical Systems (ACODS-2014) (13th-15th March), at IIT Kanpur. (Advances in Control and Optimization of Dynamical Systems, IFAC Proceedings, 2014, 3(1)	International	989-996.
66	Rajagopal Vellingiri*, Dmitri Tseluiko and Serafim Kalliadasis	Absolute and convective instabilities in countercurrent gas-liquid film flows	British Applied Mathematics Colloquium, Cardiff, UK, April 28-30, 2014	National (UK)	
67	Rajagopal Vellingiri*, Marc Pradas, Markus Schmuck and Serafim Kalliadasis	Description of multiphase flows in porous media using an effective convective Cahn-Hilliard equation	67th Annual Meeting of the APS - Division of Fluid Dynamics, San Francisco, CA, USA, November 23-25, 2014	International	
68	H.M. Mouna, Gurav Parag, S.S. Baral,	Bioleaching of Nickel from spent Fluid Catalytic Cracking catalyst by Aspergillus Niger,	SCHEMCON 2015, MIT Pune, 12 - 13th Sep. 2015	National	
69	Suprabhat Bhagavathula, Joshi Manasi Satchit, Sutapa Roy Ramanan and Jegatha Nambi Krishnan	Fabrication and characterization of Nanoporous Gold film Electrode	International Conference on New Frontiers in Chemical, Energy and Environmental Engineering (INCEEE-2015), NIT Warangal, India	International	
70	S. Bhagavathula, S. R. Ramanan, S. K. Kim and J. N. Krishnan	Fabrication of Electroless Plated Nano Porous Gold Film for Heavy Metal Ion Detection in Sensor Applications	Tech Connect World Innovation Conference and Expo (NanoTech-2015), Gaylord National Resort and Convention Center, National Harbor, Washington, D. C., U. S. A.,2015	International	
71	Potti Sanjay Sambhu, Jayant Singh Sidhu, Srinivas Krishnaswamy, K N Ponnani and Jegatha Nambi Krishnan	"Fluidized Bed Design in Electronic Grade Silicon Manufacture",	International Conference on New Frontiers in Chemical, Energy and Environmental Engineering (INCEEE-2015), NIT Warangal, India.	International	321-322
72	published prior to joining BITS Pilani				

23. **Details of patents and income generated:**

(i) Nanomaterial based DNA Delivery vehicle for bacterial transformation, Provisional Indian patent application number 1529/MUM/2013, Inventors: Ketaki Deshmukh, Sutapa Roy Ramanan, Meenal Kowshik, provisional patent filed in 2013.

24. **Areas of consultancy and income generated**
- Area of consultancy- Process Engineering
- Income generated – INR 4,85,130/-

25. **Faculty selected nationally / internationally to visit other laboratories / institutions industries in India and abroad:** None

26. **Faculty serving in National committees b) International committees c) Editorial Boards d) any other (please specify) :**None

27. **Faculty recharging strategies (UGC, ASC, Refresher / orientation programs, workshops, training programs and similar programs).**

1) Research Initiation Grant

The Research Initiation Fund is designed to enable the beginning of research and related activities for a newly recruited faculty who has significant potential to attract external funding. The grants shall be awarded soon after joining BITS for up to Rs. 2 Lakhs and the amount should be spent within 24 months of appointment.

S. No	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration
1	Studies on Separation and purification of rare earth metals from red mud/used catalyst; Campus.	S.S. Baral	BITS Pilani-K. K. Birla Goa	2.0	2 year, 2011-13
2	Electroless deposition of metallic nanostructures on metallic substrates for Sensor applications	Jegatha Nambi Krishnan	BITS Pilani, K. K. Birla Goa Campus	2	05/11/2013-05/11/2015 2 years

2) Seed Grant Scheme

The Seed Grant scheme is designed to stimulate competitive research in strategic areas of national or international importance, to promote innovative product and technology development, and/or to facilitate the start of research programs which will potentially develop into creative ventures on their own through external funding. The grant shall be awarded with a maximum value of Rs.20 Lakhs. The duration of the Grant will be 2 years.

3) Chair Professorship

A Chair Professorship helps recognize and reward excellence in teaching and/or research by a member of the BITS Pilani faculty at either of its campuses or to induct a professor from outside BITS, Pilani. Such a person would be re-designated as Chair Professor, Each "Chair Professorship" also helps establishment an endowment with significant funds that are used to (a) make available to the Chair Professor a "research grant", and (b) provide to him/her a small honorarium to cover additional effort required to fulfill the charter laid out for the endowment.

4) OPERA Award

The awards named OPERA awards (for "Outstanding Potential for Excellence in Research and Academics") are to facilitate and incentivize new faculty to join BITS and excel in research and teaching. The award is in the form of a "joining bonus" paid over 5 years, plus funds to kick-start their R&D and professional development. The award will help compensate new faculty (or provide R&D funds) at par with the best institutions in India.

Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration (years)
Outstanding Potential for Excellence in Research and Academics (OPERA) Award	Jegatha Nambi Krishnan	BITS Pilani	15	5 years (17/11/ 2013 – 16/11/2018) (note: project sanctioned 23/07/2013)

5) Professional Development Allowance:
The institute provides Rs 100,000/- to each faculty member for expenses related to research, conference registration etc.

6)Industry Day: The institute has engaged in intensifying its contact with industry to leverage industry sponsored projects to keep faculty competence in line with industry and societal needs. In addition it aims to bring all aspects of practice to classroom.

7) Visits of eminent scholars to various departments as well as the organization of conferences and workshops by the department together with other national and international professional societies to help create platforms and forums for exchange of ideas and knowledge in the upcoming fields of science and technology.
- Prof. M.O. Garg (Director, IIP Dehradun)
- Prof. M.S. Ananth (IISc Bangalore, 2011)
- Prof. Chaitanyamoy Ganguly (IIT Kanpur, 2014)

8) The institute provides financial support to initiate such events and also facilitates financial support to lectures and tenured faculty members to participate in national and international seminars/workshops/schools/ conferences etc.

P.V. Rao, **S.S. Baral,** Pre-treatment of organic composite waste mixtures for enhanced bio-methanantion. Accepted for presentation at 3rd International Engineering Symposium, Kumamoto University, Japan, March 4-6, 2013.

28.   Student projects

- percentage of students who have done in-house projects including inter-departmental projects : **BE**: **100% and   ME: 65%**

- percentage of students doing projects in collaboration with other universities /industry / institute: **BE**: **100%   ME: 48%**

> Note: Every graduating first degree student would have done at least one in-house project and one project in collaboration with industry (PS) before graduating.

29.   Awards / recognitions received at the national and international level by

SL NO		Details
1	Faculty	Dr. Asima Shaukat INSA Inspire Award 2014 (DST) Rs. 7 lakh per annum for 5 years
2	Doctoral/post doctoral fellows	None
3	Students	None

30.   Seminars/ Conferences/Workshops organized and the source of funding (national/ international) with details of outstanding participants, if any.
1. COMSOL Multiphysics Modelling Workshop, 22nd Feb, 2013.
2. COMSOL Multiphysics 5.1 Workshop, 14th Aug, 2015.

31.   Code of ethics of research followed by the Department.
> The department follows the code of ethics specified by the Institute

32.   a) Student profile programme-wise:

Name of the Programme (refer to question no. 4)	Applications received	Selected		Pass percentage*	
		Male	Female	Male	Female
Academic year 2010-2011					
B.E. Chemical Engineering	139234	47	13	100%	100%
M.E. Chemical	4428	3	2	100%	100%
Ph.D.	425	1	0		
Academic year 2011-12					

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B.E. Chemical Engineering	123677	46	9	100%	100%
M.E. Chemical	4571	4	2	100%	100%
Ph.D.	461	0	0		
Academic year 2012-13					
B.E. Chemical Engineering	136904	41	13	100%	100%
M.E. Chemical	4825	7	4	100%	100%
Ph.D.	01	0	0		
Academic year 2013-14					
B.E. Chemical Engineering	166260	56	11	100%	100%
M.E. Chemical	5549	4	5	100%	100%
Ph.D.	13	2	2		
Academic year 2014-15					
B.E. Chemical Engineering	186181	46	6	100%	100%
M.E. Chemical	5172	4	2	100%	100%
Ph.D.	1	0	1		

*BITS follows a credit based system and cafeteria approach in offering of courses. Students not performing well are monitored by ACB (Academic Counselling Board), HDCC (Higher Degree Counselling Cell) and ACC (Academic Counselling Cell). Their pace is slowed down. Normally not more than 3% students (including all programmes, B.E., M.Sc, and M.E.) at a given point of time are under the purview of ACB.

33. b) Diversity of Students

Name of the Programme (refer to question no. 4)	% of students from the same university	% of students from other universities within the State	% of students From Universities outside the State	% of students from other countries
B. E. (Hons) Chemical	0	0	0	0
M.E. Chemical	0	0	100	0
PhD	33.33	0	66.67	0

34. How many students have cleared Civil Services and Defence Services examinations, NET, SET, GATE and other competitive examinations? Give details category-wise.

We do not capture this data through any formal process. The detail given are approximately

UPSC: Between 2010-2014:Records Not Available

2014 – 2015: One student (From 2007 batch)

GATE selection:

Year	Number of students cleared
2010 – 2011	Records Not Available
2011 – 2012	Records Not Available
2012 – 2013	Records Not Available
2013 – 2014	7
2014 - 2015	13

35. **Student progression:**

Based on available data (Record not maintained)

Student progression	Percentage against enrolled
UG to PG	7.66 (Texas A&M University, Purdue university, TU Delft, IISc Bangalore
PG to M.Phil.	0 (NA)
PG to Ph.D.	25
Ph.D. to Post-Doctoral	0
Employed	
Campus selection	74.81
Other than campus recruitment	Information not available
Entrepreneurs	1.09

36. **Diversity of staff**

Percentage of faculty who are graduates	
of the same university	21.43
from other universities within the State	00
from universities from other States	57.14 (From other state universities)
from universities outside the country	21.43 (From outside the country)

37. **Number of faculty who were awarded M.Phil., Ph.D., D.Sc. and D.Litt. during the assessment period :**

   One (PV Rao)

38. **Present details of departmental infrastructural facilities with regard to**
   o **Library**
      The central Library has a good collection of over 34,000 bookson a wide range of subjects, of which 906 books are related to Chemical Engineering. The whole building of the library is covered by wi-fi connectivity. This Campus subscribes to 96 print journals, domestic as well as international Subscriptions to important digital libraries like IEL online, Science Direct, ASME, Proquest and AEA Online Journals etc. provide access to thousands of online journals to students and

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researchers.. Several dozens of educational CDs, audio/video cassettes and question banks are also made available. The textbook section provides all prescribed texts and reference books. From 2004 to 2014, the Library transactions, stock accounting and its entire house keeping activities had been automated using the proprietary LibSyS Library Management Software. In 2014, a shift was made to LibLime Koha, a Free and Open Source Software (FOSS) system. We have an active Library Committee on which every department is represented, and this committee decides policies and allocations and oversees their implementation.

o **Internet facilities for staff and students**
   Internet facilities to Staff (and faculty): Unlimited access is provided to staff and faculty at their office as well as residence. WiFi connectivity is provided to the complete academic area. The bandwidth provided to faculty is 100Mbps on a 10Gbps backbone (for intranet).

   Internet facilities to Students: All students are provided intranet (10Gbps back bone), internet (300Mbps provided by Vodafone, GWave and TATA) and WiFi in all hostels with per day download limit of 800MB for under graduate students and 1GB for post graduate students and Ph.D. scholars.

o **Students' laboratories**

   Chemical Engineering Lab (CEL) I :   Heat transfer, Fluid Mechanics and Engineering Chemistry, COMSOL)
   CEL II: Process Control, Reaction Engineering, Separation Processes I & II.
   The labs in the Department of Chemical Engineering are fully equipped with the experimental set-ups which supplement courses taught in classroom for First Degree and Higher Degree students. In addition the CAD lab houses softwares like CHEMCAD, COMSOL, PRODYN, HYDRAFLASH etc. catering to courses in Simulation and Transport Phenomena. Details are tabulated below:

Labs catering to courses in	Equipment / Infrastructure
Fluid Mechanics (shared with Mechanical Engg.)	Flow measurements, Bernoulli's equation, Reynolds experiment, Pumps, Packed bed, Fluidization, Darcy Law, Friction in Pipes, Pressure Test bench, Viscosity measurement (Ostwald, Redwood and Saybolt viscometer)
Heat Transfer (Shared with Mechanical Engg.)	Conduction in solids, Natural convection, Forced convection, Boiling and Condensation
Engineering Chemistry	Thin Layer Chromatography, Surface Tension, Depression in Freezing point/Elevation in Boiling point, Titrations, Organic synthesis, Saponification
Process Control	Response of First order systems, Temperature Control Trainer, Pressure Control Trainer, Multi-Process Trainer, PLC Trainer, Universal Process Control Trainer, Control Valve Characteristics, Flapper Nozzle system
Separation Processes– 1	Mass transfer with and without Chemical Reaction, Solid in air diffusion, Vapour in air diffusion, Wetted

	wall column, Liquid- Liquid Extraction, Packed bed distillation, Vapour Liquid equilibrium, Steam Distillation
Kinetics & Reactor Design	Continuous Stirred Tank and Plug flow reactor set-up, RTD set-up
Separation Processes – 2 Lab	Crystallizer, Plate and frame press filter, Jaw crusher, Froth floatation, Basket centrifuge, Vacuum tray dryer, Roll crusher, Ball mill, Thickener, Sedimentation Apparatus, Sieve shakers
Softwares	ChemCad, Comsol, Prodyn

o **Research laboratories**

The Department has initiated fundamental and applied research in several thrust areas in Chemical Engineering through the constant efforts of faculty. The Department has been successful in securing grants from several Government and private funding agencies like DST, DRDO, MNRE, Ministry of Fertilizers, GAIL (India) Ltd., Thermax Limited, Aditya Birla Group, etc. Through this funding, labs have been equipped with equipment which forms a strong foundation for research in the Department. The list of equipment catering to thrust areas in the Department is listed below:

Facility	Make Model	Purpose	Funding Source
CHEMCAD Process Simulation Software	Chemstations, USA	Chemical Process Engineering Simulation	Ministry of Chemicals and Fertilizers
COMSOL Multiphysics software	COMSOL Inc. USA	Finite element analysis solver and simulation software/ FFA software package for various physics and engineering applications, especially coupled phenomena, or Multi-physics	Department
Hydraflash Software	Hydrafact, UK	Hydrate phase equilibria prediction	GAIL (India) Ltd.
HEAT- Int software	Process Integration, UK	Pinch analysis, improving performance of heat recovery systems, heat exchange network design and optimization	Department
Prodyn software	Ingenious Inc.	Dynamic Simulation and operator training (used mainly to train students)	Department
Dell Precision T5600 Chassis workstation	Dell	High speed computing	Department
3650 M4, Intel Xeon E5 (Hexa Core) IBM Server	Dell	High speed computing	DST (FIST)
Universal Process Control Trainer	Apex Innovation Pvt. Ltd.	Incorporates wide range of experiments, applications and advanced control techniques using industry standard instruments and	Department

		controls	
Brookfield Viscometer	Brookfield Engineering Laboratories Inc., USA	By utilizing a multiple speed transmission and interchangeable spindles, a variety of viscosity ranges can be measured (Newtonian and Non-Newtonian)	Department
Acoustic Interferometer	Mittal Enterprises, Model- F05	Estimation of Thermodynamics properties of liquids	Department
Gas Chromatography	Sigma Instruments Pvt. Ltd, Vadodara	Composition Analysis	Department of Science & Technology
Gas Chromatography	Shimadzu Gas Chromatography Model: GC-2014	Composition Analysis	Aditya Birla Science and Technology Company
Automatic Potentiometric Titrator	Spectralab	Composition Analysis	Ministry of Chemicals and Fertilizers
UV-Spectrophotometer	HACH / DR 5000, USA	Composition Analysis	Ministry of Chemicals and Fertilizers
Bomb-Calorimeter (Microprocessor based)	Toshniwal Model CC01/ M3	Determination of heat of combustion, calorific values and sulfur contents of solids, liquids & volatile fuels and other easily burning materials	Department
BET surface area analyzer	Smart Instruments Company Pvt. Ltd. Model- SMART SORB 93	Surface area measurement of powder samples and particle size range determination	Department
Multi-Mode membrane Test rig	Labcon Scientific instruments, Mumbai	For membrane separation studies	Ministry of Chemicals and Fertilizers
Unmixed combustion kinetics test rig	Assembled and fabricated	To study the kinetics of gas-solid reactions	DST
Refractometer (Hand held)	ATAGO make	Refractive Index measurement and Composition analysis	Ministry of Chemicals and Fertilizers
Abbe Refractometer	Toshiba (India)	Refractive Index measurement and Composition analysis	Department
Ozone Generator	Eltech Engineers, Mumbai	For advanced oxidation studies	Ministry of Chemicals and Fertilizers
Spin Coater	Apex Instruments Company, Calcutta	Thin Film studies	Ministry of Chemicals and Fertilizers
COD digester	Spectralab, Mumbai Model 2015 D	COD Analysis	Ministry of Chemicals and Fertilizers
Water Distillation Unit	Ramnath Enterprises	To prepare distilled water	Ministry of Chemicals and Fertilizers
BOD incubator	BTI-06	COD analysis	Ministry of Chemicals and Fertilizers
Kjeldahl Nitrogen apparatus	HACH	Estimation of total Kjeldahl nitrogen, several minerals,	Ministry of Chemicals and Fertilizers

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		and nutrients	
Temperature calibrator (2 nos., -40 ^{o}C – 200 ^{o}C & 250 ^{o}C – 1200 ^{o}C)	Tempsens Instruments CALSYS -40/200	Temperature calibration	DST GAIL (India) Ltd.
Refrigerated Circulator	Julabo Labrotechnik GMH, GERMANY Julabo model F32-HE	Circulating bath	GAIL (India) Ltd.
Fuel cell test rig	SPIC Science Foundation	Fuel cell studies	Ministry of New & Renewable Energy
Barometer	Labcon Scientific Instruments	Atmospheric pressure measurements	Ministry of Chemicals and Fertilizers
Water Bath	BTI-63	For maintaining constant temperature for reactors	Ministry of Chemicals and Fertilizers
pH meter	ElicoLI-610	For measuring pH of sample	Ministry of Chemicals and Fertilizers
DO meter	Model EQ-642	Estimation of dissolved Oxygen	Ministry of Chemicals and Fertilizers
Muffle furnace	BTI-41	To dry and heat the sample at high temperature. Total solids and volatile solids of waste can be found out.	Ministry of Chemicals and Fertilizers
TDS meter	Model: 682	Estimation of Total dissolved solids	Ministry of Chemicals and Fertilizers
Turbidity meter	Make: Equiptronics Model: 811	Estimation of Turbidity	Ministry of Chemicals and Fertilizers
Phase equilibrium test rig	Ablaze Glass works Pvt. Ltd.	Gas- Liquid phase equilibria studies	Aditya Birla Science and Technology Company
Wetted wall column test rig	Ablaze Glass works Pvt. Ltd.	Estimation of mass transfer co-efficient	Aditya Birla Science and Technology Company
Packed bed absorption column test rig	Ablaze Glass works Pvt. Ltd.	Estimation of absorption efficiency	Aditya Birla Science and Technology Company
Batch distillation column test rig	Labcon Scientific Instruments	Batch distillation Studies	Ministry of Chemicals and Fertilizers
Reaction Kinetics test rig	Assembled and fabricated	Coke kinetics studies	Aditya Birla Science and Technology Company
Sartorious Weighing Balance	Chiron Instruments (India) Pvt. Ltd Model: CP224 S	High accuracy measurement of mass	Ministry of Chemicals and Fertilizers
Orsat Apparatus	Vensil Glass Works	Flue gas analysis	Aditya Birla Science and Technology Company
Rotary Vacuum Evaporator	Ablaze Glass works Pvt. Ltd.	For vacuum evaporation	Research Initiation Grant (BITS- Pilani)
Differential Scanning Calorimeter	Setaram France	To predict enthalpy of phase changes at low temperature and high pressure	GAIL (India) Ltd.
Gas Hydrate Cell Unit		To study the kinetics of	GAIL (India) Ltd.

	PSL System Technik GmbH Germany	hydrate formation	
Portable Raman spectrometer	B & W Tek	Raman spectroscopy for structural analysis	GAIL (India) Ltd.
Atomic Absorption Spectrophotometer	Systronics India (Model 8130)	For element concentration analysis	GAIL (India) Ltd.
Micro and Ultra Membrane filtration unit	Permionics Membrane Pvt. Ltd.	Membrane separation unit to remove organic matter, algae, bacteria etc.	GAIL (India) Ltd.
Desalination Test rig	Amar Equipment Pvt. LtdMumbai,Bharat Engineering Works Goa	Proof of test rig for studying desalination	GAIL (India) Ltd.
Micro Carbon residue Tester (MCRT)	Tanaka scientific Limited, Japan Model: ACR-M3	Estimation of Ultimate Coking Potential	Centre For High Technology (CHT)
Cyclograph	Analtech, Inc.	For component separation	Centre For High Technology (CHT)
High Performance Liquid Chromatography (HPLC)	Shimadzu (Asia Pacific) PTE Ltd.	Composition analysis	Centre For High Technology (CHT)
Centrifuge		Separation process	DBT, Govt. of India
Laminar Air Flow (LAF)	Biotechnics Pvt. Ltd.	Sterile Bench	DBT, Govt. of India
Autoclave	Biotechnics Pvt. Ltd.	Sterilizer	DBT, Govt. of India
Orbital Shaker	Biotechnics Pvt. Ltd.	Shaking for desired RPM and temperature	DBT, Govt. of India

39. List of doctoral, post-doctoral students and Research Associates

    f) from the host institution/university

        Doctoral students:2 (Ms. Pragya Singh)

        Post Doc: Nil

        RA   :   Nil

    g) from other institutions/universities

      Doctoral Students: 2

      Mr. Vinod More (ABSTC)

                    Mr. V.V.Sivakumar (Thermax)

                 Ms. Mouna H.M

40.   **Number of post graduate students getting financial assistance from the university**

Year	No of students
2010-11	0
2011-12	6
2012-13	16
2013-14	20
2014-15	15

41. **Was any need assessment exercise undertaken before the development of new programme(s)? If so, highlight the methodology.**

The exercise undertaken before the development of a new programme usually begins with a Department airing its intention to float a new programme, CDC or elective proposed by the faculty concerned. Discussions are held regarding its merits/demerits at the DCA level and later at a CCDCA level. Once the necessary inputs and unanimity have been reached on all the aspects regarding the operational aspects related to the course, it is sent to the ARP so that it can be passed up to Senate to it to be approved.

A more systematic process of feedback and review is carried out over a longer period of time. Every few years a visiting committee) of experts from other academic institutionsand industry visit and assess the Department (across the campuses of BITS) for its faculty strength, curriculum, research, teaching, and institutional processes.

42. **Does the department obtain feedback from**
- **Faculty on curriculum as well as teaching-learning-evaluation? If yes, how does the department utilize the feedback?**

Regular update of the curriculum is done as per need and can be initiated by any faculty member. These are brought to focus by discussions within a Department – first within a campus and then across campuses. Then a central team enables cross-Departmental discussions and presents the resulting proposal(s) tothe Senate – the internal governing body of BITS – for discussion and approval.

- **Students on staff, curriculum and teaching-learning-evaluation and how does the department utilize the feedback?**

Feedback is obtained per course from students through an anonymous feedback system, across courses through a representative and participative process. This process ensures that routine changes in the curriculum are incorporated every semester. A student-faculty Council is set up to provide a platform where students and faculty can interact informally and understand the respective needs better. The council allows for open discussion on the issues such as:
- Class attendance of students
- Laboratory operation, facilities and equipments
- Expectations from class-room instructions, tutorial exercises, home assignments and laboratory experiments.
- Examination methods, level of question papers, evaluation of answer scripts.
- Any indiscipline in the classes (lecture, tutorial or practical).
- Expected electives to be offered in the subsequent semester.

- **Alumni and employers on the programmes offered and how does the department utilize the feedback?**

   Alumni
   Yes, the department obtains feedback from Alumni on the programmes offered.

   Upcoming trends in various technical industries are also discussed. Some of the alumni also pitch in ideas for newer courses to be introduced as part of the curriculum. These issues are reviewed in detail with the concerned department faculty. Suitable measures for implementation of the feedback are considered and followed accordingly.

Employers
   Each Campus conducts a Placement Faculty Advisory council meeting once a month. The council consists of the Director, the Deputy Director, The Dean, Head of the Departments, Placement Manager, Faculty Incharge (Placement) and a Faculty representing each department.
   The council discusses the feedback obtained department–wise from the recruiters and measures are taken to strengthen the programmes /courses accordingly.

43. **List the distinguished alumni of the department (maximum 10):**
   Records not available

44. **Give details of student enrichment programmes (special lectures / workshops / seminar) involving external experts.**
   - Dr. M.O.Garg, Director, CSIR-Indian Institute of Petroleum visited the department from 12-14th Jan, 2011 and delivered talks on
     - Plant data reconciliation and gross error detection
     - Insight into the role of thermodynamics in Process simulation
     - Advances in Petroleum industry with particular reference to India

   - Prof Aloke Kumar Ghoshal, Department of Chemical Engineering, IIT Guwahati, delivered 2 talks during his visit in October, 2012:
     - Carbon di-oxide capture Technologies in India: Today's Perspective
     - Liquid Membrane based separation: Prospects and Challenges

   - Prof. M.S.Ananth, IISc Bangalore gave a series of lectures as given below :

Lecture	Title	Date/Day
1	Thermodynamics and Chemical Industry	14/11/2013 Thursday
2	Introductory lectures on Statistical Thermodynamics (Part 1)	14/11/2013 Thursday

3	Introductory lectures on Statistical Thermodynamics (Part 2)	15/11/2013 Friday
4	On 'The House of Education'	15/11/2013 Friday
5	Solution Thermodynamics	16/11/2013 Saturday

- Dr. Chaitanyamoy Ganguly, IIT Kanpur delivered an invited lecture on :
  "The Prospects and Challenges of Nuclear Energy in India", through tele-presence facility from Hyderabad in Feb 2014.

45. **List the teaching methods adopted by the faculty for different programmes**.

Classroom teaching and tutorial hours are general norm for all courses conducted where multimedia usage is a common practice. All core courses are supplemented by two separate 3 unit laboratory courses for better understanding of the fundamental concepts and hands on training on the equipment. Additionally classes are also conducted across campuses through telepresence classrooms. BITS curriculum has practice school as an integrated part where every student spends eight weeks (PS1) in the industry after fourth semester and five and half months (PSII) in the final year. Software trainings are provided along with certain courses.

46. **How does the department ensure that programme objectives are constantly met and learning outcomes are monitored?**

The department ensure that programme objectives are constantly met and learning outcomes are monitored through continuous feedback from students, faculty and employers. Every few years a curriculum review is done by external experts from academia and industry and their suggestion are incorporated as appropriate. In addition when the new curriculum was approved in 2011, Senate authorized the Department to form Departmental Committees on Academics or DCA (per Dept. per campus) and cross-campus DCA or ccDCA per Department across campuses. The ccDCA has been responsible for curriculum and changes within programs and courses offered by the Department which include Senate approval processes for which they work in Unison with the Academic Resource Planning Division (ARP). The DCA has been responsible locally in each campus for handling curriculum operation and related issues raised by faculty or students of that campus.

47. **Highlight the participation of students and faculty in extension activities.**

Students actively Work for the social cause in the campus under the aegis of several social bodies on campus like Nirmaan, Abhigyaan etc. allowing them to give back to society. One of the major activities under Nirmaan is to impart knowledge to the under privileged like construction workers and their children, mess and housekeeping staff.

In addition several other initiatives like cleanliness drives, tree planting by every student who joins the Institute, blood donation camps etc. are also taken up by students as part of a social responsibility.

48. **Give details of "beyond syllabus scholarly activities" of the department. (invited talks, conferences, student Chapter)**

Invited talks by experts from industry and academia are arranged periodically. A IIChE Student Goa Chapter has been formed. Students take part in various "Tech Fests" organized by various Institutes in the country. The students of the Department also actively participate in the Tech Fest "Quark" organized by BITS Pilani Goa. Faculty in the Department constantly participate in Conferences and Workshops in their area of research at both national and international level. Faculty in the Department are members of the Indian Institute of Chemical Engineers as members or Life Members. Faculty also hold memberships at international level, i.e. Institution of Chemical Engineers, UK,. Faculty members are also involved as reviewers in various National and International Journals, and examiners for PhD and Master's Thesis in other Universities. The department has a student association "ALCHEMISTA' which conducts various faculty student engagements throughout the year. The department also organizes a "Department Day" each year where faculty and students takes part in various activities like paper presentation, short film making on chemical engineering related activities. A weekly Department Seminar is organized where faculty and student present on topics of advances in researches in relevant fields.

49. **State whether the programme/ department is accredited/ graded by other agencies? If yes, give details.** No

50. **Briefly highlight the contributions of the department in generating new knowledge, basic or applied.**

Faculty in the Department of Chemical Engineering are engaged in basic and applied research of interest to industry. Students are allowed to work on this projects at various levels of their academic career. The Department has strong linkages with Industries through Research and Consultancy projects. Linkages exist with organizations like Aditya Birla Group, GAIL, Thermax etc. These collaborations have led to development of proof of concept technologies in areas of unmixed combustion, sea water desalination etc.

51. **Detail five major Strengths, Weaknesses, Opportunities and Challenges (SWOC) of the department.**

Strength:	Weaknesses:
1. Competent, committed and young faculty members	1. Nascent research activity still building to critical strength.
	2. Strength of research scholars in the

2. Good quality student intake.	Department inadequate.
3. Well designed and updated course curriculum.	3. Number of Higher Degree student intake.
4. Established interface with the industry through Practice School and funded projects.	4. Department level technical and support staff is inadequate.
5. Well-equipped experimental and computational labs for First and Higher degrees.	5. Student faculty ratio is not at its optimum level.
Opportunities	**Challenges:**
1. New programmes at First and Higher degree (Process System Engineering)	1. Keeping pace with advancement in pedagogic techniques.
2. Industrial, national and International collaboration and projects through strong and sustainable academia/ industry engagements.	2. Competition from IIT/NIT and other top private institutes offering varied programmes.
3. Possibilities of inter campus and inter departmental collaborations.	3. Increased competition in faculty recruitment.
4. Organizing national and international conferences/workshops.	4. Retaining faculty.
5. Emergence of new pedagogic techniques to be applied to courses taught.	5. Perception of students towards core Chemical Engineering vs. IT related fields.

52. **Future plans of the department.**

The department of Chemical Engineering has reached the first level of excellence in undergraduate level academics namely through teaching, projects, practice school, industrial visits and interactions, well-groomed laboratory, social and community works and services. The department has already achieved a high standard in producing well-rounded undergraduates, who are recognized both nationally as well as internationally.

Having achieved its primary objective of producing well-rounded undergraduates for the Indian society, the department now aspires to bring up and nurture its post graduate/ masters and doctoral level programmes to the best national and international standards. This will impart recognition to the department in particular and the university as a whole as one of the best research institutes in the country. Subsequently, the Department can aspire for international rankings in chemical engineering.

With this broad overview and objective in mind, the Department has planned the development under the following clusters of specialization in chemical engineering.
(1) Materials Engineering and Nanotechnology

(2) Process Systems Engineering
(3) Energy and Environment
(4) Biotechnology and biochemical
(5) Reaction Engineering and Catalysis
(6) Advanced Thermodynamics and Phase Equilibrium
(7) Interfacial sciences
(8) Advanced separation engineering

The department of chemical engineering plans to develop research level advanced laboratories along with the expansion plans of the university. Some of the niche research laboratories planned is highlighted below:

- Real time process intelligence laboratory which will house hierarchical multilevel advanced control and optimization with DCS architecture; virtual sensing and real time inferencing and visualization etc.
- Advanced thermodynamics and phase equilibrium laboratory which will house some of the state of the art thermodynamic estimation and modeling under high pressure to high vacuum and low temperature to high temperature ranges. State of the art modeling and analysis exercises have also been planned.
- Advanced materials and nanotechnology laboratory has been planned to address new materials development for applications in biomedical, anti-corrosion, electronic, microfluidics, nano-fertilizer etc.
- Advanced Cryogenic Engineering research laboratory has been planned for application of emerging novel cryogenic processes to frontier areas of gas processing; space research; specialized materials and biomedical applications.

New and niche masters and doctoral level advanced elective courses will be floated for research students. Of course, the undergraduates of the institute will also prosper from advanced research in the department.

In order to highlight the commitment of the department to nurture and take forward the national level science initiatives of India, the chemical engineering department has planned to conduct several national or international activities from 2020 onwards. These may include hosting of prestigious Indian national level Congress for Chemical Engineers namely CHEMCON within the premises of the GOA Campus. Other international conferences may also be planned and housed.

On the whole, the chemical engineering department aspires to emerge as a prominent research and higher education centre in the future.

53. **Any other information regarding your department which you would like to include.**

None.

Goa Campus: Evaluative Report of the Department
CHEMISTRY

1. **Name of the Department :** Department of Chemistry

2. **Year of establishment of the Department :** 2004

3. **Is the Department part of a School/Faculty of the university? :**
   Departments function as independent entities in the university and are not part of any school or faculty.

4. **Names of programmes offered (UG, PG, M.Phil., Ph.D., Integrated Masters; Integrated Ph.D., D.Sc., D.Litt., etc.).**
   M.Sc. (Hons) Chemistry and Ph.D.

5. **Interdisciplinary programmes and departments involved:**

   M.Tech Environmental Engineering for working professionals is being offered by the Chemical Engineering Department through WILP. Dept. of Chemistry owns and teaches two courses of this program.

6. **Courses in collaboration with other universities, industries, foreign institutions, etc:**
   Note: some of our structure courses like Practice School and thesis dissertation are done by our students in industries and universities outside BITS.

7. **Details of programmes discontinued, if any, with reasons:** *None*

8. **Examination System:** Semester and Choice Based Credit System

9. **Participation of the department in the courses offered by other departments: Yes**

   Mechanical Engineering (Thermodynamics), Chemical Engineering (Environmental Sampling and Analytical Methods, Environmental Chemistry)

10. **Number of teaching posts sanctioned, filled and actual (Professors /Associate Professors /Asst. Professors /others).**

	Sanctioned	Filled (includes offer letters given)	Actual number
Professor	Note:**		02
Associate Professors			07
Asst. Professors			07
Others			01 (DST-INSPIRE faculty)

Note**:The faculty positions for the University is broadly governed by Growth plan which also covers designation-wise breakup with a larger vision. Keeping in mind the fluidity of movement of faculty and proposed student to faculty ratio in each campus for first degree, higher degree as well as Ph.D. programmes, individual department needs are not fixed. Besides, as we are in expansion plan which calls for new programmes, courses being introduced, the demand on faculty in terms of numbers, for each department, is broadly governed by all the above factors and hence it is not possible to have a fixed number of faculty for each department. Recruitment of faculty, therefore, varies, based on departmental needs.

11. Faculty profile with name, qualification, designation, area of specialization, experience and research under guidance

Name	Qualification	Designation	Specialization	No of year of Experience	No of Ph.D/ M.Phil students guided for the last 5 years
Aditya P. Koley	PhD	Professor	Inorganic Chemistry, Coordination Chemistry, Bioinorganic and Biophysical Chemistry	26	Nil
Raghu Nath Behera	PhD	Associate Professor	Theoretical and computational chemistry	15	PhD students: 01 + 02 (co-supervisor) (all ongoing)
Sunil Bhand	PhD	Professor	Analytical and Bio-analytical Chemistry .	19	Ph.D. students:9 (Awarded 4 submitted 2 on-going 3)
Narendra Nath Ghosh	PhD	Associate Professor	Materials Science	15	PhD student: Total 7 (4 awarded + 3 ongoing)
Anjan Chattopadhyay	PhD	Associate Professor	Physical Chemistry (Theoretical & Computational Chemistry)	10.3	1 (ongoing)
P. Bhavana	PhD	Associate Professor	Inorganic chemistry	12	Total 2: 1 awarded 1 ongoing
RanjanDey	PhD, PGDMM	Associate Professor	Physical Chemistry	17	1 (ongoing)
Rabi Narayan Panda	PhD	Associate Professor	Solid state chemistry, Nanomaterials	16	2 (ongoing)
Halan Prakash	PhD	Associate Professor	Chemistry- Bioinorganic Photochemistry and mass spectrometry	12	Total 2: 1 submitted 1 ongoing
Tincy Lis Thomas	PhD	Assistant Professor	Photophysical Chemistry	11	0
Rashmi Chauhan	PhD	Assistant Professor	Organic Chemistry, Polymer Chemistry	9	1 (ongoing)
JAYADEVANK.P.	PhD	Assistant Professor	Physical Chemistry (Thermodynamics & Solid state chemistry)	13.5	0
Mainak Banerjee	PhD	Assistance Professor	Organic Chemistry	9	02 (ongoing)
Amrita Chatterjee	PhD	Assistance Professor	Organic Chemistry	9	01 + 01(co-supervisor) (all ongoing)

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Subhadeep Banerjee	PhD	Assistant Professor	Organic Chemistry	3.5	0
Venkatesan Samy Thimmakondu	PhD	Assistant Professor	Theoretical Chemistry	8	0
Tanmoy Mondal	PhD	DST-INSPIRE Faculty	Theoretical and Computational Chemistry	4.5	01 (ongoing)

12. List of senior Visiting Fellows, adjunct faculty, emeritus professors :_None_

13. Percentage of classes taken by temporary faculty – programme-wise information: _~3%_

14. Programme-wise Student Teacher Ratio (Refer to Support document for calculation)

M.Sc.(Hons.): 10.13:1

15. Number of academic support staff (technical) and administrative staff: sanctioned, filledand actual

	Technical	Administrative
Sanctioned	03	1
Filled	03	1

16. Research thrust areas as recognized by major funding agencies:
- Material Chemistry (Nanomaterials, Polymer and nano composites, Nano Chemistry, Solid state chemistry, Nano-magnetism)

- Sensors (Nanoparticle based, Chemical, Biosensor for food safety and quality, environmental monitoring (Water, Food), Immuno-sensors, Bio-MEMS, Micro fluidics for chemical and biological applications)

- Biotechnology, Environmental Chemistry, waste-water treatment

- Organic Synthesis, Green Chemistry, Heterogeneous Catalysis, Synthetic methodologies, Supramolecular chemistry

- Physical Chemistry, Theoretical & computational Chemistry, Computational organic photochemistry, Photophysical Chemistry

- Inorganic chemistry, Porphyrins

17. Number of faculty with ongoing/completed projects in the last five years from a) national b) international funding agencies and c) Total grants received. Give the names of the funding agencies, project title and grants received project-wise.

No. of completed project: 18, Amount: 880.9 L

No. of ongoing project: 16, Amount: 453.5 L

Completed projects:

SL	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration
1	Magnetic Properties of metallic nanoparticles	Rabi Narayan Panda	CSIR	20	July 11 – July 2014
2	Synthesis and Characterization of binary and ternary transition metal nitrides	Rabi Narayan Panda	DST	18.95	Nov 2011 – May 2015
3	Development of novel initiators for the controlled polymerization of itaconamic acid/ itaconimide monomers	Rashmi Chauhan	DST	19.866	Mar 2010 – Nov 2012
4	Synthesis and spectral, redox and solid state coordination properties of asymmetric and highly functionalized thienyl- and furyl-porphyrins	Bhavana. P.	DST	19.97	Feb 2008 – Feb 2011
5	Development of Nanostructured High Surface Area Alumina and Silica based adsorbent with Tailored Pore structure for Removal of Fluoride ions from Ground Water (Sanc no: 2010/37C/2/ BRNS/ 827)	N N Ghosh	BRNS	29.072	July 2010 – Mar 2014
6	Chemical modification of peptides., and photoenhanced antimicrobial activity	Halan Prakash	DBT	21.24	Mar 2010 – Jun 2013
7	Development of turn-on type Chemodosimer for Selective Recognition of Sulfhydryl-Containing Amino Acids and Peptides in aqueous media.	Amrita Chatterjee	DST Fast Track	19.866	Sep 2010 – Mar 2014
8	Development of biosensors and micro techniques for analysis of pesticide residues, aflatoxin, heavy metals and bacterial contamination in milk Project no. Comp 4/C10125. Partner Institute: IIT Delhi (Physics and CARE Department), NDRI Karnal, Panjab University Patiala	Sunil Bhand (Consortium Principal Investigator), Co-I from BITS Goa: NN Ghosh and AP Koley	NAIP, ICAR and The World Bank	3107.31, (BITS Goa share 450.47)	Jan 2008 – Jun 2014
9	Detection and mitigation of dairy pathogens and adulterants using chemical biology, Project No. C4/C30032	PI: Naveen K Navani, IIT Roorkee, Co-PI: Sunil Bhand (BITS, Goa)	NAIP, ICAR and The World Bank	695.73 (BITS Goa Share 91.34)	Feb 2009 – Mar 2014
10	"Redox-sensitive Vesicles of Cucurbit[7]urils as an Efficient Targeted Intracellular Drug Delivery Vehicle" (SR/FT/CS 023/2010, completed, April, 2014).	Mainak Banerjee	DST Fast Track	24.15	Oct 2010 – Apr 2014

11	Novel aza and oxa-aza selenamacrocycles: synthesis, metal complexes and anion binding, SR/FTP/CS-32/2006	A. Panda	DST Fast Track	20.32	Jan 2007 – May 2010
12	Development of a novel aqueous solution based "one pot" synthesis route for hard-soft-ferrite nano-composites and their properties.(ERIP/ER/0904500/M/01/1204)	N N Ghosh	DRDO	14.98	Apr 2010 – Apr 2013
13	Spectroscopic properties of some low-lying electronic states of alkali metal-rare gas and alkaline earth metal-rare gas molecules (PI)[Scheme No.- SR/FT/CS-052/2009	Anjan Chattopadhyay	DST	5.45	Apr 2010 – Apr 2013
14	Synthesis of Mesoporous Silica and Alumina based Oxide Materials (SR/S1/IC-39/2006)(SERC)	N N Ghosh	DST	21.794	Jul 2007 – Nov 2010
15	Preparation and characterization of Nano- Ferrite Powders and Polybenzoxazine-Nanoferrite Composite (ERIP/ER/060/5042/M/01/929)	N N Ghosh	DRDO	16.533	Apr 2010 – Apr 2013
16	Novel Schiff base macrocycle containing Se-Se bonds and their reduced analogues: synthesis, characterization, comparative coordination chemistry and theoretical studies	Arunashree Panda	DST (WSO-A scheme)	21.96	Jan 2011 – Oct 2014
17	Study of effective interactions in charged colloidal suspensions	R N Behera	CSIR	10.81	Feb 2012 – Feb 2015
18	Imprinted polymer for sensing and removal of selected antibiotic and pesticide residue" Project no. NFBSFARA/PHT-4007/2013-14, Partner 1 : CARE IIT Delhi, Partner 2: NDRI Karnal	Sunil Bhand (Consortium PI), Co-PI from BITS Goa: N N Ghosh	NFBSFARA, ICAR	125.26, BITS, Goa Campus funding share 54.39 lakh	Oct 2013 – Mar 2015

Ongoing Projects:

	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration
1	"Development of a field portable device for the analysis of environmental contaminants in water" (Ref. No. 36(2)/14/25/2014-BRNS/2329-15 dated 23 Jan 2015).	Sunil Bhand	BRNS	24.138	Jun 2015 – Mar 2018

3	Development and characterization of nanomaterials for biosensors and biocatalysts" (reference number INT/UK/UKIERI/P-41/2013)	UK PI: Prof Paul Milner, Indian PI: Prof N.N. Ghosh, Co-PI: Prof Sunil Bhand	UKIERI – DST (DST and British Council)	91 (BITS Share: 22.56)	May 2013 –May 2015 (applied for 6 months extension)
4	Chalcogen containing azomethine macrocycles and bicycles: synthesis, characterization, metal complexes and theoretical investigations of nature of intramolecular interactions between divalent chalcogen and nitrogen atoms. SR/WOS-A/CS-04/2014	A.Panda	DST (under WOS-A scheme)	24.3	Jan 2015 – Jan 2018
5	"Investigation on microstructures of hard-soft ferrite nanocomposites and influence of microstructure on their properties" (Ref: CSR-KN/CRS-68/2014-15/ 508)	NN Ghosh	UGC- DAE consortium	7.0	Sep 2014 – Sep 2017
6	"Development of Polymer-Ferrite (and/ or Graphene Nanocomposites having High Thermal Stability and Microwave Absorption Property for Radar Absorbing Coating Applications (ERIP/ER/1305004/01/1523)	NN Ghosh	DRDO	14.59	May 2014 – May 2017
7	An Investigation on Derivatives of meso Tetrathienylporphyrin as dye sensitized Solar cells (DSSCs)	Bhavana. P.	CSIR	17.11	Jan 2013 – Jan 2016
8	Synthesis of metal-organic-porous-Material Based Efficient Chiral Heterogeneous Catalysts by Post-Synthetic Modification and Their Applications in Asymmetric Reactions" (project no. 02(0075)/12/EMR-II, (Co-I Dr. Rahul Banerjee of NCL Pune)	Mainak Banerjee	CSIR	23	Feb 2013 – Feb 2016
9	"Spectroscopic investigation of the properties of low-lying electronic states of some chemopreventive retinylnitrones and their comparison with retinyliminium ions" (project no. 01(2681)/12/EMR-II)	Anjan Chattopadhyay	CSIR	14	Feb 2013 – Feb 2016
10	Prediction of Thermodyamic, Thermophysical, Transport, Thermoacoustical and Excess Properties for Binary, Multi Component Liquid Mixtures and Ionic Liquids(RTIL's)	Ranjan Dey	CSIR	12	Dec 2012 – Dec 2015

11	Nonadiabatic molecular processes on threefold electronic degeneracies	Tanmoy Mondal	DST, New Delhi	35 Lakhs +Rs. 80,000/- fellowship p.m. (with 3.3% increment every year), Total: ~86.27 Lakhs	Jan 2014 – Jan 2019
12	"Development of beta,beta'-Edge Fused pi-Elongated Donor-Acceptor Porphyrins Possessing Near-IR Optical Spectra" has been sanctioned from June 2014.	Subhadeep Banerjee	DST, New Delhi	22.6	Jun 2014 – Jun 2017
13	"Preparation of Magnetically Separable, Mesoporous TiO2 Catalysts and Study of their Catalytic Properties" CSIR Sanction letter No 02(147)/13/EMR-II)	N N Ghosh	CSIR	19.04	Feb 2014 – Feb 2017
14	Design of peptides and peptide bioconjugate., and Antimicrobial activity	Halan Prakash	Aditya Birla Group	14	Mar 2011 – Mar 2016
15	Structure and energetic of C7H2 and C9H2 Isomers: Quantam Chemical studies	V.S.Thimmakondu	DST, New Delhi	27.6	Sep 2015 – Sep 2018

Project funded by BITS:

S.No.	Title of the project	Name of Principal Investigator	Funding Agency	Sanctioned amount (Lakhs)	Duration
1	Rooftop rainwater harvesting for safe potable healthy drinking water and ground water replenishment for BITS Pilani campus	PI: Rajeev Gupta, BITS Pilani Campus, Co-PI: Sunil Bhand, Co-I : Utpal Roy	BITS Pilani	91 (Goa share 45 L)	May 2014 – Mar 2017

18. Inter-institutional collaborative projects and associated grants received
   (a) National collaboration:

1) **Multi-institute Consortium Project entitled "Development of biosensors and micro techniques for analysis of pesticide residues, aflatoxin, heavy metals and bacterial contamination in milk (Project no. Comp 4/C10125).**
   Funding Agency: National Agricultural Innovation Project, ICAR, India &The World Bank USA.

   - BITS, Pilani-KK Birla Goa Campus: Prof. Sunil Bhand (Consortium PI)
   - NDRI Karnal: Dr. Naresh Kumar Consortium (partner)
   - IIT Delhi: Prof Sudhir Chandra & Prof Ratnamala Chatterjee (partner)
   - Punjabi University Patiala: Prof Neelam Verma (partner)
   - Total Revised funding Rs 3107.318 lakh (USD 5 Million approx)
   - Project Funding Period: Feb 2008- June 30, 2014**.**

- BITS, Pilani-Goa Campus funding share Rs. 450.4799 lakh

2. Multi-institute Consortium Project entitled "Detection and mitigation of dairy pathogens and adulterants using chemical biology, Project No. C4/C30032
Funding Agency: National Agricultural Innovation Project "NAIP' financed by ICAR
(Govt of India & The World Bank, USA). Total funding amount: **Rs. 695.7363 lakh**
- BITS, Pilani-Goa Campus funding share Rs. 91.34975 lakh
- Funding period February 2009- March 30 2014
- IIT Roorkee: Dr Naveen K Navani (Consortium PI)
- BITS, Pilani-KK Birla Goa Campus: Dr. Sunil Bhand (Consortium Co-PI)
- NDRI Karnal: Dr. YS Rajput (partner)

3. Multi-institute Consortium Project entitled "Imprinted polymer for sensing and removal of selected antibiotic and pesticide residue" Project no. NFBSFARA/PHT-4007/2013-14
Funding Agency: National Funds for Basic and Strategic Research in Frontier Areas of Agricultural Science, ICAR, New Delhi
- BITS, Pilani-KK Birla Goa Campus: Prof. Sunil Bhand (Principal Investigator)
- BITS Goa, Co-Investigator (Prof. NN Ghosh)
- NDRI Karnal: Dr. Y.S. Rajput (Cooperating Centre PI, CCPI)
- IIT Delhi: Prof Sudhir Chandra (Cooperating Centre PI, CCPI)
- Total Sanctioned Amount: Rs. 125.25511 Lakh,
- Project Funding Period: 1st October 2013 to 31st March, 2015.
- BITS, Pilani-Goa Campus funding share Rs. 54.39110 lakh

4. Title of the project: "Development of field portable device for the analysis of contaminant in water"
Funded by BRNS, DAE Govt of India No.Ref No: (36)/14/25/2014-BRNS-445
- Funding &duration: Rs. 24.138 lakh : 3 years (start June 2015), Staff: 1 SRF
- Principal Investigator: Prof. Sunil Bhand (Dept of Chemistry, KK Birla Goa Campus)
- Principal Collaborator: Dr R. Balasubramaniam, Ashwin Rathod (PED, BARC) Dr VK Suri (MGM,Mumbai).

b) International collaboration
1. Joint Indo-UK project under UKIERI-DST Thematic research awards 2012, "Development and characterization of nanomaterials for biosensors and biocatalysts" (reference number INT/UK/UKIERI/P-41/2013). Duration 2 years (May 2013-May 2015) **Funding agency: UKIERI (**DST and British Council**) Amount: Rs 91 lakh**
- PI- UK: Prof Paul Millner (Faculty of Biological sciences) biocatalysis
- Indian PI BITS Goa: Prof. NN Ghosh (Department of chemistry) nanomaterials
- Co-PI BITS Goa: Prof Sunil Bhand (Department of Chemistry) nanobiosensors
- Prof. NN Ghosh: 4 visits: 06 Oct- 13 Oct 2013, 29th May to 10th June 2013, 19th July to 02 August 2014, 09 March to 19th March 2015.
- Prof. S. Bhand: 1 visit, June 2013 under UKREI-DST Project.

2 .Title: Functional composite materials and their application in smart textiles
 Funding Agency: The Swedish Research Council   Duration: 3 years (2014-2017)

- PI : Dr. Cedtic Dicko, Pure and Applied Biochemistry, Lund University Sweden
- Invited PI: Prof. Sunil Bhand (funding for Exchange visit of PI and researcher), BITS Goa

3.Erasmus+ Joint Master Degree Programme "Excellence in Analytical CHemistry - EACH" (http://www.analyticalchemistry.eu/**)**

- Department of Chemistry, BITS Pilani, KK Birla Goa Campus is one of the Associate Academic Partner.This program isfunded by European Union, Max.budget: ~2 milion Euro (2014). The EU Partners are University of Tartu,Uppsala, Claude Bernard Lyon 1 and Åbo Akademi. Admission open: Oct. 2014, 1st batch started: Sept. 2015.

19. Departmental projects funded by DST-FIST; UGC-SAP/CAS, DPE; DBT, ICSSR, AICTE, etc.; total grants received.

DST-FIST Grant: Total 68.5 L (50% from BITS), Sanctioned: May 2011, Start of the project: March 2013, Duration: 5 years

20. Research facility / centre with
- state recognition : None
- national recognition : None
- international recognition : None

21. Special research laboratories sponsored by / created by industry or corporate bodies : None

22. Publications:

Sl No.	Details	Specify number here
	Number of papers published in peer reviewed journals (national / international)	173
	Monographs	Nil
	Chapters in Books	07
	Edited Books	Nil
	Books with ISBN with details of publishers	Nil
	Number listed in International Database (For *e.g.* Web of Science, Scopus, Humanities International Complete, Dare Database - International Social Sciences Directory, EBSCO host, etc.)	173
	Citation Index – range / average	67- 1235/Avg 23
	SNIP range / average	0.044–3.553/0.93
	SJR range / average	0.126-4.091/0.814
	Impact Factor – range / average	0.5 – 12.239/ 2.82
	h-index	14

Details of the publications as per the number give above (Give details in the last five years:

SL No	Authors	Title of the Publications	Details of the Journal	National/International	Year
1	Manjuri K. Koley , Amrita Chatterjee, Anjan Chattopadhyay, PeriakaruppanT. Manoharan, and Aditya P. Koley	Spectroscopic studies for the changes of a Cr(II) compound in solution triggered by the deprotonation of an aqua ligand.	Journal of Coordination Chemistry, 68 (12), 2065–2095	International	2015
2	Debabrata Moitra, Subhenjit Hazra, Barun Kumar Ghosh, Manoj Kumar Patra, Raj Kumar Jani, Sampat Raj Vadera, Narendra Nath Ghosh	A facile low temperature method for the synthesis of $CoFe_2O_4$ nanoparticles possessing excellent microwave absorption properties	RSC Advances, 5, 51130–51134	International	2015
3	Bhanudas Naik, Debabrata Moitra, Desagani Dayananda, Subhenjit Hazra, Barun Kumar Ghosh, Sivankutty Vadakkethonippurathu Prasad, Narendra Nath Ghosh	A facile method for preparation of TiO_2 nanoparticle loaded mesoporous γ- Al_2O_3: An efficient but cost-effective catalyst for dye degradation	Journal of Nanoscience and Nanotechnology (Accepted on May 7, 2015)	International	2015
4	Bhanudas Naik, Subhenjit Hazra, Dayananda Desagani, Barun Kumar Ghosh, Manoj Kumar Patra, Sampat Raj Vadera, Narendra Nath Ghosh	Preparation of magnetically separable $CoFe_2O_4$ supported Ag nanocatalysts and catalysis reaction towards decolorization of variety of dyes	RSC Advances, 5, 40193–40198	International	2015
5	Subhenjit Hazra, Hrishikesh Joshi, Barun Kumar Ghosh, Asif Ahmed, Timothy Gibson, Paul Millner and Narendra Nath Ghosh	Development of a novel and efficient H_2O_2 sensor by simple modification of a screen printed Au electrode with Ru nanoparticle loaded functionalized mesoporous SBA15	RSC Advances, 5, 34390- 34397	International	2015

6	Subhenjit Hazra, Barun Kumar Ghosh, Manoj Kumar Patra, Raj Kumar Jani, Sampat Raj Vadera, Narendra Nath Ghosh	A Novel 'One-Pot' Synthetic Method for Preparation of $(Ni_{0.65}Zn_{0.35}Fe_2O_4)_x$-$(BaFe_{12}O_{19})_{1-x}$ nanocomposites and Study of their Microwave absorption and Magnetic properties	Powder Technology, 279, 10–17	International	2015
7	Mayank Pandey, Girish M Joshi, Kalim Deshmukh, Narendra Nath Ghosh, N Arunai Nambi Raj	Electrical conductivity, optical properties and mechanical stability of 3, 4, 9, 10-Perylenetetracarboxylic Dianhidride based organic semiconductor,	Journal of Physics and Chemistry of Solids (doi:10.1016/j.jpcs.2015.01.002 Accepted 2015).	International	2015
9	Bhanudas Naik, Subhenjit Hazra, Desagani Dayananda, V. S. Prasad, and Narendra Nath Ghosh	Preparation of TiO_2 Nanoparticle Loaded MCM-41 and Study of Its Photo-Catalytic Activity Towards Decolorization of Methyl Orange	Journal of Nanoscience and Nanotechnology (doi:10.1166/jnn.2015.10904), 15, 6669-6674	International	2015
10	Subhenjit Hazra, Barun Kumar Ghosh, Manoj Kumar Patra, Raj Kumar Jani, Sampat Raj Vadera, Narendra Nath Ghosh	'One-Pot' Synthetic Method for preparation of $(NiFe_2O_4)_x$-$(SrFe_{12}O_{19})_{1-x}$ nanocomposites and their Microwave absorption properties	Journal of Nanoscience and Nanotechnology(doi:10.1166/jnn.2015.10491), 15, 6559-6567	International	2015
11	Barun Kumar Ghosh, Subhenjit Hazra, Bhanudas Naik, Narendra Nath Ghosh	Preparation of Ru nanocatalysts supported on SBA-15 and their Excellent Catalytic Activity towards Decolorization of Various Dyes	Journal of Nanoscience and Nanotechnology(doi:10.1166/jnn.2015.10650),15, 6516-6523	International	2015
12	Desagani Dayananda, Venkateswara R. Sarva, Sivankutty V. Prasad, Jayaraman Arunachalam, Padmanabhan Parameswaran, Narendra N. Ghosh	Synthesis of MgO nanoparticle loaded mesoporous Al_2O_3 and its defluoridation study	Applied Surface Science, 329, 1-10	International	2015
13	Barun Kumar Ghosh, Subhenjit Hazra, Bhanudas Naik, Narendra Nath Ghosh	Preparation of Cu nanoparticle loaded SBA-15 and their Excellent Catalytic Activity in Reduction of Variety of Dyes	Powder Technology, 269, 371–378	International	2015

14	Desagani Dayananda, Swapnil Gupta, Venkateswara R. Sarva, Sivankutty V. Prasad, Jayaraman Arunachalam, Narendra N. Ghosh	Preparation of ZrO_2 nanoparticle loaded mesoporous Al_2O_3: A promising adsorbent for defluoridation of water,	Science Letters, 4, 105	International	2015
16	Desagani Dayananda, Venkateswara Rao Sarva, Sivankutty Vadakkethonippurat hu Prasad, Jayaraman Arunachalam, Narendra Nath Ghosh	A simple aqueous solution based chemical methodology for preparation of mesoporous alumina: Efficient adsorbent for defluoridation of water	Particulate Science and Technology, 33, 8–16	International	2015
17	S. Banerjee, A. Chattopadhyay, A. Banerjee, M. M. Haridas, P. Saini, M. Das, M. S. Majik, Y. Kr. Mauyra,	Synthesis and photophysical characterization of quasi push-pull dicyanodibenzodioxins and their anti-tumor activity against glioma cell line C6	Bioorganic & Medicinal Chemistry Letters, 25, 753-757	International	2015
18	Gokulakrishnan Subramanian, Pranav Nalwade, Steven J. Hinder, Suresh C. Pillai, Halan Prakash.	Nickel azamacrocyclic complex activated persulphate based oxidative degradation of methyl orange: Recovery and reuse of complex using adsorbents	RSC Advances, 5, 31716–31724	International	2015
19	Amrita Chatterjee, Dipratn G. Khandare, Praveen Saini, Anjan Chattopadhyay, Mahesh S. Majik and Mainak Banerjee,	Amine functionalized tetraphenylethylene: A novel aggregation–induced emission based fluorescent chemodosimeter for nitrite and nitrate ions,	RSC Advances, 5, 31479-31484	International	2015
20	Praveen Saini and Anjan Chattopadhyay	"Revealing the active role of the terminal CNO moiety in the photochemical oxaziridine conversion process of some chemopreventive retinyl nitrones through hybrid QM:QM and QM:MM ONIOM calculations	Chemical Physics Letters, 633, 6-12	International	2015
21	Praveen Saini and Anjan Chattopadhyay	A comprehensive spectroscopic investigation of α-(2-naphthyl)-N-methylnitrone: A computational study on photochemical nitrone-oxaziridine conversion and	RSC Advances, 5, 22148-22159	International	2015

		thermal E-Z isomerization processes			
22	Praveen Saini and Anjan Chattopadhyay	A computational investigation of the photochemical oxaziridine and amide conversion process of open-chain conjugated nitrone with electron-withdrawing trifluoromethyl group on nitrogen	Journal of Chemical Sciences (DOI 10.1007/s12039-015-0941-8)	International	2015
23	Souvik Pal, Sunil Bhand	Zinc oxide nanoparticle-enhanced ultrasensitive chemiluminescence immunoassay for the carcinoma embryonic antigen	Microchim Acta, 182,1643-1651	International	2015
24	Souvik Pal, Manoj Sharma, Ratnamala Chatterjee, Sunil Bhand,	Multi-platform nano-immunosensor for aflatoxin M1 in milk	Materials Research Express, 2(4); 045010. (doi:10.1088/2053-1591/2/4/045010)	International	2015
25	Pranali P Naik, Geetesh Kumar Mishra, Bengt Danielsson, Sunil Bhand	Android integrated urea biosensor for public health awareness	Sensing and Bio-Sensing Research, 3,12-17	International	2015
26	Rupesh K. Mishra, Gustavo A. Alonso, Georges Istamboulie, Sunil Bhand, Jean-Louis Marty	Automated flow based biosensor for quantification of binary organophosphates mixture in milk using artificial neural network	Sensors and Actuators B: Chemical, 208, 228-237	International	2015
27	Geetesh K. Mishra, Atul Sharma, Sunil Bhand	Ultrasensitive detection of streptomycin using flow injection analysis-Electrochemical quartz crystal nanobalance (FIA-EQCN) biosensor	Biosensors and Bioelectronics, 67, 532–539	International	2015
28	Geetesh K Mishra, Gautam Bacher, Utpal Roy, Sunil Bhand	A label free impedemetric immunosensor for detection of Escherichia coli in water	Science Letters, 4,76	International	2015
29	Bhagaban Behera, Souvik Pal, Lizy Kanungo, Sunil Bhand, Sudhir Chandra	Synthesis and characterization of ZnO-$ZnAl_2O_4$whiskers and their application in biosensors	J. Nanoscience Letters, 4, 102	International	2015

30	R. Prasath, P. Bhavana	Electronic and conformational features of derivatives of meso-thien-2-ylporphyrins on protonation and perbromination	Journal of Molecular Structure, 1079, 486–493	International	2015
31	R. Prasath, P. Bhavana, S. Sarveswari, S. W. Ng, E. R.T. Tiekink	Efficient ultrasound-assisted synthesis, spectroscopic, crystallographic and biological investigations of pyrazole-appended quinolinyl chalcones	Journal of Molecular Structure, 1081, 201–210	International	2015
32	R. Prasath, P. Bhavana	Conformational features of meso-tetrathienylporphyrins and photosensitising properties of their b-1-acetyl-2-oxopropyl derivatives	Journal of Molecular Structure, 1094, 73–82	International	2015
33	R. Prasath, P. Bhavana	Electronic and conformational features of meso-5-aminothien-2-ylporphyrins and its ferrocene coupled dyad and triads	Journal of Organometallic Chemistry, 794, 181–187	International	2015
34	H. Kumar, V. Devaraji, R.aj Prasath, M. Jadhao, R. Joshi, P. Bhavana, S. K. Ghosh	Groove binding mediated structural modulation and DNA cleavage by quinoline appended chalcone derivative	Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy, 151, 605–615	International	2015
35	H. Kumar, V. Devaraj, R. Joshi, M. Jadhao, P. Ahirkar, R. Prasath, P. Bhavana, S. K. Ghosh	Antihypertensive Activity of a Quinoline Appended Chalcone Derivative and its Site Specific Binding Interaction with Relevant Target Carrier Protein	RSC Advances, 5, 65496-65513	International	2015
36	Vikash Kumar, Amrita Chatterjee and Mainak Banerjee	A mild and efficient route to 3-vinylchromones in aqueous micellar media,	Synthetic Communications,DOI:10.1080/00397911.2015.1084008	International	2015
37	Ranjan Dey, Aditya Harshavardhan and Shashwat Verma	Viscometric Investigation Of Binary, Ternary and Quaternary Liquid Mixtures: Comparative evaluation of Correlative and Predictive models.	Journal of Molecular Liquids, 211, 686-694	International	2015
38	M.Srilakshmi, K. Narendra, T. Srinivasa Krishna, Ranjan Dey and A. Ratnakar	Influence of alkyl group and temperature on excess thermodynamic properties of diethylcarbonate and their binary mixtures at 0.1MPa.	Journal of Molecular Liquids, 211, 854-867	International	2015

39	Ranjan Dey, K. S. Raghuvanshi, A. Saini, A. Harshavardhan	Acoustical, thermophysical and excess properties of binary and higher order multicomponent liquid mixtures .	International Journal of Scientific Research, 251-257	International	2015
40	T. Mondal and A. J. C. Varandas	Structural evolution of the methane cation in subfemtosecondphotodynamics	The Journal of chemical physics, 143 (1), 014304 (doi: 10.1063/1.4922906)	International	2015
41	Shankar B. Dalavi and Rabi N. Panda	Structural and magnetic properties of single domain PEG coated FexNi80−xCo20 (x=20, 40) ternary alloys synthesized by chemical method	Transactios of the Indian Institute of Metals, 68, 253-257	International	2015
42	Shankar B. Dalavi and Rabi N. Panda	Magnetic properties of nanocrystalline Co and Ni synthesized via superhydride reduction route	Journal of Magnetism and Magnetic Materials, 374, 411-416	International	2015
43	Shankar B. Dalavi and Rabi N. Panda	Magnetic properties of nano-structured Co and Ni synthesized by modified $NaBH_4$ reduction route	Particulate Science and Technology, 33(1), 97-101	International	2015
44	S. Panda,A. Panda and S. S. Zade,	Organoselenium compounds as fluorescent probes	Coordination Chemistry Reviews, 300, 86-100	International	2015
45	Subhenjit Hazra, Barun Kumar Ghosh, Hrishikesh Ravindra Joshi, Manoj Kumar Patra, Raj Kumar Jani, Sampat Raj Vadera, Narendra Nath Ghosh	Development of a Novel 'One-Pot' Synthetic Method for Preparation of $(Mn_{0.2}Ni_{0.4}Zn_{0.4}Fe_2O_4)_x$-$(BaFe_{12}O_{19})_{1-x}$ nanocomposites and Study of their Microwave Absorption and Magnetic Properties	RSC Advances, 4, 45715- 45725	International	2014
46	Banasree Sarma, Debraj Dhar Purkayastha, Subhenjit Hazra, Lohit Gogoi, Chira R. Bhattacharjee, Narendra Nath Ghosh, Jayashree Rout,	Biosynthesis of fluorescent gold nanoparticles using an edible freshwater red alga, Lemanea fluviatilis (L.) C.Ag. and antioxidant activity of biomatrix loaded nanoparticles	Bioprocess and Biosystems Engineering, (DOI 10.1007/s00449-014-1233-2)1-7 (2014)	International	2014
47	Desagani Dayananda, Venkateswara R. Sarva, Sivankutty V. Prasad, Jayaraman Arunachalam and Narendra N. Ghosh	Al_2O_3: Efficient adsorbent for fluoride removal from water"	Chemical Engineering Journal, 248, 430–439	International	2014

48	Mayank Pandey, Girish M. Joshi, Kalim Deshmukh, Moumita Khutia, Narendra Nath Ghosh	Optimized AC Conductivity co-related to structure, morphology and thermal properties of PVDF/PVA/Nafion composites.	Ionics, 20, 1427–1433	International	2014
49	Banasree Sarma, Debraj Dhar Purkayastha, Subhenjit Hazra, Lohit Gogoi, Chira R. Bhattacharjee, Narendra Nath Ghosh, Jayashree Rout	Biosynthesis of gold nanoparticles using a freshwater green alga, Prasiola crispa,	Materials Letters, 116, 94–97	International	2014
50	S Hazra and NN Ghosh	Preparation of Nanoferrites and Their Applications	Journal of Nanoscience and Nanotechnology, 14, 1983–2000	International	2014
51	Desagani Dayananda, Vilas Desai, Bhanudas Naik, Meenal Kowshik, Vadakkethonippurathu Sivankutty Prasad, Narendra Nath Ghosh,	Ag Nanoparticle Loaded Mesoporous γ-Al$_2$O$_3$ and their Antibacterial Property	Journal of Nanoscience Letters, 4(15), 1- 5	International	2014
52*	M. Zeller, S. Banerjee, C. Brückner,	Oxazolochlorins 14. 8-Oxo-5,10,15,20-Tetraphenyl-7-oxa-porphyrin 24-N-oxide	Acta Crystallographica, C70, 707–711	International	2014
53	Megha Subhash Deshpande, Sendy Junedi, Halan Prakash, Satoshi Nagao, Masaru Yamanaka, Shun Hirota,	DNA cleavage with oxymyoglobin and cysteine-introduced 4 Metmyoglobin	Chemical Communications, 50, 15034-15036	International	2014
54	Subhenjit Hazra, Shruti Balaji, Mainak Banerjee, Anasuya Ganguly, Narendra Nath Ghosh and Amrita Chatterjee	A PEGylated-Rhodamine based sensor for "turn-on" fluorimetric and colorimetric detection of Hg2+ ions in aqueous media	Analytical Methods, 6, 3784–3790	International	2014
55	Vikash Kumar, Amrita Chatterjee, Nupur Kumar, Anasuya Ganguly, Indranil Chakraborty and Mainak Banerjee	D-Glucose Derived Novel Gemini surfactants: Synthesis and Study of Their Surface Properties, DNA Binding, and Cytotoxicity,	Carbhydrate Research, 397, 37–45	International	2014

56	Mahesh S. Majik, Supriya Tilvi, Stacey Mascarenhas, Vikash Kumar, Amrita Chatterjee and Mainak Banerjee	Construction and screening of 2-aryl benzimidazole library identifies a new antifouling and antifungal agent,	RSC Advances, 4, 28259–28264	International	2014
57	Dipratn G. Khandare, Hrishikesh Joshi, Mainak Banerjee, Mahesh S. Majik and Amrita Chatterjee	An aggregation-induced emission based "turn-on" fluorescent chemodosimeter for the selective detection of Pb2+ ions,	RSC Advances, 4, 47076-47080	International	2014
58	Himank Kumar, Anjan Chattopadhyay, R. Prasath, Vinod Devaraji, Ritika Joshi, P. Bhavana, Praveen Saini, and Sujit Kumar Ghosh	Design, Synthesis, Physicochemical Studies, Solvation, and DNA Damage of Quinoline-Appended Chalcone Derivative: Comprehensive Spectroscopic Approach toward Drug Discovery	The Journal of Physical Chemistry B, 118, 7257-7266	International	2014
59	Praveen Saini and Anjan Chattopadhyay	Spectroscopic features of the low-lying singlet states of some N-alkyl retinylnitrone model systems and their involvement in oxaziridine formation	RSC Advances, 4 20466-20478	International	2014
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163	Sunil G Bhand, Srimathi Soundararajan, Ioana Surugiu-Wärnmark, Jaqueline Simona Milea, Estera Szwajcer Dey, Maria Yakovleva, Bengt Danielsson	Fructose-selective calorimetric biosensor in flow injection analysis	Analytica Chimica Acta, 668(1), 13-18	International	2010
164	Rupesh K. Mishra, Deshpande Kanchanmala, Bhand Sunil	A High-Throughput Enzyme Assay for Organophosphate Residues in Milk	Sensors, 10, 11274-11286	International	2010
165	Deshpande Kanchanmala, Rupesh K. Mishra, Bhand Sunil	A High Sensitivity Micro Format Chemiluminescence Enzyme Inhibition Assay for Determination of Hg(II)	Sensors, 10(7), 6377-6394	International	2010
166	K. Deshpande, R.K. Mishra, S. Pal, B. Danielsson, M. Willander, S. Bhand	A novel on chip analysis of dissolved Hg(II) in drinking water	Nanotech, 3, 133-136	International	2010
167	R. Prasath, P. Bhavana, A. M. Butcher, R. J. Butcher, J. P. Jasinski	N^1,N^2-Bis[(2-chloro-6-methylquinolin-3-yl)methylidene]ethane-1,2-diamine	Acta Crystallographica Section E, E66, o2869	International	2010
168	R. Prasath, P. Bhavana, S. W. Ng, E. R. T. Tiekink	N,N'-Bis[(E)-(5-chloro-2-thienyl)methylidene]ethane-1,2-diamine	Acta Crystallographica Section E, E66, o2883	International	2010
169	R. Prasath, P. Bhavana, S. W. Ng, E. R. T. Tiekink	N,N'-Bis[(E)-(3-methyl-2-thienyl)methylidene]ethane-1,2-diamine	Acta Crystallographica Section E, E66, o2884	International	2010

170	R. Prasath, P. Bhavana, S. W. Ng, E. R. T. Tiekink	N,N'-Bis[(E)-(2-chloro-8-methylquinolin-3-yl)methylidene]ethane-1,2-diamine	Acta Crystallographica Section E, E66, o3123	International	2010
171 *	K. Kim, M. Banerjee, M. Young, S. Das,	Chiral Metal-Organic Porous Materials: Synthetic Strategies and Applications in Chiral Separation and Catalysis,	Topics in Current Chemistry, 293, 115–153	International	2010
172	R. Chauhan, V. Choudhary	Microstructure determination of methyl methacrylate-N-arylsubstituted itaconimide copolymers by NMR spectroscopy	Journal of Applied Polymer Science,115,491-497	International	2010
173	S. S. Baral, P.V. Rao, Ranjan Dey and Srikant Mutnuri,	Biogas Generation Potential by Anaerobic Digestion for Sustainable Energy Development in India ,	Renewable and Sustainable Energy Reviews, 14(7),2086-2094	International	2010

*Articles without BITS affiliation

23. Details of patents and income generated: Nil

1. Bhand Sunil, Pal Souvik, A biosensor kit for detection and analysis of chemical pollutants, Indian Patent Application No. 3456/MUM/2013 Date of filing: 31 October 2013 (CS filed Oct. 2014).

2. Bhand Sunil, Chandra Sudhir, Pandya Hardik, Bacher Gautam & Kanungo Lizy, "Device for Analysis of Mycotoxins" Filed as (a) Indian Patent Application No.1203/MUM/2013 filed on 28 March 2013 (b) PCT International Application PCT/IN2014/000176, Publication number WO2014155391 A2, Publication date 2 Oct. 2014 also published as WO2014155391A3.

3. Bhand Sunil, Chandra Sudhir, Pandya Hardik, Tiwari Ruchi, Mishra Rupesh Kumar "Analyte Sensor Chips" Filed as;
   (a) Indian patent appl. no 933/MUM/2012 "Dt. 29/03/2012, Complete specifications for 933/MUM/2012 filed on 28.03.2013. (Published-The Patent Office Journal 22/11/2013, 29174)
   (b)Australian Innovation patent application no. 2013100381, filed on 28 March 2013 based on Indian Patent application no. 933/MUM/2012 dated 29.03.2012. (Patent Granted)
   (c) PCT International Application No. PCT/IN2013/000205, Date of Filing: 28 March 2013. Published as WO 2013/164853 A2 November 07, 2013 also published as WO2013164853 A3 January 09, 2014.
   (d) US Patent Application No. 14/404,362 (filed 26 Nov 2014).

24. Areas of consultancy and income generated:

Organic Synthesis and Isolation of Natural Products, 2.5 lakhs
Project Name: "Isolation of Natural Products from Kokum", from 1/6/14 to 31/12/14.
PI: Mainak Banerjee; Funding agency: Kurade Agro, Goa

25. Faculty selected nationally / internationally to visit other laboratories / institutions industries in India and abroad

1. Dr. N. N. Ghosh visited University of Limoges, France, 13-17, December 2010. Funded by ENSIL, University of Limoges (France).
2. Dr. N. N. Ghosh visited University of Birmingham, School of Metallurgy and Materials UK. Invited by Professor G F Fernando for collaborative research related to Research Exchanges with China and India award. Visit was sponsored by The Royal Academy of Engineering (UK). [Two visits: 25-July to 01-August-2010; 27-31st July 2011].
3. Dr. Halan Prakash visited NAIST, Japan (NAIST fellowship (to visit NAIST for short term research during May-July, 2011), a competitive grant .
4. Dr. S. Bhand visited Acromed Invest AB (A Swedish Incubator Company) and Consultancy Firm in Sweden as a Visiting Scientist from June-Aug 2011 (awarded by ICAR Govt of India).

26. Faculty serving in National committees b) International committees c) Editorial Boards d) any other (please specify)

a) National Committee:

- o Dr. N. N. Ghosh, Member Expert in Chemistry for selection of candidates for Commonwealth Scholarship UK, Nominated by Ministry of Human Resource Development, Government of India.
- o Dr. N. N. Ghosh, Member of CSIR SRF/RA Selection Committee as Subject Expert in the area of "Material Chemical Sciences (CHEM/24)" 2012 and 2013
- o Dr. Halan Prakash, Executive Member, SECAS, Society for Environmental chemistry and allied Sciences, M.G. University, Kerala
- o Dr. S. Bhand, Member, Expert Committee in DBT for the area of biosensors
- o Dr. S. Bhand, Expert Member, 5th SERC School on X-Ray Lithography and Synchrotron Radiation RRCAT Indore 2012.

b) International Committee: None

c) Member of Editorial Board of International Journals:
- o Dr. N. N. Ghosh, Science Letters Journal (Previously named as Journal of Nanoscience Letters) Published by Cognizure (2012-15).
- o Dr. N. N. Ghosh, Journal of Chemical Engineering and Material Science Published by Academic Journals (2012-15) ,

- o Dr. N. N. Ghosh, International Scholarly Research Notices (Materials Science) Published by Hindawi Publishing Corporation (2012-15).
- o Dr. S. Bhand, Member of Editorial Board, Chemical Sensor (2012, 2013)
- o Dr. S. Bhand, Associate Editor, Chemical Sensors (2014)
- o Dr. S. Bhand, Senior Editor, Chemical Sensors (2014 onwards)
- o Dr. R. Chauhan, Member of Editorial Board, ISST Journal of Applied Chemistry (IJAC)
- o Dr. R. N. Panda had served editorial board of J. Nano Mataterials as guest editor on a special issue 'Advanced Nanoporous Materials: Synthesis, Properties, and Applications'(2014-15).

d) Any other:

Dr. Venkateshan visited Alagappa Chettiar College of Engineering & Technology, Karaikudi -630 004, India, November 18-20, 2013 as a resource person for the "Research and Consultancy Activities under Technical Education Quality Improvement Program II (TEQIP II)".

27. Faculty recharging strategies (UGC, ASC, Refresher / orientation programs, workshops, training programs and similar programs).

1) Research Initiation Grant
The Research Initiation Fund is designed to enable the beginning of research and related activities for a newly recruited faculty who has significant potential to attract external funding. The following faculty members have availed this grant.
- a) Subhadeep Banerjee, Title: Development of Novel Polycyclic Heteroaromatic Push-Pull Type Chromophores Possessing Near-IR Optical Spectra, 2 lakhs, Year: May, 2013- May, 2015.
- b) Venkatesan S. Thimmakondu, Title: Non-adiabatic Dynamics of Molecules in Ground and Excited Electronic States, 2 lakhs, Year: Nov. 2013- Nov. 2015.

2) Sabbatical Scheme
- a) Dr. N. N. Ghosh visited University of Drexel, Department of Chemical and Biological Engineering, Philadelphia, USA: Visiting Research Professor, Research in the field of Advanced Polymer: Visit was sponsored by: Department of Chemical and Biological Engineering, Drexel University and Sabbatical Program of BITS Pilani (January 2012- June 2012).
- b) Dr. Rashmi Chauhan completed her one year sabbatical from (Prof. Kenneth J Shea Lab) Dept. of Chemistry, University of California USA (2013-2014).

3) Immersion Programs
- • Dr. Halan Prakash, visited NIIST, CSIR, Kerala under **Industry Immersion Program** June-July, 2015.
- • Dr. A. Chattopadhyay visited Institute of Physical Chemistry, Theoretical Chemistry Group, University of Heidelberg, Germany for some

collaborative research work under the **University Immersion Program** of BITS-Pilani, June-July 2015.

4) Professional Development Allowance:
The institute provides Rs 100,000/- per year to each faculty member for expenses related to research, attending national & international conference etc.

Recently, the following faculty members availed this for attending international conferences:

- R. N. Behera attended 4th International Conference on Research Frontiers in Chalcogen Cycle Science & Technology, Delft, The Netherlands, May 28 – 29, 2015 and presented paper entitled "Computational study of E…N (E = Se/Te) Intramolecular Interactions in Diaryl Dichalcogenides: Effect on E–E Bond Strength and Antioxidant Activity".

- R. Dey attended the 19th Symposium on Thermophysical Propertiesorganized by NIST, at Colorado University, Boulder, Colorado , USA held on 20th - 26th June 2015 and presented a paper entitled "Transport, Optical, Interfacial And Thermodynamic Properties Of Binary And Ternary Liquid Mixtures".

- N. N. Ghosh visited Banff, Canada: 21st August to24th August 2011 for paper Presentation in The International Symposium: NANOPOROUS MATERIALS VI, Visit was co-funded by CICS, UGC and DST.

5) Industry Day: The institute has engaged in intensifying its contact with industry to leverage industry sponsored projects to keep faculty competence in line with industry and societal needs.
Dr. R. N. Behera and Dr. N. N. Ghosh have visited Hyderabad Campus under this program.

6) To encourage research, the institute gives back 60% of the overhead obtained from the sponsored projects to the respective Investigator for their professional development.

28. Student projects
- percentage of students who have done in-house projects including inter-departmental projects: 100%

- percentage of students doing projects in collaboration with other universities /industry / institute: 100%

29. Awards / recognitions received at the national and international level by

Faculty:
- o Newton Research Collaboration Programme award to Dr. N. N. Ghosh by The Royal Academy of Engineering (UK) 2015. Collaboration with University of Birmingham, UK).
- o Research Exchanges with China and India award to Dr. N. N. Ghosh by The Royal Academy of Engineering (UK) 2010. Collaboration with University of Birmingham, UK, amount : GBP 2870 (Received by University of Birmingham, UK)
- o Outstanding Reviewer Awarded to Dr. N. N. Ghosh by Materials Chemistry and Physics, An International, Interdisciplinary Journal on Science, Characterization and Processing of Advanced Materials. He had also become the "Top Cited Author for 2010 : By *Powder Technology"* for the paper "P P Sarangi, B Naik, S R Vadera, M K Patra, C Prakash and N N Ghosh[*], Synthesis and Characterization of Pure Single phase Ni-Zn Ferrite Nanopowders By Oxalate Based Precursor Method, *Powder Technology* 203, 348-353 (2010)". He received the Top Cited Papers for 2011 and 2012 award for the paper B Naik, S Hazra, V S Prasad and N N Ghosh*, Synthesis of Ag nanoparticles within the pores of SBA-15: an efficient catalyst for reduction of 4-nitrophenol, *Catalysis Communications* 12, 1104–1108 (2011).
- o Dr. TanmoyMondal received INSPIRE Faculty award by DST, New Delhi in 2013.

Students:
- o Rupesh Mishra, Research Associate, Dept. of Chemistry was awarded Indo-French sandwich Ph.D. Fellowship for six months (June-Nov 2011) to work in the field of Biosensors at University of Perpignan, France with Prof J-L Marty.
- o Dr Rupesh Mishra, has been awarded Post-doctoral Fellowship at Aix Marseille Université, France (June 2013).
- o Atul Sharma Received Erasmus Mundus Fellowship in October 2014 to carry out his doctoral work at University of Perpignen France.
- o Mr. Gokulakrishnan, and Meera Haridas participated and won the best Poster award in The third international conference on Advanced Oxidation Processes Sep 25-28, 2014, MG University Kerala. Poster title is Degradation of dyes by Potassium persulphate, its enhancement by 1,8-dimethyl-1,3,6,8,10,13-hexaazacyclotetradecane nickel(II) perchlorate complex: Removal of toxicity.
- o Dr. Halan Prakash,Priyadarshini Prakash and Subramanian Gokulakrishnan won the Best poster award in the meeting, Indo-UK Perspective on Water Quality: Threats, Technologies and Options organized by Royal Society of Chemistry, UK, and held at Indian Institute of Science (IISc), Bangalore, August 13-14, 2013.
- o Rupesh Mishra, Research Associate, Dept. of Chemistry was awarded Indo-French sandwich Ph.D. Fellowship for six months (June-Nov 2011) to work in the field of Biosensors at University of Perpignan, France with Prof J-L Marty.

- o The following research scholars have received national scholarships:
  - o Subhenjit Hazra (CSIR SRF fellowship), Bhanuda Naik (CSIR SRF fellowship, R. Prasath (CSIR SRF fellowship), Gokulakrishnan Subramanian (CSIR fellowship), Vikash Kumar (CSIR SRF), Dipratn G. Khandare (NET LS), Shankar Balu Dalavi (SET (Maharastra State), Chetana Deogare (CSIR SRF), Zigmee T. Bhutia (DST INSPIRE Fellow).
- o Tarun Khanna, anundergraduate student has received Marie-Curie Fellowship for PhD. He is pursuing his PhD at Imperial College, London, UK.

30. Seminars/ Conferences/Workshops organized and the source of funding (national/ international) with details of outstanding participants, if any.

1. INDO- UK INTERNATIONAL WORKSHOP ON ADVANCED MATERIALS AND THEIR APPLICATIONS IN NANOTECHNOLOGY (AMAN 2014)held at BITS Pilani, KK Birla Goa campus May 17- 19th 2014
Sponsors of the event: DST (International Division)- Govt. of India New Delhi, BRNS – Dept. of Atomic Energy, DSTE- Govt. of Goa, Cognizer, Indian Oil Corporation Ltd, Beckman Coulter, Malvern Aimil, Kunash Instruments, Toshvin Analytical, Bio-Lab India, BITS Pilani KK Birla Goa Campus.

   Names of prominent invited speakers:
   - o Plenary Lecture: Prof. Lars J.C. Jeuken, University of Leeds, UK)
   - o Prof. Paul A. Millner University of Leeds, UK
   - o Dr. Tim Gibson Robo Scientific Ltd & University of Leeds, UK
   - o Prof. Olof Karis, Uppsala University, Sweden
   - o Prof. Hai-Feng Ji Department of Chemistry, Drexel University, USA
   - o Prof. Bengt Denielson Acromed Invest AB, Lund, Sweden
   - o Prof. D. D. Sarma Indian Institute of Science, Bangalore , India
   - o Prof. A M Umarji Indian Institute of Science, Bangalore , India
   - o Dr. Srinivas Darbha CSIR-National Chemical Laboratory, Pune, India
   - o Prof Panchanan Pramanik Indian Institute of Technology, Kharagpur, India
   - o Prof. Ratnamala Chatterjee Indian Institute of Technology, Delhi
   - o Prof. Sudhir Chandra Indian Institute of Technology, Delhi, India
   - o Dr. P. Parameswaran Indira Gandhi Centre for Atomic Research, Kalpakkam,
   - o Dr. Hirendra N. Ghosh Bhabha Atomic Research Centre, Mumbai, India
   - o Dr. R. Mukhopadhyay Bhabha Atomic Research Centre, Mumbai, India
   - o Prof. Durga Basak Indian Association for the Cultivation of Science, India,
   - o Dr. K.M. Parida CSIR-Institute of Minerals and Materials Technology, India
   - o Dr. Sounindra Mahanty CSIR-Central Glass & Ceramic Research Institute
   - o Dr. M.I.S. Sastry IOCL, New Delhi.

2. **International Conference on "Emerging Technologies: Micro to Nano 2013"** (**ETMN-2013**) Organized jointly by BITS, Pilani and CEERI, Pilani at KK Birla Goa Campus India Feb 23 and 24, 2013 (Program Co-Chair : Prof. Sunil Bhand BITS Goa, Prof. NN Sharma BITS Pilani and Dr. Jamil Akhtar, CEERI PIlani, Prof. NN Ghosh Technical Chair

BITS Goa). Received sponsorship from CSIR N Delhi. Published book of abstracts and CD. The department faculty and the research scholars actively contributed along with Department of Mechanical Engg. Pilani and Goa Campus.

Chief Guest: Dr. Chandra Shekhar, Director CEERI, Pilani.

Keynote speakers: Prof. S. Izima (Japan), Prof. Magnus Willander (Sweden), Dr. M Meyyappan (NASA USA), Prof. Paul Millner (UK), Prof. A. Manz (Germany)

31. Code of ethics of research followed by the Department.

The department follows the code of ethics specified by the Institute

32. a) Student profile programme-wise:

FY	Disciplines	Name of the Programme	Applications Received	Selected		Pass percentage*	
				Male	Female	Male	Female
2010-11	CHEMISTRY	M.Sc.(Hons.) Chemistry	139234 Applications Received for FD & 425 Applications received for PhD	31	2	100%	100%
		Ph.D. (Sem I)		1	1	0	0
		Ph.D. (Sem II)		1	1	0	0
2011-12	CHEMISTRY	M.Sc.(Hons.) Chemistry	123677 Applications Received for FD & 461 Applications received for PhD	28	6	100%	100%
		Ph.D. (Sem I)		3	0	0	1
		Ph.D. (Sem II)		0	0	0	1
2012-13	CHEMISTRY	M.Sc.(Hons.) Chemistry	136904 Applications Received for FD 7 10	25	9	100%	100%
		Ph.D. (Sem I)		2	0	2	0
		Ph.D. (Sem II)		2	0	0	0
2013-14	CHEMISTRY	M.Sc.(Hons.) Chemistry	166260 Applications Received for FD 79	30	8	100%	100%
		Ph.D. (Sem I)		3	2	0	0
		Ph.D. (Sem II)		1	1	1	1
2014-15	CHEMISTRY	M.Sc.(Hons.) Chemistry	186181 Applications Received for FD 09	31	4	100%	100%
		Ph.D. (Sem I)		0	0	0	0
		Ph.D. (Sem II)		2	0	3	0
2015-16	CHEMISTRY	M.Sc.(Hons.) Chemistry		38	6		
		Ph.D. (Sem I)					
		Ph.D. (Sem II)		0	1		

innovate achieve lead

BITS follows a credit based system and cafeteria approach in offering of courses. Students not performing well are monitored by ACB (Academic Counselling Board), HDCC (Higher Degree Counseling Cell) and ACC (Academic Counselling Cell). Their pace is slowed down. Normally not more than 3% students (including all programmes, B.E., M.E. and M.Sc.) at a given point of time are under the purview of ACB.

33. b) Diversity of students

	Name of the Programme(refer to question no. 4)	% of students from the same	% of students from other universities within state	% of students from universities outside the state	% of students from other countries
	M.Sc. (Hons.)				
	Ph.D.		10	90	

34. How many students have cleared Civil Services and Defense Services examinations, NET, SET, GATE and other competitive examinations? Give details category-wise.
Data not available.

35. Student progression

Student progression	Percentage against enrolled
UG to PG	11.5
PG to M.Phil.	Nil
PG to Ph.D.	0
Ph.D. to Post-Doctoral	20
Employed • Campus selection • Other than campus recruitment	95% (2014-15), 74% (2013-14)
Entrepreneurs	Data not available

36. Diversity of staff

Percentage of faculty who are graduates	
of the same university	0
from other universities within the State	0
from universities from other States	94
from universities outside the country	6

37. Number of faculty who were awarded M.Phil., Ph.D., D.Sc. and D.Litt. during the assessment period: None

38. Present details of departmental infrastructural facilities with regard to

1) Library

The department uses the central library which has a seating capacity of 450 and includes several reading halls, exhibition rooms, a digital library with internet access terminals, and a large area for book storage. The whole building of the library is covered by wi-fi connectivity. We have an active Library Committee on which every

department is represented, and this committee decides policies and allocations and oversees their implementation.

The Library has a good collection of over 34,000 books on a wide range of subjects (about 1500+ chemistry reference books). Subscription to100+ print journals, and important digital libraries like IEL online, Science Direct, ASME, Proquest and AEA Online Journals etc. provide access to several online journals to students and researchers. Journals from important publishers, e.g. ACS, Elsevier, Taylor & Francis, APS etc. are available. The textbook section provides all prescribed texts and reference books.

2)   Internet facilities for staff and students

Unlimited access is provided to staff and faculty at their office as well as residence. WiFi connectivity is provided to the complete academic area. The bandwidth provided to faculty is 100Mbps on a 10Gbps backbone (for intranet).

Internet facilities to Students: All students are provided intranet (10Gbps back bone), internet (300Mbps provided by Vodafone, GWave and TATA) and WiFi in all hostels with per day download limit of 800MB for under graduate students and 1GB for post graduate students and Ph.D. scholars.

3)   Students' laboratories

The teaching laboratory is a dedicated 50 capacity lab (functional from 2014), fully furnished, well-equipped with all safety equipments etc. Besides, students use the research laboratories as and when it is necessary. The teaching laboratories is equipped withFume hoods, UV Spectrophotometer, Heidolph Rotary evaporator with chiller, Ice Flake maker, RO water system, Hot Air Oven with digital temp controller, Analytical Balance, Multichannel High Vacuum pump, pH meters (7 no. digital and analogue), conductivity meters (5 no.), Melting Point Apparatus (5 no.), TLC Wave Chamber, Magnetic Stirrer, Magnetic Stirrer with hot plates, Water bath with PID Controller.The labs C-108-C111 were used partly for undergraduate teaching purpose (till 2014) and presently used mainly for research purpose.

4)   Research laboratories

The department have four research laboratories and a central analytical facility Lab. The facilities are created by institute support to department as well as by sponsored research projects by the faculty (including DST-FIST grant). These labs are also used partly for undergraduate courses. The lab-wise facilities are provided below.

Chemistry lab,	Shaking incubator, Glove box, Spin coater (2 nos.), computational chemistry servers, Hot air oven, centrifuge, balance, HPLC (Agilent).
Biosensor Lab.,	Inverted Fluorescence microscope IX71 with CCD imager (Olympus), multiplate reader, Enzyme thermistor (Omic Bio), EQCN nano balance, Impedance analyzer, Biosafety cabinet BII, multichannel microfulidic pumps, PCR (Roche), UV-cross linker (UVP, UK), micro-channel probe station (Signatone, USA); duel channel source measuring unit (Keithley).
Nanomaterials lab,	Surface area and porosimetry analyzer (micromeritics), Electrometer (keithley), vaccum oven, liquid nitrogen can, RO water system (Sartorius), high temp furnace , Gas Chromatography (Shimadzu), Laboratory Ball Mill (Jupiter), Centrifuge (Remi), spin coater (Appex Equipments), deep coater(Appex Equipments), Electrometer/High resistance meter (Keithley)
Synthetic chemistry lab (Organic)	Rotary Evaporator (4 nos), chiller, high temp furnace , fume hoods (2 nos), Bench-top centrifuge, Immersion cooler , high temp furnace, Tubular furnace (2 nos), vacuum oven, hot air ovens (2 nos), and other wet chemical facilities.
Instrumental Methods of Analysis, IMA Lab (central analytical facility)	Atomic Force Microscope, Powder-XRD(MIniflex II, Rigaku), DTG(Shimadzu), DSC (Shimadzu), UV-Vis-Near NIR (JASCO V-570), HPLC(Shimadzu), spectro-fluorimeter (JASCO), FT-IR with ATR (Shimadzu), multilabel counter (Parkin-Elmer), KBr press, Electrochemical potentiostat, laminar flow, 6 digit balance, UPS 3 nos. refrigerated shaker. Refractometer (Rudolph), Polarimeter (JASCO), CHN analyzer (elemental, Vario MICRO), Cyclic voltammetry (Epsilon), Magnetic hysteresis loop tracer (Ferrites India)

39. List of doctoral, post-doctoral students and Research Associates
   o   from the host institution/university: None
   o   from other institutions/universities

Doctoral Students:		
S. No.	Name (gender)	Remark
1	Dr. Prita Pant Sarangi (F)	Degree awarded 2011
2	Dr. Kanchanmala Deshpande (F)	Degree awarded 2012
3	Dr. Rupesh K Mishra (M)	Degree awarded 2013
4	Dr. Bhanudas Rama Naik (M)	Degree awarded 2013
5	Dr. Lizy Kanungo (F)	Degree awarded 2014
6	Dr. Amit Rajput (M)	Degree awarded 2014
7	Dr. Geetesh Kumar Mishra (M)	Degree awarded 2015
8	Dr. Subhenjit Hazra (M)	Degree awarded 2015
9	Dr. R. Prasath (M)	Degree awarded 2015
10	Souvik Pal (M)	Thesis Submitted
11	S. Gokulakrishnan (M)	Thesis Submitted
12	Chetana Deoghare (F)	Ongoing
13	Priyadarshini Parakh (F)	Ongoing
14	Dayananda D(M)	Ongoing

15	Vikash Kumar(M)	Ongoing
16	Shankar Dalavi(M)	Ongoing
17	Dipratn Khandare(M)	Ongoing
18	Uday Kumar Padidela(M)	Ongoing
19	Praveen Saini(M)	Ongoing
20	Atul Sharma(M)	Ongoing
21	Akanksha Saini (F)	Ongoing
22	Srimanta Halder(M)	Ongoing
23	Pragnya P. Mishra (F)	Ongoing
24	Barun Kumar Ghosh(M)	Ongoing
25	Aruna Chandra Singh (F)	Ongoing
26	Arun Kumar Prusty (M)	Ongoing
27	Debabrata Moitra (M)	Ongoing
28	Zigmee Jhupden Bhutia(M)	Ongoing
29	Sindhuja Sen (F)	Ongoing
Research Associate:		
1	Dr. Booma Devi Janaki Nadar(F)	
2	Dr. Geetesh Kumar Mishra (M)	
Research Scientist:		
1	Dr. Arunashree Panda (F)	DST WOS-A Fellow

40. **Number of post graduate students getting financial assistance from the university.**
None

41. **Was any need assessment exercise undertaken before the development of new programme(s)? If so, highlight the methodology.**
The exercise undertaken before the development of a new programme usually begins with a Department airing its intention to float a new programme, CDC or elective proposed by the faculty concerned. Discussions are held regarding its merits/demerits at the DCA level and later at a CCDCA level. Once the necessary inputs and unanimity have been reached on all the aspects regarding the operational aspects related to the course, it is sent to the ARP so that it can be passed up to Senate to it to be approved.

42. **Does the department obtain feedback from**
   o **faculty on curriculum as well as teaching-learning-evaluation? If yes, how does the department utilize the feedback?**
   Feedback is obtained from faculty on curriculum, teaching- learning and evaluation through regular departmental meetings conducted during each semester. These feedbacks and discussions on it assist faculty in revamping the teaching methodologies to be adopted in courses for the targeted group of students. This process also helps in multi-section courses offered commonly for the students of first year, where different faculty handles different sections of students.

- o **students on staff, curriculum and teaching-learning-evaluation and how does the department utilize the feedback?**

  It is used for improvement of curriculum, teaching quality. Feedback is obtained from students on each course at the end of each semester through a questionnaire which covers different aspects of the course and teaching and evaluation. These feedbacks are assessed at the institute level and then handed over to each department and then to the respective faculty. This mechanism ensures that the course structure (content as well as the evaluation) and teaching methodology are constantly assessed and improved on at the department level as well as instructor level.

  In addition to the feedback and assessment process mentioned under point 42, a student faculty council (SFC) engages in a regular assessment of conducting of various courses of first degree as well as higher degree of the department. SFC has student representatives from each batch of students admitted in Chemistry Stream and 4-5 faculty members. This committee is encouraged to discuss openly various issues related to operation and functioning of courses, evaluation methods etc. This process assists in ensuring quality teaching and constant improvement in methodologies and maintaining a healthy academic environment.

- **alumni and employers on the programmes offered and how does the department utilize the feedback?**

  Alumni Feedback: The department obtains feedback from Alumni on the programmes offered. Upcoming trends in various technical industries are also discussed. Some of the alumni also pitch in ideas for newer courses to be introduced as part of the curriculum. These issues are reviewed in detail with the concerned department faculty. Suitable measures for implementation of the feedback are considered and followed accordingly.

  Employer Feedback Each Campus conducts a Placement Faculty Advisory council meeting once a month. The council consists of the Director, the Deputy Director, The Dean, Head of the Departments, Placement Manager, Faculty Incharge (Placement) and a Faculty representing each department.

  The council discusses the feedback obtained department–wise from the recruiters and measures are taken to strengthen the programmes /courses accordingly.

43. List the distinguished alumni of the department (maximum 10)

The department is only 11 years old. Some of the alumini are faculty members in different university, some are in industry, and some are post-doc fellow.

44. Give details of student enrichment programmes (special lectures / workshops / seminar) involving external experts.

The department has regular seminars by students and faculty members. Some of the speakers are invited from external university/industries. Following talks from external people were organized in the time period of 2010 -2015.

- Dr. Gopal C Kundu (from National center for cell sciences Pane and recipient of Shanty Startup Bhavnagar award) delivered an lecture on Diagnostic and Therapeutic significance of osteopontin and other associated genes in breast and other cancers on March 21 2011.
- Prof. Bengt Danielsson, Chief Technology Officer Acromed Invest AB Sweden, delivered an invited talk on "DNA dye interaction for drug analysis" on Nov 23, 2011.
- Prof. Shyamalava Majumdar, Dept. of Chemical Physics, TIFR, Mumbai, Nov. 4-7, 2013.
- Prof. P. V. Bharatam, FRSC, Dept. of Medicinal Chemistry, NIPER, Mohali, Nov. 18, 2013.
- Prof. Suresh C. Pillai, Semiconductor Nanomaterials for Photocatalytic Applications, Centre for Precision Engineering, Materials and Manufacturing Research & Department of Environmental Sciences Institute of Technology Sligo, Ireland, 7th August, 2014.
- Prof. Paul A. Millner, Professor of Bionanotechnology and Head of School of Biomedical Science University of Leeds, U. K Biosensors, Nanoparticles and Nanofibers: How surface structure affects their performance, Feb 21, 2014.
- Dr. Tim Gibson, Chief Scientist of Roboscientific Ltd., UK Bloodhound® Electronic nose Technology: Applications in diagnosis of Tuberculosis, Feb 21, 2014.
- Prof. C. T Aravindakumar, Mahatma Gandhi University, Kerala, Advanced Oxidation Processes for the degradation of Environmental Pollutants, 1 st April, 2015.
- Prof. Ivo Leito, University of Tartu, Estonia, Superacid Derivatives In Your Pocket? 12th February 2015.
- Professor Jean-Marie LEHN (Nobel Laureate), Université de Strasbourg, France Title: From Matter to Life: Chemistry? Chemistry! 21st February 2015.
- Prof. Jean Louis Marty from the University of Perpignan FRANCE has visited the campus on May 14 2015.During the interaction with faculty and research scholars of the department, Prof.Marty has delivered a talk on aptamer based biosensors on toxin detection.
- A session was organized on "**Chemistry and Industry: An Outlook**", Dt. 22-8-2015. **Speakers:** (1) Dr. Kamlesh Pai Fondekar Head, Technology and Engineering division, Syngenta India Limited, Goa. (2) Dr. Vidyadhar Jadav HOD, VERGO Organics, Goa. The following topics were covered: Topic 1: Health, Safety and Environment in Chemical Laboratories, Topic 2: Opportunities for Chemists in Industry, Topic 3: Introduction to Pharma Industry, Topic 4: Green Drives in Synthesis.

45. List the teaching methods adopted by the faculty for different programmes.

Lecture-Tutorial Method is adopted for first year multi section courses (General Chemistry) in which students are presented with PPT slides of the content through lecture followed by interactive tutorial sessions. Additional reference sources like RSC 'Learn Chemistry' website is referred for interactive videos and concepts for the General Chemistry course.

Senior level courses are taught through problem solving approach. Basic concepts and selected contents on research advances in the field are discussed. Students are

motivated to read recent research advancement on topics. Faculty uses a combination of black board teaching and power point projection. Senior level courses and electives have assignments and presentations by students which encourage them to do research on topics and expand knowledge beyond class room learning and get exposure to advances in research happening in various fields. Students - teacher interactions are encouraged through Moodle LMS.

46. How does the department ensure that programme objectives are constantly met and learning outcomes are monitored?

The department has constituted a committee called "Departmental Committee of Academics" (DCA) which mostly deals with the department curriculum, course contents etc. A similar committee called ccDCA works among the same departments across the different BITS campus. Also, we have a Teaching Quality Assessment Committee (TQAC) in the department. Student-faculty Interaction time, availability of the faculty for doubt clearing beyond class hours, alignment of course to delivery etc. are some of the focused issues regarding the activity of this committee.

47. Highlight the participation of students and faculty in extension activities.

Students are involved in many extracurricular activities including participation in science/technology festivals, cultural festivals, sports within and outside the university. The students are also associated with various social activities such as literacy drive. Many of them volunteer charitable organizations. Also, faculty takes part in house festivals and encourages and support students' activities.

48. Give details of "beyond syllabus scholarly activities" of the department.
- Most of the faculty members are associated with various national/international professional bodies as life member (and/or annual member). For example, ACS, RSC, Indian Science Congress, CRSI etc.
- As a regular activity most of the faculty members are involved in reviewing paper(s) of various international publishing houses such as ACS, RSC, Elsevier, Springer, Taylor and Francis etc.
- Faculty members act as reviewers / examiners of PhD thesis of other universities/institutions.
- Several faculty members served as external examiners /paper setter for master degree programs.
- Several faculty members served as external examiners for the recruitment of faculty of other universities/ institutions.
- Summer projects are regularly offered to undergraduate students with national scholarships (such DST-INSPIRE, KVPY etc.) by most of the faculty members of the department. During last two years eight DST-INSPIREcandidates from NISER, IISERs successfully completed summer projects.
- Faculty members act as session chairs of national / international conferences.
- Faculty members delivered talks at other institutes upon invitation.

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49. State whether the programme/ department is accredited/ graded by other agencies? If yes, give details. No.

50. Briefly highlight the contributions of the department in generating new knowledge, basic or applied.

The department has been engaged in cutting edge R&D and teaching activities with the aim of generating and disseminating new knowledge. The specific research contributions include:

- Material synthesis including new nanomaterials, organic smart materials, polymers, photoactive materials, biosensors and chemosensors development, theoretical and computational calculations.
- Offering elective courses closely aligned with the departmental research activity to masters and higher degree students.
- Actively involved in inviting scientists and renowned scholars for seminars by hosting conferences and workshops.

51. Detail five major Strengths, Weaknesses, Opportunities and Challenges (SWOC) of the department.

Strength:	Opportunities:
Quality Faculty, Research Focus, Faculty work in contemporary and interdisciplinary areas, several International & National Collaborations, motivated students.	Presence of strong local industry, more Industry collaborations, new programs & collaborations, more inter & intra disciplinary research
Weaknesses:	**Challenges:**
Lack of Master Degree program, Limited Lab space and research facility, Limited journal accessibility	Research Sustainability, Attracting and retaining quality faculty &research scholars, Getting advanced infrastructural facilities

52. Future plans of the department.

To offer a HigherDegree program in Material Science, Increase research activities through collaboration within and outside institutions of repute including industries.

53. Any other information regarding your department which you would like to include.

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Goa Campus: Evaluative Report of the Department
COMPUTER SCIENCE AND INFORMATION SYSTEMS

1. **Name of the Department:** Computer Science and Information Systems

2. **Year of establishment of the Department:** 2004

3. **Is the Department part of a School/Faculty of the university?**
    Departments function as independent entities in the university and are not part of any school or faculty.

4. **Names of programmes offered (UG, PG, M.Phil., Ph.D., Integrated Masters; Integrated Ph.D., D.Sc., D.Litt., etc.).**

On-Campus	UG Programmes	• (BE Hons)Computer Science • M.Sc.(Tech.) Information Systems
	PG Programmes (ME)	• Computer Science • Software Systems
	Ph.D.	

5. **Interdisciplinary programmes and departments involved**
    - Ph.D. in collaboration with EEE, Biology and Mathematics Depts.
    - The Doctoral Training Centre in Computational Biology at BITS-Pilani, K.K.Birla Goa Campus, is an interdisciplinary initiative for tackling important challenges in the biosciences by combining expertise in Biologicial Sciences, Computer Science, Physics and Mathematics.
    - M.E. Embedded Systems with EEE Dept.

6. **Courses in collaboration with other universities, industries, foreign institutions : NIL**

7. **Details of programmes discontinued, if any, with reasons**

    Admissions to M.Sc.(Tech.) Information Systems & M.E. Software Systems are temporarily put on hold.

8. **Examination System:** Semester and Choice-based Credit System

9. **Participation of the department in the courses offered by other departments**
   - Every semester Department participates actively in courses offered by WILP program.
   - Pervasive Computing, Real Time Systems, Software for embedded systems for programs offered by EEE department.

10. **Number of teaching posts sanctioned, filled and actual (Professors/AssociateProfessors/Asst. Professors/others) Filled: 23 (Including two appointments where offer letter given) Actual: 21**

	Sanctioned	Filled	Actual number
Professor	Note:**	3	3
Associate Professors		3+1	3
Asst. Professors		4	4
Others		11 Lecturers + 1(Visiting Faculty)	11

Note**:The faculty positions for the University is broadly governed by Growth plan which also covers designation-wise breakup with a larger vision. Keeping in mind the fluidity of movement of faculty and proposed student to faculty ratio in each campus for first degree, higher degree as well as Ph.D. programmes, individual department needs are not fixed. Besides, as we are in expansion plan which calls for new programmes, courses being introduced, the demand on faculty in terms of numbers, for each department, is broadly governed by all the above factors and hence it is not possible to have a fixed number of faculty for each department. Recruitment of faculty, therefore, varies, based on departmental needs.

11. **Faculty profile with name, qualification, designation, area of specialization, experience and research under guidance**

Name	Qualification	Designation	Specialization	No. of Years of Experience	No. of PhD/MPhil. Students guided for last 5 years
A Baskar	Ph.D	Assistant Professor	Theoretical Computer Science	4	0
Aruna G	M.Tech	Lecturer	Data Mining	11	0
Ashwin Srinivasan	Ph.D	Senior Professor and Deputy Director	Machine Learning, Inductive Logic Programming	24	1
Bharat M Deshpande	Ph.D	Associate Professor	Data Mining, Complexity Theory, Parallel Algorithms	16	Completed 2 On-going 1 Co-Supervisors 2

Name	Qualification	Designation	Area	Experience	Supervision
Biju K Raveendran	Ph.D	Assistant Professor	Operating Systems, Architecture	10	On-going 3 Co-Supervisors 1
Geeta Patil	Mtech.	Lecturer	Computer Architecture, Cache coherency issues	10	0
J Venkateswara Rao	Ph.D	Associate Professor	Database Systems, Management Information Systems	32	0
Lucy J Gudino	Ph.D	Assistant Professor	Adaptive Signal Processing, Array Signal Processing, Digital Filter Design, Wireless Sensor Networks, Wireless Ad-hoc Networks	19	On-going 2 Co-Supervisors 3
Mahadev Gawas	M.E	Lecturer	Computer Networks, Wireless Ad Hoc Networks	8	0
Neena Goveas	Ph.D	Associate Professor	Network Science, Computational Condensed Matter Physics	15	0
Rajendra Kumar Roul	M.E	Lecturer	Web Mining, Machine Learning	14	0
Ramprasad Joshi	M.E	Lecturer	Computational Complexity, Real Computation (BSS Model), Randomized Search Heuristics, Robotics, Natural Language Processing	19	
Rizwan Parveen	M.E	Lecturer	Software System	2.5	0
Sanjay Kumar Sahay	Ph.D	Assistant Professor	Cryptography, Network Security and Data Analysis	13	On-going 3
Santonu Sarkar	Ph.D	Professor CSIS	Software quality analysis and assurance for Next Gen. Computing platforms- namely HPC and Cloud Software modularity assessment Software design	20	On-going 1 Co-Supervisors 2

Sasikumar Punnekkat	D.Phil	Senior Professor& Director	Real-time systems, Fault tolerance, Software Engineering, Software Testing	31 (13 in academics)	Completed 5 On-going 8 (Zero in BITS)
Shubhangi K. Gawali	M.Tech	Lecturer	Real Time Systems	12	0
Sreejith V	M.E	Lecturer	Wireless Sensor Networks, Network Performance, Pervasive Computing	10	0
SRK Prasad Talasila	M.Tech	Lecturer	Network Science, Computer Networks	10	0
Tirtharaj Dash	M.Tech	Lecturer	1. Machine Learning 2. Evolutionary Computation	2	0
Varun Kumar	M.Tech	Lecturer	Machine Learning, Computer Vision, Robotics	1	0

12. List of senior Visiting Fellows, adjunct faculty, emeritus professors

- Mr. Tapan Desai – Adjunct Faculty
- Mr. Sanjay Joshi – Visiting Faculty

13. Percentage of classes taken by temporary faculty – programme-wise information

Around 3% of classes are taken by temporary faculty

14. Programme-wise Student Teacher Ratio (Refer to Support document for calculation)

- For First Degree program Calculation=484/21= 23.05
- For M.E Program Calculation=18/8=2.25

15. Number of academic support staff (technical) and administrative staff: sanctioned,

Filled – 1   Actual – 1

16. Research thrust areas as recognized by major funding agencies

- Wireless Sensor Networks
- Real Time Systems
- Embedded Architecture
- Evolutionary Computation
- Data Analytics
- Distributed Computing
- Machine Learning
- Software Engineering

17. Number of faculty with ongoing/completed projects in the last five years from a) national b) international funding agencies and c) Total grants received. Give the names of the funding agencies, project title and grants received project-wise.

Completed projects: *Prior to joining BITS Pilani, Goa Campus

SL No	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration
1	A Modeling and Design Framework for Social Networking Infrastructure on Mobile Devices using P2P overlays	Dr. Biju K. Raveendran	ABG	10 Lakh	2012 -2013
2	Modelling neuronal activity during sleep	* Prof. Ashwin Srinivasan (in collaboration with School of Life Sciences and the School of Physical Science Jawaharlal Nehru University)	Department of Biotechnology	100	2011 - 2014
3	Design and Development of Condition based Monitoring of Pipelines using Wireless Sensor Networks	Prof K R Anupama (with Prof. Neena Goveas and Dr. Lucy J. Gudino as Co-Investigators)	GAIL	80.38	Sept2012 - Sept 2014

On-going projects:

SL No	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration
1	Implementation of Wireless Sensor Network for Process Monitoring of GAIL's Pipeline	Prof K R Anupama (with Prof. Neena Goveas and Dr. Lucy J. Gudino as Co-Investigators)	GAIL	98.78	Oct.2014- Jan 2016
2	Addressing Challenges in Application Development for Heterogeneous Computing Platform for Speedup and Power Efficiency	Prof. Santonu Sarkar	Science and Engineering Research Board (SERB), Govt of India	37.55	Nov.2014- Nov.2017

3	A Cost-Effective Approach of Making Software Dependable	Prof. Santonu Sarkar	Accenture Technology Labs	16	Aug.2015 - Aug.2016
4	Neutron Stars as a Source of Potential Continuous Gravitational Wave Emitter	Dr. T.K. Jha (with Dr. Sanjay K. Sahay as co-PI)	BRNS	17	June2013 – June 2016
5	Home automation and smart wheel chair based on Electroencephalography (EEG) signals produced in brain	Dr. Veeky Baths (with Prof. Bharat Deshpande as co-PI)	Cognitive Science Research Initiative (CSRI) of DST	39	July2015 - July 2018

Institute funded projects

Sl. No	Faculty	Scheme	Details	Duration
1	Prof. Ashwin Srinivasan	Additional Competitive Research Grant	Title - Applications of High Performance Computing to Software Engineering and Data Analytics Sanctioned Amount - 14 Lakh	2015-2017
2	Dr. Biju K R	SEED Grant	Title - To Design and Implementation of High Performance Energy Efficient Scheduling Algorithms for Multiprocessor /Multicore Hard Real - time Systems Sanctioned Amount – 18 Lakh	2012-2014

18. Inter-institutional collaborative projects and associated grants received
    a) National collaboration

Implementation of Wireless Sensor Network for Process Monitoring of GAIL's Pipeline, in collaboration with GAIL, Bhiwadi, Rajasthan, Sep 2014-Dec 2016.

    b) **International collaboration:** Nil

19. Departmental projects funded by DST-FIST; UGC-SAP/CAS, DPE; DBT, ICSSR, AICTE, etc.; total grants received. Nil

20. Research facility / centre with
- state recognition - Nil
- national recognition - Nil
- international recognition - Nil

21. Special research laboratories sponsored by / created by industry or corporate bodies: Nil

22. Publications:

Sl No.	Details	Specify number here
	Number of papers published in peer reviewed journals (national / international)	31
	Monographs	-
	Chapters in Books	7
	Edited Books	2
	Books with ISBN with details of publishers	*Real-Time Systems, Hans Hansson, Jan Carlson, Damir Isovic, Kristina Lundqvist, Thomas Nolte, Martin Ouimet, Paul Pettersson, Sasikumar Punnekkat, Cristina Seceleanu, Fraunhofer IESE text book, February, 2010.
	Number listed in International Database (For *e.g.* Web of Science, Scopus, Humanities International Complete, Dare Database - International Social Sciences Directory, EBSCO host, etc.)	31
	Citation Index – range / average	Average – 2.19
	SNIP	Range 0-8.47
	SJR	Range 0 - 4.328
	Impact Factor – range / average	Range 0-9.6
	h-index	38(Highest h-index)

***Publication was done prior to author joining BITS Pilani Goa Campus.**

Details of the publications as per the number give above (Give details in the last five years

SL No	Authors	Title of the Publications	Details of the Journal	National/International	Year
1.	Upadhyay, N. and Deshpande, B. M.	SDCS: six-dimensional classification strategy framework for COTSproducts.	International Journal of Data Analysis Techniques and Strategies, 2(2), pp. 170–180	International	2010
2.	Upadhyay, N., Deshpande, B. M., and Agrawal, V. P.	Integrated Decision Approach for COTS Selection,	International journal of Decision Sciences, Risks and Management, 2(3), pp. 165-177.	International	2010
3.	Upadhyay, N., Deshpande, B. M. and Agrawal, V. P.	Concurrent Design Graph Theoretic Approach for Component Based Software System,	International Journal of Product Design, 1(1), pp. 13-23.	International	2010
4.	Upadhyay, N., Deshpande, B. M. and Agrawal, V. P.	Developing Maintainability Index of a Software Component: A Digraph and Matrix Approach,	ACM SIGSOFT 35(5), pp. 1-11.	International	2010

5.	Upadhyay, N., Deshpande, B. M. and Agrawal, V. P.	Concurrent Usability Evaluation and Design of Software Component: A Digraph and Matrix Approach,	IEEE/IET Software Research Journal, pp. 1-13.	International	2010
6.	Mangesh Bedekar, Bharat Deshpande	Design and Implementation of a extensible Peer–to–Peer Content Recommendation System,	International Journal on Computer Science and Engineering, volume 2, issue 4, pp. 1018 – 1023.	International	2010
7.	Mangesh Bedekar, Bharat Deshpande	Profiling the User – A ringside view	International Journal of Machine Intelligence, volume 2, issue 2	International	2010
8.	Agarwal,S. Vaz,C. Jain,R. Bhattacharya,A. and Srinivasan,A*	Prediction of novel precursor miRNAs using a context sensitive hidden Markov Model (CSHMM)	BMC Bioinformatics 11 Suppl1:S29.	International	2010
9.	Upadhyay, N., Deshpande, B. M., and Agrawal, V. P.	Towards a Software Component Quality Model,	Lecture Notes in Computer Science (LNCS) Springer, pp. 398-412.	International	2011
10.	Vijayalekshmi Saravanan, Senthil Kumar Chandran, Sasikumar Punnekkat*	A Study on Factors Influencing Power Consumption in Multithreaded and Multicore CPU's	Wseas transactions on computers , vol 10, nr 3, March, 2011	International	2011
11.	*Srinivasan, A. and Ramakrishnan, G.	Parameter Screening and Optimisation for ILP using Designed Experiments	Jnl. Mach. Learn. Res., 12 (2011) 627-662	International	2011
12.	R.K. Roul and S.K. Sahay	An Effective Approach for Web Document Classification using the Concept of Association Analysis of Data Mining.	International Journal of Computer Science & Engineering Technology, Vol. 3, No. 10, p. 483	International	2012
13.	R.K. Roul and S.K. Sahay	An effective web document clustering for information retrieval.	International Journal of Computer Science and Management Research, Vol. 1, No. 3, p. 481	International	2012
14.	R.K. Roul and S,K. Sahay	An effective information retrieval for ambiguous query.	Asian Journal of Computer Science and Information Technology, Vol. 2, No. 3, p. 26	National	2012
15.	*Srinivasan A. Faruqui, T.A. and Joshi, S	Data and Task Parallelism for ILP using MapReduce	Machine Learning, 86(1), pp. 141–168.	International	2012
16.	S. Muggleton, L. De Raedt, D. Poole, I. Bratko, P. Flach, K.	Biography and Future Challenges. Invited position paper.	Machine Learning,86(1), 3-23	International	2012

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	Inoue and A. Srinivasan*.				
17.	Joseph Rodrigues, Lucy J. Gudino and K.R. Pai	"Sharp Transition Multiband Filter in Speech Processing Scheme for Hearing Impaired"	American Journal of Engineering and Applied Sciences, Vol. 5, pp. 42 - 49	International	2012
18.	Upadhyay, N., Deshpande, B. M., and Agrawal, V. P.	Reliability Modeling and Analysis of Component Based Software Systems,	International Journal of Reliability and Safety. Vol 7 No. 2 , 2013	International	2013
19.	M Badril Nor Shah, Abdul Rashid Husain, Sasikumar Punnekkat*, Radu Dobrin,	A new error handling algorithm for controller area network in networked control system (Oct 2013),	Computers in Industry (CompInd2013)	International	2013
20.	S Datta, S Sarkar*, ASM Sajeev, N Kumar	Impact, Team Size, Collaboration, and Epochs	CSI Journal of Computing 2 (3), 61—71 2013	National	2013
21.	ArunaGovada, ShreeRanjani, Aditi Viswanathan and S.K. Sahay	A Novel Approach to Distributed Multi-Class SVM	Transactions on Machine Learning and Artificial Intelligence, Volume 2 No 5 Oct (2014); pp: 72-79 .	International	2014
22.	Ashu Sharma and S.K. Sahay	Evolution and Detection of Polymorphic and Metamorphic Malwares: A Survey	International Journal of Computer Applications, Vol. 90, No. 2, p. 7	International	2014
23.	Ramprasad Joshi, Bharat M. Deshpande	Empirical and analytical study of many-objective optimization problems: analysing distribution of nondominated solutions and population size for scalability of randomized heuristics.	Memetic Computing 6(2): pp 133-145	International	2014
24.	Annam Swetha, Radhamani Pillay, Sasikumar Punnekkat*	Design, Analysis and Implementation of Improved Adaptive Fault Tolerant Model for Cruise Control Multiprocessor System,	International Journal of Computer Applications (ICJA Jan2014), 86(15):29-26	International	2014
25.	Abhinandan H. Patil, Neena Goveas, Krishnan Rangarajan	Test Suite Design Methodology using Combinatorial Approach for Internet of Things Operating System	Journal of Software Engineering and Applications, DOI:10.4236/jsea.2015.87031, Vol.8 No.7,	International	2015

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26.	Abhinandan H. Patil, Neena Goveas, Krishnan Rangarajan	Re-architecture of Contiki and Cooja Regression Test Suites using Combinatorial Testing Approach	ACM SIGSOFT Software Engineering Notes, Volume 40 Issue 2, March 2015 Pages 1-3	International	2015
27.	R.K. Roul, Ashish Nanda, Viraj Patel and S.K. Sahay	Extreme Learning Machines in the field of Text Classification	International Journal of Computer & Information Science, IEEE (DOI: 10.1109/SNPD.2015.7176204), Proceedings SNPD, Japan, 2015	International	2015
28.	Abhilash Thekkilakattil, Radu Dobrin, Sasikumar Punnekkat,	The Limited-preemptive Feasibility of Real-time Tasks on Uniprocessors, Real-Time Systems:	The International Journal of Time-Critical Computing Systems ,June 2015, Volume 51, Issue 3, pp 247-273	International	2015
29.	Kaalia, R., Kumar, A., Srinivasan, A. and Ghosh, I.	An Ab Initio Method for Designing Multi-Target Specific Pharmacophores using Complementary Interaction Field of Aspartic Proteases.	Molecular Informatics Volume 34, Issue 6-7, pages 380–393, June 2015	International	2015
30.	N Tiwari, S Sarkar, U Bellur, M Indrawan	Classification Framework of MapReduce Scheduling Algorithms	ACM Computing Surveys Volume 47 Issue 3, April 2015 Article No. 49	International	2015
31.	A Roy, S Sarkar, R Ganesan, G Goel	Secure the Cloud: From the Perspective of a Service-Oriented Organization	ACM Computing Surveys Volume 47 Issue 3, April 2015 Article No. 41	International	2015

*Published prior to joining BITS Pilani Goa Campus

Conference Publications: The publishing culture in computer science is different from other disciplines. Most of other disciplines publish their papers in journals and use conferences to meet and discuss their work. Whereas in computer science, we predominantly publish our papers in conference proceedings which are fully refereed. These publications are often of better quality and more prestigious than many journals.

Our department also follows the same culture and this is evident from the numbers. We have published 31 papers in journals and 116 papers in conferences in the last five years. All the papers published in the conferences are peer reviewed. So we hope these conference publications will also be considered at par with journal publications.

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SL No	Authors	Title of the Publications	Details of the Journal	National/International	Year
1.	*Srinivasan,A. Faruquie,T.A. and Joshi,S.	Exact data-parallel computation for very large ILP datasets.	20th International Conference on Inductive Logic Programming (full paper later published in the Machine Learning Journal).	International	2010
2.	Upadhyay N., Deshpande, B. M., and Agrawal, V. P.	CFMEA: Concurrent Failure Mode and Effect Analysis,	2nd International Conference on Reliability, Safety, and Hazard – Risk-Based Technologies and Physics of Failure Methods, December 14-16, 2010, Mumbai, pp. 399-405, 2010.	International	2010
3.	Mangesh Bedekar, Bharat M. Deshpande, Pralav Desai, Vijay Mohan Reddy Borra	On the enhancement provided by preceding and Succeeding Auxiliary Word to Search Engines to Categorize search results,	Proceedings of International Conference on Computing Communication and Information Technology Applications,, VLB Janakiammal College of Engineering and Technology Coimbatore, India. January 21-23. 2010	International	2010
4.	A Baskar, R Ramanujam, SP Suresh	A dexptime-complete Dolev-Yao theory with distributive encryption	Mathematical Foundations of Computer Science 2010, LNCS 6281, pp. 102-113	International	2010
5.	S Sarkar, K Verma	Accelerating technical design of business applications: a knowledge-based approach-	Proceedings of the 3rd India software engineering conference, pp 43-50 2010	International	2010
6.	S Sarkar, K Vikrant	Architecture Reconstruction from Code for Business Applications - A Practical Approach	IWRE Workshop, Collocated with ISEC 2010	International	2010
7.	*Abhilash Thekkilakattil, Anju S Pillai, Radu Dobrin, Sasikumar Punnekkat,	Preemption Control Using Frequency Scaling in Fixed Priority Scheduling,	IEEE/IFIP Embedded and Ubiquitous Computing Conference, Hong Kong, December, 2010, pp. 281 - 288	International	2010
8.	*Abhilash Thekkilakattil, Anju S Pillai, Radu Dobrin, Sasikumar Punnekkat,	Reducing the Number of Preemptions in Real-Time Systems Scheduling by CPU Frequency Scaling,	The 18th International Conference on Real-Time and Network Systems, Toulouse, France, November, 2010	International	2010

9.	*Senthil Kumar Chandran, Radhamani Pillay, Radu Dobrin, Sasikumar Punnekkat,	Efficient scheduling with adaptive fault tolerance in heterogeneous multiprocessor systems,	International Conference on Computer and Electrical Engineering (ICCEE), Chengdu, China, November, 2010	International	2010
10.	*Aleksandar Dimov, Senthil Kumar Chandran, Sasikumar Punnekkat,	Mutation testing framework for software reliability model analysis and reliability estimation,	Central and Eastern European Software Engineering Conference (CEE-SECR), Moscow, Russia, October, 2010, pp. 163 - 169	International	2010
11.	*Aleksandar Dimov, Sasikumar Punnekkat,	Fuzzy reliability model for component-based software systems,	EUROMICRO Conference on Software Engineering and Advanced Applications (SEAA), Lille, France, September, 2010, pp. 39 - 46	International	2010
12.	*Hüseyin Aysan, Abhilash Thekkilakattil, Radu Dobrin, Sasikumar Punnekkat,	Efficient Fault Tolerant Scheduling on Controller Area Network (CAN),	The 15th International Conference on Emerging Technologies and Factory Automation, Bilbao, Spain, September, 2010, pp. 1 - 8	International	2010
13.	*Anelyia Gardjeliyska, Radu Dobrin, Sasikumar Punnekkat,	A Successful Application of the Agile Manifesto to Resource Constrained Projects with Open Specifications,	The Second International Conference on Software, Services and Semantic Technologies, Varna, Bulgaria, September, 2010	International	2010
14.	*Senthil Kumar Chandran, Aleksandar Dimov, Sasikumar Punnekkat	Modeling uncertainties in the estimation of software reliability – a pragmatic approach, ,	International Conference on Secure Software Integration and Reliability Improvement (SSIRI)- Best paper award, IEEE, Singapore, June, 2010, pp. 227 – 236	International	2010
15.	*Aleksandar Dimov, Senthil Kumar Chandran, Sasikumar Punnekkat	How do we collect data for software reliability estimation? , ,	International Conference on Computer Systems and Technologies (CompSysTech), Sofia, June, 2010	International	2010
16.	*Hüseyin Aysan, Radu Dobrin, Sasikumar Punnekkat	Fault Tolerant Scheduling on Control Area Network (CAN)	IEEE International Workshop on Object/component /service -oriented Real-time Networked Ultra-dependable Systems , IEEE, Carmona, Spain, May, 2010, pp 226 - 232	International	2010

17.	Adnan Causevic, Daniel Sundmark, Sasikumar Punnekkat	An Industrial Survey on Contemporary Aspects of Software Testing, ,	International Conference on Software Testing, Verification and Validation, IEEE, Paris, France, April, 2010,pp 393 - 401	International	2010
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38.	Kumar, A.; Namboothiri, P.G.; Deshpande, S.; Sreejith, V.; Sivalingam, K.M.; Murty, S.A.V.S.,	"Testbed based throughput analysis in a Wireless Sensor Network,"	2012 National Conference on Communications (NCC) , pp.1-5, 3-5 Feb. 2012 doi: 10.1109/NCC.2012.6176804	National	2012
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50.	*Henrik Jonsson, Stig Larsson, Sasikumar Punnekkat	Agile Practices in Regulated Railway Software Development	WoSoCER, ISSRE, IEEE, Dallas, TX, USA, November, 2012, p 355 - 360	International	2012
51.	*Adnan Causevic, Sasikumar Punnekkat, Daniel Sundmark	Quality of Testing in Test Driven Development	International Conference on the Quality of Information and Communications Technology (QUATIC), Lisbon, Portugal, September, 2012, p 266 - 271	International	2012
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63.	Anguraj Baskar, Prasad Naldurg, KR Raghavendra, SP Suresh	Primal Infon Logic: Derivability in Polynomial Time.	Foundations of Software Technology and Theoretical Computer Science,pp. 163–174	International	2013
64.	Mayuri Digarwar, Sudeept Mohan and Biju Raveendran	Dynamic Voltage and Frequency Scaling Algorithm for Mixed Task set	in Proceedings of the 8th IEEE International Conference on ICISS, pp 643 - 648	International	2013
65.	Mayuri Digarwar, Sudeept Mohan and Biju Raveendran	Energy Aware Real-time Scheduling Algorithm for Mixed Task set	Energy Aware Real-time Scheduling Algorithm for Mixed Task set, pp 325 - 327	International	2013
66.	Paritosh Ramanan, Prathamesh Gaikwad, V Sreejith	Achieving connectivity in an Unstructured Wireless Sensor Network using Optimal Assignment of Mobile Nodes-	January 27, 2013 to February 1, 2013 ISBN: 978-1-61208-245-5 - Seville, Spain. Pp 7 - 14	International	2013
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68.	S Datta, S Sarkar, ASM Sajeev, N Kumar	How many researchers does it take to make impact?: mining software engineering publication data for collaboration insights	Proceedings of the 6th ACM India Computing Convention Article No. 6	International	2013

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85.	R.K.Roul, S.K.Sahay	Automated Document Indexing via Intelligent Hierarchical Clustering	High performance computing and application, IEEE conference pp 1 - 6	International	2014
86.	R.K.Roul, S.K.Sahay	A Novel modified apriori approach for web document clustering	Computational Intelligence in data mining, Springer	International	2014
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89.	*Abhilash Thekkilakattil, Radu Dobrin, Sasikumar Punnekkat	Fault Tolerant Scheduling of Mixed Criticality Real-Time Tasks under Error Bursts (Dec 2014)	The International Conference on Information and Communication Technologies (ICICT'14) Pages 1148–1155	International	2014
90.	*Ricardo Rodríguez, Sasikumar Punnekkat	Cost Optimisation in Certification of Software Product Lines (Nov 2014)	IEEE International Workshop on Software Certification (wosocer14), pp 509 - 514	International	2014
91.	*Abhilash Thekkilakattil, Radu Dobrin, Sasikumar Punnekkat	Towards Exploiting Limited Preemptive Scheduling for Partitioned Multicore Systems (Oct 2014),	The 8th Junior Researcher Workshop on Real-Time Computing (JRWRTC'14), pp45-48	International	2014

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93.	*Stephan Baumgart, Joakim Fröberg, Sasikumar Punnekkat	An Analysis of Industrial Challenges to Achieve Functional Safety Compliance in Product Lines	Euromicro Conference on Software Engineering and Advanced Applications (SEAA), 2014, pp 356 - 360	International	2014
94.	*Abhilash Thekkilakattil, Sanjoy Baruah, Radu Dobrin, Sasikumar Punnekkat	The Global Limited Preemptive Earliest Deadline First Feasibility of Sporadic Real-time Tasks	Accepted for 26th Euromicro Conference on Real-Time Systems (ECRTS'14) pp 301 - 310	International	2014
95.	*Stephan Baumgart, Xiaodi Zhang, Joakim Fröberg, Sasikumar Punnekkat	Variability Management in Product Lines of Safety Critical Embedded Systems (Jul 2014)	International Conference on Embedded Systems 2014 (ICES2014), p 98-103	International	2014
96.	*Abhilash Thekkilakattil, Radu Dobrin, Sasikumar Punnekkat	Mixed Criticality Scheduling in Fault-Tolerant Distributed Real-time Systems (Jul 2014),	International Conference on Embedded Systems 2014 (ICES2014), p 92 - 97	International	2014
97.	Srinivasan, A. Bain, M. Vatsa, D. and Agrawal, S.	Identification of transition models of biologicals systems in the presence of transition noise.	25th International Conference on Inductive Logic Programming	International	2015
98.	Mohit, Y. Hassan E. Shroff, G. Agarwal, P. and Srinivasan, A.	Patterns in Multi-Sensor Data from the Industrial Internet.	PReMI 2015	International	2015
99.	Divyansh Khanna, Rohan Sahu, Veeky Baths and Bharat Deshpande	Comparative Study of Classification techniques (SVM, Logistic Regression and Neural Networks) to predict the prevalence of Heart Disease	th International Conference on Machine Learning and Computing (ICMLC 2015), March 19-20, 2015 in Florence, Italy, pp. 414-419,	International	2015
100.	Aruna Govada,Pravin Joshi,Sahil Mittal,Sanjay Kumar Sahay	Hybrid Approach for Inductive Semi Supervised Learning Using Label Propagation and Support	11Th International Conference,MLDM 2015 Hamburg,Germany,July 20-21,2015. LNAI 9166: pp 199-	International	2015

		Vector Machine.	213		
101.	Aruna Govada, Bhavul Gauri ,Sanjay.K.Sahay	Distributed Multi-Class SVM for Large Data Sets.	Rd ACM International Symposium on Women in Computing &Informatics , Kochi ,Kerala,Aug 10-13 , 2015 . Pages 54-58	International	2015
102.	Aruna Govada, Bhavul Gauri ,Sanjay.K.Sahay	Centroid Based Binary Tree Structured SVM for Multi Classification.	4Th IEEE International Conference on Advances in Computing,Communications and Informatics , Kochi ,Kerala,Aug 10-13 , 2015 pp 258 – 262	International	2015
103.	R.K. Roul, Ashish Nanda, Viraj Patel and S.K. Sahay	Extreme Learning Machines in the field of Text Classification	16th ACIS/IEEE conference on Software Engineering, Networking, Parallel Computing and Distributed Computing, pp 1-7	International	2015
104.	Neethu Bal Mallya, Geeta Patil and Biju Raveendran	Way Halted Prediction Cache: An Energy Efficient Cache Architecture for Embedded Processors	Proceedings of the 28th International Conference on VLSI design, pp 65 - 70	International	2015
105.	Sreejith, V.; Suriyadeepan, R.; Anupama, K.R.; Gudino, L.J.,	High Bandwidth Data Streaming in Sensor Network with Mobile Nodes	Accepted for the Proceedings of IEEE- ICCC 2015	International	2015
106.	Sreejith, V.; Anupama, K.R.; Gudino, L.J.; Suriyadeepan, R.,	A fast exploration technique in WSN for partition recovery using mobile nodes,	Twenty First National Conference in Communications (NCC) , pp.1-6, Feb. 27 2015-March 1 2015 doi: 10.1109/NCC.2015.7084923	National	2015
107.	V. Sreejith, K. R. Anupama, Lucy J. Gudino, and R. Suriyadeepan	Partition Discovery and Connectivity Restoration in WSN using Mobile Relays	In Proceedings of the 2015 International Conference on Distributed Computing and Networking (ICDCN '15). ACM, GOA January - 2015, Article 36 , 9 pages. DOI=10.1145/2684464.2684	International	2015

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108.	Rob Davis, Abhilash Thekkilakattil, Oliver Gettings, Radu Dobrin, Sasikumar Punnekkat	Quantifying the Exact Sub-Optimality of Non-Preemptive Scheduling (Dec 2015)	The 36th IEEE Real-Time Systems Symposium (RTSS'15)	International	2015
109.	Abhilash Thekkilakattil, Rob Davis, Radu Dobrin, Sasikumar Punnekkat, Marko Bertogna	Multiprocessor Fixed Priority Scheduling with Limited Preemptions (Nov 2015)	Accepted for The 23rd International Conference on Real-Time Networks and Systems (RTNS'15)	International	2015
110.	Stephan Baumgart, Joakim Fröberg, Sasikumar Punnekkat	Enhancing Model-Based Engineering of Product Lines by Adding Functional Safety (Oct 2015)	Accepted for International Workshop on Modelling in Automotive Software Engineering (MASE'15)	International	2015
111.	Ayhan Mehmed, Sasikumar Punnekkat, Wilfried Steiner, Giacomo Spampinato, Martin Lettner	Improving Dependability of Vision-Based Advanced Driver Assistance Systems Using Navigation Data and Checkpoint Recognition (Sep 2015)	Accepted for International Conference on Computer Safety, Reliability & Security (SAFECOMP 2015)	International	2015
112.	Rob Davis, Oliver Gettings, Abhilash Thekkilakattil, Radu Dobrin, Sasikumar Punnekkat	What is the Exact Speedup Factor for Fixed Priority Pre-emptive versus Fixed Priority Non-pre-emptive Scheduling? (Jul 2015)	The 6th International Real-Time Scheduling Open Problems Seminar (RTSOPS'15)	International	2015
113.	Omar Jaradat, Iain Bate, Sasikumar Punnekkat,	Using Sensitivity Analysis to Facilitate The Maintenance of Safety Cases (Jun 2015)	The 20th International Conference on Reliable Software Technologies (Ada-Europe-2015)- pp 162-176	International	2015
114.	Wilfried Steiner, Ayhan Mehmed, Sasikumar Punnekkat	Improving Intelligent Vehicle Dependability By Means of Infrastructure-Induced Tests, ,	1st Workshop on Safety and Security of Intelligent Vehicles (SSIV 2015), p 147 - 152	International	2015

115.	Omar Jaradat, Iain Bate, Sasikumar Punnekkat	Facilitating the Maintenance of Safety Cases (Jun 2015)	The 3rd International Conference on Reliability, Safety and Hazard - Advances in Reliability, Maintenance and Safety (ICRES-ARMS'15)-	International	2015
116.	Marina Gutiérrez, Wilfried Steiner, Radu Dobrin, Sasikumar Punnekkat	A Configuration Agent based on the Time Triggered Paradigm for Real-Time Networks (May 2015) -- Best Paper Award	11th IEEE World Conference on Factory Communication Systems (WFCS'15), pp 1 - 4	International	2015

*Published prior to joining BITS Pilani Goa Campus

23. Details of patents and income generated

Name		Title of Patent	Persons involved	Year
Santonu Sarkar	US Patent 9,015,011	Assistant tool	With VS Sharma, R Agrawal, K Verma, A Kass	2015
	US Patent App. 14/614,226	Method and system for analyzing an extent of speedup achievable for an application in a heterogeneous system	With S Mitra	2014
	US Patent App. 14/493,905	Systems and methods for colocating virtual machines on one or more physical infrastructure	With R Ganesan	2014
	US Patent 8,839,211	Evaluating and enforcing software design quality	With V Kaulgud	2014
	US Patent 8,713,513	Evaluating programmer efficiency in maintaining software systems	With GM Rama, Avinash Kak, NN Siddaramappa, S Ramachandran	2014
	US Patent 8,566,789	System and method for improving modularity of large legacy software systems	*With GM Rama	2013
	US Patent 8,566,787	Semantic-based query techniques for source code	*With NN Siddaramappa, R Sindhgatta, S Thonse, K Pooloth	2013
	US Patent 8,442,985	System for requirement identification and analysis based on capability mode structure	*With K Verma, RG Vasquez, A Kass, VS Sharma	2013
	US Patent 8,352,914	Impact analysis of software change requests	*With A Panayappan, KS Ostman	2013
	US Patent App. 13/554,615	System and method for job scheduling optimization	*With N Tewari and R Bhose	2012
	US Patent 8,209,665	Identification of topics in source code	*With GM Rama and K Heafield	2012

	US Patent App. 13/495,753	Method, system, and computer-readable medium for providing a scalable bio-informatics sequence search on cloud	*With M Rani, A Ghosh, A Jain, M Kaushik, H Vachhani	2012
	US Patent 8,146,058	Measuring quality of software modularization	*With GM Rama, Avinash Kak, NN Siddaramappa, S Ramachandran	2012
	US Patent 7,716,254	System for modeling architecture for business systems and methods thereof	*With S Thonse and R Kapadia	2010
Neena Goveas	TEMP/E-1/13846/2015-MUM	Multi-Parameter Cross Layer Dynamic - Hierarchal Wireless Sensor Network for Monitoring of Cross Country Gas Pipelines, Process Plants and Customers.	Neena Goveas, Lucy Gudino, S.Barathy, Raj Kumar Kashyap, Parivesh Chugh, T P Yuvraj, K R Anupama	2015
Ashwin Srinivasan	8661039	Cross-guided data clustering based on alignment between data domains	*Rob Goris, Laurent S. Mignet, Ashwin Srinivasan	2013
	8209273	Automatically evaluating and ranking service level agreement violations	*Rob Goris, Laurent S. Mignet, Ashwin Srinivasan	2012
Ramprasad Joshi	India 185/DEL/2013	SYSTEM AND METHOD FOR REDUCED COMPLEXITY COMPUTATIONS WITH DETAIL PRESERVATION OF DATA Developed as a by-product of Terrain Adaptive Gait Learning. Greatly reduces redundancy in large 3D datasets while keeping almost all information content intact. Meant for use primarily with a robotic system, though applications range from image analysis to traffic routing.	7 6 alumni - 5 of them from EEEnI, one CS, and I)	2013

*Registered patents prior joining to BITS Pilani Goa Campus.

24. Areas of consultancy and income generated None

25. Faculty selected nationally / internationally to visit other laboratories / institutions industries in India and abroad

1. Prof.Bharat Deshpande –
   - Selected to visit Microsoft Research Labs , Redmond USA-6th July 2015 to 13th July 2015

2. Dr. A. Baskar –
   - *Visited Microsoft Research India, Bangalore during May--August 2010 and March--May 2011.

- *Visited Institute of Mathematical Sciences, Chennai during June--July 2014.

3. Prof. Ashwin Srinivasan –
   - Visiting Professor: Department of Computer Science, University of Oxford (2012-present);
   - Visiting Professorial Fellow: School of Computer Science and Engineeri
   - ng, UNSW, Sydney (2011-present);
   - *Distinguished Visiting Fellow, British Royal Academy of Engineering (2012)

4. Prof. Sasikumar Punnekkat -
   - *Visiting Professor, University of Oxford (2012)
   - *Visiting Professorial Fellow, UNSW, Sydney (2011)

*Prior to joining BITS Pilani Goa Campus.

26. Faculty serving in National committees b) International committees c) Editorial Boards d) any other (please specify)

1. Prof. BharatDeshpande
   - Board of Studies for CS, Goa University.
   - Member of Academic Audit Committee, Department of Computer Science , GoaUniversity.

2. Prof. J V Rao
   Committee member in "Evaluation of technical biddings for development of marine Geoscientific Database at NCAOR" , GOA.

3. Dr. S K Sahay –
   - Member of Indian Gravitational Wave Observatory Consortium.
   - Editorial Board Member of Interanational Journal of Computer Science and Engineering.
   - Advisor of the Transtellar Journal Publications and Research Consultancy.

4. Prof. Sasikumar Punnekkat
   - Co-chair of Sub-Committee on Fault Tolerant and Dependable Systems of the IEEE Industrial Electronic Society (IES) Technical Committee on Factory Automation (TCFA).
   - Technical PC member for IEEE High Assurance Systems Engineering Symposium.
   - Program Committee member for ICT Verification & Validation track and Qualityin Agile methods track in International Conference on the Quality of Information and Communications Technology (QUATIC)

- Program Committee member Industrial Communications Track of IEEE international conference on Emerging Technologies and Factory Automation (ETFA).
- Program Committee member for IADIS International Conference on Information Systems.
- Editorial Board member, International Journal of Electrical and Computer Engineering Sciences

5. Prof. Santonu Sarkar
- Member of SigSE, and Steering Committee of ISEC.

6. Prof Ashwin Srinivasan
- Program Committee member, International Conference on Inductive Logic Programming
- Editorial Board Machine Learning.
- Board of Studies member, Dept of CS, University of Goa.
- Board of Studies Member, Faculty of Maths and CS, South Asian University.
- Special Committee Member, School of Computational and Integrative Sciences, JNU.

27. Faculty recharging strategies (UGC, ASC, Refresher / orientation programs, workshops, training programs and similar programs).

1) Research Initiation Grant: The Research Initiation Fund is designed to enable the beginning of research and related activities for a newly recruited faculty who has significant potential to attract external funding. The grants shall be awarded soon after joining BITS for up to Rs. 2 Lakhs and the amount should be spent within 24 months of appointment. Prof. Santonu Sarkar

2) Seed Grant Scheme: The Seed Grant scheme is designed to stimulate competitive research in strategic areas of national or international importance, to promote innovative product and technology development, and/or to facilitate the start of research programs which will potentially develop into creative ventures on their own through external funding. The grant shall be awarded with a maximum value of Rs.20 Lakhs. The duration of the Grant will be 2 years.

Sl. No	Faculty	Scheme	Details
1	Dr. Biju K R	SEED Grant	Title - To Design and Implementation of High Performance Energy Efficient Scheduling Algorithms for Multiprocessor / Multicore Hard Real - time Systems Sanctioned Amount – 18 Lakh

3) Chair Professorship

A Chair Professorship helps recognize and reward excellence in teaching and/or research by a member of the BITS Pilani faculty at either of its campuses or to induct a professor from outside BITS, Pilani. Such a person would be re-designated as Chair Professor, Each "Chair Professorship" also helps establishment an endowment with significant funds that are used to (a) make available to the Chair Professor a "research grant", and (b) provide to him/her a small honorarium to cover additional effort required to fulfill the charter laid out for the endowment.

4) OPERA Award

The awards named OPERA awards (for "Outstanding Potential for Excellence in Research and Academics") are to facilitate and incentivize new faculty to join BITS and excel in research and teaching. The award is in the form of a "joining bonus" paid over 5 years, plus funds to kick-start their R&D and professional development. The award will help compensate new faculty (or provide R&D funds) at par with the best institutions in India.

- Prof Sasikumar Punnekkat
- Prof. Santonu Sarkar
- Dr. A Baskar

5) Professional Development Allowance:

The institute provides Rs 100,000/- to each   faculty member for expenses related to research, conference registration etc.

6) Industry Day

The institute has engaged in intensifying its contact with industry to leverage industry sponsored projects to keep faculty competence in line with industry and societal needs.

7) Visits of eminent scholars to various departments as well as the organization of conferences and workshops by the department together with other national and international professional societies to help create platforms and forums for exchange of ideas and knowledge in the upcoming fields of science and technology.

8) The institute provides financial support to initiate such events and also facilitates financial support to lectures and tenured faculty members to participate in national and international seminars/workshops/schools/ conferences etc.

28. Student projects
- percentage of students who have done in-house projects including inter-departmental projects: 100%

- percentage of students doing projects in collaboration with other universities /industry / institute

Almost all the students participate in a six months long industry engagement / thesis at industry / CSIR labs / premier institutions.

29. Awards / recognitions received at the national and international level by
Faculty /Doctoral / post doctoral fellows Students.
1. Prof. Sasikumar Punnekkat –
   - Class of 1981 Chaired Professor, BITS-Pilani (2015).
   - *Distinguished Visiting Fellow, Royal Academy of Engineering (2012).
   - Ramanujan Fellow (2009-2015).

2. Dr. S K Sahay –
   Visiting Assoicateship, IUCAA PUNE for the period 2012-2015, 2015-2018.

3. Mr. Sreejith V –
   Best PhD Forum Presentation Award- COMSNETS 2014.

4. GSoC projects – in top 10 in the world for the past 2 years.
   Google Summer of Code(GSoC) is a global program that offers students stipends to write code for open source projects. Google has worked with the open source community to identify and fund exciting projects for every summer.

5. A few UG Students have been selected under prestigious International programs like DAAD, MITACS, Erasmus Mundus etc.

30. Seminars/ Conferences/Workshops organized and the source of funding (national/ international) with details of outstanding participants, if any.

- International Workshop on Data Analytics & Applications jointly organized by Computer Science Department of BITS Pilani & BITS Goa Campus from 26th Feb 2013 to 1st March 2013 at Goa. Source of funding: BITS Pilani University.
- INDO - CHILE Workshop on BIG DataApplications jointly organized by Computer Science Department of BITS Pilani & BITS Goa Campus from 4th June to 6th June 2014 at Goa. Source of funding: DST.

- 16th International Conference on Distributed Computing and Networking,organised & hosted by BITS Goa from 4 June 2014 to 6 June 2014.
- Source of funding: Google, Accenture, TCS, IBM & DEITY.
- ACM India Annual Event 2015 jointly organised with Goa University, ACM Goa Chapter at BITS Goa from 5th February to 7th February 2015.
- Source of funding: ACM India , Persistent Systems.

31. Code of ethics of research followed by the Department.

The department follows the code of ethics specified by the Institute

32. a) Student profile programme-wise:

Name of the Programme	Applications Received	Selected		Pass Percentage	
		Male	Female	Male	Female
2010-2011					
B.E. Computer Sc.	139234 Applications Received for FD, 4428 Applications received for HD & 425 Applications received for PhD	59	22	100%	100%
M.Sc.(Tech.) (Information Systems)		37	12	100%	100%
M.E. Software Systems		6	2	100%	100%
Ph.D. (Sem I)		1	0	0	0
Ph.D. (Sem II)		0	0	0	0
2011-2012					
B.E. Computer Sc.	123677 Applications Received for FD, 4571 Applications received for HD & 461 Applications received for PhD	71	9	100%	100%
M.Sc.(Tech.) (Information Systems)		37	14	100%	100%
M.E. Software Systems		8	1	100%	100%
Ph.D. (Sem I)		1	1	0	0
Ph.D. (Sem II)		1	1	0	0
2012-2013					
B.E. Computer Sc.	136904 Applications Received for FD, 4825 Applications received	66	14	100%	100%
M.Sc.(Tech.) (Information Systems)		34	10	100%	100%

M.E. Software Systems	for HD	7	2	100%	100%
Ph.D. (Sem I)	8	2	0	2	0
Ph.D. (Sem II)	6	0	0	0	0
2013-2014					
B.E. Computer Sc.	166260 Applications Received for FD, 5549 Applications received for HD	77	9	100%	100%
M.E. Software Systems		7	2	100%	100%
Ph.D. (Sem I)	9	0	0	0	0
Ph.D. (Sem II)	26	2	0	1	0
2014-2015					
B.E. Computer Sc.	186181 Applications Received for FD, 5172 Applications received for HD	82	12	100%	100%
M.E. Computer Sc.		6	2	100%	100%
Ph.D. (Sem I)	33	2	0	0	0
Ph.D. (Sem II)	0	1	0	0	0
2015-2016					
B.E. Computer Sc.		90	10		
M.E. Computer Sc.		4	4		
Ph.D. (Sem I)		4	1		
Ph.D. (Sem II)					

33. Diversity of Students

Not available.

34. How many students have cleared Civil Services and Defense Services examinations, NET, SET, GATE and other competitive examinations? Give details category-wise.

We do not capture this data through any formal process

35. Student progression

Student progression	Percentage against enrolled
UG to PG	Approx. 15% (Officially this data is not maintained. The figure is based on the experience)
PG to M.Phil.	
PG to Ph.D.	
Ph.D. to Post-Doctoral	
Employed • Campus selection • Other than campus recruitment	90.38% Information Not Available
Entrepreneurs	Information Not Available

36. Diversity of staff

Percentage of faculty who are graduates	
of the same university	9.5 %
from other universities within the State	9.5%
from universities outside the country	9.5% (University outside the country)
from universities from other States	71.5% (University from other states)

37. Number of faculty who were awarded M.Phil., Ph.D., D.Sc. and D.Litt. during the assessment period
- Mangesh Bedekar
- Nitin Upadhyay
- Raghvendra G.S

38. **Present details of departmental infrastructural facilities with regard to**
    a. **Library**

    The Institute has a central library which caters to the requirements of the departments. There are 3657books under the computer science category. Other than these, students & Faculty members also utilize books related to Computer science under various sections on Mathematics, Electric Engineering etc. of the library. For assisting and encouraging research, institute subscribes to E-Journals like ACM Digital **Library &Science Direct.**

    We have an active Library Committee on which every department is represented, and this committee decides policies and allocations and oversees their implementation.

    b. **Internet facilities for staff and students**
    Internet facilities to Staff (and faculty): Unlimited access is provided to staff and faculty at their office as well as residence. WiFi connectivity is provided to the complete academic area. The bandwidth provided to faculty is 100Mbps on a 10Gbps backbone (for intranet).

    Internet facilities to Students: All students are provided intranet (10Gbps back bone), internet (300Mbps provided by Vodafone, GWave and TATA) and WiFi in all hostels with per day download limit of 800MB for under graduate students and 1GB for post graduate students and Ph.D. scholars.

    c. **Students' laboratories**
    The laboratory components of following courses:
    - Computer Programming
    - Data Structures and Algorithms
    - Object Oriented Programming
    - Data Bases
    - Computer Architecture
    - Computer Networks
    - Creative Multimedia
    - LISP and Prolog programming for Artificial Intelligence
    - Network Programming
    - Systems programming in Operating Systems
    - Pervasive Computing
    - Data mining
    - Cloud computing

Are conducted utilizing the computer centre which is the central computing facility.

d. Research laboratories

In addition to computer centre facility the department has an additional lab with following facilities, for higher degree and research work.

1. The lab has the 50 art of state computers with the necessary software.
2. Cloud computing facility.
3. Monosek Network Analyser.
4. Pervasive devices for applications in wireless sensor device.
5. FPGA Kits for Hardware reconfiguration.
6. Multimedia Equipment
7. Real Time Operating Systems like VxWorks, QnX.
8. HiPC Server (For University-wide Computation Service)
   IBM x3650 (Intel Xeon 5, 2GHz, 32 GB, 2-Processor, 16-core, 4TB RAID 5) Head Node with RHEL6.2 and 5 IBM x3550 (Intel Xeon 5, 2GHz, 32 GB, 2-Processor, 16-core diskless) Compute Nodes; MPI on IB backbone and ethernet connectivity. 650 MFLOPS tested, nominal 1TFLOPS.

39. **List of doctoral, post-doctoral students and Research Associates**
   b) from the host institution/university: Nil
   c) from other institutions/universities
   On-Campus
   1. Mr. Ramprasad Joshi
   2. Mr. Rajendra Kumar Roul
   3. Ms. Aruna Gowada
   4. Mr. Mahadev Gawas
   5. Ms. Shubhangi Gawali
   6. Ms. Geeta Patil
   7. Mr. V Sreejith
   8. Mr. TSRK Prasad
   9. Mr. Shamanth N
   10. Mr. Ashu Sharma
   11. Mr. Mayur Jartarkar
   12. Mr. Abhinandan Patil

   Off-Campus

Sl. No.	Name	Organization
1	Mr. Sanjay Joshi	Persistent Systems
2	Mr. Gavrav Gupta	Adobe
3	Mr. Sri Krishana	IBM
4	Mr. Sajith P	Philips
5	Mohit Sewak	Bank Of New York Mellon

6	Mr. Arun S Nair	KPIT Technologies, Bangalore
7	Ms. Julieta Luiza Louella M. Mesquita	Padre Conceicao College of Engineering Goa.
8	Captain. G. B. Varadaraju	Indian Navy
9	Mr. Ravikumar Naik	TIFR

40. **Number of post graduate students getting financial assistance from the university.**

batch	Scholarship	stipend
2011-12		
2010	0	2
2011	7	8
Total	7	10
2012-13		
2010	0	2
2011	7	7
2012	11	12
Total	18	21
2013-14		
2012	9	9
2013	6	7
Total	15	16
2014-15		
2013	6	7
2014	4	2
	10	9

41. **Was any need assessment exercise undertaken before the development of new programme(s)? If so, highlight the methodology.**

The exercise undertaken before the development of a new programme usually begins with a Department airing its intention to float a new programme, CDC or elective proposed by the faculty concerned. Discussions are held regarding its merits/demerits at the DCA level and later at a CCDCA level. Once the necessary inputs and unanimity have been reached on all the aspects regarding the operational aspects related to the course, it is sent to the ARP so that it can be passed up to Senate approval.

42. **Does the department obtain feedback from**
- **faculty on curriculum as well as teaching-learning-evaluation? If yes, how does the department utilize the feedback?**
  Feedback from the faculty is analysed and accordingly we
    1. propose new courses
    2. update courses
    3. offer new programmes
    4. upgrade labs
    5. adopt new teaching pedagogy

- **students on staff, curriculum and teaching-learning-evaluation and how does the department utilize the feedback?**

  Feedback from the students is obtained on course pages by individual faculty members. Also feedback is officially collected separately by instruction division and passed on to individual faculty members. The feedback is utilized mainly for improving the delivery of the courses. The Department also has a student faculty council consisting of faculty members and student representatives of each year to gather feedback throughout the semester regarding specific courses and programs in general.

- **alumni and employers on the programmes offered and how does the department utilize the feedback?**

  Alumni: Yes, the department obtains feedback from Alumni on the programmes offered. Upcoming trends in various technical industries are also discussed. Some of the alumni also pitch in ideas for newer courses to be introduced as part of the curriculum. These issues are reviewed in detail with the concerned department faculty. Suitable measures for implementation of the feedback are considered and followed accordingly.

  Employers: Each Campus conducts a Placement Faculty Advisory council meeting once a month. The council consists of the Director, the Deputy Director, The Dean, Head of the Departments, Placement Manager, Faculty Incharge (Placement) and a Faculty representing each department. The council discusses the feedback obtained department–wise from the recruiters and measures are taken to strengthen the programmes /courses accordingly.

43. **List the distinguished alumni of the department (maximum 10)**

The department is young, however our students have excelled in professional pursuits and few of these are listed below

S.No.	Name	Remarks
1	Ms. Ankita Kejriwal	Asia Pacific Google Anita Borg Scholarship Recipient
2	Mr. Jenish Mehta	Awarded fellowship for Ph.D. at Caltech, USA.
3	Mr. Krishna Kumar	Team leader at Apple Inc, USA
4	Mr. Roshan Sumbaly	Content Engineering Lead at Coursera
5	Mr. Krunal Patel	Eighth rank across Asia Pacific in Google recruitment APAC test
6	Mr. Kartik Aneja	Co- founder Nayi Disha
7	Mr. Ankur Kumar	Founder of BigBHK
8	Ms. Apoorva Deshpande	Asia Pacific Google Anita Borg Scholarship Recipient
9	Ms. Anwaya Aras	Asia Pacific Google Anita Borg Scholarship Recipient

44. **Give details of student enrichment programmes (special lectures / workshops / seminar) involving external experts.**

Department conducts various talk by industry / academia experts. In addition to this there are focused periodic programmes and talks like Nettech and Embryo happening throughout the semester. Few of the talks presented by eminent experts are:

- Dr. Akshara Kaginalkar, Associate Director & HoD, C-DAC, Pune gave a invited talk on Overview of C-DAC's R&D program, December 06, 2013.
- Prof. Subhjit Roy IIT Kanpur gave a invited talk on From Concrete Examples to Heap Manipulating Programs, 20th September 2013.
- Dr. Santonu Sarkar Principal Research Scientist, Infosys Research Lab delivered a invited talk on Challenges in Managing Complex Business Applications, 1/12/2013
- Dr. Anandan, Director at Microsoft Research India, gave a invited talk on Overview of Research at Microsoft on 20/08/2013
- Professor Margaret Burnett, Professor at School of Electrical Engineering and Computer Science, Oregon State University, Oregon delivered a invited talk on Information Foraging Theory in Software Navigation, 02/04/2013
- Prof. M.V. Pitke (Retired Professor from TIFR Mumbai) delivered a invited talk on Microwave Technology and the new Opportunities and Challenges, 19/08/2013

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- Dr. Anand Deshpande, CEO Persistent Systems, India, delivered a talk on "Cloud computing" in November 2012.
- Mr. Raj Biyani, Managing Director of the India operations for Microsoft IT in Hyderabad delivered a talk in November 2011
- Prof. Dragan Djuric from Departmentof Software Engineering, University of Belgrade, Belgrade, Serbia, delivered a talk on Model Driven Engineering in November 2012.
- Prof. Umesh Bellur from IIT Bombay, delivered a talk on Research Problems in Virtualized Data Centers on 28/01/2015

45. **List the teaching methods adopted by the faculty for different programmes.**
- Black board class room teaching
- Power point based class room teaching
- Hands on Laboratory based training
- Online evaluation mainly for quizzes and off campus programmes
- Webex based courses for off campus programmes
- Teaching via Telepresence facility across campuses
- MOOC based flip class room teaching

46. **How does the department ensure that programme objectives are constantly met and learning outcomes are monitored?**

The department has two levels of committees. At department level, we have peer faculty committee consisting of senior faculties constantly monitoring the progress of the teaching and research objectives. There exists a student – faculty committee to monitor the progress of individual courses. We also employ a departmental cross campus committee, to maintain uniform high standards and to discuss and deploy the updates needed.

47. **Highlight the participation of students and faculty in extension activities.**
Students actively participates in social outreach programs like NIRMAAN, ABHIGYAN etc.

48. **Give details of "beyond syllabus scholarly activities" of the department.**
- Faculty members are actively engaged in offering short term projects to students.
- Faculty members act as reviewers (journals/conferences etc)
- Faculty members are invited as resource persons in various workshops/conferences .
- Departmental faculties mentor various extension activities under ASCII and KERNEL, the department student body.
- The faculties also mentor students in ACM student chapter, Centre for Technical Education (CTE), Centre for Software Development (CSD) etc.

49. **State whether the programme/ department is accredited/ graded by other agencies? If yes, give details.**   No.

50. **Briefly highlight the contributions of the department in generating new knowledge, basic or applied.**

   - Faculty members are actively engaged in research both in theoretical and applied and have received many patents.
   - Faculty members are keenly involved in research and publish research papers in reputed peer reviewed journals and disseminate the new knowledge to higher degree students

51. **Detail five major Strengths, Weaknesses, Opportunities and Challenges (SWOC) of the department.**

Strengths	Weaknesses
• Faculty with diverse teaching skills • Exciting dual-degree programmes for undergraduates • Annual influx of 100+ fresh UG students who are among the best in the country; • Several individuals capable of doing good research. • A strong tradition of FOSS and GSoC projects and UG research	• Low faculty strength resulting in fewer elective options • student-teacher ratio is large • High administrative loads of faculty • Shortage of laboratory space and equipment. • Lack of proper access to journal articles
Opportunities	**Challenges**
• New degrees in inter-disciplinary areas • Co-existence of departments that allow for inter-disciplinary research • Existence of unique scientific laboratories like the National Institute of Oceanography and the National Institute of Antarctic Studies that can allow for very interesting joint projects • Emerging opportunities with industrial groups • Possibility of attracting international research faculty on short-term visits, because of the location	• Free availability of on-line courses from the world's top institutions • Greater choice for students by way of good tertiary institutions • New institutes both in Goa (like the IIT) and elsewhere providing better conditions for attracting researchers • Attracting quality faculty because of highly paid jobs in the industry • Increasing student numbers

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52. **Future plans of the department.**

We have been known for the diverse areas in which our faculty members do research, but that reputation is still associated with the individual researchers. We plan to determine a few thrust areas for which we hope to be known as a specializing department. Without jettisoning the diversity and the BITS model of broad-based, choice-based education, we plan to develop synergetic new programmes that highlight the thrust areas of our researchers in teaching. One such initiative is the DTC: Doctoral Training Centrein Computational Biology. We are planning to begin similar initiatives in Data Science and Software Engineering, hoping to attract good faculty in these areas.

BITS as a university has been a pioneer, inter alia, in using ICT in administration as well as pedagogy. There also has been emphasis on in-house development for these initiatives. CS Department has been in the forefront in this activity, and we plan to remain and develop as the chief resource centre.

53. **Any other information regarding your department which you would like to include.**

Ms. Aruna G – Received a travel grant of 75000 INR from Microsoft Research India to present the paper in 11th international conference on Machine learning and Data mining in Hamburg, Germany July 2015.
Mr. Rajendra Kumar Roul – Received a travel grant of 60000 INR from Microsoft Research India to present the paper in 16th ACIS/IEEE conference on Software Engineering, Networking, Parallel Computing and Distributed Computing, 2015, Japan.
Dr. S K Sahay Project Associate in Multiwavelength Astronomy Mission ASTROSAT, Raman   Research Institute Bangalore.

o Prof. Santonu Sarkar –
  • Visited Siemens Parallel Processing Research Group 2014-2015
  • Visited Accenture Research Lab in 2015
  • Visited IIIT-B and IIIT-H in 2014-15
  • Visited University of South California-LA in 2013

Goa Campus: Evaluative Report of the Department
ECONOMICS AND FINANCE

1. **Name of the Department:** Economics

2. **Year of establishment of the Department:** 2004

3. **Is the Department part of a School/Faculty of the university?**
   Departments function as independent entities in the university and are not part of any school or faculty.

4. **Names of programmes offered (UG, PG, M.Phil., Ph.D., Integrated Masters; Integrated Ph.D., D.Sc., D.Litt., etc.).**
   MSc. (Hons.) Economics;   Ph.D.

5. **Interdisciplinary programmes and departments involved:**
   Minor Specialization in Politics, Economics & Philosophy offered in conjunction with Dept of Humanities & Social Sciences

6. **Courses in collaboration with other universities, industries, foreign institutions, etc.**
   Management of Cross Cultural Engineering Teams(BITS C419):Principles and Practices of Global Innovation, conducted in collaboration with State university of California with teams from USA, India, S Korea, Israel, China, in 2013-14 2nd semester.

7. **Details of programmes discontinued, if any, with reasons:** None

8. **Examination System:** Semester System and Choice Based Credit System

9. **Participation of the department in the courses offered by other departments:**
   Supply Chain Management (MF F 421 for Mechanical Engineering)

10. **Number of teaching posts sanctioned, filled and actual (Professors /Associate Professors /Asst. Professors/others).**

	Sanctioned	Filled	Actual number
Professor	Note:**		0
Associate Professors			1
Asst. Professors			6
Others:			1 Lecturer
			1 Visiting Associate Professor
			2 Guest Faculty

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Note**:The faculty positions for the University is broadly governed by Growth plan which also covers designation-wise breakup with a larger vision. Keeping in mind the fluidity of movement of faculty and proposed student to faculty ratio in each campus for first degree, higher degree as well as Ph.D. programmes, individual department needs are not fixed. Besides, as we are in expansion plan which calls for new programmes, courses being introduced, the demand on faculty in terms of numbers, for each department, is broadly governed by all the above factors and hence it is not possible to have a fixed number of faculty for each department. Recruitment of faculty, therefore, varies, based on departmental needs.

11. **Faculty profile with name, qualification, designation, area of specialization, experience and research under guidance**

Name	Qualification	Designation	Specialization	No. of Years of Experience	No. of Ph.D./ students guided for the last 5 years
Mridula Goel	PhD	Associate professor	Economics	33	3 (ongoing)
Debasis Patnaik	PhD	Assistant Professor	Economics	14	4 +1 as Co Supervisor (ongoing)
Debdulal Thakur	PhD	Assistant Professor	Economics	9	None
Anoop S. Kumar	PhD	Assistant Professor	Economics	3	None
Ch V. V. S. N. V. Prasad	Ph D	Assistant Professor	Supply Chain Management	18	1 (ongoing)
Rajorshi Sen Gupta	PhD	Assistant Professor	Economics	6	none
Aswini Kumar Mishra	PhD	Assistant Professor	Economics	12	1 +2 as Co Supervisor ongoing
Pinky Pawaskar	MBA ,at present pursuing PhD	Lecturer	Finance	10	none

12. **List of senior Visiting Fellows, adjunct faculty, emeritus professors:**
   o Prof. Geeta Rani Duppati (Senior Lecturer, Waikato Management School, New Zealand) as Visiting Associate Professor -2015
   o Prof. Minet Schindehutte (Syracuse university, New York) Fulbright-Nehru scholar in Entrepreneurship 2012-13
   o Mr. Rammohan Menon (Guest Faculty) 2012-till date fellow of The Institute of Cost Accountants of India, Certified Management Accountant(USA) and a member of the Institute of Management Accountants-USA.
   o Mr. BinayakDutta (Guest Faculty) 2014-till date. Mr Datta is a Fellow Member of Institute of Chartered Accountants of India, CFO, Vice President of Zuari Group, Goa.

13. **Percentage of classes taken by temporary faculty – programme-wise information:** 10%

14. **Programme-wise Student Teacher Ratio (Refer to Support document for calculation):** 20:1 (224/11)

15. **Number of academic support staff (technical) and administrative staff: sanctioned, filled and actual:** 1 (actual)

16. **Research thrust areas as recognized by major funding agencies:**
    - Development economics,
    - Mining,
    - Tourism,
    - Entrepreneurship development.

17. **Number of faculty with ongoing/completed projects in the last five years from a) national b) international funding agencies and c) Total grants received. Give the names of the funding agencies, project title and grants received project-wise.**

Completed projects:

SL No	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration
2	Tourism in Goa and its Impact on Socio-Economic conditions and Sustainable Development in the State"	Mridula Goel	ICSSR	Rs 4.89	1 year August 2012 to October 2013
3	One Among Many? Examining The Efficacy Of Mobile Money In India's Remittance Corridors"	Mridula Goel	Bill & Melinda Gates	USD 4600	1year June 2013 to May 2014

Seed Funding Projects (Completed)

SI No	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration
1	A Study on Usage and Impact of ICT in Secondary Schools	ChV V S N V Prasad	Seed Grant from BITS Pilani	Rs. 7.5 Lakhs	2 Years April 2013- April 2015

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Ongoing projects:

SL No	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration
1	Mining Closure, Economic Disruption & Local Level Sustainability: A Case Study of Goa, India	Aswini K Mishra	ICSSR	9.00	2 years June 2014 to May 2016
2	Natural Disasters, Socioeconomic Vulnerability and Policy Responses: A Comparative Study of Odisha and Uttarakhand in India	Aswini K Mishra	UGC (MRP)	11.12	3 years April 2015 to March 2018

18. **Inter-institutional collaborative projects and associated grants received**
    a) National collaboration: None
    b) International collaboration: None

19. **Departmental projects funded by DST-FIST; UGC-SAP/CAS, DPE; DBT, ICSSR, AICTE, etc.; Total grants received:** NIL

20. **Research facility / centre with**
    • State recognition/National/International recognition: None

21. **Special research laboratories sponsored by / created by industry or corporate bodies:** None

22. **Publications:**

Sl No.	Details	Specify number
1	Number of papers published in peer reviewed journals (national / international)	56
2	Monographs	3
3	Chapters in Books	3
4	Edited Books	0
5	Books with ISBN with details of publishers	4
6	Number listed in International Database (For *e.g.* Web of Science, Scopus, Humanities International Complete, Dare Database - International Social Sciences Directory, EBSCO host, etc.)	23
7	Citation Index – range / average	1-11.0/5.0
	SNIP	0 to 1.086
	SJR	0 to 0.744
	Impact Factor – range / average	0 to 1.053
	h-index	0-2.5

Details of the publications as per the number given above (Give details in the last five years

Sl No	Authors	Title of the Publications	Details of the Journal	National/International	Year
1	A. K. Mishra and Ganesh Rao	Analyzing Anti-Competitive Behavior: The Case for Indian Telecom Industry	Science, Technology and Society (A Sage Journal) in Vol. 20 (1), pp.21-43 (March 2015)SNIP-0.527; SJR-0.307	International	2015
2	A. K. Mishra, Jigar N. Gadhia, N Kubendran and MakaraSahoo	Trade Flows between India and other BRICS Countries: An Empirical Analysis using Gravity Model	Global Business Review (A Sage Journal) in Vol. 16(1),pp.107-122 (February 2015) SNIP-0.759 SJR-0.211	International	2015
3	Ch VVSNV Prasad, P. Lalitha, and P.V. N Srikar	Barriers to the Use of Information and Communication Technology (ICT) in Secondary Schools: Teacher's Perspective	Journal of Management Research, Vol. 7:2, 190-208. (EBSCO indexed)	International	2015
4	MridulaGoel	Economic Integration and Factor Flow Mobility, (co authored with RamithPadaki,)accepted for publication	Journal of Economic Cooperation and Development (JECD) (Scopus listed)	International	2015
5	Debdulal Thakur	Parent's Choice Function for Ward's School Continuation in Rural India: A Case Study in West Bengal', co-authored with Shrabani Mukherjee	Margin-Journal of Applied Economic Research (accepted for publication, Next Issue), SAGE Publication, UK-India.	International	2015
5	Debasis Patnaik	Theorizing change in artificial intelligence: inductivising philosophy from economic cognition processes	AI & SOCIETY, DOI 10.1007/s00146-013-0524-5, Springer Verlag	International	2015
6	Debasis Patnaik	Understanding Forward and Backward Linkages in Banking sector:Application of Input Output Method	Journal of Banking, Information Technology and Management, ISSN 0972-902X, vol-12, Number-1 Jan-June2015	National	2015
7	Debasis Patnaik	An Economics of Nano-technology: The relative importance of Governmental	International Journal of Engineering Research and Applications, Vol-4, Issue-	International	2014

		funding and filing of patent applications	10, ISSN-2248-9622, Oct-2014		
8	Pinky Pawaskar and DrMridulaGoel	A Conceptual Model: Multisensory Marketing and Destination Branding	Procedia, Economics and Finance, Elsevier, pp. 255 – 267. ISSN:2212-5671	International	2014
9	A. K. Mishra	Safety Net Measures for Unorganised Workers in India: Critical Gaps and Challenges'	Social Change(A Sage Journal) , Vol. 44 (2), pp.179-203 (June 2014)	International	2014
10	N Kubendran, L S Rachiraju, A. K.Mishra and A Bommareddy	Quasi-Monte Carlo Approach to Asian Options Pricing	Asia-Pacific Journal of Management Research Innovation (A Sage Journal) in Vol.10 (1),pp.67-78 (March 2014)	International	2014
11	P. Lalitha, and Ch V V S N V Prasad	Factors Influencing the Usage of ICT in Secondary Schools: A Case Study in Telangana State of India	Developing Country Studies, Vol. 4:14, 42-47. (EBSCO Indexed)	International	2014
12	Ch V V S N V Prasad, and N Prakash	Lean Practices in Small and Medium Enterprises-A Structured Literature Review	Journal of Basic and Applied Engineering Research, Vol. 1:4, 78-84.	National	2014
13	Ch V V S N V Prasad, and K N Pradhan	Review of Neuromarketing	International Journal of Developments in Trade, Commerce and Business, Vol. 1:7, 44-48.	National	2014
14	Ch V V S N V Prasad, and R Prabhudesai	Sweatshop Practices in the Global Apparel Industry	International Research Journal of Commerce, Business and Social Sciences, Vol.3:3, 138-143.	National	2014
15	Ch V V S N V Prasad, and R Shivadas	The Usage and Impact of ICT in Secondary Schools: A Case Study	Rajagiri Management Journal, Vol.7:2, 52-58	National	2014
16	Ch V V S N V Prasad, and R Shivadas	Impact of Online Marketing on Small and Medium Size Business: A Case Study	Rajagiri Management Journal, Vol.7:2, 52-58	National	2014

17	MridulaGoel	Business Ethics and Corporate Social Responsibility – Is there a Dividing Line? Co-author Preeti E. Ramanathan	Science Direct, Procedia Economics and Finance Volume 11, 2014, Pages 49–59 (Scopus Listed)	International	2014
18	Debdulal Thakur	Budget of Change! How is it?	Mulyayan, Vol.2 Issue 8, ISSN-2347-6168, pp-8-10, July, 2014, Kolkata	National	2014
19	Debdulal Thakur	Governance, State, Control and West Bengal	Mulyayan, Vol.2 Issue 10, ISSN-2347-6168, December 15, 2014, Kolkata.	National	2014
20	DebasisPatnaik and SaurabhSuman	Algorithmic Finance Approach in Media Stock Analysis	American Journal of Engineering Research-eISSN:2320-0847, p-ISSN:2320-0936, Vol-3, Issue-8.	International	2014
21	Debasis Patnaik	Developing an Innovation Management Framework for Measuring Creativity in Research Design	GIABR Journal of Business; ISSN No-2324 5832, Vol-1, No-1.ed-Gonuguntla.Auckland, Manatau Institute of technology, New Zealand.	International	2014
22	DebasisPatnaik and Pranathi Mandadi	Application of Pharma Economic Evaluation Tools for Analysis of Medical Conditions: A Case Study of an Educational Institution in India	International journal for research in emerging Science and Technology, Vol-1, Issue-3, Aug-2014, ISSN-2349-7610.	International	2014
23	DebasisPatnaik	Searching for an Alternative Information System: The Demolition of Caste	International journal Of Engineering Research and Management, ISSN Number:2349-2058; Vol-1, Issue-4, July 2014.	International	2014
24	DebasisPatnaik	Australian Capital Gains Tax and commodity Gains in China: Impact of Investor behavior and Revenue Earnings	China USA Business Review, Vol-13, Number 6, June 2014, Serial Number 132.	International	2014

25	DebasisPatnaik and HimadreeKaushik	Credit Rating Analysis in Emerging Markets	Journal of Accounting and Finance;ISSN 0970 9029, Vol-28, Number-2, April-Sept 2014	National	2014
26	DebasisPatnaik and JahnaviPotluri	Economics of education: inequality in primary education in districts of Andhra Pradesh	International Journal of Management, IT and Engineering, Vol-3, Issue-12, ISSN-2249-0558	National	2014
27	Debasis Patnaik and Neha Repal	Devising a Mental Health MIS: A substantive technology in CSR	Ch-19 in 'Corporate Social Responsibility' APH Publishing Corporation	National	2014
28	A. K. Mishra, K. Narendra and Bibhu Prasad Kar	Growth and Infrastructure Investment in India: Achievements, Challenges, and Opportunities	Economic Annals, Volume LVIII, No. 196, pp.51-70(January-March 2013) SNIP-0.369 SJR-0.157	International	2013
29	A. K. Mishra, Jigar N. Gadhia, Bibhu Prasad Kar, BiswabasPatra and ShiviAnand	Are Private Sector Banks More Sound and Efficient than Public Sector Banks? Assessments Based on Camel and Data Envelopment Analysis Approaches	Research Journal of Recent Sciences (RJRS), 2 (4), pp.28-35 (2013)	National	2013
30	G.M Jha, A. Agrawal, A. Gupta and A.K. Mishra	Determinants of FDI in South Asia	International Research Journal of Social Sciences (IRJSS), 2 (1), pp.1-6 (2013)	National	2013
31	Ch V V S N V Prasad	Supply Chain Management Practices and its Implementation: A Case Study'	Supply Chain Pulse, vol. 4, no. 1, pp.26-35.	National	2013
32	MridulaGoel	Capital Adequacy and its Relevance to the Indian Banking Sector : A Study of Four Indian Banks , (Co-authored with V K Narasimhan)	International Research Journal of Social Sciences ISSN 2319–3565 Vol. 2(11), 1-5, November (2013)	National	2013
33	MridulaGoel	State Level Inequalities in Economic Development .	Online publication at http://www.indiastat.com/default.aspx, Feb 2013.	National	2013

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34	Debdulal Thakur	Right to Education and Infrastructural Facilities in Schools of West Bengal: A brief Review, co-authored with Shrabani Mukherjee	Communique, Volume 7, Number 1 (Issue funded by ICSSR, New Delhi) March 2013.	National	2013
35	Debdulal Thakur	Growing Dependence on Transfers and Rising Disparity in Municipal Finances in India: Evidence from Thirteenth Finance Commission,Co-authored with Shrabani Mukherjee	International Journal of Economics and Finance, e-ISSN: 2321-5933, p-ISSN: 2321-5925., Issue 1 (May.–Jun. 2013), Pp31-41.	International	2013
36	Debdulal Thakur	Toll Roads or Non-Toll Roads: The Debate in a Nutshell	SAARC Journal of Transport, Vol. XIV, No.9, September 2013, New Delhi.	National	2013
37	DebasisPatnaik and Nikunj Sharma	Selection Problems for Application of Probit, Tobit, Logit& Maximum Likelihood Estimation: A Methodological Issue	International Journal of Computational Engineering Research (IJCER)Vol-3,Issue-7; pp-13-29.	International	2013
38	Debasis Patnaik and Babitha V.	Climate Change and Its Financing- India's Experience	Journal of Accounting and Finance-oct2013-March 2014; ISSN 09709029-vol-28, Number-1; pp-42-49	National	2013
39	DebasisPatnaik	Economic cognitive and philosophical implications of artificial intelligence: the Challenge of Change	International Journal of Advanced Research; ISSN Number 2320-9186 Vol-1, Issue-8.	International	2013
40	RajorshiSen Gupta and Mark Musumba	Transmission of world prices to Ugandan coffee growers in a liberalised economy.	Development Policy Review,2013, 31 (2), pp. 219-234. DOI: 10.1111/dpr.12004, Journal Impact Factor: 1.053 SNIP-1.086 SJR-0.744 Listed: Scopus, Web of Science	International	2013

41	Rajorshi Sen Gupta and Mark Musumba	Customer Adoption of Electronic Billing: Incentive Payments vs. Green Fees.	Pragyaan: Journal of Management, 11(2), December 2013, pp. 41-50. ISSN: 0974-5505	National	2013
42	Pinky Pawaskar and DrMridulaGoel	Tourism and Acculturation - A study of Goa	Atna - Journal of Tourism Studies, 7(1), pp 1 - 14. ISSN 0975-3281	National	2012
43	Pinky Pawaskar and Dr Mridula Goel	Tourism: the depth of its meaning	International Journal of Research in Commerce & Management, 2(10), pp 26 - 32. ISSN 0976-2183	International	2012
44	A.K. Mishra	Planned Development and Social Security Measures for Unorganised Workers: Retrospect and Prospects in India	IASSI Quarterly: Contributions to Indian Social Science, 31(2), pp.60-78 (April-June 2012).	National	2012
45	A. K. Mishra and Rahul Yadav	Exchange Rate Behaviour and Management in India: Issues and Empirics	International Journal of Economics, Commerce and Research (IJECR), 2(4), pp.9-16 (2012).	National	2012
46	A. K. Mishra and Mohit Jain	Investigating the Causal Relationship between Saving, Investment and Economic Growth for India	International Journal of Financial Management (IJFM), 1 (1), pp.15-23 (2012)	National	2012
47	A. K. Mishra, G. Sri Harsha, ShiviAnand and Neil Rajesh Dhruv	Analyzing Soundness in Indian Banking: A CAMEL Approach	Research Journal of Management Sciences, 1 (3), pp.9-14 (2012)	National	2012
48	Ch V V S N V Prasad	Multiple Performance Dimensions to Measure Supply Chain Performance'	International Journal of Business and General Management, vol. 1, no. 1, pp. 40-55. (Impact Factor: 3.4458)	International	2012

49	Ch V V S N V Prasad	A Conceptual Framework for Measuring Supply Chain Performance	Journal of Business Management and Research, vol. 2, no. 1, pp. 39-55.	National	2012
50	MridulaGoel	Economic Regulations: Effect on Growth and Stability in Brazil and India (co-author AmanAsija)	ScienceDirect, Procedia - Social and Behavioral Sciences 00 (2011) 000–000, Elsevier Ltd., Vol.37,2012,pgs 167-181 (Scopus Listed)	International	2012
51	Debdulal Thakur	Panchayats in West Bengal-Towards Developing the Pedagogy of the Common Mass- a brief note	Mulyayan, Volume 1, Number 2, ISSN-2347-6168 Pp.36-43, Kolkata.	National	2012
52	Debasis Patnaik and Susanta Bandaru	Application of Markovitz in Indian Stock Markets	International Journal of Financial Management, Vol-1, Issue-1, 2012.	International	2012
53	Debasis Patnaik, Aman Asija, Ram Prasad Joshi. M R Gupta	Self Esteem and Financial Risk Preference: Impact on Risk Perception and Risk Propensity	Proceedings of the 2012 Annual Meeting of Academy of Behavioral Finance and Economics, Sept 18-21, 2012,NY, USA	International	2012
54	A. K. Mishra	Public Spending for Protecting the Poor during Economic Reforms: Myth or Reality? Evidence from Orissa	Journal of Rural Development, 29(1), pp.17-34 (2010). SNIP-0.143 SJR-0.111	International	2010
55	Debasis Patnaik and Sadananda Sahoo	Networking Development: Study of Emerging Areas of Diasporic Engagement in India	Diaspora Studies, Vol-3, Number1, Jan –June 2010.	International	2010
56	Debasis Patnaik	Peace: Measure of a Phenomena	ICSSR Sponsored REC Workshop Volume 2011. Bhubaneswar.	National	2010

Books /Monographs published by Faculty in Last Five Years

1	Debdulal Thakur	Fiscal Stress & Education Expenditure: A Tale of Two Indian States- Co-authored with Shrabani Mukherjee	Lambert Academic Publishers, Germany,2013, ISBN- 978-3659427046.	International	2013
2	*RajorshiSen Gupta	Management of Intellectual Property in Supply Chain Outsourcing, PhD. Dissertation	Texas A&M University, 2012. Available at http://hdl.handle.net/1969.1/ETD-TAMU-2012-08-11855	International	2012
3	MridulaGoel	Gender bias & economic development: with reference to education	Book: Lambert Academic Publishing, Germany,2012. ISBN 978-3659238413	International	2012
4	DebasisPatnaik	Productivity, growth and Dispersal of Industries	Book: Discovery Publishing House India, ISBN-978-81-8356-818-0	National	2011
5	MridulaGoel	Tourism in Goa and its Impact on Socio-Economic conditions and Sustainable Development in the State	ICSSR, MHRD	Monograph	2014
6	Debdulal Thakur	Municipal Finance Matters-Co authored with Om PrakashMathur, S.Chowdhury&A.K.Halen	NIPFP-ADB, New Delhi, 2013	Monograph	2013
7	Debdulal Thakur	Project Preparatory Technical Assistance (PPTA) report for Government of West Bengal (GoWB)	PwC-ADB, New Delhi	Monograph	2012

Prior to joining BITS Pilani

23. Details of patents and income generated: None

24. Areas of consultancy and income generated:

SI No	Consultancy Work / Title	Consulting Organization	Principal Investigator	Income Generated	Duration
1	Impact Evaluation on Empowerment of SC/ST Candidates using ICT tools in the State of Goa	Karnataka State Electronics Development Corporation Limited (KEONICS), Bangalore	Ch VVSNV Prasad	Rs 50 000	6 Months July 2013 - December 2013

25. **Faculty selected nationally / internationally to visit other laboratories / institutions industries in India and abroad:** None

26. **Faculty serving in a)National committees b) International committees c) Editorial Boards d) any other (please specify):**

Mridula Goel :
   o Examiner for Institute of Actuaries of India from 2005 to date
   o VC's nominee on Departmental Research Committee , Department of Management, Goa University 2015
   o Editor in chief , Journal of Research Innovation and Management, ISSN No. 2454-6542
   o Resource person for UGC, affiliate of Ministry of HRD, Govt. of India sponsored Teachers Training Workshops, Academic Staff Colleges (Calicut, Goa, Lucknow)
   o Elected as Vice –President of Goa Economic Association 2012

DebasisPatnaik-
   o South Goa Collectors' Committee on Natural Disaster, 2010
   o Secretary, Goa Management Association, 2010-12
   o Elected Treasurer, Goa Management Association, 2012-14
   o Debasis Patnaik, Elected Member, Executive Committee, Goa Management Association, 2014-continuing
   o Review Panel, Journal of Manpower Planning, New Delhi(From 2008-till date)
   o Member, Review Board, Journal of international Association of Scientific Innovation
   o and Research
   o Member, Editorial Board of Journals of International Academy of Science-Engineering and Technology.
   o Member, Editorial Board of International Journal of Engineering, Science and Technology
   o Invited by Goa Public Service Commission to serve as Expert on recruitment committee for the post of Assistant Professor in Goa College of Engineering and

Departments of Commerce and Accounting in UG and PG Colleges of Goa , March 2014.

- o External PhD Examiner in Hyderabad Central University(confidential)
- o k.VC's Nominee in Faculty Review Council(FRC Member) for PhD in Departments. of Economics, Commerce and Management of Goa University.
- o Member, Advisory Board, IINRS
- o Chairman and Member, Research Council-IINRS from its inception since 2014-15.
- o Editor in Chief- Journal of IINRS.
- o Treasurer- Self Study (Krishnamurti) Centre of Cuttack, Odisha.
- o Member, International Organization of Co Free Masons, Hyderabad Branch, India

27. **Faculty recharging strategies (UGC, ASC, Refresher / orientation programs, workshops, training programs and similar programs) :**

1) Research Initiation Grant: The grants shall be awarded soon after joining BITS for up to Rs. 2 Lakhs and the amount should be spent within 24 months of appointment.

2) Seed Grant Scheme: The Seed Grant scheme is designed to stimulate competitive research in strategic areas of national or international importance. The grant shall be awarded with a maximum value of Rs.20 Lakhs. The duration of the Grant will be 2 years. CH.VVSNV Prasad as Principal Investigator; A Study on Usage and Impact of ICT in Secondary Schools, Rs 7.5 Lakhs 2013-15; [Co PI- Debasis Patnaik]

3) OPERA Award: The awards named OPERA awards (for "Outstanding Potential for Excellence in Research and Academics") are to facilitate and incentivize new faculty to join BITS and excel in research and teaching. The award is in the form of a "joining bonus" paid over 5 years, plus funds to kick-start their R&D and professional development. The award will help compensate new faculty (or provide R&D funds) at par with the best institutions in India.

4) Professional Development Allowance: The institute provides Rs 100,000/-p.a. to each faculty member for expenses related to research, conference registration etc.

5) Industry Day: The institute has engaged in intensifying its contact with industry to leverage industry sponsored projects to keep faculty competence in line with industry and societal needs.Department of Economics, conducted Industry Day in Feb2014 as part of Golden Jubilee celebrations of BITS Pilani University.

6) Visits of eminent scholars to various departments as well as the organization of conferences and workshops by the department together with other national and international professional societies to help create platforms and forums for exchange of

ideas and knowledge in the upcoming fields of science and technology.

7) The institute provides financial support to initiate such events and also facilitates financial support to lectures and tenured faculty members to participate in national and international seminars/workshops/schools/ conferences etc.

- AK Mishra: Conference on Interdisciplinary Business and Economics Research organized jointly by Society of Interdisciplinary Business Research (SIBR) and THEMMASAT University, Bangkok, Thailand, during June 5-7, 2014.
- CHVVSNV Prasad: Global Conference on Business and Social Sciences , December 15-16, 2014. GATR Enterprise, Kuala Lumpur, Malaysia
- DebasisPatnaik: Regional Economics Association conference in Glasgow, Scotland in July25-27, 2010
- DebasisPatnaik: 39th Conference on Behavioral Economics and Finance in New York from Sept18-22, 2012
- DebasisPatnaik: Conference on Anthropological and Ethnological Studies by International Union of Anthropological and Ethnological Studies (IUAES) in Manchester, United Kingdom from 2nd Aug -7Aug 2013
- DebasisPatnaik: 41st Conference on Behavioral Economics and Finance in Los Angeles from Sept17-21, 2014.
- DebasisPatnaik: Conference on Global Innovations in Business conducted by Global Institute of Applied Business Research (GIABR), Auckland, New Zealand in 2014
- DebasisPatnaik: Conference on Entrepreneurship and Management in Colombo, Sri Lanka on Nov-4-6, 2014.

28. **Student projects**
   - percentage of students who have done in-house projects including inter-departmental projects:100%

   - percentage of students doing projects in collaboration with other universities /industry / institute: 100%

29. **Awards / recognitions received at the national and international level by**
   Faculty: None
   Doctoral / post-doctoral fellows: None

   Students of MSC(Hons) Economics 2011 batch :AbhishekSaikia, VaibhavKhankar, MRP RaamCharran, MuditBadlani presented a paper titled, "Application of Linear Programming Technique to Empirically Test the Relationship between Economic Growth and Financial Development" at the XV Annual International Conference, organized by ICE Academy, Birmingham, UK, Date: August 5-6, 2014 . The Paper received the best Paper award in Economics.

30. **Seminars/ Conferences/Workshops organized and the source of funding (national/ international) with details of outstanding participants, if any:**

1. The department plays an active role in organising start up conferences as an annual event since 2011.
- Grassroots-1st Conference on Social Entrepreneurship- Jan 15, 2011.
- Agora- 2nd Conference on Social entrepreneurship-Feb 26, 2012.
- ACT - 3rd Conference on Social Entrepreneurship- April19, 2014.
- (ACT meant Aspire , Create , Transform).
- Then the ACT conferences have become part of the annually held Entrepreneurship(E) Summit.
- Ist E Summit held on Aug 30-31, 2014.2nd E Summit held on Sept   5-6, 2015.
- (Hosted founders of housing.com, Freecharge.in, OYO rooms, Teach for India, Mumbaidabbawallas, EKO financial services, Tata JagritiYatra, Hackerearth, etc. in these events). The Summits saw participation of leading incubators and venture capitalists from across the country.
2. Intellectual Property Rights Workshop, Funding Agency: MSME & BITS Pilani, March 12-13, 2015
3. Workshop on Insurance, Regulation & instrument elasticity, Funding Agency: PNB-Metlife Life Insurance Company , March 4, 2015.
4. Indo-US Conference, Funding Agency: ICSSR, ICWA, DST. October 31 to November 2, 2014 .The Conference was i n a u g u r a t e d b y A m b a s s a d o r P r a b h a t S h u k l a (Distinguished Fellow, Vivekananda International Foundation, New Delhi) and addressed by Prof. Aswini Mahapatra , JNU. The,Smithsonian Asia Pacific Centre collaborated with a Special Exhibition on Indo-USA Relations.

32. **Code of ethics of research followed by the Department:**

The department follows the code of ethics specified by the Institute

32. a) **Student profile programme-wise:**

Name of the Programme(refer to question no. 4)	Applications received	Selected		Pass percentage*	
		Male	Female	Male	Female
M.Sc.(Hons.) 2010-2011	Economics 139234 Applications Received for FD, 4428 Applications received for HD & 425 Applications received for PhD				100%
Ph.D. (Sem I)		0	0	0	0
Ph.D. (Sem II)		0	0	0	0

M.Sc.(Hons.) 2011-2012	123677 Applications Received for FD, 4571 Applications received for HD & 461 Applications received for PhD	31	9	100%	100%
Ph.D. (Sem I)		0	1	0	0
Ph.D. (Sem II)		0	0	0	0
M.Sc.(Hons.) 2012-2013	136904 Applications Received for FD, 4825 Applications received for HD 00	27	8	100%	100%
Ph.D. (Sem I)		0	0	0	0
Ph.D. (Sem II)		0	0	0	0
M.Sc.(Hons.) 2013-2014	166260 Applications Received for FD, 5549 Applications received for HD 23	44	4	100%	100%
Ph.D. (Sem I)		0	1	0	0
Ph.D. (Sem II)		2	1	0	0
M.Sc.(Hons.) 2014-2015	186181 Applications Received for FD, 5172 Applications received for HD 42	50	7	100%	100%
Ph.D. (Sem I)		2	1	0	0
Ph.D. (Sem II)		0	0	0	0

BITS follows a credit based system and cafeteria approach in offering of courses. Students not performing well are monitored by ACB (Academic Counselling Board), HDCC (Higher Degree Counselling Cell) and ACC (Academic Counselling Cell). Their pace is slowed down. Normally not more than 3% students (including all programmes, B.E., M.Sc, and M.E. .) at a given point of time are under the purview of ACB.

33. b) Diversity of Students

Name of the Programme (refer to question no. 4)	% of students from the Same university	% of students from other universities within the State	% of students from universities outside the State	% of students from other countries
PhD	22%	45%	33%	nil

34. **How many students have cleared Civil Services and Defense Services examinations, NET, SET, GATE and other competitive examinations? Give details category-wise.**

We do not capture this information through any formal process.

35. **Student progression (Formal records are not maintained , only indicative figures are given , except in case of placement status)**

Student progression	Percentage against enrolled
UG to PG	25
PG to M.Phil.	0
PG to Ph.D.	10-15
Ph.D. to Post-Doctoral	0%
Employed • Campus selection • Other than campus recruitment	*refer to the table below
Entrepreneurs	2 to 3%

Placement details

Year	No of Students Registered with Placement Office	Total Placed
2010-11	43	26
2011-12	38	33
2012-13	38	38
2013-14	38	32
2014-15	42	33

36. Diversity of staff

Percentage of faculty who are graduates	
of the same university	12 %
from other universities within the State	12%
from universities from other States	64%
from universities outside the country	12%

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37. **Number of faculty who were awarded M.Phil., Ph.D., D.Sc. and D.Litt. during the assessment period:** 4 (four)

38. **Present details of departmental infrastructural facilities with regard to**

a) Library

Spread over 50000 sq. ft. floor space, the central library has a seating capacity of 450 and includes several reading halls, exhibition rooms, a digital library with internet access terminals, and a large area for book storage. The whole building of the library is covered by wi-fi connectivity. The Library has a good collection of over 34,000 books on a wide range of subjects. This Campus subscribes to 96 print journals, domestic as well as international Subscriptions to important digital libraries like IEL online, Science Direct, ASME, Proquest and AEA Online Journals etc. provide access to thousands of online journals to students and researchers.. Several dozens of educational CDs, audio/video cassettes and question banks are also made available. The textbook section provides all prescribed texts and reference books. From 2004 to 2014, the Library transactions, stock accounting and its entire house keeping activities had been automated using the proprietary LibSyS Library Management Software. In late 2013, a decision was made to shift to LibLimeKoha, a Free and Open Source Software (FOSS) system. After due preparation, the actual migration was effected in the 2014 summer vacation, entirely through the in-house efforts of the Library staff and the CS-Dept Library Committee faculty member. The shift has proved to be successful as well as welcomed by the end users, students and researchers alike, and now the software system is becoming something like a social networking platform for library users to share academic resources and use them more productively, rather than just an office automation system.

The other two campuses in India have been emboldened in their plans and efforts to make a similar shift. Plans are afoot to make an integrated library portal using the same Koha installation for all these three campuses. One of the chief advantages of Koha, apart from the freedoms associated with FOSS, is that the entire database and transactions are available through ordinary web-browsers, making it possible to combine all the other networking and social networking tools with the library system. We have an active Library Committee on which every department is represented, and this committee decides policies and allocations and oversees their implementation.Some of the economics specific databases and journal collections are: Indiastat.com, EPW database, Blackwell, Cambridge, J-STOR, Springer, Taylor & Francis.

b) Internet facilities for staff and students

Internet facilities to Staff (and faculty): Unlimited access is provided to staff and faculty at their office as well as residence. WiFi connectivity is provided to the complete academic area. The bandwidth provided to faculty is 100 Mbps on a 10Gbps backbone (for intranet). Internet facilities to Students: All students are provided intranet (10Gbps backbone), internet (300Mbps provided by Vodafone, GWave and TATA) and WiFi in all hostels with per day download limit of 800MB for undergraduate students and 1GB for postgraduate students and Ph.D. scholars.

c) Students' laboratories:
PASW, STATA, E-VIEWS, MATLAB,R, GRETL software is available for computational analysis.

b) Research laboratories:
PASW, STATA, E-VIEWS software is commonly used by faculty for research.

39. **List of doctoral, post-doctoral students and Research Associates**
    a) from the host institution/university: 4
        1) Pinky Pawaskar 2) UjjwalaBhand

    b) from other institutions/universities:
       Doctoral Students
       1) Anil Kumar 2) PoonamYadav 3) ShashilataYadav 4) Mavis H. AND 5) Sandra D'Sa
          6)- Rohit Prabhudessai 7)- Preeti Ramanathan

       Research Associates: Nil

40. **Number of post-graduate students getting financial assistance from the university:**
    NA

41. **Was any need assessment exercise undertaken before the development of new programme(s)? If so, highlight the methodology:**

    New courses are introduced based on expertise of faculty member in the department, industry expectations and interest of students. A faculty member prepares a course description and a course handout which then forms the basis for a discussion in Department committee of Academics (DCA) followed by the department. A final proposal is approved after a few iterations.Discussions are next held in the cross-campus Department committee on Academics (CCDCA) consisting of Economics DCA's of all campuses of BITS-Pilani.

After approval of CCDCA the proposal is sent to the Academic resource planning (ARP). The ARP has a series of parameters and questions that form the basis of earlier discussions at department level. Department presents the proposals to ARP accordingly. ARP then presents the proposal in the senate for final approval and incorporating into the curriculum.

42. **Does the department obtain feedback from**
    a. **faculty on curriculum as well as teaching-learning-evaluation? If yes, how does the department utilize the feedback?**
    Regular departmental meetings are held to discuss courses, course handout contents, pedagogy, student performance, etc. Course instructors incorporate feasible changes as and when appropriate in the semester.

    b. **students on staff, curriculum and teaching-learning-evaluation and how does the department utilize the feedback?**
    Feedbacks from Student-Faculty Council(SFC) and through feedback forms, administered at the end of the course. Feedback thus obtained are shared with each instructor/Head of the Department/ Dean Instruction. Instructors incorporate specific suggestions in their teaching if the department finds them useful.

    c. **alumni and employers on the programmes offered and how does the department utilize the feedback?**
    Feedbacks are obtained from the recruiting companies through the placement cells and sometime through direct interactions with alumni/recruiters. Such feedbacks are useful in long term curriculum restructuring and also in course content / reference update.

43. **List the distinguished alumni of the department (maximum 10) : The department was set up only a decade back but to mention a few achievers:**
    - ShashwatSiddhant, Assistant Vice President, Ashika Group of Companies, Mumbai
    - Ankur Kumar, Founder at BigBHK.com ,Mumbai
    - NisithRastogi, founder Pinchat, locus.sh
    - VidyaShankervellal, Harvard Business School student, worked at Mckinsey
    - PranavPathak, Founder brainbought.com, Assistant product manager at Housing.com
    - PreetiDabir nee Patnaik, Consultant Deloitte , New york
    - RachanaMukkala, Vice President, Ascension Mobile, Missouri

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44. Give details of student enrichment programmes (special lectures / workshops / seminar) involving external experts.

Name of speaker	Institution	Title / Date
Mr Nitin Kantak	Vice President, Operations, Zuari Industries	'Fertilizer Industry in India: Problems and Prospects" February 10, 2014
Prof. P.V. Rataboli,	Director, Medicine, Goa Medical College,	'Lifestyle Diseases- High TIme for Action' on March 22, 2014.
Prof. Karamjit Singh Gill	University of Brighton and Professor in Cambridge	"Artificial intelligence: Big Data, Internet of things and Beyond' on 25 March 2014 .
Rajan Jayakrishna Bhatikar	Management Consultant	Contract Creation and Contract Management Aug 4 2014
Prof. Keshab Das	Gujarat Institute of Development Research.	"Industrial Clusters" October 30, 2013
Dr Gladstone Costa	Consultant Orthopaedic Surgeon SMRC Consultant Orthopaedic Surgeon, at the Royal Gwent Hospital, U.K	' Consumer Protection Act and Legalities in Health Issues' Aug 27 2014
Prof. Pranab Mukhopadhyay,	Department of Economics, Goa University,	Environment and Development in South Asia 5th March 2015
Dr.RakeshSengupta	University of Hyderabad,India	Common Framework for Perceptual and Economic Decision Making: A Neuro-Computational Approach,Date : 29th April 2015

45. List the teaching methods adopted by the faculty for different programmes.

PPT slides are commonly used in most classes apart from the conventional modes. WEBEX was used for teaching Financial and Management Accounting and Project Appraisal Courses. Most courses involve 3 lecture hours and 1 tutorial hour per week. Teaching is made Interactive and collaborative learning encouraged, Simulation method is employed in the course ECON F 414: Creating and Leading entrepreneurial organizations. The ECON F 415: New Venture Creation course is a 100% hands on course to create a start up, including interactive sessions with entrepreneurs, mentoring and some funding. Telepresence (TP) Lecture Hall is used for Cross Campus Teaching NVC Course in the evenings. TP Rooms are used for conducting evaluations/ Viva Voce for candidates doing Internships in several organizations in India.

46. How does the department ensure that programme objectives are constantly met and learning outcomes are monitored?

We have vibrant feedback mechanisms engaging both recruiter and external experts to assess student learning outcomes. The programme objectives and learning outcomes are monitored regularly, through University wide review process through benchmarking of curriculum and/or programmes with reference to that at leading Universities in world.

47. Highlight the participation of students and faculty in extension activities.

The faculty Members and students of the department are actively involved in the following Groups inside the Campus such as Economic Association, Wall Street Club, CIIE. Lectures, seminars , workshops, business plan competitions simulation games and quizzes are organized by these groups in areas of finance, development economics and entrepreneurship.

Students participation in social enterprises like Nirmaan, Abhijyaan, etc. is commendable. Students lead several Scientific, Cultural and Sports activities during student festivals of the campus. The faculty pitches in as mentors and judges of competitive events.

48. Give details of "beyond syllabus scholarly activities" of the department.

Faculty members often undertake research projects with students, many of which culminate in conference presentations and some in journal publications. Faculty members are regular resource persons in various higher learning workshops like UGC teachers' training refresher courses. They serve as reviewers of both national and international journals. Some faculty members write for national dailies like The Financial Express.

Faculty members engage in studying problems on ground through field surveys, especially within the state, in order to contribute to development of the local economy. Key Note Speakers in National and International Seminars Organized by Universities, Institute and Ministries of Government of India. Faculty Members have Chaired sessions in various National and International Conferences of repute.

49 State whether the programme/ department is accredited/ graded by other agencies? If yes, give details. NO

50 Briefly highlight the contributions of the department in generating new knowledge, basic or applied.

The department manages an Information and Communications technology business incubator and runs courses on innovation and entrepreneurship. These have resulted in innovations by students like a braille reading device, fetal ECG monitor, Pooling algorithms, etc.

51 **Detail five major Strengths, Weaknesses, Opportunities and Challenges (SWOC) of the department.**

Strengths:	Weaknesses:
● 90% of the faculty members are PhDs from reputed institutions , ● diverse research interests of the faculty ● ability to teach electives in varied areas , including development economics, finance and entrepreneurship ● Students with economics dual degree have niche placements in banks, analytics and consulting ,	● BITS brand identity not linked with Economics –logical inflow of doctoral students / organizations for projects/consultancies / economists does not happen. ● No higher degree program ● As all students are also pursuing engineering in the latter part of their 5 year degree , they more often take placements in engineering, specially IT
Opportunities:	**Challenges:**
● Introduce Minor programmes in Finance, Business Analytics and entrepreneurship ● access collaboration with industry to attract funding and thereby improve the department image as providing good research opportunities ● Locational and brand advantage to organize academic interactions: workshops, conferences, etc.	● NIT-IIT is coming up in vicinity ● Attracting and retaining faculty , ● finding full time PhD students , not being a premier social science institution, ● Obtaining large amounts of funding for sponsored projects from government agencies

52 **Future plans of the department.**

To increase number of faculty, add to the number of elective courses, to increase research output through funding, industry engagement and doctoral research.

53 **Any other information regarding your department which you would like to include:**
In order to strengthen the doctoral programme the department offers pre PhD courses specific to the research interest of the candidate. We also offer interdisciplinary projects to students across disciplines, students of the department are enthused to participate in random experiments while working with foreign labs and professors. We have hosted two international faculty from USA (Fulbright Visiting Professor) and New Zealand.

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Goa Campus: Evaluative Report of the Department
ELECTRICAL & ELECTRONICS ENGINEERING

1. **Name of the Department:** Department of Electrical & Electronics Engineering

2. **Year of establishment of the Department:** 2004

3. **Is the Department part of a School/Faculty of the university?**
   Departments function as independent entities in the university and are not part of any school or faculty.

4. **Names of programmes offered (UG, PG, M.Phil., Ph.D., Integrated Masters; Integrated Ph.D., D.Sc. D.Litt., etc.).**

On-Campus	UG Programmes(BE Hons)	Electrical & Electronics, Electronics & Instrumentation.
	PG Programmes (ME)	M.E. Microelectronics, M.E. Embedded Systems
	Ph.D.	
Off-Campus (Work Integrated Learning Programmes: WILP)	B. Tech.	B.S. Power Engineering
	M.Tech.	M. Tech. Embedded Systems

5. **Interdisciplinary programmes and departments involved:**

M.E. Embedded Systems	Department of EEE and Department of Computer Science Goa Campus, and Pilani Campus

6. **Courses in collaboration with other universities, industries, foreign institutions, etc.:**
   Note: some of our structure courses like Practice School and thesis dissertation are done by our students in industries and universities outside BITS.

7. **Details of programmes discontinued, if any, with reasons:** NIL

8. **Examination System:** Semester and Choice Based Credit System

9. **Participation of the department in the courses <u>offered</u> by other departments**
   :Faculty participated in courses such as the
   i. CSC391 Digital Electronics & Computer Organisation, for Dept of CSIS
   ii. CSF215 Digital Design, for Dept of CSIS
   iii. CSF241 Microprocessor Programming & Interfacing, for Dept of CSIS

     iv.   ME F 215 Mechanical Engineering Lab, partly for experiments in electrical measurements lab
     v.   CS/SS G541 Pervasive Computing, for Dept of CSIS
     vi.   BITS G553 Real Time Systems for Dept of CSIS
     vii.   CS G553 Reconfigurable Computing for Dept of CSIS
     viii.   CSC414 Telecommunication Switching Systems & Networks, for Dept of CSIS.

10. **Number of teaching posts sanctioned, filled and actual (Professors/Associate Professors/Asst. Professors/others). (Refer Support document for calculation)**

	Sanctioned	Filled	Actual number
Professor	Note:**	4	4
Associate Professors		0	0
Asst. Professors		12	9
Others: Lecturers		14	12
Others: Professor Emeritus		1	1

Note**:The faculty positions for the University is broadly governed by Growth plan which also covers designation-wise breakup with a larger vision. Keeping in mind the fluidity of movement of faculty and proposed student to faculty ratio in each campus for first degree, higher degree as well as Ph.D. programmes, individual department needs are not fixed. Besides, as we are in expansion plan which calls for new programmes, courses being introduced, the demand on faculty in terms of numbers, for each department, is broadly governed by all the above factors and hence it is not possible to have a fixed number of faculty for each department. Recruitment of faculty, therefore, varies, based on departmental needs.

11. **Faculty profile with name, qualification, designation, area of specialization, experience and research under guidance**

S. No	Name	Qualification	Designation	Specialization	No. Of Years of Experience	No. Of Ph.D. students guided for last 4 years
1.	M.K. Deshmukh	Ph.D.	Professor	Renewable Energy, Wind and SPV Hybrid Electric Power Generation	24	2 (ongoing)
2.	Raghurama G.	Ph.D.	Senior Professor	Communication Systems	28	2
3.	K.R. Anupama	Ph.D.	Professor	Network Embedded Systems	20	6(1 completed) + 3 Co-sup

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4.	Dipankar Pal	Ph.D.	Professor	Microelectronic Circuits and Systems; Analog VLSI	31	4* completed 2* Ongoing
5.	Anita B. Agrawal	Ph.D.	Assistant Prof	System study and simulation, System on chip, Embedded System prototype design using FPGA/PSoC,, Sensors and data acquisition system	22	1 + 3 Co-supervisor
6.	A. Amalin Prince	Ph.D.	Assistant Prof	MEMS & Applications, VLSI signal Processing, Reconfigurable Computing	12	1
7.	Ramesha C.K.	Ph.D.	Assistant Prof	Device Modelling and Simulation, Microelectronics, VLSI Design	25	3 + 1 Co-Supervisor
8.	K. Chandram	Ph.D.	Assistant Prof	Power Systems Operation & Control under de-regulation	15	1*
9.	Narayan S Manjarekar	Ph.D.	Assistant Prof	Non-linear Control Systems, Control of Electrical Power Systems	6	2 (Co-Supervisor)
10.	Priyanka Desai	Ph.D.	Assistant Prof	Optical Regeneration, Burst mode Optical Systems, Optical Cross Talk, Free Space Optical Systems, Passive Optical Networks	2	0
11.	Nitin Sharma	Ph.D.	Assistant Prof	Wireless Communication Systems, MU-MIMO Communications, OFDM systems, Femtocell networks, cognitive radios, SDR, Algorithms for engineering applications (Signal & Image Processing)	15	0
12.	ShashidharaMechaKotian	Ph.D.	Assistant Prof	Power System Dynamics	2.5	0
13.	Neethu Robinson	Ph.D.	Assistant Prof	Brain Computer Interface, Biomedical and Neural Signal processing, Machine learning and pattern recognition, Assistive and rehabilitation applications	1	0
14.	Gautam G. Bacher	Ph.D.	Assistant Professor	Micro & Nano Biosensors, Impedimetric sensors & Electrochemical Impedance Spectroscopy	15	0
15.	Jyotsna A. Kulkarni	M.S.	Lecturer	Middleware for wireless sensor networks	5.5	0

16.	C. Balakrishna Moorthy	M.E.	Lecturer	Grid Integration of Wind Energy, Power Quality Issues in Wind energy,Wind resource assessment	13	0
17.	Meghanand Bhamare	M.E.	Lecturer	Software for Embedded systems, Real Time Systems	11	0
18.	Pravin Mane	M.E.	Lecturer	VLSI Design, FPGA, Performance evaluation	14	0
19.	Sarang C Dhongdi	M.E.	Lecturer	Underwater Acoustic Sensor Network	6	0
20.	Meetha V. Shenoy	M.E.	Lecturer	Distributed Embedded Systems	3.5	0
21.	Ch. S. Sankhar Reddy	M.E.	Lecturer	Distributed Embedded Systems	3.5	0
22.	R Femi	M.E.	Lecturer	Power Electronics & drives, Power Systems	7	0
23.	ShailendraK Dhakad	M.E.	Lecturer	RF MEMS Devices, Microwave Tubes, Tunable Filters, Communication & DSP Tools, Analog Design	5	0
24.	Gavax B. Joshi	M.Tech.	Lecturer	Low Power VLSI Design MEMS	5	0
25.	Metilda Sagaya Mary N J	M.Tech.	Lecturer	Instrumentation	1	0

- Students not registered with BITS Pilani

12. **List of senior Visiting Fellows, adjunct faculty, emeritus professors :**

Visiting Faculty	NIL	Period
Adjunct Faculty	Shri. Vivek Ladha	Jan 2010 - Dec 2012
Professor Emeritus	Prof. K. E. Raman	20th July, 2015 onwards

13. **Percentage of classes taken by temporary faculty – programme-wise information :**4.16%

14. **Programme-wise Student Teacher Ratio**

	No of Students	No of faculty	Student Teacher Ratio
BE (Hons) Electrical & Electronics,	473	26	18.2:1
BE (Hons) Electronics & Instrumentation	416	26	16:1
M.E. Embedded Systems	12	8	1.5:1
M.E. Microelectronics	15	8	1.86:1

15. **Number of academic support staff (technical) and administrative staff: sanctioned, filled and actual :**

Academic Year	Technical & Support (Administrative) Sanctioned	Technical & Support (Administrative) staff Filled
2010-2011		6
2011-2012		5
2012-2013		5
2013-2014		8
2014-2015		9

16. **Research thrust areas as recognized by major funding agencies :**

S.No	Research Thrust Areas of the Department
1	Instrumentation & Control: Bio - Medical Instrumentation, Nano - Sensors , Non-Linear Control Systems
2	Communication Engineering, Networks & Algorithms: Optical Fiber Communication, Optical Wireless Communication, Communication Systems, Telecom Networks, Underwater Communication, Ad Hoc networks, OFDM, Software Defined Radio
3	RF, Microwave, Antenna Design & Wireless Systems: Reconfigurable and Microstrip Patch Antenna, RF Systems and Circuit Design and Microwave Engineering Principles, integration of measurement and design of microwave circuits
4	Power Systems & Electrical Engineering, Renewable Energy, Smart Grids: Power System Dynamics, Wind resource assessment studies, Power System operation and control,FACTS applications in Distribution systems, Bio-inspired optimization algorithms and their applications to power systems
5	Power Electronics And Drives: Reactive Power Compensaion, FACTS Controles, Arc-less switching in micro electrical contacts
6	Embedded Systems:Wireless Sensor Networks, Swarm Robotics,Real Time Systems, Vehicular Networks, Underwater Robotics
7	Micro/ Nano Electronics, VLSI Design & Architecture: VLSI Circuits & Systems, ASIC, VLSI Signal Processing, Reconfigurable Computing Architecture & Algorithms
8	Electronic Materials, Devices, And Integrated Circuit Technology: Device Modeling and Simulation ,MEMS and Applications
9	Digital Signal Processing: Biomedical Signal Processing, Brain Computer Interface

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17. Number of faculty with ongoing/completed projects in the last five years from a) national b) international funding agencies and c) Total grants received. Give the names of the funding agencies, project title and grants received project-wise.

Completed Projects:

S.No.	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration
1.	Hardware Implementation of Time Frequency Distribution of Mirnov Oscillations in Tokamak Using the Hilbert-Huang Transform	A. Amalin Prince	Board of Research in Fusion Science &Technology (BRFST)	22.58	Sep 2012-Aug 2014
2.	Wireless Sensor Networks for Inaccessible Terrains	K.R.Anupama	UGC MRP	8.38	Jan 2011 - 2014
3	Design And Development of Condition Based Monitoring System For Pipelines	K.R.Anupama	GAIL India (Ltd)	80.38	August 2012 - July 2014
4.	Investigation of Schottky Contact to SiC using IV and CV techniques	C.K.Ramesha	UGC MRP	10.778	Jan2011-Jan 2014

Ongoing Projects:

S.No.	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration
1.	FPGA Based Fuzzy Logic Picomotor Controller for Laser Beam Pointing Stability Correction	A Amalin Prince	DAE-BRNS	25	Approval letter received on 8th July 2015, project duration is of period two years (DD not yet received)
2.	Pilot Project on Implementation of Wireless Sensor Network for Process Monitoring of GAIL's Pipeline	K.R.Anupama	GAIL India (Ltd)	98.78	Feb 2015 – July 2016

18. Inter-institutional collaborative projects and associated grants received :
a) **National collaboration**
- DAE sponsored R&D project entitled "Hardware Implementation of Time Frequency Distribution of Mirnov Oscillations in Tokamak Using the Hilbert-Huang Transform", is completed byDr., A Amalin Prince as Principal Investigator, during September 2012 to Aug 2014, in collaboration with Institute of Plasma Research, Gandhinagar, Gujarat

- GAIL sponsored R&D project entitled "Pilot Project on Implementation of Wireless Sensor Network for Process Monitoring of GAIL's Pipeline", is being conducted by Prof. K.R. Anupama, as Principal Investigator, w.e.f. from February, 2015 till August, 2017, in collaboration with GAIL India (Ltd), Bhiwadi, Rajasthan.

b) **International collaboration:**

- We have signed MoU WindSim AS, Norway and Norwegian Academy of Life Sciences (NMBU), Norway for developing projects for R&D in September, 2014 and November, 2014, respectively. Under Indo-Norwegian DST-RCN scheme for collaborative Research Project, we submitted proposal for joint R&D project in November, 2014, to DST, Govt of India, and Research Council of Norway, Oslo, Norway.

19. **Departmental projects funded by DST-FIST; UGC-SAP/CAS, DPE; DBT, ICSSR, AICTE, etc.; total grants received.**

Academic Year	Projects Funded by	Total grants received
2013-2014	DST-FIST	32 Lakhs

20. **Research facility / centre with :**
   - State recognition: Nil
   - National Recognition: Nil
   - International recognition: Nil

21. **Special research laboratories sponsored by / created by industry or corporate bodies :**

Academic Year	Laboratory	Industry or Corporate Sponsor
2010-2011	Embedded Systems	CY8CKIT -001 (qty- 05 kits) PSoC3 CY8CKIT - 003 (qty- 30 kits) Cypress Semiconductor Address: San Jose, CA, 95134, United States
2012-2013	Reconfigurable Computing	Xilinx ISE System Edition 25 user license (Xilinx Inc.) Address: 2100 Logic Drive City: San Jose State: CA Postal Code: 95124 Country : US
2013-2014	Embedded Systems Lab upgrade was done with the help of ATMEL	XMEGA-A1 XPLAINED (EVALUATION KIT) (qty- 15 kits) ATMEL ATMEGA 2560 (ATAVRDRAGON) (qty- 15 kits) Atmel University India
2014-2015	Reconfigurable Computing Lab	Xilinx Vivado System Edition 25 user license (Xilinx Inc.) Address: 2100 Logic Drive City: San Jose State: CA; Postal Code: 95124 Country : US

22. Publications:

S. No.	Details	Specify number here
1	Number of papers published in peer reviewed journals (national / international)	International - **45** National - **2**
2	Monographs	**1**
3	Chapters in Books	**1**
4	Edited Books	0
5	Books with ISBN with details of publishers	0
6	Number listed in International Database (For *e.g.* Web of Science, Scopus, Humanities International Complete, Dare Database - International Social Sciences Directory, EBSCO host, etc.)	56
7	Citation Index (range)	0 - 351
8	SNIP (range)	0.165- 2.963
9	SJR (range)	0.186 – 3.012
10	Impact Factor (range)	0.459 – 4.29
11	H –index	6

Monograph:

S.No.	Name of Faculty	Title	Publisher
1	*Narayan S. Manjarekar, R. N. Banavar	Nonlinear Control synthesis for electrical power systems using controllable series capacitors	Springer Briefs in Applied Sciences and Technologies (2012), pp. 7 – 13.

Book Chapter:

S.No.	Name of Faculty	Book Title	Chapter Title
1	*Nitin Sharma, A. Anpalagan, M. Obaidat	Modeling and Simulation of Computer Networks and Systesm, Elsevier, 2015	Evolutionary Algorithms for Wireless Network Resource Allocation, pp 629-652

Details of the publications as per the number given above (Give details in the last five years:
List of Journal Publications:

S. No	Authors	Title of the Publications	Details of the Journal	National /International	Year	Impact/ SNIP/ SJR
1.	Manish Goswami, Piyush Joshi,*D. Pal,	"Design of quadrature amplitude modulation–based DC offset cancellation circuit",	International Journal of Electronics Letters (ahead of print, featured in forthcoming issues) DOI: 10.1080/00207217. 2015.1036800	International	2015	0.459
2.	C.Balakrishn aMoorthy, M.K.Deshmu kh	A new approach to optimise placement of wind turbines using particle swarm optimisation	International Journal of Sustainable Energy, Vol. 34, No. 6, page 396–405, 2015	International	2015	0.510 0.368 (As per 2014)
3.	Mishra G. K., Bacher G., Roy U., Bhand, S.	A label free impedemetricbimmuno sensor for detection of *Escherichia coli* in water	Science Letters Journal, 2015, 4:76	International	2015	NA
4.	BalajiVenkat, Pranav Kabra, Saieesh P, Chittaranjan Hota, Raghurama G	Cooperative Spectrum Sensing in Cognitive Radios using Perceptron Learning for IEEE 802.22 WRAN	Elsevier - Procedia Computer Science, Vol 54 (2015), pp. 14-23	International	2015	NA
5.	Pravin Mane, NishilTalati, AmeyaRiswa dkar, Ramesh Raghu, C.K. Ramesha	Stateful-NOR based reconfigurable architecture for logic implementation	Microelectronics Journal, Volume 46, Issue 6, June 2015, Pages 551-562	International	2015	NA

6.	Nitin Sharma, A.S. Madhukumar	Genetic Algorithm Aided Proportional Fair Resource Allocation in Multicast OFDM Systems	IEEE Transactions on Broadcasting, Vol. 61(1), pp: 16-29, 2015	International	2015	Impact factor 1.825
7.	Nitin Sharma, , AlaganAnpalagan	Differential evolution aided adaptive resource allocation in OFDMA systems with proportional rate constraints	Applied Soft Computing 34, Pages 39–50	International	2015	SNIP: 2.729 SJR: 2.220 Impact Factor: 2.810
8	Kanungo L., Bacher G., Bhand S	Flow-Based ImpedimetricImmunosensor for Aflatoxin Analysis in Milk Products	Applied Biochemistry and Biotechnology (PART A), 2014, 174:1157–1165	International	2014	SNIP 0.868 SJR 0.585
9	R. Femi, S. Clement, A. Agrawal and A. A. Prince,	Investigation of Microelectromechanical Switches for Next Generation DC Power Distribution System	International Journal of Emerging Electric Power Sys(IJEEPS), Berkeley Electronic Press, Volume 15, Issue 6, Pages 591–605, ISSN (Online) 1553-779X, ISSN (Print) 2194-5756, DOI: 10.1515/ijeeps-2014-0042, November 2014.tems	International	2014	(SNIP) : 0.308 (SJR): 0.232
10	*Shashidhara, M Kotian, Shubhanga K N	Performance of synchronous machine models in a series-capacitor compensated system	IEEE Transactions on Power Systems, vol.29, no.3, pp.1023-1032, May 2014	International	2014	SNIP -2.963 SJR- 3.012 Impact factor: 2.814
11	C.BalakrishnaMoorthy, M.K.Deshmukh, DarshanaMukherejee	New Approach for Placing Wind Turbines in a Wind Farm Using Genetic Algorithm	Journal of Wind Engineering, Vol.38, No.6, page 633–642 , 2014	International	2014	SNIP :0.237 SJR: 0.186

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12	GawasMahadev A., Lucy J. Gudino, K.R. Anupama, Joseph Rodrigues	A Cross-Layer Aware Node Disjoint Multipath Routing Algorithm for Mobile Ad Hoc Networks	International Journal of Wireless & Mobile Networks (IJWMN) Vol. 6, No. 3, June 2014.	International	2014	NA
13	Nitin Sharma, D K Bhadeka, AlaganAnpalagan	MultiobjectiveSubchannel and Power Allocation in Interference-Limited Two-Tier OFDMA Femtocell Networks	IEEE Systems Journal, http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6758369	International	2014	Impact factor 1.98
14	Nitin Sharma, AlaganAnpalagan	Composite Differential Evolution Aided Channel Allocation in OFDMA Systems with Proportional Rate Constraints".	IEEE/KICS Journal of Communication Networks.Vol.16(5), Pages.523-533,	International	2014	Impact Factor: 0.522
15	Nitin Sharma, AlaganAnpalagan	Joint subcarrier and power allocation in downlink OFDMA systems: an multi-objective approach	Transactions on Emerging Telecommunications Technologies 25(10), pp.993–1008,	International	2014	Impact Factor: 1.354
16	Nitin Sharma, AlaganAnpalagan	Bee colony optimization aided adaptive resource allocation in OFDMA systems with proportional rate constraints	Wireless Networks 20(7), pp 1699-1713	International	2014	IF=0.961 SNIP=1.477 SJR =0.717
17	C.K. Ramesha , V. Rajagopal Reddy	Influence of annealing temperature on the electrical and structural properties of palladium Schottky contacts on n-type 4H–SiC	Superlattices and Microstructures, 76 , pp.55–65.	International	2014	SNIP = 1.027 SJR = 0.593 Impact Factor =2.097
18	K.Chandram,	Multi area economic	International	International	2013	0.7763

		dispatch using secant method	Journal of Applied Power Engineering (IJAPE), Vol.3, Issue 2, pp.1-7	onal		
19	K.Chandram, AVV Sudhakar, A Jaya Laxmi	Multi area economic dispatch with tie line constraints using secant method	Journal of Electrical Engineering & Technology Vol 8, Iuuse 4, pp. 1-7	International	2013	0.579
20	SreenadhBatchu, *Shashidhara M Kotian, Shubhanga K N	*A simulation-based analysis of subsynchronous resonance with TCSC	Journal of Electrical Engineering (Politehnica publishing House, Romania), vol.13,no.4, pp.15-22, Dec. 2013	International	2013	NA
21	*Shashidhara M Kotian, SreenadhBatchu, Shubhanga K N	Subsynchronous resonance through torsional mode interactions: an analysis	The Journal of CPRI, vol.9, no.1,pp.89-96, March 2013	National	2013	NA
22	M.K.Deshmukh, C.BalakrishnaMoorthy	A New Approach for Prediction of Growth of Onshore Wind power potential	International Journal of Electrical and Electronics and Electronics Engineering Research, Vol. 3, Issue 1, page 107-122, 2013	International	2013	NA
23	M.K.Deshmukh, C.Balakrishna Moorthy	Review on Stability Analysis of Grid Connected Wind power Generating System	International Journal of Electrical and Electronics Engineering Research, Vol 3, No. 1, page 01-33,2013	International	2013	NA
24	*N. Robinson, C. Guan, A. Vinod, K. K. Ang, and K.	Multi-class EEG classification of voluntary hand movement directions	Journal of Neural Engineering, vol. 10(5), pp. 056018. doi: 10.1088/1741-2560/10/5/056018	International	2013	Impact Factor - 3.282

	P. Tee					
25	*N. Robinson, C. Guan, A. Vinod, K. K. Ang, and K. P. Tee	EEG-Based Classification of Fast and Slow Hand Movements Using Wavelet-CSP Algorithm	IEEE Transactions on Biomedical Engineering, vol. 60(8), pp. 2123-2132. doi: 10.1109/TBME.2013 .2248153	International	2013	Impact Factor - 2.348
26	Jyotsna A. Kulkarni, Anant Kulkarni, D.M.Kulkarni , MrinmayKul karni	Motion simulation in Hip simulator: A comparative study for oval wear track using MATLAB Software and Eulerian mathematical model	International Journal of Scientific and Engineering Research (ISSN 2229-5518), Vol-4, Issue-1, Jan.2013	International	2013	NA
27	Chithra, Pallavi S., A. A. Prince	RF MEMS based Biosensor for Pathogenic Bacteria Detection	Journal of BioNanoScience Volume 3, Issue 3, pp 321-328, ISSN: 2191-1630 (Print) 2191-1649 (Online)	International	2013	SNIP 0.333; SJR 0.323
28	Aloke Saha, *D. Pal, M. Chandra	Low power 6-GHz wave-pipelined 8b×8b multiplier	IET Circuits, Devices & Systems, Vol. 7, Issue 3, pp. 124-140, May 2013	International	2013	0.521
29	M. R. Narayanan, Hasan Al-Nashash, *D. Pal, M. Chandra	Thermal model of MOSFET with SELBOX structure	Journal of Computational Electronics, Journal of Computational Electronics, Vol. 12, Issue 4, pp. 803-811	International	2013	1.520
30	Nitin Sharma and AlaganAnpal agan	Multi-Objective Resource Allocation in Multiuser OFDM	IET Communications, 7 (18), 2074 – 2083.	International	2013	IF= 0.742
31	Venkateshw aran,	A novel MEMS based current sensor design	Journal of Sensors and Transducers	International	2012	IF 0.705

	A.,Prince A A	smart grid applications	Vol. 138, No. 3, pp. 2-13			
32	Prince A.A., Jose I. and Agrawal V.P.	A new optimal design and analysis method based MADM for MEMS products development	International Journal of Advanced Manufacturing Technology, Volume 63, Issue 9, pp 851-861	International	2012	IF:1.458 SNIP 2.137 SJR 1.201
33	Prince A.A., Jose I. and Agrawal V.P.	Concurrent design, modeling and analysis of microelectromechanical systems products - Design for 'X' abilities'	Journal of Micro Nano systems Volume 4, Number 1, pp. 56-74(19)	International	2012	SNIP 0.165 SJR0.191
34	*P. N. Desai, S. Sujecki, A. J. Phillips	Modeling of Burst Mode 2R Optical Regenerator Cascades for Long-Haul Optical Networks	Journal of Optical Communication and Networking, Vol. 4, no. 4, pp. 304-313, 2012.	International	2012	SNIP 2.229 SJR 1.072
35	M. Narayanan, H. Al-Nashas, B. Mazhari, *D. Pal & M. Chandra	Analysis of kink reduction in SOI MOSFET using selective back oxide structure	Journal of Active & Passive Components, Hindawi Publishing Corporation, Vol. 2012, 2012, Article ID 565827, DOI: http://dx.doi.org/10.1155/2012/565827	International	2012	0.642
36	*N.S. Manjarekar, R.N. Banavar, R Ortega	An Immersion and Invariance Algorithm for a Differential Algebraic System	European Journal of Control 18 (2), 145-157	International	2012	SNIP 1.075 SJR 0.605
37	*N.S. Manjarekar, R.N. Banavar, R Ortega	Stabilization of a synchronous generator with a controllable series capacitor via immersion and invariance	International Journal of Robust and Nonlinear Control 22 (8), 858-874	International	2012	SNIP 1.853 SJR 2.569

38	BacherG,Pal S,KanungoL, BhandS	A label free silver wire based impedimetricimmunosensor for detection of aflatoxin M1 in milk	Sensors and Actuators B: chemical, 2012, Vol:168, PP: 223-230.	International	2012	SNIP : 1.701 SJR : 1.250 IF 4.29
39	Nitin Sharma, K R Anupama	On the use of NSGA-II for multi-objective resource allocation in MIMO-OFDMA systems	ACM/Springer's Wireless Networks, Vol. 17, pp. 1991-1201	International	2011	SNIP 1.478 SJR 0.966
40	K.Chandram, N. Subrahmanyam, P, M. Sydulu	Equal embedded algorithm for economic dispatch with transmission loss	International Journal of Electric power and energy systems, VOL 33, Issue 3, pp. 500-507	International	2011	SNIP 2.413 SJR 1.390
41	MeghanadBhamare, ChhayadeviBhamare	Predictive Branching Methods and Architectures - A Survey	Int. J. Comp. Tech. Appl., Vol 2 (3), 471-474	International	2011	NA
42	MeghanadBhamare, ChhayadeviBhamare	Comparative Study of RISC Architectures	International Journal of Technology And Engineering System(IJTES): Jan – March 2011-Vol2.No1, 58-62	International	2011	NA
43	M. K. Jha, A. K. Pandey, *D. Pal, A. Mohan	An energy efficient multilayer MAC protocol (ML MAC) for wireless sensor networks	Int. Jnl. of Electronics & Communication, Vol. 65, pp. 209-216, 2011 (Elsevier Publications)	International	2011	0.508
44	Nitin Sharma, SidharthWagh, K R Anupama	Multi-Objective Resource Allocation In Multiuser OFDM Using PAES.	International Journal of Recent Trends in Engineering and Technology, Vol. No. 3, Issue 3, pp 121-125	International	2010	NA

45	A. Sharma,* D. Pal	Design and simulation of two amplitude-matched anti-phase sinusoid-generators using current-mode approach	International Journal on Computer Science and Engineering (IJCSE), Vol. 02, No. 05, pp. 1482-1486, October 2010	International	2010	NA
46	*D. Pal, M. Goswami	A Clocked High-Pass-Filter-Based Offset-Cancellation Technique for High Gain Biomedical Amplifiers	Int. Jl. of Electronics, Vol. 97, No. 5, pp. 539–552, May 2010	International	2010	IF 0.459
47	M. K .Deshmukh, C.Balakrishna Moorthy	Application of genetic algorithm to neural network model estimation of wind potential	Journal of Electrical engineering and management education, Vol.2, page 42-48, 2010	National	2010	**NA**

(**In the Table,** indicates that the paper was published by the faculty member, before joining BITS Pilani)

List of Conference Publications

Sr. No.	Author/Authors	Title of paper	Conference Details: Name, Month, Year, Place	Indexing Database	Year of publication
	Prince A.A., Vineeth K.	A Framework for Remote and Adaptive Partial Reconfiguration of SoC Based Data Acquisition Systems under Linux	10th IEEE International Symposium on Reconfigurable Communication-centric Systems-on-Chip (ReCoSoC 2015), June 29th – July 1st 2015, Bremen, Germany, IEEE	IEEE	2015
	Prince A.A. and Mishra S.	Multi-Mode Electronic Stethoscope Implementation and Evaluation Using Dynamic Reconfigurable Design	5th IEEE International Advanced Computing Conference (IACC 2015), p.p. 228-232, June 12th - 13th 2015, Bangalore	IEEE	2015
	K.Chandram, K. Soujanya	Detection and Quantification of Harmonic Emissions in Doubly Fed Induction	First International Conference on Recent Developments in Control, Automation	IEEE	2015

		Generator Using Discrete Wavelet Transform	and Power Engineering, 12-13 march 2015 AMITY University		
	Prince A.A., Verma P.K., Jayakumar C., Raju D.	Efficient Architecture for Real Time Implementation of Hilbert Transform in FPGA	15 IEEE International Conference on Electrical, Computer and Communication Technologies (ICECCT), p.p 1-5, March 05th - 07th 2015, Coimbatore	IEEE	2015
	Dhongdi, Sarang C.; Anupama, K.R.; Gudino, Lucy J.	Review of protocol stack development of Underwater Acoustic Sensor Network (UASN)	Underwater Technology (UT), 2015 IEEE , vol., no., pp.1,17, 23-25 Feb. 2015; Place -NIOT, chennai, Indiadoi: 10.1109/UT.2015.710821 5	IEEE	2015
	Dhongdi, S.C.; Anupama, K.R.; Agrawal, R.; Gudino, L.J.	Simulation and testbed implementation of TDMA MAC on Underwater Acoustic Sensor Network	Communications (NCC), 2015 Twenty First National Conference on , vol., no., pp.1,6, Feb. 27 2015-March 1 2015, Place- IIT Bombay, Mumbaidoi: 10.1109/NCC.2015.70848 68	IEEE	2015
	Mane, P. S.; Talati, N.; Riswadkar, A.; Jasani, B.; Ramesha, C.K.	Implementation of NOR Logic Based on Material Implication on CMOL FPGA Architecture	28th International Conference on VLSI Design (VLSID), 2015 , pp.523-528, 3-7 Jan. 2015 doi: 10.1109/VLSID.2015.94	IEEE	2015
	Sampath, M.; Mane, P.S.; Ramesha, C.K.	Hybrid CMOS-memristor based FPGA architecture	2015 International Conference on VLSI Systems, Architecture, Technology and Applications (VLSI-SATA), pp.1-6, 8-10 Jan. 2015 doi: 10.1109/VLSI-SATA.2015.7050461	IEEE	2015

*N. Robinson and A. P. Vinod	Bi-directional Imagined Hand Movement Classification using Low Cost EEG-based BCI	Proc. of International Conference on Systems, Man and Cybernetics, Oct. 2015, Hong Kong.	IEEE	2015
*N. Robinson, A. D. Zaidi, M. Rana, A. P. Vinod, C. Guan, N. Birbaumer, R. Sitaram	*Real-time fNIRS-BCI system for subject-independent pattern classification of overt and covert movements*	*Real-time Functional Imaging and Neurofeedback Conference, Feb. 2015, Gainesville, Florida.*	IEEE	2015
C.Balakrishna Moorthy, Ankur Agarwal , M.K.Deshmukh	Artificial Intelligence Techniques for Wind Power Prediction: A Case Study	International Conference on Soft Computing in Applied Sciences & Engineering (ICSCASE-2015) 23-24 July 2015		2015
Anupama, K.R.; Shenoy, Meetha.V.; CH, S.Sankhar Reddy3	BSwarm robot — A low cost mobile wireless sensor research platform using COTS products	International Conference on Signal Processing, Informatics,Communication and Energy Systems ,SPICES-EB 19-21 ,2015,Calicut-India	IEEE	2015
Anupama, K.R.; Reddy, C.S.S.; Shenoy, Meetha.V	FlexEye — A flexible camera mote for sensor networks," in *Signal Processing and Integrated Networks*	SPIN 2015,International conference on Signal Processing and Integrated Networks,19-20Feb-2015-Noida,India	IEEE	2015
Sreejith, V.; Anupama, K.R.; Gudino, L.J.; Suriyadeepan, R	A fast exploration technique in WSN for partition recovery using mobile nodes," ,	Twenty First National Conference in Communications 27th Feb – 1st March – IIT, Bombay	IEEE	2015
Sreejith V, K.R. Anupama, Lucy J Gudino, R Suriyadeepan	A Fast Area Exploration in Wireless Sensor Network using Mobile Nodes	COMSNETS, International Conference on Communication Systems and Networks, Jan 6th – Jan 10th , Bangalore	IEEE	2015
GawasMahadev A., Lucy J. Gudino, K.R. Anupama	Cross Layer QoS Aware Multi Rate Protocol for Ad hoc Network	Eighth IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS), December 14th -17th , C-DoT, New Delhi	IEEE	2014

Gawas, M.A.; Gudino, L.J.; Anupama, K.R	Cross layer congestion aware multi rate multi path routing protocol for ad hoc network	*IEEE Signal Processing and Communication (ICSC)* *March 16th -18th, Noida, UP*	IEEE	2015
Gawas, M.A.; Gudino, L.J.; Anupama, K.R	Cross layer best effort qos aware routing protocol for ad hoc network	International Conference on Advances in Computing, Communications and Informatics (ICACCI) , August 10 -13th 2015, Kochi	IEEE	2015
R. Femi, S. Clement, A. Agrawal, A. A. Prince	Effect of Electric Field on Electrical Breakdown Arc Behavior of Micro Contact Gaps: A 3D Approach	6th IEEE PES Asia-Pacific Power and Energy Engineering conference, Hong Kong, December 7-10, 2014. DOI:10.1109/APPEEC.2014.7065973	IEEE	2014
AnushBekal, Manish Goswami, B.R.Singh, *D.Pal	A low power 8-bit Asynchronous SAR ADC Design using Charge Scaling DAC	5th International Symposium on Electronic System Design, NIT Suratkal, 15-17 December 2014		
R. Femi, S. Clement, A. Agrawal, A. A. Prince	Cross Tied Array of Electro-statically Actuated Micro-Electromechanical Switches for AC Circuit Breaking Applications	IEEE International Conference on Magnetics, Machines & Drives, Kerala, July 24-26, 2014. DOI:10.1109/AICERA.2014.6908215	IEEE	2014
Dhongdi, S.C.; Anupama, K.R.; Sant, R.H.; Gudino, L.J.	Implementation of multi-hop time synchronization on miniature test-bed setup of underwater acoustic sensor network	Communications (NCC), 2014 Twentieth National Conference on , vol., no., pp.1,6, Feb. 28 2014-March 2 2014 Place -IIT Kanpur doi: 10.1109/NCC.2014.6811343	IEEE	2014
Mane P. S. ; Paul Namita; BehraNikhilesh; SampathMadan	Hybrid CMOS-Memristor Based Configurable Logic Block Design	IEEE International Conference on Electronics and Communication Systems	IEEE	2014

kumar; Ramesha C. K.		2014 (ICECS'14), 13-14 Feb. 2014 pp. 1-5 doi: 10.1109/ECS.2014 .6892532		
Bhardwaj, K.; Mane, P.S.; Henkel, J.	Power and Area-Efficient Approximate Wallace Tree Multiplier for Error-Resilient Systems	15th International Symposium on Quality Electronic Design (ISQED), 2014 , pp.263-269, 3-5 March 2014 doi: 10.1109/ISQED.2014.678 3335	IEEE	2014
Bhardwaj, K.; Mane, P.S.	C3Map and ARPSO based mapping algorithms for energy-efficient regular 3-D NoC architectures	2014 International Symposium on VLSI Design, Automation and Test (VLSI-DAT), pp.1-4, 28-30 April 2014 doi: 10.1109/VLSI-DAT.2014.6834909	IEEE	2014
Mane, P. S.; Talati, N.; Riswadkar, A.; Raghu, R.; Ramesha, C.K.	Implicating logic functions with memristors	2014 InternationalSoC Design Conference (ISOCC), vol., no., pp.232-233, 3-6 Nov. 2014 doi: 10.1109/ISOCC.2014.708 7622	IEEE	2014
Mane, P. S.; VarrierVivek; Prasad, U.S.; MuthkodShridev ; Ramesha, C.K.	Nano-crossbar Based LUT Design For Reconfigurable Logic	International Conference on Microelectronics, Circuits and Systems,July 2014, Kolkata,		2014
*N. Robinson, A. P. Vinod and C. Guan	Spatio-Temporal Variations in Hand Movement Trajectory based Brain Activation Patterns	Proc. of International Conference on Control, Automation, Robotics and Vision, Dec. 2014, Singapore.	IEEE	2014
K. G. Smitha, *N. Robinson and A. P. Vinod	*A Study on the Effect of Emotion Evoking Videos on Physiological Signals*	*Proc. of 2nd International Conference on Devices, Circuits and Systems, March 2014,Tamil Nadu, India.*	IEEE	2014
Geetesh K Mishra, GautamBacher,	A micro biosensor for label-free detection of*Salmonella* in water	National conference on Nano Functional Materials (NFM2014),		2014

Utpal Roy, Sunil Bhand		BITS, Pilani India, 7-8 November, 2014.		
Geetesh K. Mishra, GautamBacher, Utpal Roy, Sunil Bhand	Impedemetricimmun osensor for bacterial detection	Indo- UK International Workshop On Advanced Materials And Their Applications In Nanotechnology (AMAN 2014) Organized by BITS Pilani, KK Birla Goa Campus (May 17- 19, 2014)		2014
Meetha V Shenoy, KirtiSusan,Mana saSUpadhyay	A 8-bit SAR ADC using Current Mode Approach for Bio-Medical Applications	National Conference on Communication,Signal Processing and Networking,NCCSN-10-12 October 2014 Palakkad-India	IEEE	2014
*MetildaSagaya Mary N.J, AshisMaity, Amit Patra	Light Load Efficiency Improvement in High Frequency DC-DC Buck Converter Using Dynamic Width Segmentation of PowerMOSFET	2014 27th International Conference on VLSI Design and 2014 13th International Conference onEmbedded Systems,pp.563,568, IIT Bombay,5-9 Jan. 2014	IEEE	2014
RajalekshmiKish ore,Ramesha C K,VirenSharma,R oopal Joshi	Performance Evaluation of Energy Based Spectrum Sensing in Multipath Fading Channel for Cognitive Radio System	IEEE Explore ,978-1-4799-6646-2/14	IEEE	2014
Prince A.A., Mangalgiri G. M., Femi R.	Electronic Circuit Design and Analysis of MEMS Current Sensor	Proc. Of International Conference on Emerging Technologies - Micro to Nano 2013, p.p. 187-188, February 23-24 2013, Goa, India		2013
Prince A.A., Chithra Pallavi S.	RF MEMS based Biosensor for Pathogenic Bacteria Detection	Proc. Of International Conference on Emerging Technologies - Micro to Nano 2013, p.p. 173-174, February 23-24 2013, Goa, India		2013

Dhongdi S.C., Anupama K.R., Gudino L.J., Sant R.H.	Deployment analysis of underwater acoustic sensor network on miniature test-bed	7th International Conference on Advanced Computing and Communication Technology, ICACCT, 2013, Vol 1,pp 18-24 Place -APIIT, Panipat,India		2013
Bhardwaj Kartikeya; Mane, P. S.	ACMA: Accuracy-Configurable Multiplier Architecture for Error-Resilient System-on-Chip	IEEE International Conference on Reconfigurable Communication-centric Sysetm-on-Chip 2013(ReCoSoc 2013), Santa Clara, CA,pp.1-6, 10-12 July 2013 DOI 10.1109/ReCoSoC.20130.6581532	IEEE	2013
*N. Robinson, A. P. Vinod C. Guan	Hand Movement Trajectory Reconstruction from EEG for Brain-Computer Interface Systems	Proc. of International Conference on Systems, Man and Cybernetics, pp. 3127-32, Oct. 2013, Manchester, UK.	IEEE	2013
LizyKanungo, Gautam Bacher, Souvik Pal, Sunil Bhand	Ultrasensitive micro-biosensors for analysis of aflatoxins	Proceedings of International Conference "Emerging Technologies: Micro to Nano" organized jointly by CSIR CEERI Pilani and BITS Pilani during Feb. 23 & 24, 2013 at BITS Pilani-KK Birla Goa Campus		2013
*P. N. Desai, A. J. Phillips, S. Sujecki	Performance evaluation for 2R burst mode optical regenerator cascades in presence of co-channel phase uncorrelated crosstalk	14th International Conference on Transparent Optical Networks (ICTON), Coventry, July, 2012	IEEE	2012
M. Schürholz, M. Rana, *N. Robinson, A. Ramos-	Differences in hemodynamic activations between motor imagery and	Proc. of International Conference of the IEEE Engineering in Medicine and Biology Society, pp.	IEEE	2012

Murguialday, C. Woosang, M. Rohm, R. Rupp, N. Birbaumer, R. Sitaram	upper limb FES with NIRS	4728-31, Aug. 2012, San Diego, CA.		
*N. Robinson, A. P. Vinod, C. Guan, K. K. Ang, K. P. Tee	A Modified Wavelet-Common Spatial Pattern Method for Decoding Hand Movement Directions in Brain Computer Interface	Proc. of International Joint Conference on Neural Networks, pp.1-5, June 2012, Brisbane, Australia.	IEEE	2012
G. Bacher, L Kanungo, S. Bhand	Miniaturized label-free impedimetricimmunosensor for analysis of Aflatoxin B1 in peanut	IEEE Proceedings of "6th International Conference on Sensing Technology ICST 2012" with focus on sensors in agriculture, 18-21 Dec. 2012 Kolkata India	IEEE	2012
M. R. Narayanan, H. Al-Nashash, *D. Pal, M. Chandra	Circuit model for SelBox MOSFET	IEEE Int. Conf. on Electron Devices & Solid State Circuits (8th EDSSC), Bangkok, Thailand, December 3-5, p. 2, 2012	IEEE	2012
M. Goswami, Manoj Malik , *D Pal	A single channel QAM based DC offset cancellation circuit for high gain instrumentation amplifier system	Proc. Int. Conf. Information, Communication Embedded Systems., vol. 1, Chennai, India, 2012		2012
M. Goswami, P. Shukla, P. Joshi, M. Malik *D Pal	A low input referred noise amplifier system for biomedical application	Proc. IEEE Int. Conf. Electronics, Computer Technology., vol. 1, Kanyakumari, India, pp. 430-434, 2012	IEEE	2012
M. R. Narayanan, H. Al-Nasash, *D. Pal, M. Chandra	Frequency response of MOS devices with SELBOX structure	16th IEEE Mediterranean Electrotechnical Conference (MELECON 2012), Medina Yasmine Hammamet, Yunisia, 25-28 March 2012	IEEE	2012
*M. K. Shashidhara, K. N. Shubhanga	*Performance of power system stabilizers in a fixed	IEEE India Conference (INDICON), Hyderabad, India, pp. 1-5, December	IEEE	2011

		series capacitor compensated system	2011		
	*M. K. Shashidhara, K. N. Shubhanga	*Some aspects of power system stabilizer performance in subsynchronous resonance study	International Conference on Power and Energy Systems (ICPS), IIT-Chennai, pp. 1-6, December 2011	IEEE	2011
	Harneet A., Prince A.A.	EMS-based Routers for OBS Network	Proc. Of National Conference on Electronic Technologies, pp. 87-90, April 15 2011, Goa, India		2011
	*N. Robinson, A. P. Vinod, C. Guan, K. K. Ang, K. P. Tee	A Wavelet-CSP method to classify hand movement directions in EEG based BCI system	Proc. of 8th International Conference on Information, Communications and Signal Processing, pp.1-5, Dec. 2011, Shangri-La, Singapore.	IEEE	2011
	GautamBacher, Souvik Pal, Sunil Bhand	A simple and sensitive impedimetric biosensor for analysis of Aflatoxin M1	2nd International Conference on Bio-Sensing Technology. 10th Oct. to 12thOct. 2011. Amsterdam, The Netherlands.	Elsevier	2011
	A.Saha, *D. Pal, M. Chandra & M. K. Goswami	Novel high speed MCML 8-bit by 8-bit multiplier	IEEE International Conference on Devices & Communications (ICDeCom-11), 24-25 February 2011, BIT Mesra,	IEEE	2011
	NazneenFatema Rajani, RajoshiBiswas, Gaurav Dar, Ramesha C K	Solution to the Tic-Tac-Toe Problem using Hamming Distance approach in a Neural Network.	Second International Conference on Intelligent Systems, Modelling and Simulation (IEEE), 978-0-7695-4336-9/11	IEEE	2011

(*indicates that the paper was published by the faculty member, before BITS Pilani)

23. Details of patents and income generated :

Academic Year	Patents	Income Generated
2012-2013	BhandSunil, ChandraSudhir, PandyaHardik, BacherGautam, KanungoLizy, "Device for Analysis of Mycotoxins". Indian Patent Application No.1203/MUM/2013 filed on 28 March 2013, Publication date: 10 July 2015	--

2013-2014	Bhand Sunil, ChandraSudhir, PandyaHardik, BacherGautam, KanungoLizy, "Device for Analysis of Mycotoxins".PCT International Application PCT/IN2014/000176, Publication number WO2014155391 A2, Publication date 2 Oct. 2014	--
2014-2015	K. R. Anupama, NeenaGoveas, LucyGudinho, Barathy S, "Multi-Parameter Cross Layer Dynamic - Hierarchal Wireless Sensor Network for Monitoring of Cross Country Gas Pipelines, Process Plants", Provisional Patent Filed: ApplNo. TEMP/E-1/13846/2015-MUM	--

24. Areas of consultancy and income generated :

Academic Year	Areas of Consultancy	Income Generated
2011-2012	Embedded Systems	Rs 40,000

25. Faculty selected nationally / internationally to visit other laboratories / institutions /industries in India and abroad :

2013-2014	Dr. M. K. Deshmukh	Was selected by WindSim AS, Norway, as representative from technical institutions in India, along with six other representatives from Wind Industry in India, namely, M/s Mytrah, Ltd., Bangaluru, for attending International WindSim Users meet on June 24th-26th, 2014 at Tonsebrg, Norway. The User meet was followed by five days advanced training for use of proprietary CFD based WindSim Technology, during June 29th – July 3rd, 2014. The interaction with the participating experts from different countries, as well as experts at WindSim headquarters, resulted in collaboration for undertaking joint R&D projects in the area of Wind power development and also for developing short term training programs for faculty and professionals from wind industry in India. Entire cost of travel, and living expenses in Norway was sponsored by the host company.

26. Faculty serving in National committees b) International committees c) Editorial Boards d) any other (please specify)

Academic Year	Name of Faculty	National/ International Committees, Boards
2013-2014	Prof K E Raman	Assessment Committee for accreditation of a number of Universities by NAAC
2014-2015	A. Amalin Prince	Member of Board of Studies (BOS), Faculty of Electrical and Electronics Engineering, Sathyabama University-Chennai, India
2014-2015	Nitin Sharma	Editorial Board Member of International Journal of Modelling and Simulation, Taylor & Francis http://www.tandfonline.com/action/journalInformation?show=editorialBoard&journalCode=tjms20#.VfbOaZcZbGs
2013-2015	Nitin Sharma	Editorial Board Member of Communications, Acta Press. http://www.actapress.com/Content_of_Journal.aspx?journalid=153#editors-3

2014-2015	Nitin Sharma	Editorial Board Member of International Journal of Wireless Communications, Networking and Mobile Computing, The American Association for Science and Technology (AASCIT)

27. Faculty recharging strategies (UGC, ASC, Refresher / orientation programs, workshops, training programs and similar programs).:

The Institute follows the following schemes for every department

I. Industry Immersion: a programme available for faculty from the level of Asst. Professor onwards (after completion of 3-years of continuous service) in which the concerned faculty can join a chosen industry/ research organization to learn a new technique/ practice or implement a topic of research or academic study in her/his area of interest in a time-bound manner during the summer vacation with her/his expenses taken care of by the Institute.In case of engineering departments lectures are also allowed to participate in the same .A number of leading industries from the area of EEE and E&I participate in the programme and the faculty of the department avail the opportunities on a regular basis under the scheme.

Faculty who Participated in Industry Immersion
a. Mr. MeghanandBhamare– ST Microelectronics, Noida, June – July 2012
b. Mr.Gavax Joshi – ST Microelectronics, Noida, June – July 2013

II. University Immersion: a programme designed on a similar mould where the faculty, instead of an industry, join a department of a university either in India or abroad

III. Professional Development Allowance: A faculty with designation Assistant Professor onwards get an yearly contingency fund of Rs 1,00,000.00 which s/he can spend for attending Conference/ Seminar/ Workshop, payment of page-charges for journal-papers, membership of professional bodies/ purchase of components/ software/ specialised items needed for research or professional growth.
Each Lecturer gets a sum of Rs 25,000 as annual contingency grant.In addition to this group of five Lecturers get a sum of Rs 75,000 on the same account over a period of 5-years which s/he can collectively or individually spend subject to rules and ceilings spelt out by the Institute.

IV. Intensive Teaching Workshop: Newly joined faculty members are mentored for a duration of a semester by senior faculty on teaching and evaluation methodologies

V. In-Service Ph.D.: selected young professionals who hold a PG-degree and appointed as "Lecturers" for a period of 6-years within which they are expected to complete their doctoral degree (working under the supervision of faculty from the department/ Institute)

VI. Research Initiation Grant: All Newly joined faculty with designation Assistant

Professor and above are eligible for this grant of Rs.2,00,000 . The objective is to enable the beginning of research and related activities for a newly recruited faculty who has significant potential to attract external funding.

Faculty with RIG in EEE/ENI: Dr. Priyanka Desai – "Free Space Optical Communication Systems for Next Generation Communication Network"

VII. Seed Grant: This scheme is designed to stimulate competitive research in strategic areas of national or international importance, to promote innovative product and technology development, and/or to facilitate the start of research programs which will potentially develop into creative ventures on their own through external funding.

VIII. Additional Competitive Research Grant:The scheme will provide upto 10 Lakhs to a new faculty to initiate research by procuring equipment to establish facility necessary for their research. The grant is awarded on a competitive basis and based on well documented research plan.Scheme supports upto $1/3^{rd}$ of the new faculty.

Faculty with Additional Competitive Research Grant

Dr.Amalin Prince – Design and Analysis of MEMs Switches for ARC less operation and control of Electric Energy Processing Systems. Duration: 16 Aug 2015 to 15 Aug 2017

IX. OPERA Award: The University has instituted OPERA (Outstanding Potential for Excellence in Research and Academics) award for newly recruited faculty. The award endows a grant of Rs. 3 Lakhs per year for maximum period of 5 years, subject to a performance review at the end of 2 years. The award is to facilitate and incentivize research focused faculty to excel in research and teaching.From the grant, may be utilized as honorarium of Rs. 15,000 per month to the faculty, and for academic and research, support to research students/staff, undertake domestic or international travel to attend a conference, or procure equipment, supplies or books, etc..

Prof.Dipankar Pal, who joined the Department on 23rd March, 2015, has been awarded for duration 5 years, subject to performance review after 2 years.

Participation in Workshop/seminars/training programmes

Academic Year	No. of Faculty Participated in Workshops, Training Programs
2010-2011	1
2011-2012	2
2012-2013	3
2013-2014	4
2014-2015	8

Academic Year	Name of Faculty	Training programs/ similar programs
2010-2011	Gautam Bacher	SERC School on Electrochemical Systems, 16-28 May, 2011, IIT Bombay

2011-2012	A. Amalin Prince	INUP Familiarization Workshop on "Nanofabrication Technologies", Indian Institute of Science, Bangalore, India, April 16-18, 2012, at Centre for Nano Science & Engineering.
	A. Amalin Prince	INUP Hands-on Training on Bio-Sensors, in Centre for Nano Science & Engineering at Indian Institute of Science, Bangalore, June 18-28 2012
	MeghanandBhamare	Industry Immersion Program at ST Microelectronics, Noida from 11th June 2012 to 25th July 2012
	Ramesha C. K.	Ten– days INUP Hand-on Training on "Nanofabrication Technologies"IISc Bangalore, 26th November to 5th December, 2012.
		Two- days Workshop on Electron and Ion Beam Lithography for Nanotechnology, IIScBangalore, December 3-4, 2012.
2012-2013	A. Amalin Prince	Advanced school on "Graph Algorithms", BITS-Pilani K.K. Birla Goa Campus, India July 23-27, 2012
	GautamBacher	Fifth SERC School on "New Developments in Microfabrication with Focus on Synchrotron Radiation based Deep X-ray Lithography" October 29-November 03, 2012 Raja Ramanna Centre for Advanced Technology (RRCAT), Indore.
	SarangDhongdi	Attended Complimentary seminar on MATLAB and Simulink for Engineering Education, at Mumbai, on 7th Sept. 2012.
2013-14	C.B.K. Moorthy	National training Course on "Wind Resource Assessment and wind turbine technology" organized and conducted by Centre for wind Energy Technology [CWET] during 1st to 12th August, 2013 at Chennai
2013-14	M. K. Deshmukh	15th National Training Course on Wind Energy Technology, at Centre of Wind Energy Technology (C-WET), Chennai, Chennai, 27-29th, November, 2013.
2013-2014	Dr. Ramesha C K	Six day short term course on Semiconductor Manufacturing and Technology at IIT Mumbai from 10 - 15th December 2013.
2013-2014	R. Femi	INUP Familiarization workshop on "NanaofabricationTechnologies".Centre of Nano Science and Engineering, Indian Institute of Science, Bangalore,May 21-23, 2014.

2013-14	Jyotsna A. Kulkarni Sankhar Reddy	Introductory Workshop on MATHEMATICA,Department of Mathematics, BITS PilaniK.K.Birla Goa Campus, Goa Atmel Workshop
	Meetha V Shenoy, K R Anupama, Sankhar Reddy	Introductory Course on Marine robotics held in National Institute of Oceanography-Dona Paulo Goa-(28-31Jan 2014
	M. K. Deshmukh	Advanced Training on WindSim Technology at Tonsberg AS, Norway, June 24-July 3, 2014
2014-2015	A. Amalin Prince	Workshop on "ARM - Xilinx SoC Lab-in-a-Box", Grand Sala Conference room, Goa, India, December 16, 2014
	A. Amalin Prince	Short Term Course on "Advances in VLSI Signal Processing", Indian Institute of Technology, Kharagpur, January 02-06 , 2015
	R. Femi	INUP Hands-on Training on "MEMS Cantilever and Micro Nano Characterization Technique.Centre of Nano Science and Engineering, Indian Institute of Science, Bangalore, May 21-29, 2015.
	SarangDhongdi	Attended National workshop on Network, Network Simulation, and Information Security [NWNSIS -2014], during 24 -29 Nov 2014
	SarangDhongdi,Narayan. S Manjarekar	Attended Marine Robotics Course, conducted by CSIR-NIO, at Panjim during 27-31 Jan 2015.
	K.R.Anupama	Attended edX Training program , Boston
	Meetha V Shenoy	Intel Academic Form - Goa - HOD recommendation
	Meetha V Shenoy	Attended the one week national workshop on Nature inspired computing and Applications held at MNIT Jaipur 2nd -6th April 2015.
	Shailendra Kumar Dhakad	INUP Hands on training workshop on Fabrication of MEMS sensors, IIT, Bombay,18-27 August, 2014
	Dipankar Pal	Academic Visitor to Bradley Department of Electrical & Computer Engineering, Virginia Tech, Blacksburg, USA from 14 to 30 May 2015. Interacted Prof. James S. Thorpp, Dr. Virgilio Centeno and Dr. Jaime De La Ree. Also visited the Virginia Bioinformatics Institute of Virginia Tech

28. Student projects

Academic Year	Students who have done in-house projects including inter-departmental projects	Students doing projects in collaboration with other universities /industry / institute
2010-2011	100%	100 %
2011-2012	100%	100 %
2012-2013	100%	100 %
2013-2014	100%	100 %
2014-2015	100%	100 %

29. Awards / recognitions received at the national and international level by Faculty; Doctoral / post doctoralfellows; Students

Academic Year	Awards / recognitions received at the national and international level by Faculty	Awards / recognitions received at the national and international level by Post Doctoral Fellows	Awards / recognitions received at the national and international level by Students
2011-2012	Dr. Anita Agrawal: Distinguished faculty award at the BITSAA first global meet in 2012	--	Students of the Department, over the years, have won scholarships, namely, S. N. Bose Scholarships, MITACS, Google Scholars
2014-2015	Prof G. Raghurama has been recognized and felicitated by SkillTree Knowledge Consortium with the title "SkillTree Education Evangelist of India, 2014"	--	Google Summer of Code – 5 students

30. Seminars/ Conferences/Workshops organized and the source of funding (national/ international) with details of outstanding participants, if any.

Academic Year	Event Organized	Sources of Funding
2010-2011	Third International Conference onEmerging Trends in Engineering &Technology. 19-21 Nov 2010	, Sponsors G. H. Raisoni College of Engineering and GHR labs and research center
2011-2012	Cadence Workshop conducted by IEEE student Chapter, BITS, Pilani K K Birla Goa Campus . April 2012	National Semiconductors
2012-2013	Training program on "ANSYS HFSS" and "ANSYS MAXWELL" tools -25-28 August 2012	ANSYS

	MATLAB Workshop 15 Oct 2012 Training program on "Advanced Features of WindRiver VxWorks" by Mr. SrujanBabu on 24 Aug 2012 Cadence Workshop 04 to 06 Nov 2012 Conducted by Uma Shankar Sahu, from Cadence Academic Program Group	CoreEl Technologies CADENCE
2014-2015	Advances in Robotics,2-5 July 2015 Outstanding Participants - Roland Siegwart ,Professor of Robotics, ETH Zurich, Switzerland - Steven. M. Levelle ,Professor of Computer Science, University of Illinois - Jae Bok Song Professor, School of Mechanical Engineering, Korea University	BRNS, DST
2014-15	Advanced Programming Techniques in MATLAB, Ms. Loren Sure, Mathworks Technical Ambassador USA. 24th July 2015	, Mathworks, USA
	Modern Underwater Systems -29th and 30th August 2015 Outstanding Participants - Sanjeev Afzulpurkar, NIO, Goa - PramodMourya, NIO-Goa - Antonio M, NIO-Goa - Tata Sudhakar, NIOT-Chennai - MohitTahiliani, NITK	Tektronix

31. **Code of ethics of research followed by the Department.**
The department follows the code of ethics specified by the Institute.

32. **a) Student profile programme-wise:**
Academic Year 2010 -11

Name of the Programme	Applications received	Selected		*Pass percentage	
		Male	Female	Male	Female
B.E. EEE		62	18	100%	100%
B.E. ENI		63	16	100%	100%
ME. Embedded Systems		5	1	100%	100%
M.E. Microelectronics		ME Microelectronics started in Goa Campus 2011-12			
PhD (Sem1)					
PhD (Sem 2)					
Academic Year 2011 -12					
B.E. EEE	123677 Applications Received for FD, 4571	68	12	100%	100%

B.E. ENI	Applications received for HD & 461 Applications received for PhD	65	14	100%	100%
ME. Embedded Systems		10	2	100%	100%
M.E. Microelectronics		7	3	100%	100%
PhD (Sem1)		0	0	1	0
PhD (Sem 2)		0	1	0	0
Academic Year 2012 -13					
B.E. EEE	136904 Applications Received for FD, 4825 Applications received for HD	69	11	100%	100%
B.E. ENI		66	13	100%	100%
ME. Embedded Systems		7	1	100%	100%
M.E. Microelectronics		6	2	100%	100%
PhD (Sem1)	6	1	2	0	0
PhD (Sem 2)	5	2	2	0	0
Academic Year 2013 -14					
B.E. EEE	166260 Applications Received for FD, 5549 Applications received for HD	73	13	100%	100%
B.E. ENI		71	16	100%	100%
ME. Embedded Systems		11	2	100%	100%
M.E. Microelectronics		9	2	100%	100%
PhD (Sem1)	9	3	0	0	0
PhD (Sem 2)	18	2	0	1	0
Academic Year 2014 -15					
B.E. EEE		87	12	100%	100%
B.E. ENI		58	6	100%	100%
ME. Embedded Systems		4	1	100%	100%
M.E. Microelectronics		6	1	100%	100%
PhD (Sem1)	0	0	0	0	0
PhD (Sem 2)	17	2	0	0	0

*BITS follows a credit based system and cafeteria approach in offering of courses. Students not performing well are monitored by ACB (Academic Counselling Board), HDCC (Higher Degree Counselling Cell) and ACC (Academic Counselling Cell). Their pace is slowed down. Normally not more than 3% students (including all programmes, B.E., M.Sc, and M.E. .) at a given point of time are under the purview of ACB.

33. Diversity of Students

Name of the Programme (refer to question no. 4)	% of students from the same university	% of students from other universities within the State	% of students from universities outside the State	% of students from Other countries
M.E	2%	NIL	98%	NIL
Ph.D.	20%	0%	80%	0%

34. How many students have cleared Civil Services and Defense Services examinations, NET, SET, GATE and other competitive examinations? Give details category-wise.

We do not capture this information through any formal process. However we have limited information regarding this point, as stated below:

Academic Year	Civil Services	Defense Services	GATE
2013-2014	Unable to Answer	Unable to Answer	1 2010A8PS350G ASHISH BEHERA AIR-1
2014-2015	1 2006B1A3614G SANSKRITI JAIN	1 2009A8PS343G SRIKANTH H V	Unable to Answer

35. Student progression

Student progression	Percentage against enrolled
UG to PG	During the period of assessment, about 25% of graduating students, have obtained admissions in reputed Institutes in India and abroad. These include: MIT, Stanford, IIMs, IISc, IIT, Carnegie Mellon University, University of Minnesota, Georgia Institute of Technology, Colorado State University, Purdue University, Washington University, Michigan State University, Virginia Tech, University of Michigan, London School of Economics, University of California San Diego, etc..
PG to M.Phil.	0%
PG to Ph.D.	2010-2011:6% 2011-2012:6% 2012-2013: 2013-2014:6% 2014-2015:
Ph.D. to Post-Doctoral	0

Employed Campus Selection	UG:% employed through PU/PS 2010-2011: 65 2011-2012: 91 2012-2013:78 2013-2014:89 2014-2015:96 PG:% employed through PU/PS 2010-2011: 50 2011-2012: 39 2012-2013:31 2013-2014:67 2014-2015:74
Entrepreneurs	2010-2011: 5 start-ups 2011-2012: 4 start-ups 2012-2013: 2013-2014: 2014-2015: 1 start-up

36. Diversity of staff

Percentage of faculty who are graduates	
of the same university	31%
from other universities within the State	0%
from universities from other States from universities outside the country	69%

37. Number of faculty who were awarded M.Phil., Ph.D., D.Sc. and D.Litt. during the assessment period

Academic Year	No. Of Faculty who were awarded Ph.D.
2010-2011	1
2011-2012	1
2012-2013	1
2013-2014	1
2014-2015	0

38. Present details of departmental infrastructural facilities with regard to

a) Library: Central Library of the Institute provides access to text books, reference books, international & national journals, relevant to courses and areas of research interests of the faculty and research scholars of the Department. The Library also provides access to online catalogues, digital library, and journals.

The library has stock of 2475 books related to disciplines of the Department. Also, the Library has subscribed to

       (1). About 77 Number of Indian Journals (Print)

       (2) About 19 Number of Foreign Journals (Print)

       (3) About 42 Number of e- Journals

b)   Internet facilities for staff and students: All members of faculty and staff, as well as students, are provided access to internet in chambers, offices, laboratories, classrooms, and lecture theatres. Also, the internet access is provided 24 X 7, in all faculty & staff quarters on Campus.

c)   Students' laboratories :

1.Digital Communications Lab

Sr No	Major Equipment	Specifications	Make	Estimated worth (Rs.)
1	Digital storage oscilloscopes	TDS 2014C : 100 MHz 4 channel TDS 2012C : 100 MHz 4 channel	Tektronix Pvt. Ltd	118 Lakhs
2	Arbitrary function generators	AFG 3022B : 25MHz, 2 channel AFG 3021C : 25MHz, 1 channel		
3	Digital Multi-meters	DMM 4020 : 5.5 digits, desktop, programmable		
4	Bench Digital Multi-meters	Model No. 2110-220 : 5.5 Digits	Keithley Pvt. Ltd	
5	Programmable Triple channel Power Supplies	Model No. 2230-30-1 : 0-30V/1.5A, 0-6V-5A		
6	Power Supplies	Model : LQ6324 : Multi output Rack Adaptable	Aplab Ltd	
7	Communication Kits		Scientech Pvt. Ltd	
8	GSM Kit			
9	GSM application module Kit			
10	EPABX trainer kit			

11	Antenna Trainer Equipments		
12	Universal IC Tester	Model : DICT -03	Kitech Pvt. Ltd
13	Microwave Bench Equipments		M/S Mars Edpal Inst Pvt. Ltd Ambala
14	Spectrum Analyzer	SM-5011	
15	Software : MATLAB & SIMULINK	Version : R2015b	MathWorks
16	Software : Ansys academic teaching EM & HF perpetual licence	Version : 13.0	
17	Software : Frequency Response Analysis		
18	Spectrum Analyzer	GSP-810	GW instek Integrated Services & consultancy Pvt. Ltd
	Facility Through Sponsored Project		
1	ENA Series Network Analyzer 2 – Port Test Set	Model : E5063A-2H5, 100KHz to 15GHz, MY54100831	Keysight Technologies

2 Analog & Digital Lab

Sr No	Major Equipment	Specifications	Make	Estimated worth (Rs.)
1	System Source Meter	Model : Keithley 2602B , Dual Channel	Keithley Pvt. Ltd	58 Lakhs
2	Arbitrary Function Generators	Model : AFG3021C - 2 Channel 25MHz	Tektronix Pvt.Ltd	
3	Power Supplies	Model : LQ6324 Multi output Rack Adaptable	Aplab Ltd	
4	Cathode Ray Oscilloscopes	Model : HM203M and SM440	Scientific MT	
5	Universal IC Tester	Model : DICT -03	Kitech Pvt. Ltd	
6	Analog System lab Kits	ASLK PRO	Texas Instruments	

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3) Instrumentation Lab

Sr No	Major Equipment	Specifications	Make	Estimated worth (Rs.)
1	NI Compact RIO : (for Power Monitoring System)		National Instruments	58 Lakhs
2	NI ELVIS II			
3	NI ELVIS I			
4	Software : NI LABVIEW	Academic Site License, College , Fall 2014,		
5	Kits- Sensor Lab,		Scientech Ltd	
6	Arbitrary Function Generator	Model : AFG3021C - 2 Channel 25MHz	Tektronix Pvt. Ltd	
7	Digital Multimeter	DMM 4020 : 5.5 digits, desktop, programmable		
8	Digital storage Oscilloscope	TDS 2012C : 100 MHz 4 channel		
9	Spectrum Analyzer	GSP-810	GwInstek (Goodwill)	
10	Digital Storage Oscilloscope	ET25GS/ S (150 MHz)		
11	Programmable Logic Controller-01		Scientech Ltd	
12	PLC FHP Motor Interface			
13	NI 9205	32 Channel 16 bit Analog Input Module	National Instruments	
14	NI 9421	8-Channel Sinking Digital Input Module		
15	NI 9472	8-Channel Sourcing Digital Output Module		
16	NI 9263	4-Channel,16 bit Analog Output Module		

17	NI cDAQ-9172	8-Slot USB 2.0 Chasis		
18	NI 9219	4 CH-Ch isolated ,24 bit,module ±60V,100S/s Universal AI Module		
19	NI 9403	with DSUB 32 Ch,TTl Digital Input/Output Module		
20	NI 9923	37 pin DSub Terminal block for Screw terminal connectivity to 37 Pin DSub C series modules		
21	CDAQ -9178,	Compact DAQ chassis : 8 slot USB		
22	Software	Circuit Simulation Software (Tina V9)		
23	Scientech SS05 LVDT		Scientech Ltd	
24	Dual Power Supply	LD 3202	Aplab Ltd	

4) Electrical Machines Lab

Sr No	Major Equipment	Specifications	Make	Estimated worth (Rs.)
1	Transformers	1 phase, 3 phase		26 Lakhs
2	Auto Transformers	1 phase, 3 phase		
3	Induction Motors	1 phase, 3 phase		
4	DC Motors & Generators			
5	Synchronous Machines			
6	Loads	Resistors, Capacitors and Inductive		
7	Voltmeters	AC & DC		
8	Ammeters, and Wattmeters	AC & DC		
9	Clamp Meter &Multimeters			

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5) Power Electronics Lab

Sr No	Major Equipment	Specifications	Make	Estimated worth (Rs.)
1	Digital Storage Powerscope / Oscilloscope	TPS2014B :100 MHz, 4-Ch, 1 GS/s	Tektronix Pvt. Ltd	57 Lakhs
2	Multi Phase Power Analyser	Model : PA4000 , with 4 i/p Modules		
3	Current Probes	AC/DC-100KHz		
4	Triple Channel DC Power Supply	2 channels with 0-30V 1.5A, 1 channel with 0-6V 5A	Keithley Pvt. Ltd	
5	4 Phase Diode Rectifier + 3 Phase 4 Leg Igbt Inverter Stack		Semikron Ltd	
6	Power Electronics Lab Panel	Model : Scientech 2700 (with Motor, Heater and Lamp Load)	Scientech Pvt. Ltd	
7	Buck Boost Converter Training Kit	Model : Scientech 2729		
8	Boost Converter Training Kit	Model : Scientech 2727		
9	Buck Converter Training Kit	Model : Scientech 2724		
10	Fly Back Converter Training Kit	Model : Scientech 2728		
11	Forward Converter Training Kit	Model : Scientech 2730		
12	Software : Power World Software	Simulator and Optimal Power Flow	Powerworld Corporation	
13	Software : PS-CAD	X4M25E PSCAD X4 Academic 25 User Network License	Manitoba HVDC Research Centre	

6) Reconfigurable Computing Lab (A205)

Sr No	Major Equipment	Specifications	Make	Estimated worth (Rs.)
1	Xilinx 5 & 7 Series FPGAs			52 Lakhs
	XUP V5 Board	Vertex 5 (with Accessories)	Xilinx	
	Vertex 7	EK-V7-VC707-CES-G (with Accessories)		
	Kintex 7	AES-K7DSP-32ST-G (with Accessories)		
2	Xilinx ZynqSoC			
	Zed Board	Zynq TM 7000 development board	Xilinx	
	Zed Board	Zynq TM 7000 SoC ZC702 Evaluation Kit		
3	Software : Xilinx ISE	System Edition (50 Licence)		
4	Software: Xilinx ISE	Partial Reconfiguration Tool		
5	Software : Netsim Academic Edition	10 Users		
6	Software : Netsim Standard Edition	3 Users		
7	Digital Storage Oscilloscopes, Arbitrary Function Generators and Power Supplies			
8	High Speed Data cards, Interface cards: ADCs, DACs, Accelerometers, Gyroscopes, Microphones, Displays etc.			
	Facility Through Sponsored Projects			
1	Software : Xilinx VIVADO	System design Tool (25 License)	Xilinx	
2	Software: Xilinx Vivado	Partial Reconfiguration Tool		
3	KC705 DSP Kit With High Speed Analog			
4	Xilinx Artix-7 Based **Nexys 4** Development Board			

5	Xilinx Artix-7 Based **Basys3** Development Board		
6	Xilinx Spartan 6 Based **Atlys**Development Board		
7	Mixed Domain Oscilloscope	MDO4014-3	Tektronix Pvt. Ltd

7) Embedded Systems Lab

Sr No	Major Equipment	Specifications	Make	Estimated worth (Rs.)
	EMBEDDED SYSTEM DESIGN : Small & Medium Scale Embedded System			237 lakhs
Hardware:				
1	8051 DEVELOPMENT KIT	ESA KEIL MCBx51	KEIL	
2	ARM LPC 2378 DEVELOPMENT BOARDS	KEIL MCB2370		
3	STM32 Discovery Board	STM32F100RBT6B	STM 32 Discovery	
4	SAM Set Acoustic Modem Starter Set		Desert Star	
5	Sam-1 Miniature Acoustic Modem			
6	AVR XMEGA EVALUATION KIT	XMEGA-A1 XPLAINED ATXMEGA128A1	Atmel	
7	ATAVRDRAGON	ATMEL ATMEGA2560		
8	PSoC 3 FIRST TOUCH STARTER KITS	CY8CKIT-003	Cypress Semiconductor	
9	PSoC DEVELOPMENT KIT	CY8CKIT-001		
Software:				
1	KEIL PK51-ED : C51 Professional Developer's Kit	Version 8.0	KEIL	
2	KEIL MDK-ARM-ED : RealView Microcontroller			
DIGITAL SIGNAL PROCESS : DSP Tools used in Lab				
	Hardware:			

1	DSP Kits	TMS320C6455 TMS320C5510 TMS320C6713	Texas Instruments
2	DSP Evaluation Modules	TMS320C6455	
3	Omap35x Evaluation Module	TMDXEVM3503	

	Software:		
1	CC Code Composer Studio.	V3.1 & V3.3	Texas Instruments

	Facility Through Sponsored Project:		
1	Omni Directional Wheeled Robots		Nex Robotics
2	Sensor Motes	Lotus, Telos B, Micaz	Memsic
3	Microcontroller(Software)		KEIL
4	Wireless Modules ,Antennas		Amitec
5	Flow Computer	AutoPILOT PRO	Thermo Scientific

8) Microelectronics Lab (CC-123)

Sr No	Major Equipment	Specifications	Make	Estimated worth (Rs.)
1	Software : Cadence EDA Tools	Version 6.16	Cadence	127 Lakhs
2	Software : Synopsys EDA Tools	Synopsys AsiaPac Front End , Back End and Full Custom University Bundles	Synopsys	
3	Software : Mentor Graphics EDA Tools	Tools of HEP Category 1 & 2	Mentor Graphics	
4	Software : Silvaco TCAD	1 Omni License	Silvaco	
5	Software : Windriver VxWorks	Version 6.9	Windriver	

d)   Research laboratories:

S.No	Laboratory	Areas of Research	Major Equipment	Estimated worth (Rs.)
1	Embedded System	Wireless sensor network, swarm robotics, static and mobile wireless sensor networks, underwater communication and networks	Same as Above	Same as Above
2	Microelectronics	VLSI circuits and systems, ASIC Design	Same as Above	Same as Above
3	Reconfigurable Computing Lab	VLSI Signal Processing, Reconfigurable Computing Architectures and Algorithms	Same as Above	Same as Above
4	Renewable Energy	WRA, SRRA, Hybrid Systems, Smart Grids,	Anemometer Mast, Solar Radiation Measurement , Pressure, Temperature, Rainfall, Humidity Sensors, Data Logger, SPV Training Systems, NI-Compact RIO Systems, Power Analyzer, Thermal Image Analyzer, Vibration Measurement, etc.	25 Lakhs

39. **List of doctoral, post-doctoral students and Research Associates**
    a) from the host institution/university
    b) from other institutions/universities

S.No.	Name & ID No of Doctoral Students from the host Institution	Name & ID No of Doctoral Students from other Institution
1.	Jyotsna A. Kulkarni, ID No. 2011PHXF410G	C. BalakrishnaMoorthy, ID No.2007PHXF409G
2.	Sarang C Dhongdi, ID No. 2010PHXF022G	MeghanandBhamare, ID No. 2008PHXF403G
3.	Meetha V. Shenoy, ID No. 2012PHXF002G	Pravin Mane, ID No. 2009PHXF420G
4.	Ch. S. Sankhar Reddy, ID No. 2012PHXF001G	R Femi, ID No. 2012PHXF003G
5.	Joshi Abhishek Dilip, ID No. 2013PHXP410G	Praveen G.B, ID No. 2012PHXP404G
6.	SaifNalband ID No. 2013PHXP008G	Rajlekshmi Kishore, ID No. 2012PHXF401G
7.	KhairnarVikas Vishnu, ID No. 2013PHXP409G	Bhushan Kadam, ID No. 2013PHXP010G
8.		Bharat Bushan Singh, ID No. 2013PHXP009G

40. Number of post graduate students getting financial assistance from the university.

Academic Year	No. Of PG students getting financial assistance from the University
2010-2011	7
2011-2012	17
2012-2013	27
2013-2014	24
2014-2015	29

41. Was any need assessment exercise undertaken before the development of new programme(s)? If so, highlight the methodology.

Each time a proposal for either new programme or course is generated, the same is considered and vetted, in view of its merit, by the Department level committee for Academics (DCA). The inputs from related Divisions, such as Instruction, ARCD, SWD, Placement, Alumni, are considered. The recommendation of DCA is sent to concerned Departments of other Campuses for their consideration and approval. The proposal is jointly submitted to Academic Resource Planning and Development Division of the University, for consideration and approval of Senate of the University. A similar process is followed for development of Off-Campus Programs.

42. Does the department obtain feedback from

a. Faculty on curriculum as well as teaching-learning-evaluation? If yes, how does the department utilize the feedback?

The feedback on curriculum is collected by the department and Instruction Division every semester. Each faculty member is required to submit copies of final handout(s) in the beginning of semester. The handout of the course prescribes suitable Text Book (s) and Reference Book(s) of the course, lecture-wise plan, evaluation components, weightages, make-up policy, etc. Normally the handout is finalized in the beginning of semester and adhered to. The feedback on test- and Test-2 is also collected from faculty members during the semester. At the end of semester, each faculty members are expected to collect feedback from students of the classes and submit to Instruction Division. The Instructor In-charge and Instructors are encouraged to give feedback by the end of semester, On the basis of feedback, the faculty members recommend appropriate Text Books and Reference Books for the courses to be offered during next semester, change the pattern of nature of exams, number of evaluation components, etc.. Also, terms of recommendation for appropriate Text Books, Reference Books for the Course.

b. **Students on staff, curriculum and teaching-learning-evaluation and how does the department utilize the feedback?**

At the end of every semester structured feedback from students of all courses offered, is collected in specified formats. The feedback is anonymous. The completed feedback forms are deposited by the student representative in the Instruction Division of the Campus. The feedback forms received from students, are scanned at Instruction Division for all courses. The scanned copies of feedback forms are returned to respective faculty members, in the beginning of the next semester, so that the faculty Instructor can corroborate the useful feedback in teaching-learning-evaluation practice during subsequent semesters. The feedback is also utilized to compute performance index of faculty Instructor on a ten-point scale. The performance index is also made available to faculty members for records.

During the semester, the feedback from students of ongoing courses, is collected through SFC, the student faculty council. The SFC is for FD programs as well as HD programs. The SFC provides platform where students and faculty can interact informally and understand the respective needs. The council may discuss issues such as class attendance of students, laboratory operations and facilities, expectations from classroom instructions, tutorial exercises, Laboratory experiments, Home Assignments etc. The feedback from the council is utilized fro giving instant feedback to Instructor In-charge and Instructors of the ongoing courses. Also, the feedback is utilized for offering new elective courses during next semesters.

c. **Alumni and employers on the programs offered and how does the department utilize the feedback?**
The feedback from alumni and employers is collected informally as well as formally through interaction. The feedback collected from Placement Unit is made available to faculty of the Department for further improvement. The feedback is utilized for planning curriculum updating of existing courses, introducing new courses, practical evaluation components, arranging pre-placement doubt clearing sessions for the students.

Contents for off-campuses courses are developed in equal partnership with industry.

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43. **List the distinguished alumni of the department (maximum 10) :**

S.N	ID No.	Name	Details of Achievement
1	2006A8PS253G	ABHINAV ASTHANA	CEO/Co-founder at Postman
2	2007A3PS051G	PUNEET GARG	Director at Salutaire Chemicals
3	2007A3PS143G	NIKHIL SAMUEL	Co-founder Zuper

44. **Give details of student enrichment programmes (special lectures / workshops / seminar) involving external experts.**

Academic Year	Special Lectures/ Workshops/ Seminar arranged
2010-2011	Two day lecture series by SiddarthNath, on "Switchable Graphics and New & Emerging Display technologies" Dated 1-2 April 2010.
2011-2012	Guest Lecture by Dr. Rajeev Shorey, *President, NIIT University,* on topic of "Recent Trends in communication and Networks dated 25 Nov 2011 Lecture on "Overview of Electronics" by Prof. L K Maheshwari, Former Vice-Chancellor, BITS-Pilani, dated 14 March 2012
2012-2013	Organized a training program on "ANSYS HFSS" and "ANSYS MAXWELL" tools from 25th August to 28th August 2012. One day workshop on MATLAB on 15th October 2012. The resource person was Mr. Tabrez Khan from Mathworks India Pvt. Ltd. Three day workshop on Cadence EDA Tools from 04 to 06 Nov 2012 Conducted by Uma Shankar Sahu, from Cadence Academic Program Group
2013-2014	Training program on Mentor Graphics EDA tools by CoreEl Technologies Pvt Ltd on 13 Feb 2014. Training program on Synopsys EDA tools by Eigen Technologies Pvt Ltd on 25 Feb 2014.
2014-2015	1. One day Workshop "The WindSim Technology" (15-Sep- 2014), Prof. Arne R. Gravdahl's 2. Invited talk on "Smart technologies for Harnessing Solar & Wind Energy" By Shri. Sudeep Jain, I.A.S.,Chairman& Managing Director Tamil Nadu Energy Development Agency, Chennai (20-Sep-2014) 3. Invited talk on "Opportunities for Instrumentation Design Engineers in Core Industries" By Shri. Vishnu Vardhan J., Managing Director TREND Instrumentation and Automation Pvt. Ltd., Chennai (09- OCT-2014) 4. Workshop On VLSI Circuit Simulation Techniques Using "Synopsys EDA tools" By Industry Experts from Eigen Technologies Pvt Ltd. New Delhi (14-OCT-2014) 5. Invited Talk On "Research Opportunities in Underwater Communication Systems" By Cdr (Dr.) Arnab Das, Military Institute of Technology, Pune (08-Nov-2014) 6. Workshop On "Using MATLAB and SIMULINK for Signal Processing, Communication and Computer Vision" By Experts from Mathworks India Pvt Ltd. Pune (12-Nov-2014) 7. Invited talk On "Evolution and Advancement in Electrical Machines and Drives" By Prof.Dr. K. R. Rajagopal, FNAE, SMIEEE IIT , Delhi (17 Apr 2015) 8. Workshop On "Advanced Programming Techniques in MATLAB" By Ms. Loren Shure, Ph.D., MathWorks Technical Ambassador at MathWorks, USA, (24-Jul-15) 9. Workshop on "Modern Underwater Systems", Conducted with NIO, Goa (Aug 30 15)

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45. **List the teaching methods adopted by the faculty for different programmes.**

UG Programmes	PG Programmes
Teaching with Blackboards, LCD projection, Power Point	Teaching with Blackboards, LCD projection,
Use of learning management Systems such as Moodle – to act as a knowledge repository as well as platform for online interaction with students.	Use of learning management Systems such as Moodle – to act as a knowledge repository as well as platform for online interaction with students.
Tutorial, assignments - design & study, seminars, viva	Tutorial, assignments, seminars, viva.
Most courses have Labs, Hands-on learning as well Projects.	All courses have Labs, Hands-on learning as well Projects.
Web Ex Based courses for Off-campus students	Web Ex Based courses for Off-campus students
MOOC based courses - One of the courses has been offered via Coursera and EdX as a SPOC course for students across four campuses of BITS	Telepresence courses offered across all 3 Indian campuses.
Practice based learning at industries and research organizations through Practice School	Practice based learning at industries and research organizations through Practice School

46. **How does the department ensure that programme objectives are constantly met and learning outcomes are monitored?**

The programme objectives and learning outcomes are monitored regularly, through University wide review process through benchmarking of curriculum and/or programmes with reference to that at leading Universities in world.

A major revision of curriculum was done in Academic Year 2011-2012 for all PG/UG programs offered by the department. The existing curriculum was benchmarked against the top 3 universities in the world (In case of UG Programs comparison was done with MIT, UC Berkeley and Stanford. In case of ME Embedded Systems it was compared against UC Berkeley, University of Southern Florida and IIT Kharagpur). The entire course content, structure, pedagogy and evaluation was updated and implemented from Academic Year 2011-2012.

The special purpose Placement Division in the Institute, facilitates placement drive for eligible students. The feedback is obtained from recruiters of students on their performance. Also, the students themselves are requested to give direct feedback. The Department also conducts pre-placement refresher interactive sessions for students preparing for placement, for the subject areas of their choice. The post-placement feedback from students is also collected for the purpose of monitoring programme objectives and learning outcomes.

47. **Highlight the participation of students and faculty in extension activities.**

The students of the department are encouraged to become members of the associations, clubs, and local chapters of voluntary bodies. The faculty members of the department act as In-charge or facilitators. The activities undertaken by the students include community services, such as cleanliness drives, education for children and adults from less-privileged sections of community, collection of usable/recyclable items such as stationery items, books, clothes, etc.

The students of the Department have been regularly participating in students activities for community welfare, under the aegis of ""Äbhiygyan", and 'Nirmaan". Under "Äbhighyan" the students conduct educate children and/or adults from under-privileged sections of society, including labourers and mess-workers, living on campus. Under "Nirmaan", students undertake computer literacy programs, demonstration of science experiments, organizing competition, etc. for under-privileged children. Faculty of the Department encourage and assist the students' participation in these activities, where ever possible.

48. **Give details of "beyond syllabus scholarly activities" of the department.**

Special Lectures: The department on a regular basis organises lectures on selected topics such on MATLAB, SIMULINK, Underwater Systems, Cadence as Design Tool, Ansys, to supplement formal education.

For developing technical competence, special purpose training programs are also organized with the help external agency and students of the Department, for example, RoboTryst, etc.

Workshops, Seminars, Technical Festivals, Design & Coding Contests:

Beyond syllabus scholarly activities also include organization of design contest, debugging contest, quizzes, algorithm development, etc., held under several students' bodies including the Students Association, IEEE Students' Chapter, Students' organized annual Technical festival- Quark, etc., with faculty of Department as mentor or supervisor. The senior students of the Department also, voluntarily conduct orientation and technical seminars for benefit of their junior peers.

Associations
Department has an active (1) EEE (2) ENI Associations that organise workshops, invited lectures, industrial visits.Also there are other associations built on area of student technical interests such as Electronics and Robotics Club, Aerodynamics etc. These Associations bring various students with similar interests together and they work on

various projects of mutual interest. Students also participate in technical and cultural festivals organized during semesters, in which they get ample opportunities to develop personality, communication and artistic traits.

49. **State whether the programme/ department is accredited/ graded by other agencies? If yes, give details.**

No

50. **Briefly highlight the contributions of the department in generating new knowledge, basic or applied.**

The Department has been encouraging participation of faculty members in the ongoing R&D work in other academic or Utilities' departments of the Institute. The academic departments include Department of Computer Science & Information Systems, Department of Chemical Engineering, Department of Mechanical Engineering, Department of Department of Chemistry, Department of Biological Sciences, Department of Physics, Department of Mathematics, Department of Economics and Management. The faculty of Department has been contributing to Estate & Maintenance Department, in terms of providing consultancy for standard operating practices (SOPs) for upkeep and maintenance of electrical distribution infra-structure, DG sets, central AC plant, installing and commissioning of solar water heating systems, SPV-lighting systems, Hybrid (wind+SPV) power generation systems. Faculty members of Department have also provided support in terms of lab-based research facilities for diagnostic studies elsewhere in the campus. There are ongoing projects aiming at expanding capacity of renewable electric power generation on campus, manage local power grid and electrical energy supply with improved efficiency.

Over five past years, through such efforts savings of the order of Rs. 36 Lakhs (approx.) per year, (computed at the then prevalent rate of Rs. 4 per unit of electricity), have been recorded. The annual savings have increased due to subsequent increase in price of electricity.The faculty members of the Department have also established weather observatory and renewable energy lab, in collaboration with Estate & Maintenance Department and Department of Mechanical Engineering, for undertaking R&D in the area of renewable energy based electric systems, monitoring of wind energy and solar energy resource and existing renewable electric power generating systems on campus. At weather observatory, the time series data on wind resource and solar radiation resource is measured and logged, for its consumption for ongoing as well as new projects leading to expansion of renewable energy based power generation capacity.

The commitment of the Department has resulted in signing of MoU with National institute of Wind Energy (NIWE), Chennai and WindSim AS, Norway for further research and development, in these areas.

51. Detail five major Strengths, Weaknesses, Opportunities and Challenges (SWOC) of the department.

Strengths	Weakness
• Mix of senior and young qualified faculty, motivated for developing capability for active research in the areas of Robotics, Wireless Sensor Networks, Under water communication, Wireless Communications, Microelectronics, Embedded Systems, Renewable Energy, Power Sytems and Power Electronics • Qualified and experienced faculty to adopt blend of newer pedagogical techniques, such MOOC, and LMS, alongwith conventional techniques of teaching core discipline courses as well as elective courses • Modern up to date, laboratory resources in terms of hardware and software • All courses are designed to include practical, hands-on, project and advance study topics so as to enhance the research components in all courses including UG • Continuously expanding technical infrastructure • Quality undergraduate research	• Lesser number of faculty members than expected • Each faculty member is required to participate in teaching, research and institute contribution, • Inadequate number of senior faculty members to mentor younger faculty members • Additional laboratory space is required for existing labsas well as for new labs • Lesser number of supporting /non-teaching staff in Labs and Department's office
Challenges	**Opportunities**
• Meeting set goals of performance by individual faculty and staff, as part of University's Performance Management System, • Aggressive recruitment of qualified, research focused faculty to address existing academic and research needs of the Department • Attracting qualified and experienced supporting staff for managing Departmental labs and office • Orientation and training of faculty and staff for meeting Department's immediate needs, from time to time • Developing appropriate work management system and optimum use of available ICT infra-structure.	• Encouragement for multi-disciplinary/ inter-disciplinary education • Incentives for encouraging research among faculty members • Continuing professional development of faculty and staff • Collaboration withreputed Universities, Institutes and Industries in India and abroad • Opportunities for excelling in teaching, research and institutional contribution.

52. Future plans of the department.

In future, we will continue strengthening our core strengths, namely, excellence in teaching by way of adopting innovative pedagogical techniques and utilizing modern ICT infra-structure, creating conducive work environment for undertaking collaborative multi-disciplinary research projects under different sponsorship schemes and through University Immersion scheme, and reinforcing our engagement with industry, through encouraging faculty to participate in Industry Immersion. Specifically, we will

- Build infra-structure capability for undertaking testing and validation ofSPV and Small wind energy systems, for the State Govt. Nodal Agency, namely, the Goa Energy Development Agency and industries in the region
- Set up anechoic chamber, VNA, PCB facilities - for micro-strip antenna design
- Set-up testing and validation facility for analog and mixed mode ASIC
- Developing capability for design and development for ASIC

With above goals in view, the faculty members of the Department have visited reputed R&D institutions of National as well as International importance, during past five years. Also, the excellent efforts of the faculty members have been recognized by the host institutions.

53. Any other information regarding your department which you would like to include.

The efforts of faculty members of Department, in furthering collaborative R&D have resulted in signing of MoUs with below mentioned Institutions/ Industriesof national/International importance:

1. MoU with Indian Naval Acedemy, Ezhimala, Tamil Nadu, 19th March, 2014
2. MoU with WindSim As, Norway, September th 15th, 2014
3. MoU with Norwagian Academy of Life Sciences, (NMBU), As, Norway, November, 10th, 2014
4. MoU with National Institue of Wind Energy Technology (NIWE), Chennai, February, 19th, 2015
5. MoU with National Institute for Oceanography, Panaji, Goa

We are also mobilizing resources for developing new collaboration with- for undertaking joint research and development projects.

1) Indian Navy's establishments in Goa,
2) National Institute of Technology, Goa,
3) Govt. Engineering College, Farmagudi, Goa,
4) The Energy Research Institute, Panaji, and
5) National Institute of Oceanography, Panaji,

Goa Campus: Evaluative Report of the Department
HUMANITIES AND SOCIAL SCIENCES

1. **Name of the Department :** Humanities and Social Sciences

2. **Year of establishment of the Department** 2004

3. **Is the Department part of a School/Faculty of the university?**
   Departments function as independent entities in the university and are not part of any school or faculty.

4. **Names of programmes offered (UG, PG, M.Phil., Ph.D., Integrated Masters; Integrated Ph.D., D.Sc., D.Litt., etc.).**

Minor Programme in	PEP (Philosophy, Economics and Politics- started in Aug. 2014) For First Degree Students
	PhD Programme

5. **Interdisciplinary programmes and departments involved :**
   PEP Minor (Dept of Economics is involved)

6. **Courses in collaboration with other universities, industries, foreign institutions, etc. :**
   Note: some of our structured courses like Practice School and Thesis/Dissertation are done by our students in industries and universities outside BITS.

7. **Details of programmes discontinued, if any, with reasons :** NIL

8. **Examination System:** Semester and Choice Based Credit System

9. **Participation of the department in the courses offered by other departments :**
   Compulsory course :
   - CSF214 :Logic in Computer Science (Offered by Computer Science Department) Dr.Reena Cheruvalath
   - FIN C451 : International Business (offered by Economics Department)Dr.R. P . Pradhan

10. **Number of teaching posts sanctioned, filled and actual (Professors/AssociateProfessors/Asst. Professors/others).**

Designation	Sanctioned	Filled)	Actual number
Professor	Note: **	1	1
Associate Professors		3	3
Asst. Professors		8(1 offered)	7

| Others | | 1Visiting Associate professor offered | 2Visiting Asst. Professors; 2 Lecturers and 5 Guest faculty |

Note**:The faculty positions for the University is broadly governed by Growth plan which also covers designation-wise breakup with a larger vision. Keeping in mind the fluidity of movement of faculty and proposed student to faculty ratio in each campus for first degree, higher degree as well as Ph.D. programmes, individual department needs are not fixed. Besides, as we are in expansion plan which calls for new programmes, courses being introduced, the demand on faculty in terms of numbers, for each department, is broadly governed by all the above factors and hence it is not possible to have a fixed number of faculty for each department. Recruitment of faculty, therefore, varies, based on departmental needs.

11. **Faculty profile with name, qualification, designation, area of specialization, experience and research under guidance**

Name	Qualification	Designation	Specialization	No. of years experience	No. of Ph.D./M.Phil. students guided for the last 4 years
Meenakshi Raman	Ph.D	Professor	English	16 years 7 months	2 completed& 1 ongoing (Supervisor) 1 submitted (co-supervisor)
Geetha B	Ph.D	Associate Professor	English	9 years	1 completed 2 ongoing
BasavadattaMitra	Ph.D	Associate Professor	English	14 years 7 months	--
R. P. Pradhan	Ph.D	Associate Professor	International Relations	13 years	--
ShaliniUpadhyay	Ph.D	Assistant Professor	English Literature	11 years	---
ReenaCheruvalath	Ph.D	Assistant Professor	Philosophy	11 years	4 ongoing
K. A. Geetha	Ph.D	Assistant Professor	English	6 years	2ongoing
Rayson Alex	Ph.D	Assistant Professor	Ecocriticism	5 Years	---
NilakDatta	Ph.D	Assistant Professor	Literary and Cultural Studies	4 Years	--
Pushkar	Ph.D	Assistant Professor	Comparative Politics & International Relations	9 years	1 ongoing
Amitendu Bhattacharya	Ph.D	Assistant Professor	English Literature	5 months	--

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Madhvi Gupta	Ph.D	Visiting Assistant Professor	Political Science	9 years	--
Anoop George	Ph.D	Visiting Assistant Professor	Philosophy	9 months	---
LaylaMascarenhas	Ph.D (Submitted)	Full Time Visiting Faculty	English	--	---
PragyanBarik	M.Phil.	Lecturer	Sociology	--	---
Solano Da Silva	M.Phil.	Lecturer	Development Studies	--	---

12. **List of senior Visiting Fellows, adjunct faculty, emeritus professors : NIL**

13. **Percentage of classes taken by temporary faculty – programme-wise information**

   5 out of 33 = 15.15%

   - The following courses are offered by Guest Faculty:
     - PrahladChaitanya :HSS F334 (SRIMAD BHAGAVAD GITA)
     - AnibelFersus-Comelo : BITS F385 (INTRO TO GENDER STUDIES);
     - MeenaSundaram&P.Sandhya : HSSF347 : INTRODUCTION TO CARNATIC MUSIC
     - DoreenAlvares : (FRE N102T/FRE N101T TECHNICAL FRENCH/BEGINNING FRENCH;
     - Zayra Pereira : GER N102T/GER N101TTECHNICAL GERMAN / BEGINNING GERMAN

14. **Programme-wise Student Teacher Ratio (Refer to Support document for calculation)NA**

15. **Number of academic support staff (technical) and administrative staff: sanctioned, filled and actual :**

   Administrative staff : 1 Junior Office Assistant Mr.VijayLamani

16. **Research thrust areas as recognized by major funding agencies**

English :	Social Sciences :
• Professional Communication • English Language and Literature • Media and Film studies • Journalism • Tourism and Travel • Ecocriticism • Cultural Studies	• Sociology • Philosophy • Ethics • Higher Education • Spiritual Intelligence • Political Science • Development Studies

17. **Number of faculty with ongoing/completed projects in the last five years from a) national b) international funding agencies and c) Total grants received. Give the names of the funding agencies, project title and grants received project-wise.**

Completed projects: (3)

SL No	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration
1	Exploring Spiritual Quotient and Analyzing its Impact on Research performance of University Teachers	ShaliniUpadhyay	ICSSR	Rs. 6,57,900/-	2012-2014
2	Fieldwork for creating an audio dictionary of Mudugar	Rayson Alex	Firebird Foundation for Anthropology, USA	Rs. 4,50,000/-	3 years (March 2011 to Mar2014)

Projects funded by BITS Pilani

Topic	Faculty	Funding Agency	Amount	Year
Documentary film Project Parivartan on the impact of various women empowerment programmes in Shekawati region of Rajasthan(Completed in Pilani Campus)	Geetha B.	U.G. C. Centre for Women Studies, BITS Pilani	Rs. 55,000/-	2009- 2010

Ongoing projects: (4)

SL No	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration
1	Land dispossession for a golf Course In Tiracol Goa	Solano Da Silva, Prof. Alito Siqueira and Prof. Peter R. deSouza.	Centre for the Study of Developing Societies (CSDS), Delhi	Rs. 85,000/-	June - October 2015
2	"Mining Closure, Economic Disruption & Local Level Sustainability; A Case Study of Goa, India"	PI: Dr.Aswini Mishra, Economics, BITS Goa. Co-PIs: R P Pradhan&Debasis Pattanaik.	ICSSR	9,00,000/-	Started in Oct 2014 (duration 2 years)

3	Literature as an Instrument of Social Change : A Study of Reader Response to Dalit Literature	K A Geetha	UGC	Rs.8,26,400	Project approved in 2014 but fund yet to be released by UGC
4	Technical/Business/Professional COMMUNICATION: An empirical analysis of Cross Cultural Communication Variables in Indian Industries and Academia	BasavadattaMitra	Major UGC Project	Rs. 6,50,000/-	2013-2015

18. Inter-institutional collaborative projects and associated grants received: NIL

    a) National collaboration   b) International collaboration

19. Departmental projects funded by DST-FIST; UGC-SAP/CAS, DPE; DBT, ICSSR, AICTE, etc.; total grants received. NIL

20. Research facility / centre with NIL
- state recognition
- national recognition
- international recognition

21. Special research laboratories sponsored by / created by industry or corporate bodies NIL

22. Publications:

Sl No.	Details	Specify number here
1	Number of papers published in peer reviewed journals (national / international)	52 journal publications
2	Conference Proceedings	6
3	Monographs	NIL
4	Chapters in Books	23 book chapters
5	Edited Books	1
6	Books with ISBN with details of publishers	11 books
7	Number listed in International Database (For *e.g.* Web of Science, Scopus, Humanities International Complete, Dare Database - International Social Sciences Directory, EBSCO host, etc.)	64
89	Citation Index – range / average	Range : 0-34; Average :

			14.3
10	SNIP		1.52
11	SJR		0.54
12	Impact Factor – range / average		Range : 0.101-3.467 ; Average : 0.59
13	h-index		H-Index : 3

Details of the publications as per the number give above (Give details in the last five years

Edited Books 1

Faculty Editor	Title	Publication details		Year
Rayson K Alex, Susan Deborah and Sachindev P.S.## 2nd and 3rd editors are from other instirutions	Culture and Media :Ecocritical Explorations.	UK : Cambridge Scholars Publishing.	ISBN (10: 1-4438-5971-0, ISBN (13): 978-1-4438-5971-4	2014

23. Details of patents and income generated

- ShaliniUpadhyay, Inventor for a Patent on "Method and System for Generating Spiritual Intelligence and Research Performance Indices" (complete filing)2013.
  Application Number : 264/MUM/2013

24. Areas of consultancy and income generated:

Sl.No	Faculty	Topic	Funding	Year	Amount
1	PI: Dr. SrikanthMutnuri, Co-PI: Rayson Alex	Developmentand Demonstration of Two Decentralized Wastewater Treatment Systems	BITS Pilani	2014-17	50,000
2	Dr.Rayson Alex and Solano Da Silva	Analysis of Stakeholders in Dr.Salim Ali Bird Sanctuary, Chorao, Goa,	German DevelopmentCorporation (GIZ)	Aug 2014-Jan. 2015	2.6 Lacs
3	Dr.Rayson K Alex	Detailed study module titled "Media and Popular Culture" and "Postcolonial Theory." for project on ePathshala (eContent Development for PG Subjects English Ref. No. 19/2013	MHRD-UGC	May - Aug 2014	Rs. 14,000/

4	Dr.Basavadatta Mitra	ELT Consultant for Technical Education Quality Improvement Programme,	World Bank; MHRD, Govt. of India &Ministry of Education, Govt. of West Bengal	2013--Continuing	Only Travel and hospitality

25. Faculty selected nationally / internationally to visit other laboratories / institutions industries in India and abroad

Solano Da Silva : May - July 2014 Solano Da Silva was invited to spend two months at the School of the Build Environment at Heriot-Watt University, Edinburgh, UK to research on the politics of land-use planning which is part of his PhD topic. Invited to be an external expert on a project called the Language of the Becoming City initiated by the Royal Institute of Art, Stockholm. The project reflects on urban transformations across four urban spaces: Södertälje, Sweden; Goa, India; Cape Town, South Africa and Rio, Brazil. As part of fieldwork this project he visited Stockholm and Södertälje, Sweden from 27th May - 6th June 2015

26. Faculty serving in National committees b) International committees c) Editorial Boards d) any other (please specify)

Senate members - Meenakshi Raman
- Senate Member of SVNIT Suratfor three years from 04 October 2011.
- Expert Member of Senate of NIT, Goa

Member of Board of Studies :
Meenakshi Raman:
- Member of the Board of Studies in English , Goa University for a 3-year period. (9.3.2015 to 9.3.2018)
- Special Invitee for the IQAC of MES College, Zuarinagar, Goa
- Member, Board of Studies of Sciences and Humanities ,Satyabhama University, Chennai
- Expert Member of Selection Committee under CAS(Career Advancement Scheme) , The English and Foreign Languages University, Hyderabad.(2010)

ReenaCheruvalath
- Member of the Board of Studies in Philosophy, Goa University for a 3-year period. (9.3.2015 to 9.3.2018)

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Solano Jose Da Silva
- Member of the Board of Studies in Political Science, Goa University for a 3-year period. (9.3.2015 to 9.3.2018)

Member of Editorial Board

BasavadattaMitra
- 2011 Editorial Board of The Learning
- 2010 Associate Editor, International Journal of The Book

Meenakshi Raman
- Editorial Board, AIMS International Journal of Management (6 April 2011-continuing)
- Editorial Board, International Journal of Educational Administration and Policy Studies
- Editorial Board, Asian EFL Journal, ISSN 1738-1460, Taylor International Ltd., Australia. (29.11.2008—continuing)

Reena Cherulvalath
- Editorial Advisor for the Journals published by Media and Analysis Research (MARC), Kerala (July 2015--)
- Associate Editor, International Journal of Humanities, USA (2010—continuing)

Shalini Upadhyay
- Interdisciplinary Studies of Doctoral Studies, USA (2009—continuing)
- Info Lit. Book, Informing Science Institute, UK (2008—continuing)
- Interdisciplinary Journal of Knowledge and Learning Objects, USA (2008-continuing)

Government of India Committee

Rayson K Alex
- Member of the Technical Advisory Committee of Science and Technology Communication Program, "Jal Sutra : Eco & WaSH Futures" of National Council for Science and technology Communication (NSTC) of the Department of Science and Technology, Ministry of Science and technology, new Delhi. (2014—continuing)

R P Pradhan
- Commonwealth fellowship Member Expert for Economics for Commonwealth Fellowship M Sc & PhD program, Ministry of Human Resource (MHRD), GOI (2006-7 to 2011)

27. Faculty recharging strategies (UGC,ASC, Refersher/orientation programs, workshops, training programs and similar programs).

The university has initiated schemes such as RIG (Research Initiation Grant), SeedGrant, etc., to encourage faculty members to take up research and later on submitproposals to external funding agencies. It also provides contingency grant to facultyfor attending reputed conferences in order to enrich and update their knowledgeand share their research with others

Scheme	Faculty	Project Title	Amount	Duration
RIG (Research Initiation Grant)	NilakDatta	"Frontier as Tourist Construct in the Postmodern Novels of Ishmael Reed, E.L. Doctorow, Cormac McCarthy, and Thomas Pynchon."	Rs. 1,85,000/-	Aug 2013-Aug 2015
Seed Grant	Geetha B.	A Digital Humanities Approach to Interpret the Visual Culture of Shekhawati Region	Rs. 13,90,000/-	2012 –2015
University Immersion	Geetha B	Design of a Liberal Arts Program that is relevant in technology-driven world at Undergraduate and Master's level	Visited School of Literature, Media and Communication at Georgia Tech University, USA. Worked with Prof.LisaYaszek, Professor and Director of undergraduate studies	28 June-25 July 2015

The following Faculty members were invited by external institutions to deliver talks and conductworkshops wherein they could share their expertise with other colleagues and students.

Faculty	Talks	Workshops/Sessions
Meenakshi Raman	8	12
R P Pradhan	5	-
Shalini Upadhyay	2	-
Reena Cheruvalath	1	2
K A Geetha	2	-
Rayson K Alex	4	12
Pushkar	1	-
Total	**23**	**26**

28. Student projects

Study Oriented Projects:276

- percentage of students who have done in-house projects including inter-departmental projects Not Applicable

- percentage of students doing projects in collaboration with other universities

/industry / institute : Not Applicable

29. **Awards / recognitions received at the national and international level byFaculty Doctoral / post doctoral fellows Students**
    <u>**Faculty Members**</u>

    Meenakshi Raman
    1. 2013. Winner of the Research paper Competition organized by ELT weekly. (May 2013) She won the First Prize for her paper on "Teaching Expressions of Cause, effect, Purposeand Function in English for the Students of Science and technology" and was awarded aCertificate, $200 and a copy of the book "Compelling Conversations" by Eric Roth.

    2. 2012. Received the Outstanding Editor Award for the AIMS International Journal of management for 2011by AIMS International (Association of Indian ManagementScholars) on 2 January 2012 at the AIMS International Conference held at FLAME,
       Pune during 01-04 Jan. 2012.

    Pushkar
    Jan 2015: an article in Forbes India listed him as one of India's 24 thinkers"who best explain a rapidly-changing India to the world (and the world to India)"

    <u>**Research Scholars**</u>
    B. Gnanabharathi presented a paper TheTransglobal flows and Tribal Literatures of Indian context(s) at the 5th Lisbon summer school for the study of culture of Lisbon Consortium during 22-27 June 2015 jointly organized by the Catholic university of Portugal and Lisbon university. He was partially sponsored by Fundacaooriente Goa (APortugese cultural centre).

30. **Seminars/ Conferences/Workshops organized and the source of funding (national/ international) with details of outstanding participants, if any. NIL**
    - 12-14 Feb 2015, Space, Place, Travel, Displacement, Exile, National Conference (with Indian Association for Commonwealth Literature)   (110)
    - 20-Jan-2015 We Care Film Festival (with Nirmaan-Goa Chapter and Brotherhood, New Delhi)   (200)
    - 31 Oct.- 02 Nov. 2014. International Conference on Changing Contours of Indo-US Relations: Perceptions, Continuity and Change. 31 Oct-2 Nov. 2014(Convenor : Dr.RPPradhan)   (120)
    - 9-11 Oct 2014, International Conference on Eco-Ethics (with American Society for Literature and Environment- ASLE)   (130)

- 31 Jan- 1 Feb 2014, Tinai Eco Film Festival (with RGNIYD-Rajiv Gandhi National Institute of Youth Development)
- 4-6 Sep 2013, Innovative Pedagogies for Enhancing the Employability Skills of Students, National Workshop   (32)
- Two –day workshop on "Negotiations and Negotiating" 8-9 March 2013. (25)
- Workshop on Cross Cultural Behavioural Simulation for the faculty of Goa Campus on 2 March 2012 (Resource persons : KhushwantPittenger, ShikhaSahai) 20 participants.
- 15-Apr-2011, Issues related to literature, theatre and contemporary trends in writing, Symposium,seminar on Research methods and Data Analysis for the faculty and research scholars of BITS Pilani, K K Birla Goa Campus, 4 February 2012 (80 participants) Resource Persons: VVSNA Prasad, DebasisPatnaik, SrinivasKrishnaswamy, Srikanth M, K. Ponnani.
- 12-14 January 2010, We Care Film Festival (with Brotherhood, New Delhi)

Department Seminars

Date	Speaker	Title
30-Apr-15	Dr. Jose Carlos Oliveira	A Tribute to Bal Chandra Luitel
19-Mar-15	Mrs. Layla Mascarenhas	Discovering One's Identity after Personal Encounters with the Divine in Three *Amar Chitra Katha* Comics and some Biblical Parallels.
28-Feb-15	Prof. Barbara Harriss-White	Globalisation, Development and the Metabolic Rift
29-Jan-15	Prof. S. V. Srinivas	Worth of a Film Star
20-Nov-14	Mr. Anoop George	Technological Nihilism: Gandhi and Heidegger
04-Sep-14	Mr. Amitendu Bhattacharya	Grave Matters: A Reading of the "Discourse on Death"
21-Aug-14	Dr. R. P. Pradhan	ASEAN Plus & Plus : India's Look East Approach Through Tokyo
10-Apr-14	Prof. Mohan Ramanan	Romanticism and Society
25-Mar-14	Mr. Sebastian Anthony Rodrigues	The Social Costs of Ethical Journalism
11-Mar-14	Dr. Anibel Ferus-Comelo	The Promises and Pitfalls of Tourism
11-Feb-14	Dr. R P Pradhan	Underdevelopment, Alienation & Terrorism: A Narrative on India's Development, Maoism and Red Corridor
28-Jan-14	Prof. Meenakshi Raman	Interpersonal communication as a tool for effective hospital administration
30-Nov-13	Mr. Amitendu Bhattacharya	Universities at the Crossroads and the Humanities at a Dead-End: What *is* the Way Forward?

23-Nov-13	Ms. Heidi Danzl	Superfunds Fictionalized: An Eco-cosmopolitan Approach to Animal's People by Indra Sinha
16-Nov-13	Mrs. Pinky Pawaskar R.	A Conceptual Model: Multisensory Marketing and Destination Branding
05-Nov-13	Dr. Pushkar	Democracy, Civil Society, and Health in India

31. Code of ethics of research followed by the Department. Quality of research admission, evaluation

The department follows the code of ethics specified by the Institute.

32. Student profile programme-wise:

Programme	Total No. of applications / No. Selected Male + Female				
Year	2011-12	2012-13	2013-14	2014-15	2015-16
PhD	461/1+1	5/0	17/3+2	6/1+3	--/0+1
PEP Minor	--	--	--	40/30	11/11

33. Diversity of students

Name of the Programme (refer to question no. 4)	% of students from the same university	% of students from other universities within the State	% of students from universities outside the State	% of students from other countries
PhD	NIL	60%	40%	NIL
Minor Certificate	100%	NIL	NIL	NIL

34. How many students have cleared Civil Services and Defense Services examinations, NET, SET, GATE and other competitive examinations? Give details category-wise.

We do not capture this information through any formal process

35. Student progression Not Applicable

Student progression	Percentage against enrolled
UG to PG	
PG to M.Phil.	
PG to Ph.D.	
Ph.D. to Post-Doctoral	

Employed Campus selection Other than campus recruitment	
Entrepreneurs	**NIl**

36. Diversity of staff

Percentage of faculty who are graduates	
of the same university	12.5 %
from other universities within the State	18.75 %
from universities from other States from universities outside the country	Other States (50%) Abroad (18.75 %)

37. Number of faculty who were awarded M.Phil., Ph.D., D.Sc. and D.Litt. during the assessment period

5 faculty were awarded their PhDs during 2010 – date
1.   Amitendu Bhattacharya (2015) --- EFLU
2.   Anoop George (2014)   ---- IIT (Bombay)
3.   Manisha Dixit (2014)   ---- BITS Pilani

38. Present details of departmental infrastructural facilities with regard to

Library :The Library has a good collection of over 34,000 books on a wide range of subjects out of which 5851 books deal with the subjects pertaining to English, Social Sciences, Philosophy, Arts, Sports and other Humanities subjects. The textbook section provides all prescribed texts and reference books. The Library Committee has one faculty representation from the department of HSS (Dr.Nilak Datta is the present member), and this committee decides policies and allocations and oversees their implementation.

Books: 5851: **Details**: Law & Education = 838; English Language = 618; Art and Sports = 344; English Literature = 612; Novels = 2381; English Literature = 131; Geography & History = 842; Hindi = 85

Journals: This Campus subscribes to 96 print journals, domestic as well as international Subscriptions to important digital libraries like IEL online, Science Direct, ASME, Proquest and AEA Online Journals etc. provide access to thousands of online journals to students and researchers. 13 Indian and 2 foreign journals are dedicated to the Department of HSS.Besides these 3 specific e-journals and other HSS journals listed in various databases also pertain to the department of HSS. Several dozens of educational CDs, audio/video

cassettes and question banks are also made available.

PRINT	
Indian Journals	**Foreign Journals**
Biblio: Review of Books	Foreign Affairs
Down to earth	Monthly Review
Economic and Political weekly	**E-JOURNALS**
Indian journal of gender studies	English Studies
Indian literature	International Social Science
National Geographic	Economic & Political Weekly
Sruti	**ALL HUMANITIES & SOCIAL**
The Journal of Indian writing in English	**SCIENCE COLLECTIONS IN THE**
University News	**FOLLOWING DATABASES**
Yojana	Annual Reviews
Journal of Land and Rural Studies	Blackwell
Journal of South Asian Development	Cambridge
	J-STOR
	Open Access
	Springer Link
	Taylor & Francis
	ProQuest

a.   **Internet facilities for staff and students :**

Internet facilities to Staff (and faculty): Unlimited access is provided to staff and faculty at their office as well as residence. WiFi connectivity is provided to the complete academic area. The bandwidth provided to faculty is 100Mbps on a 10Gbps backbone (for intranet). Internet facilities to Students: All students are provided intranet (10Gbps back bone), internet (300Mbps provided by Vodafone, GWave and TATA) and WiFi in all hostels with per day download limit of 800MB for under graduate students and 1GB for post graduate students and Ph.D. scholars.

b) Students' laboratories : **Language Lab and Music Lab**

Language Lab: A twenty-seatercomputer assisted language laboratory was functioning in Room No. CC 122 under the Department of Humanities and Social Sciences since its inception at the BITS Pilani, K K Birla Goa Campus. This lab is primarily meant for enhancing the English language skills and communication skills of its users.

During July 2011, the lab has been expanded to a 36-seater lab and the Odell language lab system has been installed. All the 36 computers are networked with the Teacher Console to enable the teacher to conduct the classes using the various modules of the Odell software and also to display educational videos to all users and discuss with them. The lab

facilitates interactive discussion both one-to-one and group. Several video CDs on different aspects of communication such as Professional presentations, Business conversations, Nonverbal communication, Job Interviews, GDs, Public Speaking, etc., and on all the four language skills, namely, listening, speaking, reading and writing are used in the lab to enhance the student's understanding of the various forms of professional communication learnt in their classes.

Music Lab: 10 Key Boards kept for students' practice for the course HSSF229: Introduction to Western Music ; for individual practice .

Research laboratories : NIL

39. **List of doctoral, post-doctoral students and Research Associates**
    DOCTORAL STUDENTS (13)Faculty : 3; Non-Teaching : 1

from the host institution/university : 4
- AnjaniSrikanthKoka 2010PHXF804P—PS faculty
- PragyanParamitaBarik –Faculty at HSS, Goa Campus
- Solano Da Silva –Faculty at HSS, Goa Campus
- Vivek Salaskar – Hostel Assistant, Goa Campus

from other institutions/universities 9
Full time Research Scholars   (5)

Sl. No.	Name	ID No.
1.	Mr. GNANA BHARATHI	2013PHXF012G
2	Mr. SUSHANT KISHORE	2013PHXP412G
3.	Mr. SEBASTIAO ANTHONY RODRIGUES	2013PHXF411G
4.	Ms. PRAPTI ADHIKARI	2014PHXP405G
5.	TANYA ANNE PINTO	2015PHXP009G

Part-time research scholars (4)

Sl. No.	Name	ID No.
1.	Mr. RANJIT RODRIGUES	2013PHXP503G
2.	Ms. MEDHA TRIPATHI	2013PHXF102G
3.	Mr. AJAY GAUDE	2014PHXP009G
4.	Mr. VIVEK SALASKAR	2014PHXP008G
5.	Ms. SHWETHA PINTO	2014PHXP010G

innovate   achieve   lead

40. **Number of post graduate students getting financial assistance from the university.**
Not Applicable

41. **Was any need assessment exercise undertaken before the development of new programme(s)? If so, highlight the methodology.**
The exercise undertaken before the development of a new programme usually begins with a Department airing its intention to float a new programme, CDC or elective proposed by the faculty concerned. Discussions are held regarding its merits/demerits at the DCA level and later at a CCDCA level. Once the necessary inputs and unanimity have been reached on all the aspects regarding the operational aspects related to the course, it is sent to the ARP so that it can be passed to Senate to it to be approved.

42. **Does the department obtain feedback from**
- **faculty on curriculum as well as teaching-learning-evaluation? If yes, how does the department utilize the feedback?**
  Department meetings are held periodically to discuss the pedagogy , curriculum and evaluation methods. Faculty members share their classroom experiences thereby enabling others to be aware of various innovative methods adopted by colleagues. The courses to be allotted to each faculty member are also discussed well before the semester.
- **students on staff, curriculum and teaching-learning-evaluation and how does the department utilize the feedback?**
  Formal and informal feedback is obtained. The printed forms ask for feedback on the course, instructor and evaluation. Feedback forms are collected at the end of the semester and sent to Instruction Division for analysis. Faculty members carefully go through the analysis and feel encouraged / try to improve upon the shortcomings, if any. In addition, feedback on the courses, faculty, etc., is obtained through the discussion during the Students Faculty Council meetings. Such feedback is shared with the members so as to facilitate them in taking corrective measures if needed.
- alumni and employers on the programmes offered and how does the department utilize the feedback? Not Applicable

43. **List the distinguished alumni of the department (maximum 10) Not Applicable**

innovate   achieve   lead

44. Give details of student enrichment programmes (special lectures / workshops / seminar) involving external experts.

Guest lectures organized for various courses:

Speaker	Affiliation	Topic	Date/s
Dr.MunmunJha	Professor, HSS, IIT Kanpur	Religious Traditions and Human Rights Gandhi, Ambedkar and Nehru in Human Rights Framework	29-30 Jan. 2015
Dr.S.V.Srinivas	Professor, AzimPremji University	Culture and Rights; Studying Culture	28-29 Jan. 2015
Mr.Atul Singh	Founder and Editor-in-Chief, Fair Observer	Socratic Seminar : The moral limits of markets.	27 Jan. 2015
Prof. Barbara Harriss-White	Emeritus Professor of Development Studies, University of Oxford	Globalisation, Development and the Metabolic Rift	28 Feb. 2015
Dr.Amritjit Singh	Langston Hughes professor of English, Ohio University, USA.	The Frontier and the American Imagination: A Retrospective View.	16 April 2015
Dr. Jose Carlos Tiago de Oliveira	Department of Mathematics, University of Évora, Portugal	A Tribute to Bal Chandra Luitel	30 April 2015
Prof. JiaHaitao.	Professor ,Depratment of Political Science and International relations, Jinan University, China.	Sino-Indian relations : Implications for South Asia.	11 Feb. 2015
Mrs.Anupama TV	District Magistrate, Kerala	BITS to IAS : Civil Services as an alternative Career Option .	7 Nov. 2014
Prof.Susan Z Andrade.	Associate professor of English, University of Pitsburg, USA.	Naturalism; Alex La Guma: A Walk in the Night.	22 April 2014
Dr.MohanRamanan .	Professor and Former Dean, School of Humanities, University of Hyderabad.	Romanticism Modern british literature and Society.	10-11 April 2014
BlaiseCostabir.	MD,GMIZarhak Moulders Pvt. Ltd., Goa.	Workplace Communication: Perspectives and Challenges.	20 Feb.2014
Ms. Heidi Danzl	PhD scholar , University of Salzburg, Austria (Visiting scholar)	Superfunds Fictionalized: An Eco-cosmopolitan Approach to Animal's People by IndraSinha	23 Nov. 2013

SudeepChakravarti	Writer and Columnist.	Alien in your own land : Crisis of identity, development and democracy.	18 Oct. 2013
Prof.V.B. Tharakeshwar	Dept.of Translation Studies, EFLU	Modernity, City and Gender.	30-31 August 2012
JyotinathGanguly	Visiting Faculty at IIM Bangalore, IIM Kozhicode	Strategy, Innovation and Monetization in Industry	30 Jan. 2012
Dilip D'Souza	Freelance Writer	Creative Writing (non Fiction) in English	18-19 Mar.2010

45. List the teaching methods adopted by the faculty for different programmes.

Lectures, Power Point Presentations; Videos-cum-discussion; Group Discussion sessions; Field trips; real time surveys; critical analysis of texts; Dictocomposition; Mock Meetings and Conversations; Individual and Team presentations; case discussions; projects; Modern Language Association (MLA) Style research papers (rough and final draft writing). Flipped classroom is being implemented for the course BITSF112 : Technical Report Writing with the help of video lectures recorded by faculty members of the Department.

46. How does the department ensure that programme objectives are constantly met and learning outcomes are monitored?

Through feedback (PEP Minor) from faculty and students the CCDCA added two courses in the pool of electives. Bench marking of the HSS courses was done with the three leading universities of the world and 13 new elective courses were introduced by faculty members . [Dr.Pushkar (3); Dr.Madhvi Gupta (1); Dr.K A Geetha (2) Dr.Rayson K Alex (2) Dr. Nilak Datta (1) Dr.Meenakshi Raman (1);

Ms.Layla Mascarenhas (1); Radhika Vatsan with the help of experts (2 music electives)]

47. Highlight the participation of students and faculty in extension activities.

Department faculty members have been the coordinators for Nirmaan (Dr.Meenakshi Raman), Department of Journalism and Media Affairs (Dr.Basavadatta Mitra and Dr.Meenakshi Raman) ; Film Club (Dr.Nilak Datta) ; MATRIX (Dr.Nilak Datta) ; Mentor for ACB students(Dr.K A Geetha) ;organized film screening to create awareness on disability issues [We Care Film Festival : details are given in Sl. No. 31 (ii)]

48. Give details of "beyond syllabus scholarly activities" of the department.
- Presenting research paper at national and international conferences
- External Examiners of PhD thesis, MPhil Dissertation
- Members of Board of Studies of External Institutions
- Members of Editorial Boards of Journals

- Reviewers of Journals
- Members of the Senate of external institutions
- Conducting workshops, acting as resource persons for refresher programs, delivering keynote addresses, talks, etc., in external institutions
- Member of Government organizations
- Members of BITS Pilani Senate, Committees, etc.
- Department Seminars by Faculty members

Date	Speaker	Title
19-Mar-15	Mrs. LaylaMascarenhas	Discovering One's Identity after Personal Encounters with the Divine in Three *Amar Chitra Katha* Comics and some Biblical Parallels.
20-Nov-14	Mr. Anoop George	Technological Nihilism: Gandhi and Heidegger
04-Sep-14	Mr. Amitendu Bhattacharya	Grave Matters: A Reading of the "Discourse on Death"
21-Aug-14	Dr. R. P. Pradhan	ASEAN Plus & Plus : India's Look East Approach Through Tokyo
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30-Nov-13	Mr. Amitendu Bhattacharya	Universities at the Crossroads and the Humanities at a Dead-End: What *is* the Way Forward?
16-Nov-13	Mrs. Pinky Pawaskar R.	A Conceptual Model: Multisensory Marketing and Destination Branding
05-Nov-13	Dr. Pushkar	Democracy, Civil Society, and Health in India

48. **State whether the programme/ department is accredited/ graded by other agencies? If yes, give details.** NO

49. **Briefly highlight the contributions of the department in generating new knowledge, basic or applied.**
    - Developed two Minor Certificate Programmes : PEP (Philosophy, Economics , Politics -- 2014) and English Studies (2015)

- Organized a number of conferences to enrich the knowledge in various research areas and also to gain more visibility among the other institutions in India and abroad
- Organizedguest lectures by experts from other institutions
- Organized Departmental Seminars

50. **Detail five major Strengths, Weaknesses, Opportunities and Challenges (SWOC) of the department.**

Major Strengths	Major Weaknesses
• Faculty from diverse areas who receive positive feedback consistently on the 30 electives offered every semester catering to varied interests of students . • Offering two Minor Certificates (first time at BITS Pilani) • Successfully organized conferences regularly to enrich knowledge and to network with colleagues from India and abroad. • More than 80% are PhDs	• Difficulty in arriving at a common research agenda for the department because of the diverse areas of expertise. • No full- fledged degree programme • Low levels of collaboration with other departments for interdisciplinary projects • Lack of expertise in certain specific areas of Social Sciences
Challenges	Opportunities
• Getting funding for projects because there are not many funding agencies in HSS domain • Arriving at one or two First Degree programs which can utilize all the available diverse resources • Attracting students for the future degree programs of the department as BITS is reputed primarily for its Engineering programs. • Getting faculty members in areas such as History, Geography, Mass Communication, etc.,	• Changing career trends towards Arts / Humanities has enabled us to look for offering one / two degree program/s in Humanities and Social Sciences • Receive funding for projects through interdisciplinary project proposals • Collaboration with other Institutions and Industries for bridging the gap between the demands of industry and teaching at the university. • Participating in more Government projects and consultancy • Increasing the number of PhD scholars in the department

51. **Future plans of the department.**
    - Offer two degree programs : one in English and the other in Development Studies
    - Identifying more funding agencies and send projects proposals jointly with departments of Economics, Biology and Computer science in interdisciplinary areas such as Gender studies, Applications of Computer Science in English Language and Social Sciences, Environmental Studies, etc.

52. **Any other information regarding your department which you would like to include.**

The Department has very young and dynamic faculty participating in all departmental activities. Though the department offers mostly elective courses, the faculty members enjoy good reputation among students.The Department looks forward to begin a new degree program and wants to attract students who are really interested in pursuing a *Humanities* program.

Goa Campus: Evaluative Report of the Department
MATHEMATICS

1. **Name of the Department :** Mathematics

2. **Year of establishment of the Department:2004**

3. **Is the Department part of a School/Faculty of the university?**
    Departments function as independent entities in the university and are not part of any school or faculty.

4. **Names of programmes offered (UG, PG, M.Phil., Ph.D., Integrated Masters; Integrated Ph.D., D.Sc., D.Litt., etc.).**
    *   M.Sc.(Hons.) Mathematics
    *   Ph.D. program in Mathematics

5. **Interdisciplinary programmes and departments involved :**NA

6. **Courses in collaboration with other universities, industries, foreign institutions, etc.**
    Note: some of our structure courses like Practice School and thesis dissertation are done by our students in industries and universities outside BITS.

7. **Details of programmes discontinued, if any, with reasons:** NIL

8. **Examination System:** Semester System, Choice based credit system

9. **Participation of the department in the courses offered by other departments**
    Optimization offered by Department of Electrical and Electronics Engineering

10. **Number of teaching posts sanctioned, filled and actual (Professors/Associate Professors/Asst. Professors/others).**

	Sanctioned	Filled (includes offer letters given)	Actual number
Professor	Note:**		0
Associate Professors			2
Asst. Professors			11
thers(Lecturers)			2

Note**:The faculty positions for the University is broadly governed by Growth plan which also covers designation-wise breakup with a larger vision. Keeping in mind the fluidity of movement of faculty and proposed student to faculty ratio in each campus for first degree, higher degree as well as Ph.D.

programmes, individual department needs are not fixed. Besides, as we are in expansion plan which calls for new programmes, courses being introduced, the demand on faculty in terms of numbers, for each department, is broadly governed by all the above factors and hence it is not possible to have a fixed number of faculty for each department. Recruitment of faculty, therefore, varies, based on departmental needs.

11. Faculty profile with name, qualification, designation, area of specialization, experience and research under guidance

Name	Qualification	Designation	Specialization	No. of years of experience	No. of Ph.D./ Students guided for the last 5 years
Prasanna Kumar N	Ph.D.	Associate Professor	Complex Analysis	12 years	*1-completed
Tarkeshwar Singh	Ph.D	Associate Professor	Graph Theory	11 years	3-ongoing
P. Danumjaya	Ph.D	Assistant Professor	Numerical Analysis	9 years and 6 months	1-ongoing
Anil Kumar	Ph.D	Assistant Professor	Control Theory	9 years	1-ongoing (Co-supervisor)
Manoj Kumar Pandey	Ph.D	Assistant Professor	Partial Differential Equations	8 years	1-ongoing
Amit Setia	Ph.D	Assistant Professor	Fracture Mechanics	6 years and 6 months	2-ongoing
Sahoo Jajati K.	Ph.D	Assistant Professor	Statistical Learning Theory	5 years and 5 months	-
Mayank Goel	Ph.D	Assistant Professor	Investment Portfolio Optimization	9 years	-
Dhorajia, Alpesh M.	Ph.D	Assistant Professor	Algebra	3 years	-
Paul, Prabal	Ph.D	Assistant Professor	Cryptography	8 years	-
ukherjee, Himadri	Ph.D	Assistant Professor	Algebra, Algebraic Geometry	7 years	
Boggarapu Pradeep	Ph.D	Assistant Professor	Harmonic Analysis	4 months	-
Samanta Gauranga C.	Ph.D	Assistant Professor	Theoretical Cosmology, Inventory.	7 years and 9 months	-
Mrs. Jessica Pereira	M.Phil.	Lecturer	Graph Theory	13 years	-
Mr. Bijil Prakash	M.Tech.	Lecturer	Modelling and simulation	6 years	-

*Guided Mr. Raghavendra – Awarded in 2014 Computer Science and Information Systems

12. List of senior Visiting Fellows, adjunct faculty, emeritus professors

Adjunct faculty: Prof. S. Arumugum, Director, National Centre for Advanced Research in Discrete Mathematics, Kalasalingam University, Tamilnadu, India.

13. Percentage of classes taken by temporary faculty – programme-wise information: NIL

14. Programme-wise Student Teacher Ratio (Refer to Support document for calculation)

MSc.(Hons.) - 14:1

15. Number of academic support staff (technical) and administrative staff: sanctioned, filled and actual : One

16. Research thrust areas as recognized by major funding agencies
- o DifferentialEquations
- o Graph Theory
- o Fracture Mechanics
- o Cryptography
- o Algebraic Graph Theory
- o Analysis

17. Number of faculty with ongoing/completed projects in the last five years from a) national b) international funding agencies and c) Total grants received. Give the names of the funding agencies, project title and grants received project-wise.

Completed projects: Nil
Ongoing projects:

SL No	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration
1	Studies on Neighbourhood Magic Graphs (Reference No. SR/S4/MS: 734/11)	Dr. Tarkeshwar Singh	Department of Science and Technology, Govt. of India	Rs. 12.69 lakhs	3 years 01/07/2013 to 30/06/2016

18. Inter-institutional collaborative projects and associated grants received

    a) National collaboration   b) International collaboration   NIL

19. Departmental projects funded by DST-FIST; UGC-SAP/CAS, DPE; DBT, ICSSR, AICTE, etc.; total grants received.

Department received DST-FIST Level-1 grant to establish Scientific Computation Lab. Total amount sanctioned: Rs. 37,50,000 (50:50) (Letter No. SR/FST/MSI-092/2013)

20. Research facility / centre with:NA
- **state recognition**
- **national recognition**
- **international recognition**

21. Special research laboratories sponsored by / created by industry or corporate bodies
Nil

22. Publications:

SI No.	Details	Specify number here
	Number of papers published in peer reviewed journals (national / international)	56
	Monographs	00
	Chapters in Books	00
	Edited Books	00
	Books with ISBN with details of publishers	00
	Number listed in International Database (For *e.g.* Web of Science, Scopus, Humanities International Complete, Dare Database - International Social Sciences Directory, EBSCO host, etc.)	48
	Citation Index – range / average	0.0 to 56 / 1.60
	SNIP	0.502
	SJR	0.4
	Impact Factor – range / average	0.0-2.263/0.387
	h-index	6

Details of the publications as per the number given above (Give details in the last five years

SL No	Authors	Title of the Publications	Details of the Journal	National /International	Year
1	Alpesh M. Dhorajia	Equality of linear and symplectic orbits (Appendix)	Journal of Pure and Applied Algebra, 219 (12), 5363–5386	International	2015
2	Alpesh M. Dhorajia	Total graph of the ring $Z_n \times Z_m$	Discrete Mathematics Algorithms and Applications 07, DOI: 10.1142/S1793830915500044	International	2015
3	P. Danumjaya	Finite Element Methods for one-dimensional fourth-order semilinear partial differential equation	International Journal of Applied and Computational Mathematics, 1, DOI: 10.1007/s40819-015-0068-0	International	2015
4	Prasanna Kumar	On an inequality involving the complex polynomial and its derivative,	Lobachevskii Journal of Mathematics, 36(2), 154-159	International	2015
5	Prasanna Kumar	On the generalizations of polynomial inequalities in the complex domain,	Journal of Contemporary Mathematical Analysis 50(1), 14-21	International	2015
6	Sanjukta Krishnagopal, Sakshi Pratap, and Bijil Prakash	Image encryption and steganography using chaotic maps with a double key protection.	Advances in Intelligent Systems and Computing, 336, 67-78	International	2015
7	G. C. Samanta, and B. K. Bishi	Universe described by Kaluza-Klein space time with viscous modified cosmic chaplygin gas in general relativity	Iranian Journal of Science and Technology, Accepted for publication, (June 2015). Manuscript ID: 1819-IJSTS (R1)	International	2015

8	G.C. Samanta, B. K. Bishi	Geometry of the universe described by bianchi type-III space time in presence of wet dark fluid (WDF)	Iranian Journal of Science and Technology, Accepted for publication, (Feb 2015). Manuscript ID: 1889-IJSTS (R1)	International	2015
9	Smrutirekha Debata, Milu Acharya and G.C. Samanta	An inventory model for perishable items with quadratic trapezoidal type demand under partial backlogging	International Journal of Industrial Engineering Computations, 6, 185-198	International	2015
10	T. Singh, Aloysius Godinho and S. Arumugam	On S-magic graphs	Electronic Notes in Discrete Mathematics, 48, 267–273	International	2015
11	T. Singh, Jessica Periera and S. Arumugam	On (k,d)-Skolem graceful graphs	Electronic Notes in Discrete Mathematics, 48, 81-88	International	2015
12	Jessica Periera, T. Singh and S. Arumugam	A new measure for gracefulness of graphs	Electronic Notes in Discrete Mathematics, 48, 275-280	International	2015
13	Manoj Pandey	Evolution of weak discontinuities in non-ideal magnetogasdynamic equations	International Journal of Applied and Computational Mathematics, DOI 10.1007/s40819-015-033	International	2015
14*	Pradeep Boggarapu and S. Thangavelu	Mixed norm estimates for the Riesz transforms associated to Dunkl harmonic oscillators	Annales Math´ematiques Blaise Pascal, 22, (1) 89-20	International	2015
15*	Pradeep Boggarapu and S. Thangavelu	Mixed norm estimates for the Riesz transforms on the Heisenberg group	Monatshefte für Mathematik Accepted for publication (June 2015). DOI 10.1007/s00605-015-0790-z	International	2015

16	Prabal Paul	Counting zero-free sequences	Journal of Combinatorics and Number Theory, Accepted for publication (June 2015), Manuscript ID- NT130927Paul	International	2015
17	R.B. Sonawane, Anil Kumar and S.B. Nimse	Exact controllability of wave equation with multiplicative controls	Applied Mathematics E-Notes, 14, 45-52	International	2014
18	Prasanna Kumar	On the topological situations in geographic spaces	Annals of GIS, 20(2), 131 – 137	International	2014
19	Kratarth Goel, Raunaq Vohra, and J.K. Sahoo	Polyphonics music generation by modeling temporal dependencies using RNN-DBN	Lecture Notes in Computer Science (LNCS), 8681, 217-224	International	2014
20	G.C. Samanta	Dark energy and future singularity of the universe in Kaluza-Klein space time	Astrophysics and Space Science, 353, 731-736	International	2014
21	G.C. Samanta	Universe described by variable modified chaplygin gas with staefinder diagnostic in general relativity	International Journal of Theoretical Physics, 53, 1867-1878	International	2014
22	G.C. Samanta, S. Jaiswal and S. K. Biswal	Universe described by dark energy in the form of wet dark fluid (WDF) in higher dimensional space time	The European Physical Journal Plus, 129;48. DOI 10.1140/epjp/i2014-14048-8	International	2014
23	T.Singh, Veeky Baths and Anil Kumar	Disruption of cell wall fatty acid biosynthesis in mycobacterium tuberculosis using the concept of minimum robust domination energy of graph	Annual Research & Review in Biology, 4(12):2037-2014	International	2014
24	Amit Setia	Solution of various cases of Cauchy type singular integral equation	Applied Mathematics and Computation, 230, 200-207	International	2014

25	T. A. Naidu, P Paul, and Venkaiah, V.C	Computationally perfect compartmented secret sharing schemes based on MDS codes	International Journal of Trust Management in Computing and Communications (IJTMCC), 2, (4)	International	2014
26	Sahoo, J. K., and Deepak Rishi	Speaker recognition using support vector machines,	International Journal of Electrical, Electronics and Data Communication, 2(1), 1-4.	International	2014
27	N Prasanna Kumar	A short note on the theory of perspective topology in GIS	Annals of GIS, 19(2), 123-128	International	2013
28	G.C. Samanta	Holographic dark energy cosmological models with quintessence in Bianchi type-V space time	International Journal of Theoretical Physics, 52, 4389-4402	International	2013
29	G.C. Samanta	Two fluid anisotropic cosmological model with variable G and Lambda	International Journal of Theoretical Physics, **52**, 4015-4024	International	2013
30	G.C. Samanta and S. Debata	Two fluid cosmological models in Kaluza-Klein space time	International Journal of Theoretical Physics,**52**, 3999-4007	International	2013
31	G.C. Samanta	Anisotropic dark energy Bianchi type-III cosmological models in Lyra geometry	International Journal of Theoretical Physics, 52**,** 3442-3456	International	2013
32	G.C. Samanta and S. Dhal	Universe filled with a binary mixture of perfect fluid and dark energy	International Journal of Theoretical Physics**,** 52, 3092-3105	International	2013
33	G.C. Samanta, S. Dhal, and B. Mishra	Five dimensional bulk viscous cosmological model with dark fluid in general relativity	Astrophysics and Space Science, 346, 233-236	International	2013
34	G.C. Samanta	Kantowski-Sachs universe filled with perfect fluid in f(R, T) theory of gravity	International Journal of Theoretical Physics, 52, 2647-2656	International	2013

35	G.C. Samanta	Universe filled with dark energy from a wet dark fluid in f(R, T) gravity	International Journal of Theoretical Physics, 52, 2303-2315	International	2013
36	G. C. Samanta, S. K. Biswal and P. K. Sahoo	Five dimensional bulk viscous string cosmological models in Saez and Ballester theory of gravitation	International Journal of Theoretical Physics, 52, 1504-1514	International	2013
37	G.C. Samanta and S. Dhal	Higher dimensional cosmological models filled with perfect fluid in f(R, T) theory of gravity	International Journal of Theoretical Physics, 52, 1334-1344	International	2013
38	Manoj Kumar Pandey	Exact solutions of the shallow water equations,	The International Journal of Nonlinear Science, 16(4), 334-339	International	2013
39	T. Singh and Mukti Acharya	Embedding of sigraphs in graceful sigraphs	ARS Combinatoria, 11, 421-426	International	2013
40*	Alpesh M. Dhorajia and Manoj Kumar Keshari	A note on cancellation of projective modules	Journal of Pure and Applied Algebra, 216, 126-129	International	2012
41*	Alpesh M. Dhorajia	Symplectic modules over overrings of polynomial rings	Indian Journal of Pure and Applied Algebra, 43, 371-390	International	2012
42	Prasanna Kumar N	A note on the inequalities for a polynomial and its derivative	Acta Mathematica Vietnamica, 37(1)	International	2012
43	G. C. Samanta and S. Debata	Five dimensional Bianchi type-I String cosmological models in Lyra manifold	Journal of Modern Physics, 3, 180-183	International	2012
44	Amit Setia, Rajesh K. Pandey	Laguerre polynomials based numerical method to solve a system of generalized Abel integral equations	Procedia Engineering, 38, 1675–1682	International	2012

45*	Chintamani, M. N., Moriya, B. K., Gao, W. D., Paul, P. and Thangadurai, R.	New upper bounds for the Davenport and for the Erdős-Ginzburg-Ziv constants	Archiv der Mathematik 98, 133–142	International	2012
46	Sahoo, J. K., and Singh, A	A modified regularization scheme for classification problems.	International Journal of Computational andApplied Mathematics 6(3),267-280	International	2011
47	G. C. Samanta, S. K. Biswal and G. Mohanty	Some five dimensional Bianchi type-III string cosmological models in general relativity	Bulgarian Journal of Physics, 38, 380-389	International	2011
48	Utpal Roy, Veeky Baths and T. Singh,	Disruption of cell wall fatty acid biosynthesis in mycobacterium tuberculosis using graph theory	Theoretical Biology and Medical Modeling, 8:5, 1-13, DOI:10.1186/1742-4682-8-5	International	2011
49*	H. Mukherjee, and V. Lakshmibai	Singular loci of Hibi toric varieties.	Journal of Ramanujan Mathematical Society 26 (1), 1–29	International	2011
50*	Alpesh M. Dhorajia and Manoj Kumar Keshari	Projective modules over overrings of polynomial rings.	Journal of Algebra, 323, (2), 551-559	International	2010
51	P. Danumjaya and Amiya K. Pani,	Mixed Finite Element methods for a fourth order reaction diffusion equation	Numerical Methods for Partial Differential Equations, 28(4), 1227-1251	International	2012
52*	Sahoo, J. K., Singh, A	An estimate of misclassification error with Hinge and square loss.	International Journal of Computational andApplied Mathematics 5(1): 89-102	International	2010
53*	Manoj Kumar Pandey	Group theoretic method for analyzing interaction of discontinuity wave with a strong shock in an ideal gas,	Zeitschrift für angewandte Mathematik und Physik , 61, 87-94	International	2010

54	T. Singh, B.D. Acharya, MuktiAcharya and S.B. Rao	Hypergraceful complete graphs	Australasian Journal of Combinatorics, 48, 5-24	International	2010
55	T. Singh and MuktiAcharya	Skolem graceful signed graphs	Utilitas Mathematica, 82, 97-109	International	2010
56*	Chintamani, M. N., Moriya, B. K., and Paul, P.	The number of weighted n-sums	International Journal of Modern Mathematics, 2, 215–222	International	2010

* papers published by our faculty with their earlier affiliations

Conference Publications

No	Authors	Title of the paper	Proceedings	National/ International	Year
1	Bijil Prakash and Amit Setia	Numerical solution and error analysis of Fredholm integro-differential equations using Legendre and block pulse functions.	Proceedings of 4th Annual International Conference on Computational Mathematics, Computational Geometry & Statistics (CMCGS 2015), Singapore, 26-27 January	International	2015
2	Tarkeshwar Singh, Manoj Kumar Singh and Dharm Raj Singh	A hybrid heuristic algorithm for Euclidean travelling salesman problem	IEEE Proc. International Conference on Computing, Communication and Automation (ICCCA 2015), 767-772	International	2015
3	R.B. Sonawane, Anil Kumar and S.B. Nimse	Optimal control of a vibrating string with variable axial load and damping gain	3rd International Conference on Advances in Control and Optimization of Dynamical Systems (ACDOS-2014), Published by Elsevier, 75-81	International	2014
4	Vinit Gela,M.S. Suraj,Kshitij Patil, and Bijil Prakash	Monocular vision based autonomous navigation for arbitrarily shaped urban roads.	Proceedings of International Conference on Machine Vision and Machine Learning, Prague, Czech Republic, 14-15 August	International	2014
5	R.B. Sonawane, Anil Kumar and S.B. Nimse	Numerical optimal control for bilinear hyperbolic PDEs	4th Nirma University International Conference on Engineering (NUiCONE 2013)	International	2013

			10.1109/NUiCONE.2013.6780203 Published by IEEE.		
6	T. Singh, and Nutan G. Nayak	On the energy of signed graphs	Proc. of International Conference on Recent trends in Discrete Mathematics And Its Applications to Science and Engineering (ICODIMA) Page nos. 95-103. ISBN-978-81-924767-5-9	International	2013
7	Bijil Prakash, Gunveer Gujral, and Jyotiranjan Harichandan	Computing hand gestures using computer vision to control cursor movements.	Proceedings of International Conference on Recent Technologies, 9-11 February	International	2012
8	Bijil Prakash, Sridhar.P Narayanan, and Athul.S Ramkumar	Fuzzy logic algorithms in image egde detection.	In proceedings of National Conference on Computational Engineering: Modelling, Simulation and Optimization, 8-10 December	National	2010
9	Bijil Prakash, R S Deodhar	A new technique for optical & infrared Image fusion.	In proceedings of National Conference on Computational Engineering: Modelling, Simulation and Optimization, 8-10 December	National	2010

23. Details of patents and income generated: Nil

24. Areas of consultancy and income generated: Nil

25. Faculty selected nationally / internationally to visit other laboratories / institutions industries in India and abroad
- Dr. Amit Setia awarded INDO-US Raman Fellowship by UGC, New Delhi, for one year Post Doctoral work at University of Louisiana, Lafayette, USA, during 2013-14.
- Dr. Alpesh M Dhorajia attended Thematic Program on Calabi-Yau Varieties: Arithmetic, Geometry and Physics at Field Institute for Research in Mathematical Science, Toronto, Canada, July-December, 2013 (Sponsored by DST)

26. Faculty serving in National committees b) International committees c) Editorial Boards d) any other (please specify)

Dr. Prasanna Kumar
1. Member of Board of Studies in the department of postgraduate studies and research in mathematics, Mangalore University, Karnataka, India.
2. Member of the subject expert committee for SLET in mathematics, Govt of Karnataka, India during 2014-15.

3. Chancellor's nominee, Selection Committee for faculty in mathematics, Goa University, Goa, India during 2014-15.
4. Question paper setter for entrance test for MSc in mathematics, Mysore University, Karnataka India during 2013-14.

Dr. G. C. Samantha
1. Member, Editorial Board, International Journal of Research in Applied Sciences. http://www.ijras.in/

Dr. J. K. Sahoo
1. Member, Board of Studies, Department of Mathematics, Dhenkanal Autonomous College, Orissa , 2009-2012.
2. Member, Editorial Board, International Journal of Mathematics and Computer Applications Research (IJMCAR).
3. Member, Editorial Board, Global Journal of Theoretical and Applied Mathematical Science.
4. Member, Editorial Board, International Journal of Computational Science and Mathematics.

Dr. T. Singh
1. Member, Editorial Board of Journal of Indian Academy of Mathematics, during 2011-2013.
2. Member, Advisory Board of Indian Academy of Mathematics, during 2013-2015.
3. Member, Editorial Board of Journal of Vignan Parishad, India.
4. Member of the Reviewer Committee in Mathematical Review of American Mathematical Society (AMS).
5. Member of the Advisory Body of Department of Mathematics for the academic year 2010-11&2014-16 in KLS Gogte Institute of Technology, Belgaum.
6. Member of Executive Council of Academy of Discrete Mathematics for the period of 2014-16.
7. Member of Associate Editors of South East Asian Journal of Mathematics and Mathematical Sciences (SEAJMMS) published by Ramanujan Society of Mathematics and Mathematical Sciences.

27. Faculty recharging strategies (UGC, ASC, Refresher / orientation programs, workshops, training programs and similar programs).

Research Initiation Grant
The Research Initiation Fund is designed to enable the beginning of research and related activities for a newly recruited faculty who has significant potential to attract external funding. The grants shall be awarded soon after joining BITS for up to Rs. 2 Lakhs and the

amount should be spent within 24 months of appointment. Projects undertaken in the department under this scheme;

SL No	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration
1	Mathematical Modeling and Simulation of Crack in Smart Materials	Dr. Amit Setia	BITS Pilani Research Initiation Grant	Rs. 2 Lakh	2011-13

Seed Grant Scheme

The Seed Grant scheme is designed to stimulate competitive research in strategic areas of national or international importance, to promote innovative product and technology development, and/or to facilitate the start of research programs which will potentially develop into creative ventures on their own through external funding. The grant shall be awarded with a maximum value of Rs.20 Lakhs. The duration of the Grant will be 2 years.

Chair Professorship

A Chair Professorship helps recognize and reward excellence in teaching and/or research by a member of the BITS Pilani faculty at either of its campuses or to induct a professor from outside BITS, Pilani. Such a person would be re-designated as Chair Professor, Each "Chair Professorship" also helps establishment an endowment with significant funds that are used to (a) make available to the Chair Professor a "research grant", and (b) provide to him/her a small honorarium to cover additional effort required to fulfill the charter laid out for the endowment.

OPERA Award

The awards named OPERA awards (for "Outstanding Potential for Excellence in Research and Academics") are to facilitate and incentivize new faculty to join BITS and excel in research and teaching. The award is in the form of a "joining bonus" paid over 5 years, plus funds to kick-start their R&D and professional development. The award will help compensate new faculty (or provide R&D funds) at par with the best institutions in India.

Professional Development Allowance: The institute provides Rs 100,000/- to each faculty member for expenses related to research, conference registration etc.

Industry Day: The institute has engaged in intensifying its contact with industry to leverage industry sponsored projects to keep faculty competence in line with industry and societal needs.

Visits of eminent scholars to various departments as well as the organization of conferences and workshops by the department together with other national and international professional societies to help create platforms and forums for exchange of ideas and knowledge in the upcoming fields of science and technology.

The institute provides financial support to initiate such events and also facilitates financial support to lectures and tenured faculty members to participate in national and international seminars/workshops/schools/ conferences etc.

Every faculty member will undergo Intensive Teaching Workshop held in the Institute.

Under faculty recharging strategies the following faculty have been sent to various workshops/training programmes;

1. Dr. Prasanna Kumar visited Department of Mathematics and Statistics, Auburn University, Auburn, USA during May 21-July 20, 2014 under University Immersion Programme of BITS.
2. *Dr. Alpesh M Dhorajia*
   - Attended a workshop on "Projective modules and affine fibrations", a training program held at IIT Bombay during 10th - 14th March 2014.
   - Attended a workshop on "Introduction to Graph and Geometric Algorithms" jointly organized by the Department of Mathematics, BITS Pilani KK Birla Goa Campus, Goa and School of Technology and Computer Science, Tata Institute of Fundamental Research(TIFR) Mumbai during January 17-19, 2013 held at BITS Pilani – K K Birla Goa campus, Goa.
   - Attended Total Graph of Certain Rings, Conference on Graph Theory, Matrix Theory and Interaction at Queens University, Ontario, Canada, June 20-21, 2014 (Sponsored by NBHM).

3. *Dr. Anil Kumar* visited Department of Mathematics, Indian Institute of Science, Bangalore under Indo-French Centre for Applied Mathematics (IFCAM) Visitors Program during the period from May 24, 2014 to June 24, 2014 and worked with Prof. A. K. Nandkumaran and worked on "Optimal control of the velocity term in a Kirchhoff plate equation with multiplicative control"(Sponsored by NMI).
4. *Mr. Bijil Prakash*
   - Attended Introductory workshop on SCILAB, Department of Mathematics, BITS Pilani K K Birla Goa Campus, during 9th -10th July 2012.
   - Attended Introductory Workshop on MATHEMATICA, Department of Mathematics, BITS Pilani K K Birla Goa Campus, during 24th - 25th July 2013.
   - Attended Workshop on Nonlinear Functional Analysis & Its Applications (NFAA 2013), University of Kashmir, Srinagar, during 21st -29th October 2013.

- Attended Advanced Workshop on Computational Methods for Integral Equations & Applications (AWCMIEA-2014), IIT Kanpur, during 13th - 17th January 2014.

5. *Mrs. Jessica Periera*
   - Attended Instructional Workshop on Mathematical Modelling and Simulation, organized by *n*-CARDMATH, Kalasalingam University, Tamil Nadu, India, during July 07-14, 2010.
   - Attended Instructional Workshop on Graph Theory and its Aplications, organized by Department of Mathematics, BITS Pilani K K Birla Goa Campus, India, during April 28-29, 2011.
   - Attended ISTE approved one week short term training programme on Graphs and Algorithms organized by the department of computer/IT engineering and department of humanities Padre Conceicao college of engineering, Verna, Goa, during July 09-14, 2011.
   - Attended Advanced School on Graph Algorithms, organized by Department of Mathematics, BITS Pilani K K Birla Goa Campus, India, during July 23-27, 2012.
   - Attended Introduction to Graph and Geometric Algorithms, organized by Department of Mathematics, BITS Pilani K K Birla Goa Campus, India, during Jan 17-19, 2013.
   - Attended Introductory Workshop on Mathematica, organized by Department of Mathematics, BITS Pilani K K Birla Goa Campus, during India, July 24-25, 2013.

6. *Dr. T. Singh*visited Department of Mathematics, National Chiao Tung University, Hsinchu, Taiwan during November 19-22, 2013 (Sponsored by DST).

28. Student projects

- percentage of students who have done in-house projects including inter-departmental projects :100%
- percentage of students doing projects in collaboration with other universities /industry / institute: 100%

29. Awards / recognitions received at the national and international level by Faculty Doctoral / post doctoral fellows Students

Dr Pradeep Boggarapu, Assistant Professor was awarded Young Scientist, by Dr K V Rao Scientific Society, Hyderabad for the year 2014-2015.*
* Before joining our Institute.

30. Seminars/ Conferences/Workshops organized and the source of funding (national/ international) with details of outstanding participants, if any.

1. "Advanced Level Training Program on Differential Equations" from May 25 to June 14, 2015 (Sponsored by NPDE-TCA, DST). Around 40 research scholars, faculty from across India participated.
2. "Mathematical foundation of Advanced Finite Element Methods" during December 26, 2013 to January 3, 2014 in collaboration with National Mathematics Initiative (NMI) and National Program on Differential Equations: Theory, Computation and Applications (NPDE-TCA) (Sponsored by NBHM, NMI, NPDE-TCA, DST). There were 30 participants from different parts of India including few research scholars from Humboldt University of Berlin, Germany also.
3. Research Promotion Workshop on "Introduction to Graph and Geometric Algorithms" during January 17-19, 2013 in collaboration with TIFR Bombay (Sponsored by NBHM). There were 45 participants from various parts of India.
4. "Advanced School on Graph Algorithms (ASGA-2012)" during July 23-27, 2012 in collaboration with the Department of Computer Science and Information Systems (Sponsored by NBHM, DSTE, Govt. Of Goa). Around 40 participants underwent rigorous training on the topic.
5. "School on Graph Algorithms" during December 15 - 19, 2011 in collaboration with the Department of Computer Science and Information Systems (Sponsored by NBHM). Number of participants was around 35 apart from the inhouse students and faculty members.
6. International Workshop on "Advances in Computational Partial Differential Equations" during February 7 - March 5, 2011 (Sponsored by NBHM). Around 42 participants attended the workshop, couple of them from Germany.

31. Code of ethics of research followed by the Department.

The department follows the code of ethics specified by the Institute.

32. Student profile programme-wise:

Name of the Programme (refer to question no. 4)	Applications received	Selected		Pass percentage	
		Male	Female	Male	Female
MSc.(Hons.) (Year: 2010-11)	139234	33	4	100%	100%
MSc.(Hons.) (Year: 2011-12)	123677	30	10	100%	100%
MSc.(Hons.) (Year: 2012-13)	136904	30	6	100%	100%

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MSc.(Hons.) (Year: 2013-14)	166260	40	4	100%	100%
MSc.(Hons.) (Year: 2014-15)	186181	47	9	100%	100%
Ph.D. (Year: 2010-11)	0	0	0	NA	NA
Ph.D. (Year: 2011-12)	0	0	0	NA	NA
Ph.D. (Year: 2012-13)	4	0	1	NA	NA
Ph.D. (Year: 2013-14)	4	2	0	NA	NA
Ph.D. (Year: 2014-15)	4	1	1	NA	NA

*BITS follows a credit based system and cafeteria approach in offering of courses. Students not performing well are monitored by ACB (Academic Counselling Board), HDCC (Higher Degree Counselling Cell) and ACC (Academic Counselling Cell). Their pace is slowed down. Normally not more than 3% students (including all programmes, B.E., M.Sc, and M.E.) at a given point of time are under the purview of ACB.

33. Diversity of students

Name of the Programme(refer to questionno. 4)	% of students from the same university	% of students from other universities within the State	% of students from universities outside the State	% of students from other countries
M.Sc.(Hons.)	NA	NA	NA	NA
Ph.D.	0	40%	60%	0

34. How many students have cleared Civil Services and Defense Services examinations, NET, SET, GATE and other competitive examinations? Give details category-wise.

We do not capture this information through any formal process. Approximately 10 to 15 students in a year clear competitive examinations (Ex. CAT, GATE, etc.).

35. Student progression

Student progression	Percentage against enrolled
UG to PG	*15%
PG to M.Phil.	
PG to Ph.D.	Data unavailable
Ph.D. to Post-Doctoral	

Employed	2010-11 , 65%
	2011-12, 88%
• Campus selection	2012-13, 76%
• Other than campus recruitment	2013-14, 79%
	2014-15, 97%
Entrepreneurs	NIL

* We do not capture this information through any formal process

36. Diversity of staff

Percentage of faculty who are graduates	
of the same university	0
from other universities within the State	13.4
from universities from other States from universities outside the country	86.6

37. Number of faculty who were awarded M.Phil., Ph.D., D.Sc. and D.Litt. during the assessment period: Nil

38. Present details of departmental infrastructural facilities with regard to
a. **Library**

Spread over 50000 sq. ft. floor space, the central library has a seating capacity of 450 and includes several reading halls, exhibition rooms, a digital library with internet access terminals, and a large area for book storage. The whole building of the library is covered by wi-fi connectivity. The Library has a good collection of over 34,000 books on a wide range of subjects out of which around 3410 are from mathematics discipline. This Campus subscribes to 96 print journals including around 10 mathematics journals, domestic as well as international Subscriptions to important digital libraries like IEL online, Science Direct, ASME, Proquest and AEA Online Journals etc. provide access to thousands of online journals to students and researchers. Several dozens of educational CDs, audio/video cassettes and question banks are also made available. The textbook section provides all prescribed texts and reference books. From 2004 to 2014, the Library transactions, stock accounting and its entire house keeping activities had been automated using the proprietary LibSyS Library Management Software. In late 2013, a decision was made to shift to LibLime Koha, a Free and Open Source Software (FOSS) system. After due preparation, the actual migration was effected in the 2014 summer vacation, entirely through the in-house efforts of the Library staff and the CS-Dept Library Committee faculty member. The shift has proved to be successful as well as welcomed by the end users, students and researchers alike, and now the software system is becoming something like a social networking platform for library users to

share academic resources and use them more productively, rather than just an office automation system. The other two campuses in India have been emboldened in their plans and efforts to make a similar shift. Plans are afoot to make an integrated library portal using the same Koha installation for all these three campuses. One of the chief advantages of Koha, apart from the freedoms associated with FOSS, is that the entire database and transactions are available through ordinary web-browsers, making it possible to combine all the other networking and social networking tools with the library system. We have an active Library Committee on which every department is represented, and this committee decides policies and allocations and oversees their implementation.

Department receives books from NBHM under the NBHM books grant (so far received 120 books). Apart from this department has a good collection of Books for our students and faculty members.

b. Internet facilities for staff and students

Internet facilities to Staff (and faculty): Unlimited access is provided to staff and faculty at their office as well as residence. WiFi connectivity is provided to the complete academic area. The bandwidth provided to faculty is 100Mbps on a 10Gbps backbone (for intranet).

Internet facilities to Students: All students are provided intranet (10Gbps back bone), internet (300Mbps provided by Vodafone, GWave and TATA) and WiFi in all hostels with per day download limit of 800MB for under graduate students and 1GB for post graduate students and Ph.D. scholars.

c. Students' laboratories

Presently, the lab classes are being taken in the Central Computer Lab. Department has procured 20 MATHEMATICA licences and campus-wide MATLAB licence jointly with other departments. DST-FIST Level-1 Scientific Computating Lab is under construction.

d. Research laboratories

Research Scholars are also using the Central Computer Lab for their computational works. They are using two major software like MATHEMATICA and MATLAB

39. List of doctoral, post-doctoral students and Research Associates
  - ○ **from the host institution/university**
  - ○ **from other institutions/universities**

  Total: 5
  - Sharma, Vashali
  - Bhal, Santosh K.
  - Handa, Adarsh K.
  - Godonho Aloysius Querobino
  - Govekar Sweta Suryakant

40. Number of post graduate students getting financial assistance from the university:NA

41. Was any need assessment exercise undertaken before the development of new programme(s)? If so, highlight the methodology.

The exercise undertaken before the development of a new programme usually begins with a Department airing its intention to float a new programme, CDC or elective proposed by the faculty concerned. Discussions are held regarding its merits/demerits at the DCA level and later at a ccDCA level. Once the necessary inputs and unanimity have been reached on all the aspects regarding the operational aspects related to the course, it is sent to the ARP so that it can be passed up to Senate to it to be approved.

Department interact with experts from academia while revising the program structure, curriculum etc. A Curriculum Review Meeting with experts from IIT and IISc was conducted on 28th July 2015.

42. Does the department obtain feedback from
  - **faculty on curriculum as well as teaching-learning-evaluation? If yes, how does the department utilize the feedback?**
    Yes there is a committee at the departmental level called Department Committee for Academics which will seek the opinions of every other faculty member on curriculum and teaching–learning-evaluation.

    Faculty members from other campuses at the university level also meet once or twice in a semester to discuss above said issues and to make necessary changes in our curriculum, instructional strategies, evaluation methodologies etc.

  - **students on staff, curriculum and teaching-learning-evaluation and how does the department utilize the feedback?**
    Yes. Department takes feedback from the students through two channels. One is, we have a Faculty-Student Council comprising of two-five teachers and at least five

students from each class will meet twice in a semester to discuss the teaching - learning related issues. The grievances received from the students will be taken to faculty and corrective/improvement measures will be taken accordingly.

Second one is, at the end of semester we take student feed back in a form with anonymity and that will be analysed during the semester break and implementation of students' suggestions will be done to the possible extent in the subsequent semesters.

- **alumni and employers on the programmes offered and how does the department utilize the feedback?**
  Yes, the department obtains feedback from Alumni on the programmes offered.
  Upcoming trends in various technical industries are also discussed. Some of the alumni also pitch in ideas for newer courses to be introduced as a part of the curriculum. These issues are reviewed in detail with the concerned department faculty. Suitable measures for implementation of the feedback are considered and followed accordingly.

  Employers:
  Yes, it does. Each Campus conducts a Placement Faculty Advisory council meeting once a month. The member consists of the Director, the Deputy Director, the Dean, Head of the Departments, Placement Manager, Faculty In charge (Placement) and a faculty representing each department. Employers' feedback will be conveyed to each faculty via HoD and a one-to-one dialogue between every faculty and the HoD will take place. Corrective measures will be suggested. The progress will be constantly monitored all through the subsequent semesters.

43. List the distinguished alumni of the department (maximum 10)
   1. Swetansu Mohapatra, CEO, TAKE ZERO, Mumbai (Graduating year; 2011-12).
   2. Some of our Alumni pursuing doctoral programs in various world class Universities

Name	Pass-out year	Pursuing program	Department	University
G V S Srikant	2010-11	PhD in the area of Cryptography	Department of Computer Science	Purdue University, USA
Apoorva Deshpande	2012-13	PhD in the area of Security and Cryptography	Department of Computer Engineering	Brown University, USA
Aarti Sundaram	2013-14	PhD in the area of Algorithms	Centre for Quantum Technologies	National University of Singapore, Singapore
Siddharth Gupta	2014-15	PhD in the area of Algorithmic Graph Theory	Department of Computer Engineering	University Of California, Irvine, USA

44. Give details of student enrichment programmes (special lectures / workshops / seminar) involving external experts.

- We regularly invite external guest faculties to interact our students and deliver some lectures on current research topics.
- We send our students to do summer internships and projects with other reputed institutes like TIFRs, IISc, IITs and central universities.

- We encourage our students to attend national level workshops to enhance the subject knowledge.

These are the special lecture/ activities arranged by the department for our students and research scholars.

1. June 9, 2015, Professor Amiya Kumar Pani (FNASc, FASc), Institute Chair Professor, Department of Mathematics, IIT Bombay delivered a talk on "Scientific Computing: A New Way of Looking at Mathematics".
2. April 17, 2015, Prof. S. Arumugam, Director, National Center for Advanced Research in Discrete Mathematics, Kalasalingam University, Tamil Nadu delivered a talk on "Cellular Manufacturing Problem - A Graph Theoretic Approach".
3. The second department day was organized on April 12, 2015 during 9.30 a.m to 10.00 p.m. Students conducted several competitions for the in-house students and also for higher secondary school children and around 120 students of 9th-12th level across the various schools/colleges in Goa.
4. February 20, 2015, Prof. Graeme Fairweather, Mathematical Reviews, American Mathematical Society, Ann Arbor, Michigan, U.S.A. delivered a talk on "Ethical and Responsible Conduct of Research".
5. February 9, 2015, Dr. Raghav Kulkarni, Postdoctoral Fellow, Center for Quantum Technology, National University of Singapore, delivered a talk on "Evasiveness and the distribution of prime numbers".
6. February 5, 2015, Prof. Venkata Sundarananda Putcha, Associate Professor, CR Rao Advanced Institute of Mathematics, Statistics and Computer Science, University of Hyderabad Campus, delivered a talk on "Discrete Linear Sylvester Repetitive Process".
7. January 17, 2015, Prof. Peter Beelen, Professor and Head, Department of Applied Mathematics and Computer Science, Technical university of Denmark, delivered a talk on "An Introduction to the Decoding of Reed-Solomon Codes".
8. January 17, 2015, Prof. Sudhir R. Ghorpade, Professor and Head, Department of Mathematics, Indian Institute of Technology Bombay, delivered a talk on "Polynomial Systems over Finite Fields and Linear Error-Correcting Codes".
9. January 5, 2015, Prof. Richard A Zalik, Professor, Department of Mathematics and Statistics, Auburn University, USA, delivered a talk on "Nonlinear Jeffcott Equations".

10. December 8, 2014, Dr. Sanjiban Santra, Australian postdoctoral fellow, School of Mathematics and Statistics, The University of Sydney, Australia, delivered a talk on "Existence and Non-existence of Bounded Solution for Fourth Order ODE".

11. May 18-19, 2014, Dr. R. Thangadurai, Associate Professor, Harish Chandra Research Institute, Allahabad, visited Mathematics Department for collaborative research work.

12. April 3, 2014, Prof. S. Arumugam, Director, National Center for Advanced Research in Discrete Mathematics (n-CARDATH) Kalasalingam University, Tamil Nadu, delivered a talk on "Risk Management in Portfolios-Applications of Signed Graphs".

13. March 23, 2014, Prof. Govendan Rangarajan, Department of Mathematics, IISc Bangalore, delivered a talk on "Brain Machine Interface".

14. On the eve of BITS Pilani golden jubilee celebrations 2013-14, Mathematics Department organized Department Day on March 23, 2014. Prof. Govindan Rangarajan, Professor, Department of Mathematics, IISc, Bangalore honored the event as the Chief Guest.

15. February 1, 2014, Dr. A. K. Singh, Scientist-D, DST India, delivered a talk on "Various Schemes in DST for Students and Faculties".

16. January 23, 2014, Dr. Vishal Saraswat, Assistant Professor, C. R. Rao Advanced Institute of Mathematics, statistics and Computer Science, Hyderabad delivered a talk on "Public-Key Encryption with Searchable Keywords Based on Jacobi".

17. January 10, 2014, Prof. T.E.S. Raghavan, Emeritus Professor, Department of Mathematics, Statistics and Computer Science, University of Illinois at Chicago delivered a talk on "Game Theory and its Applications".

18. January 9, 2014, Prof. T.E.S. Raghavan, Emeritus Professor, Department of Mathematics, Statistics and Computer Science, University of Illinois at Chicago delivered a talk on "Graph Theoretic Algorithm for Assignment games".

19. December 6, 2013, Dr. Goutam Paul, Assistant Professor, R.C. Bose Center for Cryptology and Security, Indian Statistical Institute, Kolkata delivered a talk on "No Cloning Theorem and Quantum Key Distribution".

20. October 11, 2013, Prof. A. S. Vasudeva Murthy, TIFR Center for Applicable Mathematics, Bangalore, delivered talks on "Searching and Sorting Million Needles in Zillion Haystacks" and "On the string equation of Narasimha".

21. October 10, 2013. Prof. A. S. Vasudeva Murthy, TIFR Center for Applicable Mathematics, Bangalore, delivered a talk on "Far field boundary conditions and their numerical approximation".

22. October 3, 2013. Prof. Mridul Nandi, Applied Statistics Unit, ISI Kolkata delivered a lecture on "Analysis of Modes of Hash Functions".

23. September 14, 2013. Prof. Sudhir Ghorpade, Professor & Head, Department of Mathematics, Indian Institute of Technology Bombay delivered a talk on "Matrices and Linear Recurrences over Finite Fields".

24. September 14, 2013. Prof. M. K. Kadalbajoo, Professor, Department of Mathematics, Indian Institute of Technology Kanpur delivered a talk on "Computational Mathematics-Some Challenges".

25. April 16-17, 2013. Prof. D. S. Nagaraj, Department of Mathematics, Institute of Mathematical Sciences, Chennai delivered lectures on "Algebraic varieties-A Conceptual Approach" and "Groups and Symmetries of Structures".

26. August 6, 2012. Prof. E. B. Postnikov, Department of Theoretical Physics, Kursk State University, Russia delivered a talk on "Wavelet Theory".

27. February 27-28, 2012. Prof. A. K. Nandakumaran, Department of Mathematics, Indian Institute of Science (IISc) Bangalore delivered lectures on "Multivariable Calculus and Implicit -Inverse function Theorems" and "A View of Newton as a Mathematician".

28. February 13, 2012. Prof. M. V. Deshpande, Retired Professor, Department of Mathematics, Indian Institute of Technology Bombay delivered a talk on "Why epsilon and delta? What next?".

29. November 11, 2011. Prof. C. S. Dalawat, Department of Mathematics, Harish-Chandra Research Institute (HRI), Allahabad delivered a talk on "Constructability and Solvability".

30. February 11, 2011. Prof Amiya kumar Pani, Department of Mathematics, Indian Institute of Technology Bombay delivered a talk on "Industrial Mathematics with a Case Study from Finance".

31. January 21, 2011. Prof. S. P. Singh, Visiting Scientist, Physics and Astronomy, University of Western Ontario London Canada delivered a talk on "Fixed point theorem & its applications".

45. List the teaching methods adopted by the faculty for different programmes.

- We use black board teaching as well as power point slide presentation in the lecture classes.
- We give self study components to the students to test their innovation ideas in the subject.
- We use mathematical software to show the geometrical interpretation in various concepts. Hands on demonstrations are done in the lab for few of the courses
- Project type exercises are given in some courses.
- We teach online courses for WILP programme and developed digital content for the course Calculus.

46. How does the department ensure that programme objectives are constantly met and learning outcomes are monitored?

- We present the course objectives in the course handout at the beginning and lectures are followed accordingly. We collect information about the learning outcomes from the students, as well as from the final year students. Department student affairs committee with Department Committee for Academics will constantly monitor the learning progress of students. We have a cross campus forum called cross campus Department Committee for Academics in which we discuss these issues periodically.

47. Highlight the participation of students and faculty in extension activities.

- The department has student association called MATHLETS, which is very active all through the academic years. It conducts various activities for the students as well as outside students. It organizes the department day each year and conducts various brainstorming sessions.
- Our faculty have been engaging in participating and encouraging mathematics related activities in nearby schools.

48. Give details of "beyond syllabus scholarly activities" of the department.

Intra-campus workshops conducted
- Organized an Introductory Workshop on "Mathematica" during July 24-25, 2013 (Sponsored by Dept. of Mathematics, BITS-Pilani, Goa).
- Organized a Workshop on "Graph Theory and its Application" during April 28 - 29, 2011 (Sponsored by Dept. of Mathematics, BITS-Pilani, Goa).

Participations/Invited talks by our faculty members;
1. Dr. Tarkeshwar Singh delivered an invited talk on "d-Distance Neighborhood Magic Graphs" in National Conference in Graph Theory and its Applications(NCRTGTA-2015) organized by Department of Mathematics, Mangalore University, Karnataka, during Feb.5-6, 2015.
2. Dr. Tarkeshwar Singh, Delivered an invited talk on "Some Neighborhood Magic Graphs" in National Conference on Discrete Mathematics and its Applications organized by Department of Mathematics, Manonmaniam Sundarnar University, Tirunelveli, Tamil Nadu during July 15-17, 2015.
3. Dr. Anil Kumar delivered lectures on "different computational methods" in the advanced level workshop on "Computational Methods for Control Problems" held at Department of Mathematics, IIST Trivandrum and Mar Ivanios College, Trivandrum during March 16 to March 21, 2015.
4. Dr. Anil Kumar participated in Indo-European Study Group Meeting on Industrial Problems (IESGMIP-2015) held at M. S. University of Baroda, Vadodara, Gujarat during January 5 to January 9, 2015.
5. Dr. Dhanumjaya P, participated as Speaker and Resource Person in the National Program on Differential Equations: Theory, Computation & Applications, UG-Level Program at NIT Bhopal, Bhopal, from 26th May to 14th June 2014.
6. Dr. Dhanumjaya P, participated as a Resource Person in the National Level Workshop on Orthogonal Spline Collocation Methods for Differential Equations held at South Asian University, New Delhi during 21-24 March 2014.

7. Dr. Dhanumjaya P, delivered a lecture in the workshop on "Mathematical Foundation of Advanced Finite Element Methods (MFAFEM-2013)" at BITS Pilani-Goa Campus from 26th December 2013 to 3rd January 2014.

8. Dr. Tarkeshwar Singh, delivered two lectures on "Graph Algorithms and its applications" in UGC- Academy Staff College Refresher Course in Computer Science University of Goa during Jan.09-29, 2014.

9. Dr. Tarkeshwar Singh, delivered an invited talk on "Neighborhood Magic Graphs: A Survey" in the National Seminar on Recent Trends in Mathematics and its Applications organized by Department of Mathematics, Gogte Institute of Technology, Belgaum, Karnataka during Jan 28-29, 2014.

10. Dr. Tarkeshwar Singh, delivered 4 invited lectures on "Applications of Graceful and Skolem Graceful Graphs, Signed Graphs" in the Instructional Workshop on Graph Labeling Problems, organized by n-CARDMATH (national center for advanced research in Discrete Mathematics) Kalasalingam University, Anand Nagar, Krishnan Kovil, Tamil Nadu during Feb. 5-11, 2014.

11. Dr. Tarkeshwar Singh, delivered an invited talk on "Application of Graph Theory in Partition Theory" in the DST Sponsored Workshop on Thoughts on Mathematics at Department of Mathematics, T.D. P.G. College (Purvanchal University Jaunpur) Jaunpur during Nov. 2-6, 2014.

12. Dr. Tarkeshwar Singh, delivered an invited talk on "(k,d)-Skolem Graceful Graphs" in the 8th International Workshop on Graph Labelings, Kalasalingam University, Krishnankoil, Tamil Nadu, during Dec.03- 06, 2014.

13. Dr. Mayank Goel attended National workshop on Financial Data Analytics (FiDA2014) held in C. R. Rao Advanced Institute of Mathematics, Statistics and Computer Science, Hyderabad, India, during Dec 27- Dec 30, 2014.

14. Dr. Amit Setia delivered an invited talk entitled "Numerical method to solve fractional Integro-differential equation using Wavelet" at the AMS Special Session held at the 2014 Joint Mathematics Meetings in Baltimore, Maryland, USA, during January 15-18th, 2014.

15. Dr. Dhanumjaya P, participated in the conference on Computational PDEs, Finite Element Meet 2014, held at TIFR Bangalore during December 18 to December 20, 2014.

16. Dr. Dhanumjaya P, delivered six lectures in "UGC Refresher Course" at Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, during December 16-18, 2013.

17. Dr. Dhanumjaya P, participated as Speaker and Resource Person in the National Program on Differential Equations: Theory, Computation and Applications, UG-Level Program at Birla Institute of Applied Sciences Bhimtal, Uttarakhand, during 03-22 June 2013.

18. Dr. Tarkeshwar Singh, was a resource person in the panel discussion 'Is research a good career option?" in Research Promotion Workshop on Introduction to Graph and Geometric Algorithms at the Department of Mathematics, Birla Institute of Technology and Science Pilani, KK Birla Goa Campus, Goa, during Jan. 17-19, 2013.

19. Dr. Tarkeshwar Singh Delivered two lectures on "Discrete Mathematical Models and its Applications" in a Workshop on A tribute to S. Ramanujan and Prof. S. Chandrashekhar (Life and Work)at Department of Mathematics, T.D. P.G. College (Purvanchal University Jaunpur) Jaunpur during April 18-22, 2013.

20. Dr. Tarkeshwar Singh, attended a Workshop on MATHEMATICA at the Department of Mathematics, Birla Institute of Technology and Science Pilani, KK Birla Goa Campus, Goa, during July, 24-25, 2013.

21. Dr. Tarkeshwar Singh, delivered an invited talks on "Hooked Skolem Graceful Signed Graphs' in the 3rd India-Taiwan Conference in Discrete Mathematics organized by Department of Mathematics, National Chiao Tung University, Hsinchu, Taiwan during November 19-22, 2013.

22. Dr. Anil Kumar delivered lectures on Mathematica in the Introductory Workshop on Mathematica held at Department of Mathematics, BITS Pilani KK Birla Goa Campus, Goa, India during July 24 to July 25, 2013.

23. Dr. Anil Kumar delivered lectures on "Numerical Computation by Using Matlab" in the workshop on Scientific Computing: Theory and Practices held at Faculty of Engineering and Technology, Gurukula Kangri Vishwavidyalaya Haridwar, Uttarakhand, India during October 8 to October 13, 2012.

24. Dr. Anil Kumar delivered lectures on "Computation of Steering Controls in Matlab" in the workshop on Mathematical Theory of Control and Numerics held at Department of Mathematics, Indian Institute of Space Science and Technology, Thiruvananthapuram, Kerla, India during November 21 to November 30, 2012.

25. Dr. Dhanumjaya P, participated as Speaker and Resource Person in the National Program on Differential Equations: Theory, Computation and Applications, UG-Level Program at IMA Bhubaneshwar, during 17-27 May 2012.

26. Dr. Dhanumjaya P, delivered a series of lectures to M.Sc and Ph.D Students on "Scientific Computation" at NIT Warangal from 30th January 2012 to 1st February 2012.

27. Dr. Tarkeshwar Singh, was a tutorial leader in Advanced School on Graph Algorithms, held at Department of Mathematics, Birla Institute of Technology and Science Pilani, KK Birla Goa Campus, Goa, during July, 23-27, 2012.

28. Dr. Tarkeshwar Singh, was a resource person in the workshop on Mathematics Project Guidelines and Evaluation, organized by State Council for Educational Research and Training (SCERT), Govt. of Goa, Goa, on Sept.6, 2012.

29. Dr. Anil Kumar attended a conference on Recent Trends on Partial Differential Equations and Applications held at Department of Mathematics & Statistics, University of Hyderabad, Hyderabad during March 18 to March 19, 2012.

30. Dr. Dhanumjaya P, delivered a series of lectures in National Workshop on "Recent Trends in Mathematics" held at Dept. of Mathematics, Mahatma Gandhi Vidyamandir, Nashik, during January 27-29, 2011.

31. Dr. Tarkeshwar Singh, delivered an invited talk on "Embedding Skolem Graceful Graphs" in the Conference on Algorithms, Computing, Graph Theory and Combinatorics, at Vishvesvaraya Technological University Belgaum, during April 18-20, 2011.

32. Dr. Tarkeshwar Singh, delivered 3 invited talks on "Graph Algorithms" in National Instructional Workshop on Graph Theory and Applications at DST – Centre for Interdisciplinary Mathematical Sciences (DTS-CIMS BHU), Banaras Hindu University, Varanasi, during May 23-28, 2011.

33. Dr. Tarkeshwar Singh delivered an invited talk on 'Some Embedding Problems on Graceful Signed Graphs" in Seventh Annual Conference of Academy of Discrete Mathematics and Application and Graph Theory Day VII at National Institute of Technology Calicut, during June 9-11, 2011.

34. Dr. Tarkeshwar Singh was a resource person in ISTE Approved Short Term Training Programme on Graphs and Algorithms, at Padre Conceicao College of Engineering, during July 4-9, 2011.

35. Dr. Tarkeshwar Singh delivered an invited talk on "Application of Linear Algebra in Graph Theory" in National Conference on Linear Algebra and Applications at Milagres College Udupi, during August 4-5, 2011.

36. Dr. Dhanumjaya P, delivered a series of lectures in the National Workshop on "Mathematical Softwares and Applications" held at Dept. of Mathematics, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, during March 23-27, 2010.

37. Dr. Tarkeshwar Singh, delivered an invited talk on "Neighborhood Magic Graphs" in "National Conference in Distance in Graphs" held at Department of Mathematics, PoornaPrajna College Udupi during Oct. 3-5, 2010.

38. Dr. Anil Kumar delivered lectures on "Mathematica" and its application in the National Workshop on Mathematical Software and Applications held at Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, India during March 23 to March 27, 2010.

39. Dr. Anil Kumar delivered lectures on "Linear Programming and its Application with Matlab" in the National Workshop on Optimization-Theory and Practice held at SSJ Campus Almora of Kumaun University, Uttarakhand, India during November 15- 19, 2010.

Papers presented in conferences;

1. Dr. Samanta G .C, presented a paper on "Geometry of the universe described by wet dark fluid in f(R, T) theory of gravity" in the conference held at Saha Institute of Nuclear Physics, Kolkata from 28th Jan-2015 to 30th Jan-2015.

2. Dr. Dhanumjaya P, presented a paper on "Orthogonal Cubic Spline Collocation Methods for one-dimensional Helmholtz equation with discontinuous data" in UGC Sponsored National Level Conference on Applied Mathematics: Numerical
   o Analysis, Algebra and Computational Mathematics held at Gudleppa Hallikeri
   o Degree College, Haveri, Karnataka State during 30-31 January 2015.

3. Dr. Danumjaya P, presented a paper on "Nonconforming Finite Element Methods to fourth order nonlinear parabolic type equations" in UGC Sponsored National Level Conference on Numerical Analysis and its Applications held at Gokhale Centenary College, Ankola, Karnataka State during 10-11 January 2014.

4. Dr. Alpesh M Dhorajia presented a paper on "Total Graph of a Certain Ring" in the Conference on Graph Theory, Matrix Theory and Interactions A Conference to celebrate the scholarship of David Gregory, held at Queen's University, Kingston, Ontario, Canada during June 20-21, 2014.

5. Dr. Manoj Pandey, presented a paper on "Exact Solutions of Magnetogasdynamic Equations" in the International Conference on Special Functions & Their Applications (ICSFA 2014).

6. Dr. Anil Kumar presented a paper (with R.B. Sonawane, S.B. Nimse) on "Numerical Optimal Control for Bilinear Hyperbolic PDEs" in the 4th Nirma University International Conference on Engineering (NuiCONE 2013) during November 28 - 30, 2013.

7. Dr. Samanta G. C, presented a paper on "Higher dimensional mesonic string cosmological models in Lyra geometry" in the national level seminars on Exact Solutions of Einstein's Field Equations held at Ernakulam from 11th-Dec-2014 to 12th Dec-2014

8. Dr. Tarkeshwar Singh presented a paper on "d-Distance Neighborhood Magic Graphs" in 3rd International Conference on Discrete Mathematics (ICDM-2013)" held at Karnataka University Dharwad, during June 10-14, 2013.

9. Dr. Danumjaya P, presented a paper on "Mixed Discontinuous Galerkin Finite Element Methods for the Extended Fisher-Kolmogorov (EFK) Equation" in the national conference;"New Vistas in Computational Fluid Dynamics in Engineering" held at NIT Warangal during 27-29th January 2012.

10. Dr. Tarkeshwar Singh, attended and presented a paper entitled "Additively Graceful Signed Graphs" in Twenty first International Conference of FIM on Interdisciplinary Mathematics, Statistics and Computational Techniques IMSCT 2012 – FIM XXI at the Department of Statistics, Panjab University Chandigarh, during Dec. 15-17, 2012.

11. Dr. Samanta G. C, presented a paper on "Bulk Viscous Cosmology in Five Dimensional LRS Bianchi Type –I space time" in the International conference on Mathematical Sciences held at Nagpur, from 28-Dec-2012 to 31-Dec-2012.

12. Dr. Amit Setia and Rajesh K. Pandey presented a paper on " Laguerre Polynomials Based Numerical Method to Solve a System of Generalized Abel Integral Equations" in the International Conference on Modeling Optimisation and Computing during April 10- 11, 2012.

13. Prasanna Kumar presented a paper on "A Note on the Applications of Topology in GIS" in 'GEOMATRIX -12', An International Conference on Geospatial Technologies and Applications held at IIT Bombay during 26-29 February 2012.

14. Raghavendra G S and Prasanna Kumarpresented a paper on "An ACO Framework for Single Track Railway Scheduling Problem" at Seventh International Conference on Bio-

Inspired Computing: Theories and Applications (BIC-TA 2012) held at IITM, Gwalior, India, during December 14 - 16, 2012.

15. Dr. Tarkeshwar Singh, presented a research paper entitled "Graceful Signed Trees" IN THE International Conference on Recent Trends in Graph Theory and Combinatorics (ICRTGC-2010), held at Cochin University of Science and technology, Cochin, during August 12-15, 2010.

External PhD Theses examined:

1. Dr. Tarakeshwar Singh; A Study on Differential Geometry of Some Special Finsler Spaces V.B.S. Purvanchal University Jaunpur, U.P. (Viva-voce Examiner also).
2. Dr. Tarkeshwar Singh; Distances of Graphs and Related Topics, Visvesvaraya Technological University, Belgaum Karnataka,(Viva-voce Examiner also).
3. Dr. Tarkeshwar Singh; Association Scheme in Data Mining using Graph Theory Anna University, Chennai (Viva-voce Examiner also).
4. Dr. Tarkeshwar Singh; DStudies in Visual Cryptography Kalasalingam University, Tamil Nadu, (Viva-voce Examiner also).
5. R. Tarkeshwar Singh; A Study of Inverse, Mixed Block Domination and Related GraphsManipal University, Manipal Karnataka.
6. Dr Anil Kumar, CCS University, Meerut (U.P.) (1-PhD thesis)
7. Dr. Anil Kumar, Kumaun University, Nainital, Uttarakhand (1-PhD Thesis).
8. Dr. Anil Kumar, Gandhigram Rural Institute,Dindigul,Tamil Nadu (2-PhD Theses)

Research Paper Reviewed:

1. Dr. Tarkeshwar Singh; A graph based ranking strategy for automated text summarization, DU Journal of Undergraduate Research and Innovation.
2. Dr. Tarkeshwar Singh; The Structure of SP5 free Graphs, Indian Journal of Pure and Applied Mathematics.
3. Dr. Tarkeshwar Sungh; Magic &AntimagicLabeling of m-copies of Flower Snark and related topics, Discrete Applied Mathematics.
4. Dr. Tarkeshwar Sungh; Super Total Graceful Graphs and a Tree Conjecture, AKCE International Journal of Graphs and Combinatorics.
5. Dr. Tarkeshwar Sungh; Super Total Graceful Graphs, Electronics Note in Discrete Mathematics.
6. Dr. Tarkeshwar Sungh; Odd Mean Labeling of Chain Graphs, Electronics Note in Discrete Mathematics.
7. Dr. Tarkeshwar Sungh; Extending the Class of Super Total Graceful Graphs, Electronics Note in Discrete Mathematics.
8. Dr. Tarkeshwar Sungh; An optimal Algorithm to detect Balancing of Iterated Line Sigraph, Open Journal of Discete Mathematics.
9. Dr. Tarkeshwar Sungh; Zumkeller Cordial Labeling of Graphs, International Conference. on

Computational Intelligence, Cyber Security and Computational Models.

10. Dr. Tarkeshwar Sungh; Some sharp bounds on the degree distance of a graph, Proceedings of the National Academy of Sciences, Physical Sciences.
11. Dr. Samanta G. C; Kantowski-Sachs and Bianchi-Type Models with a General Non-Canonical Scalar Field for Canadian Journal of Physics.
12. Dr. Samanta G. C; A Higher Dimensional Cosmological Model And Quark Confinement for International Journal of Theoretical Physics.
13. Dr. Samanta G. C; Einstein's Gravitational Field Approach to Dark Matter and Dark Energy for Journal of Modern Physics.
14. Dr. Samanta G. C; Solar system's bounds on the extra acceleration of $f(R,T)$ gravity revisitedfor International Journal of Theoretical Physics.
15. Dr. Samanta G. C; Strange quark matter attached to string cloud in general scalar tensor theory of gravitation for International Journal of Theoretical Physics.
16. Dr. Samanta G. C; Bianchi Type - II, VIII & IX cosmological models with strange quark matter attached to string cloud in Brans-Dicke and General theory of gravitation for International Journal of Theoretical Physics.
17. Dr. Samanta G. C; Bianchi type-I string cosmological model with bulk viscosity in bimetric theory of gravitation for International Journal of Theoretical Physics.
18. Dr. Samanta G. C; Bianchi type-VI0 perfect fluid cosmological model in f(R,T) Gravity for International Journal of Theoretical Physics.
19. Dr. Samanta G. C; Bianchi Types II, VIII & IX String Cosmological Models with Bulk Viscosity in Brans-Dicke Theory of Gravitation for International Journal of Theoretical Physics.
20. Dr. Samanta G. C; String cloud and domain walls with quark matter for plane symmetric cosmological model in biometric theory for Journal of Theoretical and Applied Physics.
21. Dr. Alpesh Dhorajia; Cayley sum graphs of ideals of a commutative ring, J. Aust. Math. Soc.
22. Dr. Mayank Goel reviewed a book "Mastering R for Quantitative Finance", PACKT Publishing in academic year 2014-2015.

49. State whether the programme/ department is accredited/ graded by other agencies? If yes, give details. No

50. Briefly highlight the contributions of the department in generating new knowledge, basic or applied.
- Apart from traditional teaching, we are offering various study oriented, computer oriented, lab oriented projects and thesis projects to our students to get knew knowledge in the extended curriculum study.
- We invite renowned mathematicians and our faculties interact with them very closely to come up with some joint papers.

- New knowledge gained/discovered will be shared with the peer mathematicians through publications in journals and paper presentations in conferences.

51. Detail five major Strengths, Weaknesses, Opportunities and Challenges (SWOC) of the department.

Strength:	**Weakness:**
• Faculty with postdoctoral experience from reputed institutions and actively involved in research. • Attractive undergraduate program and quality student input. • Good infrastructure with recently approved DST-FIST Lab for Computational Work. • Organizing invited talks, workshops etc for our students. • Academically diversified student group.	• Not getting sufficient research scholars. • No in-house input to PhD program • Faculty attrition. • Students continuing in core mathematics stream are very few.
Opportunities:	**Challenges:**
• An atmosphere conducive for quality teaching and research. • More interdisciplinary research opportunities. • Availability of potential undergraduate students for research activity. • Attractive offers - Sabbatical Policy, University and Industry Immersion, Research Initiation Grant, Seed Grant, etc. • Collaboration-attractable brand name.	• Faculty retaining. • Greater competitions from Public/Private Universities. • Attracting quality research scholars. • Social and student perspective of education as solely a means of a job.

52. Future plans of the department.

- Increasing the intake and course coverage in undergraduate program.
- Attracting more students to PhD program by proper means.
- Organizing conferences / workshops of national /international level
- Attempt towards generating research funds.
- Establishing new collaborations with industries and researchers in India or abroad.
- Exploring the possibility of establishing a centre of excellence in a specific area like Computational PDE or Algebraic Graph Theory etc.

53. Any other information regarding your department which you would like to include.

Goa Campus: Evaluative Report of the Department
MECHANICAL ENGINEERING

1. **Name of the Department:** Mechanical Engineering

2. **Year of establishment of the Department:** August, 2004

3. **Is the Department part of a School/Faculty of the university?**
   Departments function as independent entities in the university and are not part of any school or faculty.

4. **Names of programmes offered (UG, PG, M.Phil., Ph.D., Integrated Masters; Integrated Ph.D., D.Sc., D.Litt., etc**

On-Campus	UG Programmes (BE Hons)	Mechanical Engineering
	PG Programmes (ME)	Design Engineering M.E. Embedded Systems
	Integrated Masters	Mechanical Engineering to M.E Design Engineering
	Ph.D.	
Off-Campus (Work Integrated Learning Programmes: WILP)	M.Tech	Automotive Engineering
	M.Tech.	Design Engineering

5. **Interdisciplinary programmes and departments involved : Nil**

6. **Courses in collaboration with other universities, industries, foreign institutions, etc.**
   Note: some of our structure courses like Practice School and thesis dissertation are done by our students in industries and universities outside BITS.

7. **Details of programmes discontinued, if any, with reasons**

   M.E Design Engineering programme admissions are temporarily withhold from Ist Semester 2014-2015 due to crunch of faculty from design engineering background

8. **Examination System:** Semester and Choice Based Credit System

9. Participation of the department in the courses offered by other departments: **NIL**

10. Number of teaching posts sanctioned, filled and actual (Professors/Associate Professors/Asst. Professors/others).

	Sanctioned	Filled	Actual number
Professor	Note:	1	1
Associate Professors		2	2
Asst. Professors		7	7
Lecturers		4	4

Note**:The faculty positions for the University is broadly governed by Growth plan which also covers designation-wise breakup with a larger vision. Keeping in mind the fluidity of movement of faculty and proposed student to faculty ratio in each campus for first degree, higher degree as well as Ph.D. programmes, individual department needs are not fixed. Besides, as we are in expansion plan which calls for new programmes, courses being introduced, the demand on faculty in terms of numbers, for each department, is broadly governed by all the above factors and hence it is not possible to have a fixed number of faculty for each department. Recruitment of faculty, therefore, varies, based on departmental needs.

11. Faculty profile with name, qualification, designation, area of specialization, experience and research under guidance

Name	Qualification	Designation	Specialization	No. of Years of Experience	No. of Ph.D. Students Guided for last 4 years	
					Completed	Ongoing
D. M. Kulkarni	Ph. D.	Professor	Design Engineering	20	2	2
P. M. Singru	Ph. D.	Associate Professor	Design Engineering	23.3	5	1
Shibu Clement	Ph. D.	Associate Professor	Aerospace Engineering	12.2	2	2
Sachin Waigaonkar	Ph. D.	Assistant Professor	Manufacturing Engineering	15	0	1
Ranjit S. Patil	Ph. D.	Assistant Professor	Energy, Thermal Engineering and Fluid Mechanics	4.9	0	1
Karthikeyan G.	Ph. D.	Assistant Professor	Micro/macro manufacturing and Materials	6	0	1
Vikas V. Chaudhari	Ph. D.	Assistant Professor	Design Engineering,	12.3	0	1

Varinder Singh	Ph. D.	Assistant Professor	Industrial Engineering	12.5	0	1
Gaurav Singh	Ph. D.	Assistant Professor	Fracture Mechanics	1.5	NIL	
Sandesh Chougule	Ph. D.	Visiting Assistant Professor	Thermal Engineering	0.1	NIL	
Anant C. Kulkarni	M. Tech (Design)	Lecturer	Design Engineering	16	NIL	
Mali Kiran Dinkar	M.E. (Mech) Design	Lecturer	Design Engineering	10.8	NIL	
M Sreedhar Babu	M. Tech.(Energy Systems)	Lecturer	Energy Systems Engineering	6.9	NIL	
PL. Ramkumar	M. E. (CAD)	Lecturer	CAD	9.9	NIL	

12. List of senior Visiting Fellows, adjunct faculty, emeritus professors

Dr. Nikolay Kharchenko (Visiting Professor, 2013-14 Sem-II , Jan 2014-May 2014)

13. Percentage of classes taken by temporary faculty – programme-wise information

Name of Faculty	Course	Percent of classes taken
Dr. Nikolay Kharchenko	Solar thermal process engineering	2.08

14. Programme-wise Student Teacher Ratio

Programme	Student Teacher Ratio
B. E. (Hons.) Mechanical Engineering	32.8
M. E. Design Engineering	1.8

15. Number of academic support staff (technical) and administrative staff: sanctioned, filled and actual

	Technical	Administrative
Sanctioned		
Filled	17	2
Actual	17	2

16. Research thrust areas as recognized by major funding agencies
- Machine Dynamics
- Polymers and Composite Processing
- Thermal and Fluid Science
- MEMS
- Bio-Tribology
- Micro-manufacturing
- Fluidized Bed Heat Exchange

17. Number of faculty with ongoing/completed projects in the last five years from a) national b) international funding agencies and c) Total grants received. Give the names of the funding agencies, project title and grants received project-wise.

Completed projects:

SL No	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration
1	Experimental Investigation of Friction and Wear Mechanism for Hip Prosthesis Material using Multi-Station Orbital Tribometer	D M Kulkarni & A C Kulkarni	DUCOM Instruments Bangalore	15.00	Aug-2012 to Aug-2014

Ongoing projects:

SL No	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Lakhs)	Duration
1	Experimental Investigations of Rotational Moulding Process Using Nano-Scale Fumed Silica Composites	Sachin D.Waigaonkar	Science and Engineering Research Board (SERB), DST, Govt. of India	15.85	Dec-2012 to Dec-2015
2	RO-RO Challenge for c130J aircraft	PM Singru	Lockhead Martin Corporation, USA	15.79	Jan-15 to Dec15
3	Rotational Moulding of LLDPE using Nano scale Fumed Silica Composites.	Sachin D.Waigaonkar	UGC/MHRD	6.00	Dec-2013 to Dec-2015
4	Flow investigation through µED-milled metallic micro channels	G. Karthikeyan	Science and Engineering Research Board (SERB), DST, Govt. of India	21.00	Jun-2014 to Jun-2017
5	Experimental Wear Analysis of an Artificial Hip Implant Materials using Advanced Tribometer Customized for Bio-Tribological Studies	D M Kulkarni & A C Kulkarni	Aditya Birla Science &Technology Center , DST, DUCOM Instruments	57.00	Jun-2012 to Oct-2015

18. **Inter-institutional collaborative projects and associated grants received**
   a) National collaboration   b) International collaboration

Name of Company	Name of Project	Collaboration (National /International)	Grant (Lakhs)
Ducom Instruments, Bangalore	Experimental Investigation of Friction and Wear Mechanism for Hip Prosthesis Material using Multi-Station Orbital Tribometer	National	15.00
Ducom Instruments, Bangalore	Experimental Wear Analysis of an Artificial Hip Implant Materials using Advanced Tribometer Customized for Bio-Tribological Studies	National	57.00

19. **Departmental projects funded by DST-FIST; UGC-SAP/CAS, DPE; DBT, ICSSR, AICTE, etc.; total grants received.**

SL No	Project Name	Funding Agency	Sanctioned Amount (Lakhs)	Duration
1	National MEMS Design Center	NPMASS	30.00	Feb-2011 to Dec-2014
2	Funds for improvement of S and T in fracture for the following areas i. Machine Dynamics ii. Polymers and Composite Processing iii. Thermal and Fluid Science	DST-FIST	80 Contributions : DST 50% + BITS 50%	Dec 2011-Dec 2016

20. **Research facility / centre with**

Sr. No.	Research facility	Recognition
1	National MEMS Design Center	Provided by National Program on Micro and Smart System (NPMASS)

21. **Special research laboratories sponsored by / created by industry or corporate bodies**

Name of Laboratory	Name of Company	Name of Project	Collaboration (National /International)	Grant (Lakhs)
Bio-Tribiology Laboratory	Ducom Instruments, Bangalore	Experimental Investigation of Friction and Wear Mechanism for Hip Prosthesis Material using Multi-Station Orbital Tribometer	National	15.00

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Bio-Tribiology Laboratory	Ducom Instruments, Bangalore	Experimental Wear Analysis of an Artificial Hip Implant Materials using Advanced Tribometer Customized for Bio-Tribological Studies	National	57.00

22. Publications:

Sl No.	Details	Specify number here
1	Number of papers published in peer reviewed journals (national / international)	69
2	Monographs	-
3	Chapters in Books	6
4	Edited Books	1
5	Books with ISBN with details of publishers	1 Publisher: PHI Learning Pvt. Ltd., New Delhi ISBN:978-81-203-3783-1
6	Number listed in International Database (For e.g. Web of Science, Scopus, Humanities International Complete, Dare Database - International Social Sciences Directory, EBSCO host, etc.)	60
7	Citation Index – range / average	Avg=36.70, Range=1 to 137
8	SNIP	1.11
9	SJR	0.67
10	Impact Factor – range / average	0.98
11	h-index	7.00

Details of the publications as per the number give above (Give details in the last five years
List of Journal Publications:

Sl No.	Authors	Title of the Publications	Details of the Journal	National/International	Year
1	R.S. Patil, M. Pandey, P. Mahanta	Effect of Scale-up on Lower and Middle Splash Region on Heat Trasnfer Characterisitcs of Circulating Fluidized Bed Risers	Part A, IMechE Journal, 224(8), 1059-1068	International	2010

2	R.S. Patil, P. Mahanta, M. Pandey	Effect of Scale-up on Heat Transfer Characterisitcs of Cyclone Separators of Circulating Fluidized Beds	International Energy Journal, 35(3), 485-494.	International	2010
3	Chaudhari, V. V., Kulkarni, D. M. and Prakash, R.	Three- dimensional finite element analysis of fracture behavior in general yielding fracture mechanics.	Journal of Mechanical Engineering, Strojnícky Časopis, 61, č. 3, 131-148 (2010).	International	2010
4	Kumar, A., Clement, S. and Agrawal, V. P.	Structural modeling and analysis of an effluent treatment process for electroplating – A graph theoretic approach.	Journal of Hazardous Materials, 179, 748-761.	International	2010
5	G. Karthikeyan, J. Ramkumar, S. Dhamodaran and S. Aravindan	Micro ED-Milling Process Performance: An Experimental Investigation	International Journal of Machine tools and Manufacture , 50(8), 718-727.	International	2010
6	Kumar, A., Clement, S. And Agrawal, V. P.	Attribute Based Design Specification, Comparison and Selection of Electroplating Waste Treatment System Using MADM Approach	Journal of Tribology and Surface Engineering, 1, 263-286.	International	2010
7	G. Karthikeyan, K. Sambhav, J. Ramkumar and S. Dhamodaran	Simulation and Experimental Realization of μ-channel by μED-milling Process	Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture, 225(12), 2206-2219.	International	2011
8	S. Kanmani Subbu, G. Karthikeyan, J. Ramkumar and S. Dhamodaran	Plasma characterization of dry μ-EDM	The International Journal of Advanced Manufacturing Technology, 56(1-4), 187-195.	International	2011
9	R.S. Patil, M. Pandey, P. Mahanta	Parametric Studies and Effect of Scale-up on Wall-to-Bed Heat Transfer Characteristics of Circulating Fluidized Bed Risers	Experimental Thermal and Fluid Science , 35(3), 485-494.	International	2011
10	Babu B.J.C., Waigaonkar S.D. and Rajput A.	Experimental investigations and optimization of processibility of sheet molding compound	Journal of Polymer Engineering, 31(2-3), 309-317.	International	2011

11	Chaudhari, V. V., Kulkarni, D. M. and Prakash, R.	Determination of critical CTOD using crack flank opening angle method in general yield regime.	Fatigue and Fracture of Engineering Materials and Structures, 34, 260- 269 (2011).	International	2011
12	R.D. Naik and P. M. Singru	Resonance stability and chaotic vibration of a quartercar vehicle model with time delay feedback	Communications in nonlinear science and numerical simulation, Volume 16, Issue 8, August 2011, Pages 3397-3410	International	2011
13	Dillip K. Mohanty & Pravin M. Singru	Use of C-Factor for monitoring of fouling in a shell and tube heat exchanger	Energy. Volume 36, Issue 5, May 2011, Pages 2899- 2904	International	2011
14	Kumar, A., Clement, S. and Agrawal, V. P.	Quality Modeling and Analysis of Electroplating System Using Graph Theory Matrix Approach	International Journal of Productivity and Quality Management, 8, 85-112. (Inder Science Publication)	International	2011
15	Kumar, A., Clement, S. and Agrawal, V. P.	Concurrent Design of Electroplating System for X-Abilities: A Graph Theoretic Approach	International Journal of Industrial and Systems Engineering, 9, 350-371 (Inder Science Publication)	International	2011
16	Kumar, A., Clement, S. and Agrawal, V. P.	Optimum Selection and Ranking of Electroplating System Process Parameters: Taguchi-MADM Approach	International Journal of Applied Decision Science, 4, 341-361 (Inder Science publication)	International	2011
17	Kiran C.P, Shibu Clement and Agrawal V.P.	X-abilities based concurrent design and evaluation of mechatronic system	Journal of mechatronics and intelligent manufacturing, Vol.2, pp.115-127. (Nova Publication, USA)	International	2011
18	Kiran C.P., Shibu Clement and Agrawal V.P.	Design for x-abilities of a mechatronic system-a concurrent engineering and graph theoretic approach	Concurrent engineering- research with applications, Vol.19, pp.55-69.	International	2011
19	Kiran C.P., Shibu Clement and Agrawal V.P.	Coding, evaluation and selection of a mechatronic system	Expert system with application, Vol.38, pp.9704-9712	International	2011

20	Waigaonkar S.D., Babu B.J.C. and Rajput A	Curing studies of unsaturated polyester resin used in FRP products	Indian Journal of Engineering and Material Sciences, Vol.18, pp.31-39	National	2011
21	M. Sreedhar Babu, Shibu Clement, N.K.S. Rajan	Biomass Based Green Technologies-Potential and Sustainability	Bio-energy India Magazine, Issue 9 and 10, pp. 20-23.	National	2011
22	Kiran D. Mali and Pravin M. Singru	Determination of The Fundamental Frequency Of Perforated Plate With Rectangular Perforation Pattern of Circular Holes by Negative Mass Approach for the Perforation	"International journal of Advanced Materials Manufacturing and Characterization. ,Vol.1(1), pp 105- 109. (ISSN 2277-3886)	International	2012
23	Varinder Singh & Pravin M. Singru	Analysis of Restructuring in a Manufacturing system using Graph Theoretic Model	Journal of Manufacturing Technology Management,Vol. 24(4) pp. 615-636	International	2012
24	Rajput A., Ghosh N.N. and Singru P.M	Synthesis, characterization and properties of flexible magnetic nanocomposites of CoFe2O4-polybenzoxazine- LLDPE	Journal of Applied Polymer Science, Volume 128, Issue 6, 15 June 2013, Pages: 3726–3733	International	2012
25	Dillip Kumar Mohanty and P M Singru	Numerical method for heat transfer and fouling analysis of a shell and tube heat exchanger using statistical analysis	Korean J. Chem. Eng., Springer, Vol. 29(9), 1144-1150, 2012	International	2012
26	Mali K.D.and Singru P.M	An analytical model to determine fundamental frequency of free vibration of perforated plate by using unit step functions to express non homogeneity	Journal of Vibro-Engineering, Vol 14, Issue 3, pp 1292-1296	International	2012
27	G. Karthikeyan, J. Ramkumar, Shalabh and S. Aravindan	Performance analysis of µEDmilling process using various statistical techniques	International Journal of Machining and Machinability of Materials, Vol. 11 (2), pp. 183-203	International	2012

28	Indrani Sen, G. Karthikeyan, J. Ramkumar and R. Balasubramaniam	A study on machinability of B-modified Ti-6Al-4V alloys by EDM	International Journal of Materials and Manufacturing Processes,Vol. 27 (3), pp. 348-354	International	2012
29	G. Karthikeyan, Anuj K. Garg, J. Ramkumar and S. Dhamodaran	A microscopic observation of machining behavior in µED-milling process	Journal of Manufacturing Processes, Vol. 14(3), pp. 297-306	International	2012
30	G. Karthikeyan, K. Sambhav, D. Santhosh and J. Ramkumar	CAD Based Modeling and Prediction of Tool Wear in µED-milling	International Journal of Manufacturing Technology Research ,Vol. 4(2),pp21-34	International	2012
31	R.D. Naik and P. M. Singru	"Stability and Hopf bifurcation of a Nonlinear oscillator with multiple time-delays"	Chaos, Solitons & Fractals Volume 45, Issue 11, November 2012, Pages 1387-1396.	International	2012
32	Kiran C.P., Shibu Clement and Agrawal V.P.	Quality modeling and analysis of a mechatronic system	International Journal of Industrial Systems, Vol. 12, No. 1, pp.1-28. (Inderscience publication)	International	2012
33	D.M. Kulkarni and Vikas Chaudhari	Failure Analysis and Prevention: A Course for Undergraduates	Bulletin of Marine Science and Technology. Tolani Maritime Institute, Pune Vol.7(1), pp.27–29 (2012).	National	2012
34	PL. Ramkumar, D.M. Kulkarni and Sachin D. Waigonkar	Effct of Cycle Time on Mechanical Properties of LLDPE during rotational moulding process	Journal of Polymer Research, Nova. Vol: 8, issue: 1, pp 19-33	International	2013
35	Kiran D. Mali, Pravin M. Singru	An Analytical Model to Determine Fundamental Frequency of Free Vibration of Perforated Plate by Using Greatest Integer Functions to Express Non Homogeneity	Advanced Materials Research Vols. 622-623 (2013) pp 600-604, Trans Tech Publications, Switzerland, doi:10.4028/www.scientific.net/AMR.622-623.600	International	2013
36	Rajput A., Ghosh N.N. and Singru P.M	Preparation of flexible magnetic nanocomposites of 3 linear low-density polyethylene-polybenzoxazine-magnetic nanoparticles 4 and their mechanical and magnetic	Journal of Nanoscience Letters,Vol.3(26),pp.1-10.	International	2013

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		properties			
37	Kiran D. Mali, Pravin M. Singru	"An Analytical Model to Determine Fundamental Frequency of Rectangular Plate Having Rectangular Array of Circular Perforations	Journal of Vibro-Engineering Vol 15, pp.588-596	International	2013
38	Kiran Mali and Pravin Singru	"Determination of the fundamental frequency of perforated rectangular plates: concentrated negative mass approach for the perforation	Advances in Acoustics and Vibration, Vol. 2013,pp.1-6., Article ID 972409, doi:10.1155/2013/972409	International	2013
39	Kiran C.P. and Shibu Clement	Surface quality investigation of turbine blade steels for turning process	Measurement, Vol. 46, No. 6, pp.1875-1895	International	2013
40	Kiran C.P., Shibu Clement and Agrawal V.P.	Mechatronic system reliability modeling and analysis	International Journal of Reliability and Safety, Vol. 7, No. 2, pp.128-155.	International	2013
41	PL. Ramkumar, D.M. Kulkarni and V.V.Chaudhari	Parametric and Mechanical Characterization of Linear Low Density Polyethylene (LLDPE) Using Rotational Moulding Technology	Journal of sadhana, Springer,Vol: 39, issue: 3, pp. 625-635.(2014)	International	2014
42	PL. Ramkumar, D.M Kulkarni	Objective Based Multiple Attribute Decision Making Method for Plastic Manufacturing Process Selection	International journal of manufacturing technology and management, Inderscience, Vol: 28, issue: 4/5/6, pp.184-199.	International	2014
43	PL.Ramkumar, D.M.Kulkarni, V.V.R Abhijit and Aditya Cherukumudi	Investigation of Melt Flow Index and Impact Strength of Foamed LLDPE for Rotational Moulding Process.	Procedia Materials Science. Vol: 6, issue: 3, pp. 361-367.	International	2014
44	G. Karthikeyan, J. Ramkumar and S. Dhamodaran,	Block EDG: Issues and Applicability in multiple pass μED-milling	Machining Science and Technology (MST), Taylor & Francis,Vol.18(1),pp 120-136	International	2014

45	Garg, A., Tai, K., Vijayaraghavan, V. and P. M. Singru	Mathematical Modelling of Burr Height of the Drilling Process Using a Statistical Based Multi-Gene Genetic Programming Approach	International Journal of Advanced Manufacturing Technology, Volume 73, Issue 1, pp 113-126	International	2014
46	Kiran Mali and Pravin Singru	Determination of modal constant for fundamental frequency of perforated plate by Rayleigh's method using experimental values of natural frequency	International Journal of Acoustics and Vibration, (Accepted)	International	2014
47	Garg, A., Vijayaraghavan, V. and Singru, P.M"	An Integrated Computational Approach for determining the Elastic Properties of Boron Nitride Nanotubes	n International Journal of Mechanics and Materials in Design, Vol. 11(1),pp.1-14	International	2014
48	Dillip Kumar Mohanty and P M Singru,	Fouling analysis of a shell & tube heat exchanger using local linear wavelet neural network"	International Journal of Heat and Mass Transfer, Elsevier, Vol. 77, pp. 946-95.	International	2014
49	A Garg, V Vijayaraghavan, C H Wong, K Tai, K Sumithra, K Sumithra, Pravin M. Singru, Leehter Yao,	Application of artificial intelligence technique for modeling elastic properties of 2-D nanoscale material", Molecular simulation"	Molecular Simulation, Vol. 41, (14), pp. 1143-1152	International	2014
50	Kiran Mali and Pravin Singru	"On The Use of Greatest Integer Function to Express Material Property Variation in Free Vibration Problem of Simply Supported Square Plates with Square Array of Circular Perforations	Procedia Material Science, Vol. 6, pp. 409 – 416.	International	2014
51	V. Vijayaraghavan, A. Garg, C. H. Wong, K. Tai, K. Pravin M. Singru, and L. Gao	"On the Study of Machining Characteristics of 2-D Nanoscale Material	Nanoscience Nanotechnology Letters. 6, 1079-1086 (2014)	International	2014
52	A Garg, V Vijayaraghavan, K Tai, Pravin M. Singru, L. Gao and K.S. Sangwan	An ensemble evolutionary approach in evaluation of surface finish reduction of vibratory finishing process	Engineering Computations, Vol. 32 (5), pp.1214 - 1229	International	2014
53	P. Kousik, Pravin M Singru and Narayan manjrekar	Comparing PID and H-∞ Controllers on a 2-DoF Nonlinear Quarter Car Suspension System	Journal of Vibro-Engineering, Vol. 16(8),pp. 3977-3990	International	2014

54	R. Femi, Shibu Clement, Anita Agrawal and A. Amalin Prince	Investigation of Microelectromechanical Switches for Next Generation DC Power Distribution System	International Journal of Emerging Electric Power Systems (IJEEPS), Vol. 15, No. 6, pp. 591–605	International	2014
55	Gaurav Singh, James Kermode, Alessandro De Vita & Robert W. Zimmerman	Validity of the infinitesimal strain theory in the crack-tip region	International Journal of Fracture 189: 103-110	International	2014
56	Gaurav Singh & Robert W. Zimmerman	Modification of Griffith-McClintock-Walsh model for crack growth under compression to incorporate stick-slip along crack faces	International Journal of Rock Mechanics & Mining Sciences 72: 311-318	International	2014
57	Gaurav Singh & Jonathan B. Hopkins	General selection of lattice shape in ductile-reinforced brittle structures for increased stiffness	Composite Structures (2015) 131: 325-332	International	2015
58	Girish Chandran V and Sachin Waigaonkar	Rheological and Dynamic Mechanical Characteristics of Linear Low Density Polyethylene (LLDPE) – Fumed Silica Nano Composites for Rotational Molding	Polymer Composites,(Accepted). DOI: 10.1002/pc.23496	International	2015
59	Girish Chandran V and Sachin Waigaonkar	Mechanical Properties and Creep Behavior of Rotationally Moldable Linear Low Density Polyethylene-Fumed Silica	Polymer Composites, (Accepted) DOI: 10.1002/pc.23600	International	2015
60	Chaudhari, V. V., Kulkarni, D. M.	Influence of Loading Rate on Fracture Behaviour of Extra Deep Drawn Steel Sheets	Fatigue and Fracture of Engineering Materials and Structures, 38, 851- 859 (2015).	International	2015
61	Raghavendra D. Naik & Pravin M. Singru	Stability of a Nonlinear Quarter-Car System with Multiple time-Delays"	International Journal of Acoustics and Vibration, Vol. 20, No. 2, 2015, pp 90-94	International	2015
62	V Vijayaraghavan, A. Garg, C.H Wong, K. Tai, Pravin M. Singru"	Investigation of Mechanical Strength of 2-D Nanoscale Structures using a Molecular dynamics based computational intelligence approach	International Journal of Modern Physics Letters B. 29, 1450242 (2015) [18 pages] DOI: 10.1142/S0217979214502427	International	2015

63	Venkatesh Vijayaraghavan, Akhil Garg, Chee How Wong, Kang Tai, K Sumithra, Liang Gao, Pravin M Singru	Combined CI-MD approach in formulation of engineering moduli of single layer graphene sheet	Simulation Modelling Practice and Theory(July 25, 2014) , 48 (2014) 93–111	International	2015
64	Vijayaraghavan, V., Garg, A., Wong, C.H., Tai, K., Singru, M. Pravin, Gao L and Sangwan S. K	A Molecular Dynamics Based Artificial Intelligence Approach for Characterizing Thermal Transport in Nanoscale Material	Thermochimica Acta. Vol. 594, pp. 39-49	International	2015
65	A. Garg , V. Vijayaraghavan ,Jasmine Siu Lee Lam , Pravin M Singru, Liang Gao	"A Molecular Simulation Based Computational Intelligence Study of a 2 Nanomachining Process with Implications on its Environmental 3 Performance	Swarm and Evolutionary Computation. Volume 21, April 2015, Pages 54–63. (http://www.sciencedirect.com/science/article/pii/S2210650215000115)	International	2015
66	Nikilesh Krishnakumar, Vishal Jain , Pravin M. Singru	Development of predictive model for vibro-acoustic condition monitoring of lathe	Journal of Vibroengineering, Vol. 17(1), pp. 229-242	International	2015
67	Akhi Garg, V Vijayaraghavan, Kang Tai, Pravin M Singru, Vishal jain, Nikilesh Kumar	Model Development based on Evolutionary framework for condition monitoring of a lathe machine	Measurement , Vol. 73, pp95-110	International	2015
68	V. Vijayaraghavan, A. Garg, P.M Singru and L. Gao	Formulation of Energy Consumption model for Manufacturing by Combined Evolutionary computing Approach	Measurement. Vol.75, pp. 171-179	International	2015
69	Meghanath Prabhu, Sachin Waigaonkar, Regina Dube, Dirk Walther and Srikanth Mutnuri	Anaerobic co-digestion of food waste and septage A waste to energy project in Nashik city	Carbon – Science and Technology,Vol. 7(2),pp.87-98	National	2015

23. Details of patents and income generated: Nil

24. Areas of consultancy and income generated

Sr No	Name of the Industry	Title of the Project	Completed/ Ongoing	Project Duration	Amount
1	BTCL Composites Goa	Analysis of FRP Sectional Panel Tanks	Completed	1/1/2013 to 1/07/2013	50,000/-
2	M/s.Park sintech (Verna Industrial Estate) Goa	Component dimensional measurement on Coordinate measuring machine	Completed	28/12/12, to 16/02/13	4800/-
4	M/s Jaihind Projects Limited, Tivim - Goa	Destructive testing of LR Pipe 90◦ bend of dia 4" & thickness 7.9mm	Completed	22/06/13 to 04/07/13	35,130/-
5	Padre Conceicao College of Engineering, Verna - Goa	Hardness Test of Polymer Composite material specimens	Completed	12/09/13 to 09/04/14	10,893/-

25. Faculty selected nationally / internationally to visit other laboratories / institutions industries in India and abroad.

Sr. No.	Faculty	Industry/Lab Visited/Institution	National/International
1	Ranjit Patil	IIT Guwahati (INSA Fellowship)	National

26. Faculty serving in National committees b) International committees c) Editorial Boards d) any other (please specify)

Name of the Faculty	Serving In National committees
Ranjit S Patil	UPSC, India

27. Faculty recharging strategies (UGC, ASC, Refresher / orientation programs, workshops, training programs and similar programs).

1) Research Initiation Grant

The Research Initiation Fund is designed to enable the beginning of research and related activities for a newly recruited faculty who has significant potential to attract external

funding. The grants shall be awarded soon after joining BITS for up to Rs. 2 Lakhs and the amount should be spent within 24 months of appointment.

Recipients: Dr. Ranjit Patil, Dr. Sachin Waigaonkar

2) Seed Grant Scheme

The Seed Grant scheme is designed to stimulate competitive research in strategic areas of national or international importance, to promote innovative product and technology development, and/or to facilitate the start of research programs which will potentially develop into creative ventures on their own through external funding. The grant shall be awarded with a maximum value of Rs.20 Lakhs. The duration of the Grant will be 2 years.

3) Chair Professorship

A Chair Professorship helps recognize and reward excellence in teaching and/or research by a member of the BITS Pilani faculty at either of its campuses or to induct a professor from outside BITS, Pilani. Such a person would be re-designated as Chair Professor, Each "Chair Professorship" also helps establishment an endowment with significant funds that are used to (a) make available to the Chair Professor a "research grant", and (b) provide to him/her a small honorarium to cover additional effort required to fulfill the charter laid out for the endowment.

4) OPERA Award

The awards named OPERA awards (for "Outstanding Potential for Excellence in Research and Academics") are to facilitate and incentivize new faculty to join BITS and excel in research and teaching. The award is in the form of a "joining bonus" paid over 5 years, plus funds to kick-start their R&D and professional development. The award will help compensate new faculty (or provide R&D funds) at par with the best institutions in India.

Recipients: Dr. Ranjit Patil, Dr. Gaurav Singh

5) Professional Development Allowance: The institute provides Rs 100,000/- to each faculty member for expenses related to research, conference registration etc.

6) Industry Day: The institute has engaged in intensifying its contact with industry to leverage industry sponsored projects to keep faculty competence in line with industry and societal needs.

7) Visits of eminent scholars to various departments as well as the organization of conferences and workshops by the department together with other national and international professional societies to help create platforms and forums for exchange of ideas and knowledge in the upcoming fields of science and technology.

8) The institute provides financial support to initiate such events and also facilitates financial support to lectures and tenured faculty members to participate in national and international seminars/workshops/schools/ conferences etc.

9) Our faculty members have actively engaged with industries through industry immersion programme of BITS Pilani. Prof. P. M. Singru, Dr. Ranjit S Patil, and Dr. Sachin Waigaonkar were worked at Tata Technologies Pune, Mahankali Sugar Factory Sangli, and GMI Zarahak Moulders Pvt. Ltd. Verna, Goa, respectively.

10) The details of the Workshop/Training programmes attended by the Faculty

Name of the Faculty	Workshops	Staff training conducted by the BITS-Pilani university
K. D. Mali	TEQIP-II sponsored Three day National workshop on Dynamics of Machines and structure 2014(Jan 29 To 31st). N.I.T. Surathkal, Karanataka	**[1]** Introductory Scilab Workshop for Research Scholars and Faculty members during 9-10 July 2012. **[2]** Two days Introductory Workshop on MATHEMATICA 24th-25th July 2013.
Shibu Clement		[1] Introductory Scilab Workshop for Research Scholars and Faculty members during 9-10 July 2012. [2] Two days Introductory Workshop on MATHEMATICA 24th-25th July 2013.
Varinder Singh		(1) Workshop on Effective Teaching and Learning during 18th-20th July, 2015 @ BITS Pilani KK Birla Goa Campus (2) Workshop on MatLab on 24th July, 2015 at BITS Pilani KK Birla Goa Campus (3)Training Workshop on simulation in industrial environments using FlexSim held during 26th-28th March, 2015 at BITS Pilani Hyderabad Campus
PL. Ramkumar		**[1]** Introductory Scilab Workshop for Research Scholars and Faculty members during 9-10 July 2012. **[2]** Two days Introductory Workshop on MATHEMATICA 24th-25th July 2013.
M. Sreedhar Babu	1) Advanced engine combustion and emissions control, 17th to 22nd July 2012 at Indian Institute of Technology, Kanpur (IIT-Kanpur), Uttar Pradesh, India 2) Cutting edge technologies for	1) Introductory workshop on SCILAB, 9th to 10th July 2012 at BITS Pilani-Goa Campus, Organized by Dept. of Mathematics, BITS-Goa Campus. Goa. India.

	diesel engines, 20th to 22nd March 2013 at National Institute of Technology, Karnataka (NIT-K), Surathkal, Karnataka, India. 3) Combustion Modeling and Diagnostics, 7th to 11th Oct. 2013, Organized by Dept. of Mechanical Engineering, Indian Institute of Technology, Indore (IIT-Indore), Indore. Uttar Pradesh. India. 4) ANSYS-CFD, 15th to 18th Dec. 2014, Organized by Department of Mechanical Engineering, BITS Pilani-Goa Campus, in association with Innovent Engineering, Pvt. Ltd. Bangalore.	2) Introductory workshop on MATHEMATICA, 24th to 25th July 2013 at BITS Pilani-Goa Campus, Organized by Dept. of Mathematics. BITS-Goa Campus. Goa, India.
Ranjit S. Patil	**1)** Frontier Energy Research with Industry Academia Partnership (FERIP) 2015" organized by Centre for Energy, Indian Institute of Technology (IIT) Guwahati, held on 20-21st March 2015. **2)** Advanced Biomass Thermal Conversion Processes" organized by CSIR- Central Mechanical Engineering Research Institute, Durgapur, held on 18-19th December 2013.	
Sachin Waigaonkar	Future Composites Technology for Wind Mill Blades, IIT Delhi October 8-9, 2012	
G. Karthikeyan	Attended CAE workshop conducted by IIT madras between 22-24, December, 2013. The talk was given my eminent Professor S. S. Rao on the topic "Engineering Optimization Theory and Practice".	Training Workshop on simulation in industrial environments using FlexSim held during 26th-28th March, 2015 at BITS Pilani Hyderabad Campus

28. **Student projects**
- **percentage of students who have done in-house projects including inter-departmental projects:** 100 percent

  - **percentage of students doing projects in collaboration with other universities /industry / institute:** 100 percent

29. **Awards / recognitions received at the national and international level by**
   Faculty
   - Prof. D. M. Kulkarni received'Prof. S. Venkateswaran Faculty Excellence Award 2012' for academic excellence (in Teaching, Research) and Contribution to Institution Development
   - Dr. Ranjit S. Patil received INSA Visiting Scientist Fellowship Award by Government of India, 2014 -2015
   - **Doctoral / post doctoral fellows: NIL**
   - **Students**

S.N.	Name	ID No	Type of Scholarship
1	Abhishek Ravi	2008A4PS056G	DAAD
2	Saagar Gadhok	2008A4PS290G	The Mitacs Globalink Research Award
3	Nikilesh Krishnakumar	2011A4PS220G	S. N. Bose Scholarship
4	Shah Ujash Dipakbhai	2012A4PS134G	ASME Power Division Scholarship
5	Pai Raikar Praharsh pravin	2012A4PS012G	The Mitacs Globalink Research Award
6	Shah Ujash Dipakbhai	2012A4PS134G	S. N. Bose Scholarship

30. **Seminars/ Conferences/Workshops organized and the source of funding (national/ international) with details of outstanding participants, if any.**

Sl. No.	Title	Date	Name of the Funding Agency
1	International Conference on Emerging Miniaturized Technology Micro to Nano ETMN 2013	Feb 22-23, 2013 at BITS Pilani, K.K. Birla, Goa	Funded by CSIR and Industries(NIYO,COMSOL,MACWIN ,ACCURION,RAITH,ZETA INSTRUMENTS,RISE,SWEM)
2	AICTE sponsored Winter School on "Industrial Applications of Mechatronics	Mechanical Department in collaboration with Agnel Polytechnic, Verna, Goa has organized AICTE sponsored Winter School during 16th-29th Dec, 2013 at BITS Pilani, K.K. Birla, Goa	Sponsored by AICTE
3	Four Days workshop on Computational Fluid Dynamics (CFD)	Jan 2-5, 2013 at BITS Pilani, K.K. Birla Goa Campus	Sponsored by BITS-Pilani
4	Faculty Development Program for Engineering and Technical courses in collaboration with Confederation of Indian Industry	Sep 27-28, 2012	Funded by Confederation of Indian Industry (CII)

31. **Code of ethics of research followed by the Department**.
    The department follows the code of ethics specified by the Institute.

32.   a) Student profile programme-wise:

Academic Year	Name of the Programme	Applications Received	Selected		Pass percentage*	
			Male	Female	Male	Female
2010-2011	B.E. Mechanical Engineering	139234 Applications Received for FD, 4428 Applications received for HD & 425 Applications received for PhD	73	6	100%	100%
	M.E. Design Engineering		11	0	100%	100%
	Ph.D. (Sem I)		0	0	NA	NA
	Ph.D. (Sem II)		0	0	NA	NA
2011-2012	B.E. Mechanical Engineering	123677 Applications Received for FD, 4571 Applications received for HD & 461 Applications received for PhD	80	0	100%	100%
	M.E. Design Engineering		8	0	100%	100%
	Ph.D. (Sem I)		0	0	NA	NA
	Ph.D. (Sem II)		1	0	NA	NA
2012-2013	B.E. Mechanical Engineering	136904 Applications Received for FD, 4825 Applications received for HD 23	78	1	100%	100%
	M.E. Design Engineering		10	0	100%	100%
	Ph.D. (Sem I)		0	0	NA	NA
	Ph.D. (Sem II)		0	0	NA	NA
2013-2014	B.E. Mechanical Engineering	166260 Applications Received for FD, 5549 Applications received for HD 96	78	2	100%	100%
	M.E. Design Engineering		9	1	100%	100%
	Ph.D. (Sem I)		0	0	NA	NA
	Ph.D. (Sem II)		3	0	NA	NA
2014-2015	B.E. Mechanical Engineering	186181 Applications Received for FD, 5172 Applications received for HD 0	70	4	100%	100%
	Ph.D. (Sem I)		0	0	NA	NA
	Ph.D. (Sem II)		0	0	NA	NA

*BITS follows a credit based system and cafeteria approach in offering of courses. Students not performing well are monitored by ACB (Academic Counselling Board), HDCC (Higher Degree Counselling Cell) and ACC (Academic Counselling Cell). Their pace is slowed down. Normally not more than 3% students (including all programmes, B.E., M.Sc, and M.E. .) at a given point of time are under the purview of ACB.

33.   b) Diversity of students

Name of the Programme (refer to question no. 4)	% of students from the same university	% of students from other universities within the State	% of students from universities outside the State	% of students from other countries
Ph. D.	43	NIL	47	NIL

34.   How many students have cleared Civil Services and Defense Services examinations, NET, SET, GATE and other competitive examinations? Give details category-wise.

We do not capture this information through any formal process.

35.   Student progression

Student progression	Percentage against enrolled
UG to PG	15 to 20%*
PG to M.Phil.	**Nil**
PG to Ph.D.	4%*
Ph.D. to Post-Doctoral	Not available
Employed • Campus selection • Other than campus recruitment	89.60 **Not available**
• Entrepreneurs	0.7*

*We do not capture this information through any formal process.

36.   Diversity of staff

Percentage of faculty who are graduates	
of the same university	28.57 %
from other universities within the State	
from universities from other States from universities outside the country	71.42 %

37. **Number of faculty who were awarded M.Phil., Ph.D., D.Sc. and D.Litt. during the assessment period**

Sr. No.	Name of faculty	Year of award
1	Sachin Waigaonkar	2010-11
2	Abhishek Kumar	2011-12
3	C.P. Kiran	2012-13
4	D. K. Mohanty	2013-14
5	Varinder Singh	2013-14
6	Vikas Choudhary	2013-14
7	Raghavendra Naik	2014-15

38. **Present details of departmental infrastructural facilities with regard to**

a) Library

The central library includes a digital library with internet access terminals. The whole building of the library is covered by Wi-Fi connectivity. The Library has a good collection of over 2000 books on Mechanical Engineering subjects. This Campus subscribes to 96 print journals, domestic as well as international Subscriptions to important digital libraries like IEL online, Science Direct, ASME, Proquest and AEA Online Journals etc. provide access to thousands of online journals to students and researchers.. Several dozens of educational CDs, audio/video cassettes and question banks are also made available. The textbook section provides all prescribed texts and reference books. From 2004 to 2014, the Library transactions, stock accounting and its entire house keeping activities had been automated using the proprietary LibSyS Library Management Software. In late 2013, a decision was made to shift to LibLime Koha, a Free and Open Source Software (FOSS) system. After due preparation, the actual migration was effected in the 2014 summer vacation, entirely through the in-house efforts of the Library staff and the CS-Dept Library Committee faculty member. The shift has proved to be successful as well as welcomed by the end users, students and researchers alike, and now the software system is becoming something like a social networking platform for library users to share academic resources and use them more productively, rather than just an office automation system. The other two campuses in India have been emboldened in their plans and efforts to make a similar shift. Plans are afoot to make an integrated library portal using the same Koha installation for all these three campuses. One of the chief advantages of Koha, apart from the freedoms associated with FOSS, is that the entire database and transactions are available through ordinary web-browsers,

making it possible to combine all the other networking and social networking tools with the library system. We have an active Library Committee on which every department is represented, and this committee decides policies and allocations and oversees their implementation.

b) Internet facilities for staff and students

Internet facilities to Staff (and faculty): Unlimited access is provided to staff and faculty at their office as well as residence. Wi-Fi connectivity is provided to the complete academic area. The bandwidth provided to faculty is 100Mbps on a 10Gbps backbone (for intranet). Internet facilities to Students: All students are provided intranet (10Gbps back bone), internet (300Mbps provided by Vodafone, GWave and TATA) and Wi-Fi in all hostels with per day download limit of 800MB for under graduate students and 1GB for post graduate students and Ph.D. scholars.

c) Students' laboratories

S. N.	Teaching Lab Title
1	IC Engines
2	Fluid Machines
3	Thermal Science
4	Material Testing
5	Workshop
6	Pneumatic and Automation
7	Computer Aided Design (In computer Center)
8	Dynamic and Vibrations
9	Mechanical Engineering Lab

d) Research laboratories

S. N.	Research Lab Title	Details
1	Polymer & Composite Processing	Dynamic Mechanical Analyser (Q 800 TA Instruments), Melt Flow Indexer (Dynisco USA),Single Screw extruder with Torque Rheometer (customized),Universal testing Machine (0-10 KN) for polymers, Izod and Charpy Impact Tester for polymers, Rotational Moulding Machine, TEMPLOGGER IAT measuring Device for Rotational Moulding
2	Unconventional Machines	Electric Discharge Machine
3	Bio-Tribology	1] Multi-Station Orbital Tribometer (DUCOM Make) 2] Advanced Tribometer Customized for Bio-Tribological Studies
4	CNC	Vertical Machining Center, CNC Lathe, Coordinate Measuring Machine, Roughness Testing Machine, Ultra Sonic Flaw Detector, Rapid Proto Typing Machine(3D Printer for ABS Material), CNC Milling & Turning Simulation Software.

5	Dynamics and Vibration	Sound level meter, 8 channel Vibration Analyser with accompanied softawre, Electrodynamics shaker (445N), accelerometers (single & tri-axial), microphones,Hand Arm & Whole Body Exposure Measurement and Analyzer System along with Accessories and software, impact hammer, 2 channel vibration analyser with modal anlysis software , ANSYS, MATLAB
6	National MEMS Design Center (NPMASS)	COVENTORWARE, COMSOL (Class room & Research), iNTELLISUIT
7	Wind Tunnel Facility	Low-speed wind tunnel (Max speed : 50 m/s, Test Section : 0.6 m X 0.6 m X 2.0 m), Scanivalve pressure scanner (16 channels, -+10 inch water)
8	IC Engine Research Rig	Greaves Cotton (model # 1533), Single cylinder, 4 stroke modified SI engine. Equipped with piezo-electric transducer (Kistler make, 2 MHz sampling frequency per channel) and Crank angle encoder (1 deg. resolution, Kubler - Germany make). Availability of Interface conversion kit for Natural Gas, Producer Gas and LPG.
9	Material Science lab	KD-2 Pro (Decagon Devices), Viscometer (LVDV 2T CP, Brookfield) and Upright microscope (Leica)

39. List of doctoral, post-doctoral students and Research Associates

a) from the host institution/university

Sr. No.	Name of faculty	Year of award
1	Abhishek Kumar	2011-12
2	C.P. Kiran	2012-13
3	Varinder Singh	2013-14

b) from other institutions/universities

Sr no.	Name of the Student
1	Kiran D. Mali
2	A.C Kulkarni
3	M. Sreedhar Babu
4	PL.Ramkumar
5	Girish Chandran
6	Satish Mullya
7	Harichandra Uttam Chandekar

8	Devandra Shahare
9	Rajesh Kumar Jha
10	Vishal V. Patil
11	Mahesh Dasar

40. Number of post graduate students getting financial assistance from the university.

Year	No. of Students
2011-12	14
2012-13	18
2013-14	22
2014-15	9

41. Was any need assessment exercise undertaken before the development of new programme (s)? If so, highlight the methodology.

The exercise undertaken before the development of a new programme usually begins with a Department airing its intention to float a new programme, Compulsory Disciplinary Courses or elective proposed by the faculty concerned. Discussions are held regarding its merits/demerits at the Departmental Committee on Academics (DCA) level and later at a Cross Campus Departmental Committee on Academics (CCDCA) level. Once the necessary inputs and unanimity have been reached on all the aspects regarding the operational aspects related to the course, it is sent to the ARP so that it can be passed up to Senate to it to be approved.

Participated in development of Work Integrated Learning Programmes (WILP) such as
- B. Tech Engineering Design
- B. Tech Engineering Technology
- B. Tech manufacturing Technology
- B. Tech Power Engineering
- M. Tech Automotive Engineering
- M. Tech Design Engineering
- M. Tech manufacturing management
- M. Tech Quality management

42. **Does the department obtain feedback from**
   a. **Faculty on curriculum as well as teaching-learning-evaluation? If yes, how does the department utilize the feedback?**

   Yes. Faculty members can discuss with the HOD about any issues regarding courses and/or lab components. The department has course curriculum committee which records all the grievances and suggestions by faculty members. The committee will submit the proposal of possible modification in curriculum to the HOD. This suggestion will be shared with department of other campuses and final proposal will be submitted to senate for approval. Certain minor modification like addition or deletion of topics/lab experiments are internally discussed in meeting and approval by the HOD

   b. **Students on staff, curriculum and teaching-learning-evaluation and how does the department utilize the feedback?**

   Yes. Student feedback is collected for each course in three components viz., lecture, tutorial and practical. Students by themselves will circulate and collect the feedback form which will be sealed and submitted to the ARC division. The evaluation is performed confidentially and the final score in a scale of 10 is given to individual faculty members along with the scanned copy of feedback forms by the HOD. The comments given by the student is directly shared with the respective faculty members. The department utilizes the feedback data to allocate courses, update the course topics and modify evaluation scheme.

   Department has Student Faculty Counsel (SFC) which interacts with students representatives from each year and collects feedback twice a semester on different aspects such as course content, evaluation scheme, course delivery and availability of faculty for consultation. Further this feedback will be sent to respective faculty members concerned with the courses so that they can take corrective measures.

   c. **Alumni and employers on the programmes offered and how does the department utilize the feedback?**

   Alumni
   Yes, the department obtains feedback from Alumni on the programmes offered.
   Upcoming trends in various technical industries are also discussed. Some of the alumni also pitch in ideas for newer courses to be introduced as part of the curriculum. These issues are reviewed in detail with the concerned department faculty. Suitable measures for implementation of the feedback are considered and followed accordingly.

Employers

Each Campus conducts a Placement Faculty Advisory council meeting once a month. The council consists of the Director, the Deputy Director, The Dean, Head of the Departments, Placement Manager, Faculty Incharge (Placement) and a Faculty representing each department.

The council discusses the feedback obtained department–wise from the recruiters and measures are taken to strengthen the programmes /courses accordingly.

43. **List the distinguished alumni of the department (maximum 10)**

Sr. No.	Name*	Year of Admission	Occupation
1	Anish Dhoble	2007	Partner, Samarthshree Promoters & Developers, Pune
2	Kushal Raju Bhagia	2008	Founder, Nayi Disha Studios Pvt. Ltd.
3	Sundeep Singh	2008	Founder & Director, Swaad Foods
4	Rahul Ketan Rupani	2009	Founder, VenueMonk

*Being a young campus we have given names of the persons who have excelled in their domain

44. **Give details of student enrichment programmes (special lectures / workshops / seminar) involving external experts.**
    1. Automobile club has performed following activities in year 2011: Workshop on STAR CD software, RC car workshop etc
    2. Conducted ProEngineer workshop: 21st Sept - 24th Sept, 2012
    3. Conducted AutoCAD 2013 lecture series: 8th Oct - 10th Oct, 2012
    4. Arranged a workshop on Computational Fluid Dynamics between 2nd Jan - 5th Jan, 2013
    5. Lecture series on CATIA were arranged between, 12th – 14th Nov, 2012
    6. Four Days workshop on Computational Fluid Dynamics (CFD). Prof. Atul Sharma, Department of Mechanical Engineering, IIT Bombay was the resource person, 2nd-5th Jan, 2013
    7. Invited talk on "Identification of multiple fault parameters in rotor-bearing-coupling systems based on forced response measurements". Prof. Rajiv Tiwari, Professor, Department of Mechanical Engineering, IIT Guwahati was the resource person, 19thOct, 2013

8. Invited talk on "Importance and Ways of effective Process Control in Rotational Moulding". Mr. Gary Lategan, Owner of Roto Solutions, Cape Town, South Africa was the resource person, 27th Nov, 2013
9. Pro-E workshop has arranged for two days. Mr. Atul from Krotos Engineering was the resource person, 15th-16th Nov, 2014
10. Ansys-CFD workshop has arranged for four days. Mr. Ashish Mittal from Innovant Engineering Pvt .Ltd. Bangalore was the resource person, 15th-18th Dec, 2014

45. List the teaching methods adopted by the faculty for different programmes.

For B.E. Program: For undergraduate programmes faculty are mostly conducting class room lectures were they use both i.e black board and power point, modes of teaching depending on the content of particular lecture. Every CDC course has laboratory where students can get hands on experience on topics covered in class. Also students can register to discipline electives and project type course (Study Oriented Projects; Design Projects; Computer Projects; Lab oriented projects). There is flexibility for the students to register for electives offered by other departments as an open elective. Teachers specially adopt the lecture theatre teaching for multi-sectional courses like Engineering Graphics and Thermodynamics. These courses have separate tutorial classes which held in class room. Technical arts courses such as Workshop Practice and Engineering Graphics involves laboratory practice to develop basic skills for visualization, drafting and manufacturing. Second year students spend summer term in industry through Practice School-I (PS-I) programme for industrial exposure. Final year students either do Practice School –II (PS-II) in the industry or Thesis (On Campus as well as at other reputed research laboratories/industries in India as well as abroad) for one semester.

For M.E. Program: For postgraduate propramme class room lectures are conducted for CDC courses as well as elective courses. Every CDC course has tutorial hour every week so that students can develop their analytical and problem solving skills. Most of the courses have compulsory project component and some of the courses have unstructured laboratory exercises. In second semester every student registers for Research Practice course were he/she will be getting basic training related to research activities (Like literature review, preparing research proposals, and experimental/numerical techniques. Fourth semester students either do Practice School –II (PS-II) in the industry or Dissertation (On Campus as well as at other reputed research laboratories/industries in India as well as abroad.)

For Ph.D. Program: The department follows semester-wise pattern and a candidate is required to register in prescribed Ph. D. courses in every semester. A candidate is normally admitted to the Ph.D. programme after passing his/her interview. A notional supervisor and Doctorial Advisory committee (DAC) members will be assigned to him by

DRC (Departmental Research Committee). In consultation with the student's notional supervisor and Doctorial Advisory committee (DAC) members, course work is prescribed. Each Ph.D. student must clear qualifying examinations. Once a Ph.D. student clears the required qualifying examination, he/she, in Consultation with his/her notional supervisor and the DAC members will decide upon the topic. Registration in Ph.D. Thesis (10 units) is permitted only after the approval of Topic of Research and Supervisor. The candidate is supposed to plan his/her work and is evaluated continuously by the respective supervisor/mentor.The candidate can submit his/her Ph.D. thesis once the draft thesis has been approved by the DAC at the time of pre-submission seminar and his title is approved by Doctoral Counseling Committee (DCC).

Dean Academic Research Division (ARD) will recommend two examiners to Vice Chancellor (VC) for his approval. Subsequently, Dean ARD will send the thesis with list of approved examiners to Registrar for necessary communication. The Registrar will send the thesis for evaluation to the examiners. The Registrar will receive examiner's reports, including reports from Supervisor and co-supervisors (if any), and will send reports to Dean ARD with a request to study the examiner's reports together with two Examination Committee (EC) members. A three member committee, including the Dean, ARD will examine the reports, and submit recommendation to the Registrar. On receiving the recommendation of the 3 member committee, the Registrar will obtain the approval of EC (or VC as Chairman of EC) for conduct of viva-voce examination.

46. **How does the department ensure that programme objectives are constantly met and learning outcomes are monitored?**
   ● The department collects feedback every semester for each course and in addition to this Student Faculty Council was formulated to discuss various issues with the team of students directly. From each batch, 2 representatives are selected and they are informed to interact with all students to collect overall grievance of students. These grievances are collected and shared with all faculty members during the department meetings. With regress discussion, solutions are developed to improve faculty teaching, addition or dropping of topics of particular course, modification of lab report, addition of experiments in lab courses, introducing of new elective courses, etc. Department can proudly say that with student meetings and department meetings, the program objectives are continuously monitored and updated.

   ● The department takes inputs from industrial organizations interviewing our students. These inputs are used on a continuous basis to improve the course curriculum. The faculty members are also updated about the industry's changing requirements who in turn take efforts to include the discussion of requisite material in classroom instructions.
   ● The department also benchmarked its curriculum with the leading universities of the world so that the best practices of teaching and learning could be adopted.

- Based on students and faculty feedback Departmental committee on academics (DCA) conducts meeting at departmental level and discusses possible improvements in the contents of the existing curriculum. Further this will be discussed Cross campus departments through Cross campus departmental committee on academics (CCDCA).

47. **Highlight the participation of students and faculty in extension activities.**

   The students participate in social activities organized and conducted by Nirmann, Abhigyan,etc.

48. **Give details of "beyond syllabus scholarly activities" of the department.**

- Department of Mechanical Engineering arranged a "Mechanical Engineering Day" on 11th Apr, 2015 and conducted several technical events related with robotics, aerodynamics clubs etc. Technical sessions were arranged by means of visiting different labs of BITS Pilani Goa campus for school children to generate an interest in the engineering field and future career prospects. Our faculty members and technical staff were delivered a talk on functioning of different machines to the school children. Chief Guest was Dr. Jayanth Sridhar (presently Global Head of Biologicals Manufacturing at Cipla Company, Verna, Goa) and he has given inspiring talk on his student life and career opportunities to the engineering students.
- Faculty members of the department have been actively engaged in conducting workshops, conferences.
- Reputed institutes in the India invited our faculty members for a talk on their research areas
- Faculty members are actively engaged in reviewing activities such as Journal papers, Conference papers and Books. They also acted as members of different technical committees for international and national conferences.
- Faculty members also engaged in guiding different projects conducted under different technical clubs like SAE, ASME, Aerodynamics, Robocon etc.

49. **State whether the programme/ department is accredited/ graded by other agencies? If yes, give details.**
   No

50. **Briefly highlight the contributions of the department in generating new knowledge, basic or applied.**
   To enrich the classroom teaching with the latest updates from the industry three faculty members   were sent to the 'Industry Immersion' programme.
   - Faculty members publish their research work in the reputed journals, and also in the international conferences.

51. **Detail five major Strengths, Weaknesses, Opportunities and Challenges (SWOC) of the department.**

- **Strengths**
  1) Top quality first degree (UG) students
  2) Presently, there are excellent and modern laboratory infrastructure for First and Higher Degree
  3) State of the art Workshop
  4) Latest versions of software like MATLAB, ANSYS, PRO-E, AUTOCAD, COMSOL, COVENTORWARE, ABAQUS,STARCM++,STAR CD, ROTOSIM, STAT- EASE,CADAM, MASTERCAM (In Progress). ADAMS (In Progress)
  5) Dedicated faculty members with good coordination
  6) Great work culture within the department through democratic and transparent decision-making
  7) Diverse knowledge and ability to deliver training programs in the areas of CAD, FEM, CFD, Vibration and Polymers

- **Weaknesses**
  1) Student to faculty ratio is high causing high teaching load
  2) Less number of sponsored projects and collaborative research within the department
  3) Expansion of research laboratory space is limited
  4) Limited advanced infrastructure for top-class research
  5) Less number of non-teaching staff and secretarial staff
  6) Less number of faculty members at senior positions

- **Opportunities**
  1) The department can restart ME Design after some faculty intake
  2) Starting new PG programs: ME Thermal and ME Manufacturing
  3) New electives in emerging areas
  4) Development of specialized research lab & consultancy potential
  5) Organizing workshop / short term courses/conferences

- **Challenges**
  1) High teaching load limiting research activities.
  2) Limited scope expansion and new research lab development
  3) Retaining research-focused faculty
  4) Getting full-time PhD students

52. **Future plans of the department.**

Plans to strengthen post graduate program
- Restarting ME Design Engineering from first semester 2016-17
- ME (Thermal Engineering) in 2017-18: Recruitment drive will focus on faculty hiring in this specialization
- ME (Manufacturing Engineering) in 2019-20: Recruitment drive will focus on faculty hiring in this specialization

Plans to increase research output
- The department plans to drastically reduce the teaching, laboratory and WILP load (by hiring faculty/staff) to allow more time to be devoted to research for faculty who are aspiring for research focused
- Departmental brochure on Ph.D. admission
- Sending part-time Ph.D. advertisement through PS division and Placement unit to different industries in India
- Encouraging faculty for Industry Immersion Program which gives access to large no of Industries with PG employees.
- Conducting seminars about 'Research at BITS' at private engineering colleges

Plans to increase Project Funding
- More research projects will submitted by faculty members in the coming years
- Encouraging faculty for Industry Immersion Program which will strengthen the industrial funding for research
- Meeting with local industries and enlightening them with our strengths and capabilities
- Plans to engage foreign collaborators as Co-PI which will greatly increase the chances of acquiring funds from external non-government agencies
- Plans to engage famous Indian collaborators as Co-PI which will greatly increase the chances of acquiring funds from government agencies

Initiatives in the department & institute which will increase its visibility in the country
- Conducting short term Certificate Programs in the area of FEM, CFD, NVH and CAD/CAM for industries as well as academic institutes
- The faculties will be attending at least 1 international/national conferences each year and begin their presentation (one slide, 1 minute) with a brief introduction to the department/institute

53. **Any other information regarding your department which you would like to include.**

Goa Campus: Evaluative Report of the Department
PHYSICS

1.   **Name of the Department :** Physics Department

2.   **Year of establishment of the Department** : 2004

3.   **Is the Department part of a School/Faculty of the university?**

     Departments function as independent entities in the university and are not part of any school or faculty.

4.   **Names of programmes offered (UG, PG, M.Phil., Ph.D., Integrated Masters; Integrated Ph.D., D.Sc., D.Litt., etc.).**

     M.Sc (Hons) , PhD.

5.   **Interdisciplinary programmes and departments involved: None**

6.   **Courses in collaboration with other universities, industries, foreign institutions, etc. :**

     Note: some of our structure courses like Practice School and thesis dissertation are done by our students in industries and universities outside BITS.

7.   **Details of programmes discontinued, if any, with reasons :** None

8.   **Examination System: Semester:** Semester and Choice based credit system

9.   **Participation of the department in the courses offered by other departments :**
     Physics Department has also been involved in teaching following courses in other departments -
     1   <u>Mathematics Dept</u>: Math -I, Math-II, Math-III, Complex analysis, Linear algebra & optimization, Discrete Structure, Numerical analysis, Engineering mathematics
     2   <u>Electrical & Electronics Engg</u> : Fiber optics & optoelectronics, Electromagnetic field & Waves, Electromagnetic theory-1, Digital Image processing, Electronic devices
     3   <u>Chemical Engg:</u> Nuclear Engineering
     4   <u>Computer Science</u> : Neural Network & Applications
     5   <u>Multi-department courses</u> - Thermodynamics, Structure and properties of materials, Nonlinear dynamics & chaos, Quantum Information & computation

10. **Number of teaching posts sanctioned, filled and actual (Professors/Associate Professor / Assistant professor)Professors/Asst. Professors/others).**

There are 15 faculty members in the department (at the level of Professor, Associate Professor, and Assistant Professor)

	Sanctioned	Filled (includes offer letters given)	Actual number
Professor	Note: **	1	1
Associate Professors		5	5
Asst. Professors		9	9
Others		0	0

Note**:The faculty positions for the University is broadly governed by Growth plan which also covers designation-wise breakup with a larger vision. Keeping in mind the fluidity of movement of faculty and proposed student to faculty ratio in each campus for first degree, higher degree as well as Ph.D. programmes, individual department needs are not fixed. Besides, as we are in expansion plan which calls for new programmes, courses being introduced, the demand on faculty in terms of numbers, for each department, is broadly governed by all the above factors and hence it is not possible to have a fixed number of faculty for each department. Recruitment of faculty, therefore, varies, based on departmental needs.

11. **Faculty profile with name, qualification, designation, area of specialization, experience and research under guidance**

Name	Qualificaiton	Designation	Specialization	Years of Experience	No of Ph.D/ M.Phil Students guided for the last 5 years
A.V. Kulkarni	Ph.D	Professor	Nuclear physics	20	0 completed 1 ongoing
P. Nandakumar	Ph.D	Associate Professors	Optics, Atomic and molecular physics	15	1 completed 2 ongoing
Gaurav Dar	Ph.D	Associate Professors	Nonlinear Dynamics	15	0
RadhikaVathsan	Ph.D	Associate Professors	Foundations of Quantum Mechanics	15	0
RaghunathRatabole	Ph.D	Associate Professors	High energy physics	9	0
Prasanta Kumar Das	Ph.D	Associate Professors	High energy physics	13	2 ongoing
Toby Joseph,	Ph.D	Assistant Professors	Condensed matter physics (Theory & Experiments)	11	0
Ram Shanker Patel.	Ph.D	Assistant Professors	Condensed matter physics (Theory & Experiments)	9	1 ongoing

Chandradew Sharma	Ph.D	Assistant Professors	High energy physics	6	2 ongoing
P.N Deepak	Ph.D	Assistant Professors	Nuclear physics	12	0
Teny Theresa John	Ph.D	Assistant Professors	Condensed matter physics (Theory & Experiments)	9	1 ongoing
E.S. Kannan	Ph.D	Assistant Professors	Condensed matter physics (Theory & Experiments)	6	1 ongoing
Tarun Kumar Jha	Ph.D	Assistant Professors	Nuclear physics	8	2 ongoing
V. Sunilkumar	Ph.D	Assistant Professors	High energy physics	12	1 ongoing
Kinjal Banerjee	Ph.D	Assistant Professors	Gravitation, Cosmology and Astrophysics	7	0

12. List of senior Visiting Fellows, adjunct faculty, emeritus professors : None

13. Percentage of classes taken by temporary faculty – programme-wise information : None

14. Programme-wise Student Teacher Ratio

> 208/15 = 13.9

15. Number of academic support staff (technical) and administrative staff: sanctioned, filled and actual :

> Filled - 2 (technical) + 1 (administrative)

16. Research thrust areas as recognized by major funding agencies :

a. Condensed matter physics (Theory & Experiments)
b. Optics, Atomic and molecular physics
c. High energy physics
d. Gravitation, Cosmology and Astrophysics
e. Nuclear physics
f. Mathematical physics
g. Foundations of Quantum Mechanics
h. Nonlinear Dynamics

17. **Number of faculty with ongoing/completed projects in the last five years from a) national b) international funding agencies and c) Total grants received. Give the names of the funding agencies, project title and grants received project-wise.**

<u>**Completed Projects**</u>

SL No	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Rs. in Lakhs)	Duration
1	Development of low temperature magnetization measurement Set-up	Dr. Ram Shanker Patel	CSIR	13.85	2 Years (July 2012 to July 2014)
2	Investigations on factors affecting nuclear accumulation of DNA studied using an in-house constructed confocal microscope	Dr. GeethaVarier	DST-WOSA	18.90	3 Years
3	Radion contribution to various flavour changing neutral current (FCNC) processes in B-meson decay	Dr. Prasanta Das	DST-FT	2.88	3 years (11-Dec 2008 to 11-Dec 2011)
4	Studies on the optical nonlinearity of gold nanoparticle embedded $BaTiO_3$ thin films.	Dr. P. Nandakumar	DRDO	15.65	3 years (26-June-09 to 26-June-12)
5	Photothermal imaging of nuclear transport	Dr. P. Nandakumar	DBT	26.23	3 years (29-May-09 to 29-May 12)
6	Magneto-transport in magnetic tunnel junctions	Dr. Ram Shanker Patel	DST	52.65	3 years (1-Sep 2012 to 1-Sep 2015)

Ongoing projects:

SL No	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Rs. in Lakhs)	Duration
1	Aspects of some astrophysical systems like supernovae and neutron stars in the light of new physics	Dr. Prasanta Kumar Das	DAE, BRNS	17.51	3 years (27-May 2011 to 31-Oct 2015)

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2	Probing new physics at high energy colliders	Dr. Prasanta Kumar Das	CSIR	13.50	3 years (15-Jan-2013 to 2016)
3	Photoluminescence Studies on Undoped and Transition Metal Doped ZnO Nanoparticles	Dr. Teny Theresa John	DST-FT	22.34	3 years (9-Aug 2012 to 9-Feb2016)
4	Neutron stars as a source of potential continuous gravitational wave emitter	Dr. Tarun Kumar Jha	BRNS	17.00	3 years (July 2013-2016)
5	Searching for new physics in B-meson decay	Dr. Chandradew Sharma	BRNS	19.74	3 years (27-Sep 2013 to 27-Sep 2016)
6	Improving the energy efficiency of solar cells by spin caloritronics	Dr. Ethirajulu S. Kannan	DST-FT	22.08	3 years (25-Nov2013 to 25-Nov2016)

Institute funded project

SL No	Project Name	Principal Investigator	Funding Agency	Sanctioned Amount (Rs. in Lakhs)	Duration
1	Probing Space-Time Noncommutativity at High Energy Experiments	Dr. Prasanta Kumar Das	BITS Pilani Seed grant	3.80	2 years (April 2011 – March 2013)
2	Dynamics of neurons under periodic forcing by external currents.	Dr. Gaurav Dar	BITS Pilani Seed grant	4.0	2 years (9-Feb 2013 to 9-Feb 2015)

18. Inter-institutional collaborative projects and associated grants received
    a) National collaboration   b) International collaboration = None

19. Departmental projects funded by DST-FIST; UGC-SAP/CAS, DPE; DBT, ICSSR, AICTE, etc.; total grants received. DST- FIST Rs 98,50,000

20. Research facility / centre with: None
- **state recognition**
- **national recognition**
- **international recognition**

21. Special research laboratories sponsored by / created by industry or corporate bodies :
    None

22. Publications:

Sl No.	Details	Specify number here
1	Number of papers published in peer reviewed journals (national / international)	33
2	Monographs	None
3	Chapters in Books	None
4	Edited Books	None
5	Books with ISBN with details of publishers 1. Prasanta Kumar Das, Some phenomenological aspects of low scale quantum gravity ISBN No.: 78-3-8443-1194-5, Publisher: LAP LAMBERT Academic Publishing GmbH & Co. KG DudweilerLandstraße 9966123 Saarbrücken Germany 2. RadhikaVathsan, Introduction to Quantum Physics and Information Processing, ISBN No. : 978-1-4822-3811-2, CRC Press, Taylor and Francis Group	2
6	Number listed in International Database (For *e.g.* Web of Science, Scopus, Humanities International Complete, Dare Database - International Social Sciences Directory, EBSCO host, etc.)	31
7	Citation Index – range / average	0-192 /15
8	SNIP	0.519 -7.93
9	SJR	0.259 - 17.31
10	Impact Factor – range / average	0.295 - 30.76
11	h-index	12

Details of the publications as per the number give above (Give details in the last five years

SL No	Authors	Title of the Publications	Details of the Journal	National/International	Year
1	Kinjal Banerjee	Some Aspects of Holst and Nieh-Yan Terms in General Relativity with Torsion	Class. Quant. Grav. 27, 135012*	International	2010
2	T K Jha, H. Mishra & V sreekanth	Bulk viscosity in hyperonic star and r-mode instability	Physical Review C 82, 025803	International	2010
3	Rahul Sinha, N.G. Deshpande, SandipPakvasa, and Chandradew Sharma	Determination of Weak Amplitudes Using Bose Symmetry and Dalitz Plots	Physical Review Letters vol 107 271801-1 to 271801-5	International	2011

4	E. S. Kannan, I. Bisotto, J.-C. Portal, R. Murali and T. J. Beck,	Photovoltage induced by ratchet effect in Si/SiGeheterostructure under microwave irradiatio	Appl. Phys. Lett. 98, 193505 (2011)*	International	2011
5	Bisotto,E. S. Kannan, J.-C. Portal, R. Murali, T. J. Beck and L. Jalabert,	Microwave based nanogenerators using ratchet effect in Si/SiGeheterostructures	Nanotechnology 22, 245401 (2011).*	International	2011
6	Teny Theresa John, K. R. Priolkar, AurélieBassière, P. R Sarode and Bruno Viana	Effect of [OH-] linkages on luminescent properties of ZnO Nanoparticles	J. Phys. Chem. C 115 (37)18070–18075	International	2011
7	Sumit K. Garg, T. Shreecharan, P.K.Das, N.G.Deshpande, G. Rajasekaran	TeV Scale Implications of Non Commutatative Space time in Laboratory Frame with Polarized Beams	Journal of High Energy Physics 024, 1107	International	2011
8	Prasanta Kumar Das, AbhisodhPrakash, AnupamMitra	Neutral Higgs boson pair production at the LC in the Noncommutative Standard Model(NCSM).	Physical Review D 83:056002	International	2011
9	R. S. Patel and A. K. Majumdar,	Temperature dependence of the giant magnetoresistance in Fe-Cr multilayers - Intralayer and interlayer exchange energies	J. Magn. Magn. Mater. 323, 646 (2011).	International	2011
10	Jian Yang, Kinjal Banerjee, Yongge Ma	Hamiltonian Analysis of R+T^2 Action	Phys. Rev. D. 85 06404*	International	2012

11	Kinjal Banerjee, GianlucaCalcagni, Mercedes Martin-Benito	Introduction to loop quantum cosmology	Invited review for SIGMA Special Issue "Loop Quantum Gravity and Cosmology"; SIGMA 8, 016*	International	2012
12	Prasanta Kumar Das & AbhishodhPrakash	Laboratory frame analysis of $e^+ + e^-$ to $\mu^+ + \mu^-$ scattering in the Non-commutative Standard Model	International Journal of Modern Physics A, 27 (2012) 1250141.	International	2012
13	Prasanta Kumar Das	The inclusive semi-leptonic $ B \rightarrow X_s \mu^+ \mu^-$ and leptonic $\bar{B} \rightarrow \mu^+ \mu^-$ decays in the presence of a light stabilized radion in Randall-Sundrum model	Mod. Phys. Lett. A 27(2012), 1250043	International	2012
14	E. S. Kannan, I. Bisotto, L. Jalabert, T. J. Beck, and J.-C. Portal,	Energy Free Microwave based Signal Communication Using Ratchet Effect	Applied Physics Letters 101, 143504*	International	2012
15	In-yeal Lee, Jianwei Wang 1 , Gil-Ho Kim, Jin-Hong Park, E. S. Kannan , Ji-Hoon Jang, Young-Uk Kwon,	Reduced grapheme oxide produced by rapid head reduction and its use in carbon based field effect transistors	J. Appl. Phys. 112 , 033701 (2012)*	International	2012
16	P.N.Pandita, Chandradew Sharma	Radiativeneutralino production in low energysupersymmetric Models. II. The Case of beam polarization	Phys.Rev. D 85 , 015021	International	2012

17	Prasanta Kumar Das, Selvaganapat hy J, C.Sharma, T.K.Jha and V SunilKumar	Tsallis statistics and the role of a light radion in supernovae cooling	International Journal of Modern Physics A (IJMPA) 28:1350152	International	2013
18	Prasanta Kr. Das and A. Prakash	26 GeV Higgs boson pair production at the Linear Collider in the noncommutative space-time	International Journal of Modern Physics A 28:1350004.	International	2013
19	Jian Yang, Kinjal Banerjee, Yongge Ma	Connection dynamics of a gauge theory of gravity coupled with matter	Classical and Quantum Gravity 30 205015	International	2013
20	Chang-Shun Hsu, E.S.Kannan, J.-C.Portal, C.-T.Liang , C.F.Huang , S.-D.Lin,	Probing the co-existence of semiclassical transport and localization in a two dimensional electron gas using microwave radiation	Solid state Communication 156, 45 (2013).	International	2013
21	T. Qureshi and RadhikaVaths an	Einsteins Recoiling Slit Experiment, Complementarity and Uncertainty",	Quanta, 2, No.1 : 58	International	2013
22	Pratik Mandrekar and Toby Joseph	'When to cut corners and when not to	Mathematical Intelligencer, Vol. 36, No. 3 , 70-74	International	2014
23	Ravi S Manohar, Selvaganapat hy J and Prasanta Kumar Das	Probing space-time noncommutativity in the top quark pair production in e-e+ collider	International Journal of Modern Physics A (IJMPA)29: 1450156	International	2014
24	I. Bisotto, E.S. Kannan, J.-C. Portal, D. Brown, T.J.	Ratchet effect study in Si/SiGeheterostructures in the presence of asymmetrical antidots for	Sci& Tech. of Adv. Materials 15, 045005	International	2014

	Beck, Y. Krupko1, L. Jalabert, H. Fujita, Y. Hoshi, Y. Shiraki and T. Saraya,	different polarizations of microwaves			
25	S. Arunkarthick, M. M. Bijeesh, Geetha K. Varier, MeenalKowshik, and P. Nandakumar	Laser Scanning Photothermal Microscopy: Fast Detection and Imaging of Gold Nanoparticles	Journal of Microscopy 256 (2), 111-116.	International	2014
26	HimanshuGangal and Gaurav Dar	Mode locking, chaos and bifurcations in Hodgkin-Huxley neuron forced by sinusoidal current	Chaotic modeling and Simulation - International Journal of Nonlinear Science (CMSIM), 3: 287-294	International	2014
27	Akshat Agha, Sahil Gupta and Toby Joseph	Particle Sliding on a turn table in the presence of friction	American Journal of Physics, Vol. 83, 126	International	2015
28	Chandradew Sharma and Kinjal Banerjee	A Study of Correlations in the Stock Market	Physica A: Statistical Mechanics and its Applications, 321	International	2015
29	Andre Dankert, M. VenkataKamalakar, Abdul Wajid, R. S. Patel, and Saroj P. Dash.	Tunnel magnetoresistance with atomically thin two-dimensional hexagonal boron nitride barriers	Nanoresearch ,8, 1357	International	2015
30	PANDA collaboration (involves P N Deepak and A V Kulkarni)	Experimental access to Transition Distribution Amplitudes with the P̄ANDA experiment at FAIR	European Physical Journal A 51, 107	International	2015

31	A. Venkatesan, Raj Nanalal Patel, and E. S. Kannan,	Reduced Graphene Oxide for Room Temperature Hydrogen Storage Application	Advanced Materials Research, 1086, 91	International	2015
32	Kalyani S. Date, Arun V. Kulkarn, C. V. Dharmadhikar	Force on a conducting tip near a metallic surface coated with a polarizable	E-Journal of Surface Science &Nanotechnology Vol 9 , 206-209	International	2011
33	S. Arunkarthick, M. M. Bijeesh, Anand Satya Vetcha, Nishith Rastogi, P. Nandakumar and Geetha K. Varier	Design and construction of a confocal laser scanning microscope for biomolecular imaging	Current science, vol. 107, No. 12, 1965	National	2014

*papers assigned this mark were written by authors before they joined BITS

Papers published in conference

Sr.No	Name	Title of paper	Conference Name	National/Inter national	Year
1	Dr. Tarun Kumar Jha	Application of Relativistic Mean Field Theory in Nuclear Physics'	DAE-BRNS symposium in Nuclear physics proceedings, vol. 55, page 125	National	December 2010
3	Dr. Teny Theresa John, Chithira P R,	Photoluminescence studies on $Zn_{1-x}Co_xO$ nanoparticles	Proceedings of international conference on Advances in Materials, Manufacturing and Applications (AMMA-2015) April 9-11,2015, **p-118** (NIT, Trichy)	International	April 9-11,2015
7	HimanshuGangal, Prof. Gaurav Dar	Mode locking, Chaos, and Bifurcations in a Sinusoidally Forced Hodgkin-Huxley	7th Chaos conference proceedings, 7-10 June, Lisbon, Portugal, Page 45	International	June 7-10, 2014

		Neuron			

23. **Details of patents and income generated :** None

24. **Areas of consultancy and income generated :** None

25. **Faculty selected nationally / internationally to visit other laboratories / institutions industries in India and abroad :** None

26. **Faculty serving in National committees b) International committees c) Editorial Boards d) any other (please specify)**

1. Prasanta Kumar Das - Director, "SERC Main school in Theoretical High Energy Physics(THEP), 2014". The school was held at BITS Pilani K K Birla Goa Campus from 20th December,2014 to 8th January,2015.
2. Sunilkumar V - School Director (joint) for XXVI Preparatory SERC School in Theoretical High Energy Physics, BITS-Goa 2010 (October 20-November 15)
3. Prasanta Kumar Das - Joint Director, "SERC Preparatory school in Theoretical High Energy Physics(THEP), 2010". The school was held at BITS Pilani K K Birla Goa Campus from 20th Oct. to 15th Nov. 2010.
4. Prasanta Kumar Das - Convenor- "Planning committee meeting of the DST, SERB SChool on THEP" on 13th October,2014.
5. Prasanta Kumar Das - Convenor -DSTPAC-2013 during the period April 22nd - 23rd, 2013.
6. Prasanta Kumar Das - Convenor& member of National organizing committee for HIGGSTOP-2013 . The workshop was held from 25th February to 27th February, 2013.
7. Sunilkumar V -National Organizing committee member for HIGGSTOP-2013 held at BITS Pilani-Goa during Feb 25-27th 2013
8. Sunilkumar V Member of national organizing committee "SERC Main school in Theoretical High Energy Physics(THEP), 2014".
9. A.V.Kulkarni is a member of Board of Studies, Goa University member
10. A.V.Kulkarni is the President - Indian Association of Physics Teachers (IAPT), Goa Regional Council.

27. **Faculty recharging strategies (UGC, ASC, Refresher / orientation programs, workshops, training programs and similar programs).**

a. **Research Initiation grant**
   The Research Initiation Fund is designed to enable the beginning of research and related activities for a newly recruited faculty who has significant potential to attract external funding. The grant is awarded soon after joining BITS for up to Rs. 2 Lakhs and the amount has to be spent within 24 months of appointments.

   Two faculty members -Madhu K, and Kinjal Banerjee - have received the grant from 2010 onwards.

b. **Seed Grant Scheme**

   The Seed Grant scheme is designed to stimulate competitive research in strategic areas of national or international importance, to promote innovative product and technology development, and/or to facilitate the start of research programs which will potentially develop into creative ventures on their own through external funding. The grant is awarded with a maximum value of Rs.20 Lakhs. The duration of the Grant is 2 years.

   Two faculty members – Prasant Kumar Das, and Gaurav Dar - from Physics Department were awarded this grant from 2010 onwards.

c. **Sabbatical**
   One faculty member –RadhikaVathsan - from Physics Department took a sabbatical to write a book on "Quantum Physics & Information". This book has now been published by CRC press.

   Radhika also gave several invited talks on her research work and also wrote an invited article "Aspects of Complementarity and Uncertainty" for publication in the International Journal of Quantum Information, (to be published).

d. **Chair Professorship**

   A Chair Professorship helps recognize and reward excellence in teaching and/or research by a member of the BITS Pilani faculty at either of its campuses or to induct a professor from outside BITS, Pilani. Such a person is re-designated as Chair Professor, Each "ChairProfessorship" also helps establish an endowment with significant funds that are used to (a) make available to the Chair Professor a

"research grant", and (b) provide to him/her a small honorarium to cover additional effort required to fulfill the charter laid out for the endowment.

e. **OPERA Award**

The awards named OPERA awards (for "Outstanding Potential for Excellence in Research and Academics") are to facilitate and incentivize new faculty to join BITS and excel in research and teaching. The award is in the form of a "joining bonus" paid over 5 years, plus funds to kick-start their R&D and professional development. The award is meant to help compensate new faculty (or provide R&D funds) at par with the best institutions in India.

f. **Professional Development Allowance:**

The institute provides Rs 1,00,000/- each year to every faculty member for expenses related to research, attending national & International conferences / workshops.

g. **Industry Day**

The institute has engaged in intensifying its contact with industry to leverage industry sponsored projects to keep faculty competence in line with industry and societal needs.

h. **Department Seminars**

Department organizes regular department seminars. Seminars are given by either an external speaker or one of our own faculty members on one of the following - (a) their own research work, (b) Physics Pedagogy, (c) Some topics of general interest.

28. **Student projects**

- **percentage of students who have done in-house projects including inter-departmental projects**
  Students can take up projects as one of their electives. They are allowed a maximum of 4 projects and 3 units are assigned to one elective . 100 % of students choose to take up at least one project.

- **percentage of students doing projects in collaboration with other universities /industry / institute**

  100 % students carry out a project in collaboration with University / Industry.In their last year students either take up a 1-semester thesis or spend 1-semesterat an industry. Students can also do a thesis in collaboration with a facultymember at another institution / University. A large percentage of students who do a thesis choose to do this.

29. **Awards / recognitions received at the national and international level by Faculty /Doctoral / post doctoral fellows Students**

    1. Arunkarthick, PhD student, received a Scholarship of 800 Euro and reg. fee waiver from organizers of 18th International Microscopy congress, Prague, Czech Republic, Sep. 2014.
    2. Arunkarthick, PhD student, received Travel Grant Award from Department of Biotechnology, GOI for a Conference - Focus on Microscopy - 2013 in Maastricht, The Netherlands.
    3. Arunkarthick, PhD student, was awarded Senior Research Fellowship (SRF) from CSIR.
    4. Bijeesh M. M. and Mr. Arunkarthick, PhD students, received the Best Poster Award for the poster presented during DAE-BRNS National Laser Symposium held at RRCAT, Indore during Dec. 2010.

30. **Seminars/ Conferences/Workshops organized and the source of funding (national/ international) with details of outstanding participants, if any.**
    a. The physics department organised the "SERC Main school in Theoretical High Energy Physics(THEP), 2014". The school was held from 20th December,2014 to 8th January,2015. It was funded by DST-SERB
    b. The physics department of BITS-Pilani, K K Birla Goa campus recently has organised the workshop HIGGSTOP-2013. The workshop was held from 25th February to 27th February, 2013. It was funded by DST-SERB & DAE
    c. The physics department of BITS-Goa recently has organised the "SERC Preparatory school in Theoretical High Energy Physics(THEP), 2010". The school was from 20th Oct. to 15th Nov. 2010. It was funded by DST-SERB.
    d. The Physics department of BITS-Pilani, K K Birla Goa campus & IAPT, Goa Regional council organized a workshop on Quantum Mechanics for Physics Teachers of colleges in Goa on Saturday 12th and Sunday 13th March 2011 at BITS-Pilani, K K Birla Goa campus. The workshop was funded by the DSTE, Govt. of Goa.
    e. The Physics department of BITS-Pilani, K K Birla Goa campus & IAPT, Goa Regional council jointly organized a workshop titled "Demonstration Based

teaching of Science in Schools" on 19th and 20th of Nov'2011. The workshop was partially funded by SCERT Govt. of Goa.

f. The Physics department of BITS-Pilani, K K Birla Goa campus & IAPT, Goa Regional council jointly organized a 2-day workshop on Electromagnetism for Physics Teachers of colleges in Goa, on Saturday 10th and Sunday 11th March 2012. It was funded by DSTE, Govt. of Goa.

g. The Physics department of BITS-Pilani, K K Birla Goa campus & IAPT, Goa Regional council jointly organized a 2-day workshop on Statistical Mechanics for College Physics Teachers of Goa, on Friday & Saturday 22nd and 23rd March 2013. It was funded by DSTE, Govt. of Goa.

h. The Physics department of BITS-Pilani, K K Birla Goa campus & IAPT, Goa Regional council jointly organized a 2-day workshop on "Einstein's Theory of Relativity" on 16th and 17th August 2014 for college teachers. Funding was provided DSTE, Govt. of Goa.

31. **Code of ethics of research followed by the Department.**
The department follows the code of ethics specified by the Institute.

32. **a) Student profile programme-wise:**

Name of the Programme (refer to question no. 4)	Applications received	Selected		Pass percentage*	
		Male	Female	Male	Female
Academic year 2010-11					
M.Sc (Hon's) 2010-2011	139234 Applications Received for FD, 4428 Applications received for HD and 425 applications received for PhD	29	5	100%	100%
PhD. (Sem I)					
PhD. (Sem II)					
Academic year 2011-12					
M.Sc.(Hons.) 2011-2012	123677 applications received for FD, 4571 applications received for HD and 461 applications received for PhD	30	8	100%	100%
PhD. (Sem I)		3	2	0	0
PhD. (Sem II)		0	0	0	0
Academic year 2012-13					
M.Sc.(Hons.) 2012-2013	136904 Applications Received for FD, 4825 Applications received for HD and	33	3	100%	100%

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PhD. (Sem I)	8	1	0	0	0
PhD. (Sem II)	0	0	0	0	
Academic year 2013-14					
M.Sc.(Hons.) 2013-2014	166260 Applications Received for FD, 5549 Applications received for HD 97	34	3	100%	100%
PhD. (Sem I)		0	5	0	0
PhD. (Sem II)		1	1	0	0
Academic year 2014-15					
M.Sc.(Hons.) 2014-2015	186181 Applications Received for FD, 5172 Applications received for HD 22	48	6	100%	100%
PhD. (Sem I)		1	0	0	0
PhD. (Sem II)		2	0	0	0

BITS follows a credit based system and cafeteria approach in offering of courses. Students not performing well are monitored by ACB (Academic Counselling Board), HDCC (Higher Degree Counselling Cell) and ACC (Academic Counselling Cell). Their pace is slowed down. Normally not more than 3% students (including all programmes, B.E., M.Sc, and M.E. .) at a given point of time are under the purview of ACB.

33. b) Diversity of students

Name of the Programme (refer to question no. 4)	% of students from the Same university	% of students from other universities within the State	% of students from universities outside the State	% of students from other countries
MSc. (Hons)	NA	**NA**	NA	NA
PhD	0	**7 %**	93%	0 %

34. How many students have cleared Civil Services and Defense Services examinations, NET, SET, GATE and other competitive examinations? Give details category-wise.

We do not maintain this data through any formal process.

35. **Student progression**

	Student progression	Percentage against enrolled
	UG to PG	Do not maintain data
	PG to M.Phil.	Do not maintain data
	PG to Ph.D.	Around 20 of our alumni are pursuing PhD in physics in institutions such as MIT, UIUC, Texas A&M, University of Geneva, IISc. A similar number might be pursuing PhD's in other disciplines after completing a dual degree in MSc Physics and a B.E in an engineering discipline.
	Ph.D. to Post-Doctoral	
		None so far
	Employed	
•	Campus selection	A large percentage of students with dual degree take up jobs through campus placement.
•	Other than campus recruitment	*(see table below)*
	Entrepreneurs	Do not have data

For "Other than campus recruitment":

Year	No. Registered with placement office	No. of students placed through placement office
2010-11	21	12
2011-12	24	21
2012-13	25	17
2013-14	21	18
2014-15	18	18

36. **Diversity of staff**

Percentage of faculty who are graduates	
of the same university	None
from other universities within the State	None
from universities from other States from universities outside the country	100%

37. **Number of faculty who were awarded M.Phil., Ph.D., D.Sc. and D.Litt. during theassessment period :None**

38. **Present details of departmental infrastructural facilities with regard to**

   a. **Library**

   There is a collection of nearly 2500 physics books in the central library. In addition, there are also nearly 3500 books in Mathematics many of which are of utility to physics.

   We have access to print copies of 9 Indian journals and 2 International journals / science magazines relevant to Physics. We also have online access to journals by 13 publishers through Inflibnet.

b. **Internet Facilities**
- Unlimited access is provided to staff and faculty at their office as well as residence.
- WiFi connectivity is provided to the complete academic area.
- The bandwidth provided to faculty is 100Mbps on a 10Gbps backbone (for intranet).
- Internet facilities to Students - All students are provided intranet (10Gbps back bone), internet (300Mbps provided by Vodafone, GWave and TATA) and WiFi in all hostels. Per day download limit of 800MB for under graduate students and 1GB for post graduate students and Ph.D. scholars.

c. **Teaching laboratories :**
1. Physics Lab 1 (Mechanics, waves & oscillations)
2. Physics Lab-2 (Electromagnetism & Optics)
3. Physics Lab-3 (Modern Physics Lab)
4. Advanced Physics Lab (Solid state, Atomic & molecular physics, Nuclear Physics)

All teaching laboratories are equipped with desktops with each experiment. Students submit their reports online and perform their calculations on excel sheets.

d. **Research laboratories**
1) **Nonlinear Optics Lab**
1. Inverted Microscope
2. He-Ne Laser (543 nm, 632 nm)
3. Ar-ion laser (488/514 nm)
4. Ti: sapphire femtosecond laser
5. Second harmonic generator
6. Digital storage Oscilloscope
7. Galvanometer scan mirrors
8. Vibration isolation table
9. Lock-in amplifier
10. Acousto-optic modulator

2) **Nanomaterials& Optoelectronics Lab**
1. Keithley Semiconductor Characterization System
2. High speed centrifuge
3. CH Instruments Electrochemical Work Station
4. Variable temperature hot air oven

innovate   achieve   lead

3) **Nanoelectronics Lab**
 1. Home made liquid nitrogen dip-stick for electrical transport
 2. Oxford Instruments 3 K cryocooler for electrical transport
 3. Low temperature magnetization set-up

4) **Semiconductors & Photovoltaic Lab**
 1. He-Cd laser (325 nm) - KimmonKoha (make)
 2. USB 4000 extended range spectrometer 200-1050 nm
 3. Closed cycle liquid He Cryostat (can go upto 10 K) (Janis) -
 4. Spray Pyrolysis setup (Holmarc)

5) **Physics Wet Lab**
 - High temperature furnace
 - Magnetic stirrer
 - Autoclave
 - Laminar flow bench

e. **Computing facilities**
 - Every faculty member is given a laptop or a desktop.
 - IBM cluster with 6 node, 12 processor, and 86 core is available centrally in the computer center.
 - IBM X3500 M4 server with 6 cores, 2GHZ and 16 GB RAM.
 - IBM X3200M Tower Server, Intel Quad Core 2.4 GHz, 8MB cache, 12GB RAM, 292GB HD,
 - IBM Server X 3650 M4 2 U Rack Server 10 core 2.2 GHz 25 MB L3 Cache 96 GB RAM 4 TB Hard disc

f. **Telescope**
 - Telescope: 9.25"celestron
 - CCD: Celestron Nightscape CCD Camera

39. **List of doctoral, post-doctoral students and Research Associates**

a) from the host institution/university : None
b) from other institutions/universities :
 Doctoral students :
 1. ArunKarthick. S
 2. Selvaganapathy. J
 3. DhavalaSuri
 4. Akhila Mohan
 5. Chithira P R

6. Tuhin Malik
7. DebashreeSen
8. Shakhi P K
9. Bijeesh M M
10. Aneesh KP
11. A Venkatesan
12. AtanuGuha
13. MalatiDessai

40. Number of postgraduate students getting financial assistance from the university.

None. We do not have a postgraduate programme.

41. Was any need assessment exercise undertaken before the development of new programme(s)? If so, highlight the methodology.

The department has recently been in the process of introducing couple of minor programs in physics. In addition, the department has introduced several new courses from 2010 onwards.

The need for the minor program was felt by the department as there are a large number of students from other departments who take keen interest in physics and end up doing two to three physics courses as electives. A poll was conducted amongst students to gauge their interest in pursuing a minor in physics. After analysing the poll data, the department decided to propose two minors: one in pure physics and another in the applied area of semiconductor physics. A first iteration of the program structures were arrived at by the Department Committee on Academics (DCA) after taking inputs from faculty and students. The program structures were fine tuned after discussions in the departmental meetings. These were then presented to the cross-Campus department committee on Academics (CCDCA). Cross campus discussions are currently on to finalise on the final program content. This would then be submitted to the Academic resource planning unit, which will present it in the senate for approval.

New courses are introduced based on expertise of faculty member in the department, and interest of students of Physics as well as other departments. A faculty member prepares a course description and a course handout which then forms the basis for a discussion in Department committee of Academics (DCA) followed by the department. A final proposal is approved after a few iterations.

Discussions are next held in the cross-campus Department committee on

Academics (CCDCA) consisting of Physics DCA's of all campuses of BITS-Pilani.

After approval of CCDCA the proposal is sent to the Academic resource planning (ARP). The ARP has a series of parameters and questions that form the basis of earlier discussions at department level. Department presents the proposals to ARP accordingly. ARP then presents the proposal in the senate for approval.

42. Does the department obtain feedback from

a. faculty on curriculum as well as teaching-learning-evaluation? If yes, how does the department utilize the feedback?

Feedback from faculty members is obtained through department meetings. The feedback is used by Department committee on Academics (DCA) to carry out any curricular changes, if required. Further DCA on its own actively discusses issues related to curriculum and other matters related to teaching-and-learning. Any concrete outcome of these discussions is presented in Department meetings for a decision.At the end of the semester there are department grade meetings that discuss the performance of students in each course.

b. students on staff, curriculum and teaching-learning-evaluation and how does the department utilize the feedback?

At the end of the semester students fill up a course feedback form. The course feedback is processed by the Instruction division and this is shared with the faculty members for their own improvement, and various relevant committees and HOD for annual assessment.

The department has also constituted a Student-Faculty Council. An important objective of the council is to receive feedback and inputs from students on curriculum and the effectiveness of our teaching methods. Feedback received is discussed in DCA.

c. alumni and employers on the programmes offered and how does the department utilize the feedback?

Department had conducted a review of the curriculum by an external committee drawn from other universities in the country. We also obtained their assessment of the type of post-graduate programmes that the Physics Department could offer based on job opportunities.

Each Campus has also constituted a Placement Faculty Advisory council. The member consists of The Director, the Deputy Director, The Dean, Head of the Departments, placement manager, faculty in charge (placement) and a Faculty representing each department. The council discusses the employer feedback as a feedback mechanism for the curriculum revision.

43. List the distinguished alumni of the department (maximum 10)

We are a ten year old department. Thus we haven't been in existence for a long enough time for our alumni to have thus far made many noteworthy contributions. In the last five years, close to twenty of our alumni have gone to do their PhD's in some of the top universities and institutions across the world and in India.. Many others are well placed in industry jobs. One of our students – Ashok Ajoy - doing his PhD at MIT won the Manson Benedict Award for excellence in academic performance and professional promise, MIT NSE

44. Give details of student enrichment programmes (special lectures / workshops / seminar) involving external experts.

We have regular seminars in the department. List of speakers over last 5 years is given below. The seminars are usually targeted at senior students

Name of speaker	Institution	Title / Date
Prof. Hiranmaya Mishra	Physical Research laboratory, Ahmedabad	Matter under extreme condition and chiral symmetry breaking in quark matter.July 2012
Prof. Anand. K. Kulkarni	Emeritus Professor, Michigan Technological University, USA	Optical Absorption in Nanostructures for Photovoltaic Applications 03rd February 2014
Prof. Sasha Kvinikhidze	PROFESSOR, Tbilisi State University, Georgia	Continuum Quantum Field TheoryFebruary 2014
Prof. Walter Lewin	Professor Emeritus, MIT	Birth and death of stars March 2014
Prof. SitabhraSinha	Institute of Mathematical Sciences	Mind, Memory and Modules, Using nonlinear dynamics and complex networks to understand the brain.April 2014.

Prof. SitabhraSinha	Institute of Mathematical Sciences	Econophysics, Towards a physical theory of socio-economic phenomena. April 2014.
Prof. DeshdeepSahdev	IIT Kanpur	Resolving Atoms in our Backyard. April 2014.
Prof. DeshdeepSahdev	IIT Kanpur	Popular Introduction to Cosmology. April 2014.
Prof. Srinivas Krishna Gopal,	Senior Scientist, BARC Mumbai	Femtosecond X-rays Lasers – Making Movies with Atmos.11th October 2014
Prof. Rajesh Gopakumar	Professor , HRI, Allabad	"String Theory and The Quest for Quantum Spacetime". 13th October 2014
Prof. A. K. Majumdar	Indian Institute of Technology, Kanpur	"Magnetism: fundamentals, measurement techniques, and current applications".November 20th to 25th, 2013
Prof. Hiranmaya Mishra	Physical Research laboratory, Ahmedabad, India	Matter under extreme condition and chiral symmetry breaking in quark matter. 26th July 2012
Prof. Mukhopadhyay	ex-Head of Solid state division BARC	Structural and Dynamical Transition in Condensed Matter May 2015
Prof. Jeremy Kasdin	Princeton University	Discovering other earths

We have also conducted workshops on MATLAB in 2014 and 2015. These workshops were conducted by experts from MATLAB.

45. List the teaching methods adopted by the faculty for different programmes.
   a) Assignments (graded or ungraded) are usually given in various courses to help students master the concepts taught.
   b) Some courses also involve a project component , or computer based assignments.
   c) Over the last couple of years, a few faculty members are experimenting with devising methods to aid greater discussion in the classroom through a flipped

classroom model. In this direction,

    a. Quantum Information and computation lectures were video-recorded and available to students before the class-hours so that greater discussion could be carried out in the class.

    b. A similar model is being attempted on a much larger scale in the 1st year Physics course - Mechanics, Oscillations, and Waves -with nearly 650 students.

d) The course on "Astronomy and astrophysics" is making use of the telescope to aid learning.

e) Last year, in the 1st year course - Mechanics, Oscillations, and Waves - students were asked to build demonstrations illustrating physics taught in the course. A couple of demonstrations of those demonstrations built by students are now being used in the course

f) In the 1st year Physics laboratory,

    a. in addition to the traditional manual, video introductions of all experiments have been prepared. These videos help students to come better prepared to the laboratory.

    b. We have carried out a reform in the entire process of lab work. Students have to answer an online pre-lab quiz, reports are written and submitted online, calculations are done on excel sheets. In this manner students can pay greater attention to the ideas and removes the need for repetitive work.

g) A lot of emphasis is laid on projects. Students are involved in the research work of faculty members through these projects

h) Students can take up either a thesis or spend time at an industry in their last year.

46. How does the department ensure that programme objectives are constantly met and learning outcomes are monitored?

Course feedbacks are conducted for every course where questions are posed to students on course content, teaching effectiveness, evaluation components. These are used to bring about any changes, if required.

Department committee on Academics regularly discusses matters related to the curriculum. Discussion on academics further take place amongst all campuses through the Cross-campus department committee on academics (CCDCA). The department also engages in a discussion with students through the Student-Faculty council.

47. Highlight the participation of students and faculty in extension activities.

Our students are involved in social activities through bodies created through their initiatives. They teach kids of local community in the evenings. Students organize skill training workshops to women in local community that help generate an income.

48. Give details of "beyond syllabus scholarly activities" of the department.

Papers presented in conference

Sr.No	Name	Title of paper	Conference Name	National/International	Year
1	Tarun Kumar Jha	Application of Relativistic Mean Field Theory in Nuclear Physics'	Application of Relativistic Mean Field Theory in Nuclear Physics'	National	December 2010
2	Teny Theresa John, Chithira P R,	International Conference on Magnetic Materials and Applications (IC MAGMA-2014) Pondicherry University	Structural and optical properties of Ni-doped ZnO nanoparticles	International	September 15-17, 2014
3	Teny Theresa John, Chithira P R,	International conference on Advances in Materials, Manufacturing and Applications (AMMA-2015), p-118 (NIT, Trichy)	Photoluminescence studies on $Zn_{1-x}Co_xO$ nanoparticles	International	April 9-11,2015
4	Arunkarthick S., Bijeesh M. M., Varier G.K., Kowshik M. and Prof. P. Nandakumar	8th International Microscopy Congress (IMC 2014) 7 -12 Prague	Studies on Biomolecular Transport through Nuclear Membranes using a Home Built Confocal Laser Scanning Microscope	International	September 2014.
5	Arunkarthick S., Bijeesh M. M., Varier G.K., Kowshik M. and Prof. Nandakumar P.	DAE-BRNS National Laser Symposium (NLS-22) Department of Atomic and Molecular Physics University, Manipal, Karnataka, INDIA	Permeability studies on nuclear membranes using confocal laser scanning microscopy,	National	January 8-11, 2014.

6	Arunkarthick S., Bijeesh M. M., Varier G.K., Kowshik M. and Prof. Nandakumar P.,	DAE-BRNS National Laser Symposium (NLS-22) Department of Atomic and Molecular Physics University, Manipal, Karnataka, INDIA	Nonlinear refractive index measurements of BaTiO3 by the Z - scan technique,	National	January 8-11, 2014.
7	HimanshuGangal, Gaurav Dar	7th Chaotic modeling and simulation International conference	Mode locking, Chaos, and Bifurcations in a Sinusoidally Forced Hodgkin-Huxley Neuron	International	June 7-10, 2014
8	J. Selvaganapathy	DAE, BRNS Symposium at IIT Guwahati h	Collider and Astrophysical searches of beyond the Standard Model Physics	National	8th – 12th Dec.2014.
9	E. S. Kannan A. Venkatesan	ICMENC – 2013.	Graphene Oxide for Room Temperature Hydrogen Storage Application	National	2013.
10	R. S. Patel, DhavalaSuri,	ICTP Workshop, Jawaharlal Nehru University, New Delhi, India.	Spin Hall Effect measurement techniques.	National	February 9 - 13, 2015. poster

Invited as speakers

1. R. S. Patel. Gave an invited talk titled "Tunneling Magnetoresistance with Thin Hexagonal Boron Nitride Barriers" at "A cluster of topical meetings on Current Trends in Condensed Matter Physics", National Institute of Science Education and Research (NISER), Bhubaneswar. February 19 - 22, 2015.
2. RaghunathRatabole was invited as a resource person for XXVI Preparatory SERC School in Theoretical High Energy.
3. Tarun Kumar Jha, Workshop on Gravitational Wave Data Analysis at BITS Pilani K K Birla Goa Campus (17-21 Dec 2012), "Neutron stars as a potential Gravitational Wave emitter".
4. Tarun Kumar Jha, Invited talk delivered at the NUSTAR WEEK 2012 at VECC kolkata, India (8 - 12 October 2012). Talk title : "Recent trends in Neutron star Physics"

5. *Tarun Kumar Jha, Invited talk at the International Conference on Theoretical & Applied Physics", at Indian Institute of Technology, Kharagpur (Dec 2011). Talk title : "Equation of State and Neutron Star Structure"*

6. Tarun Kumar Jha, Invited talk on the WORKSHOP on "Light from the dark side of the Universe", BHU, Varanasi (17 - 20 March, 2015)

7. Tarun Kumar Jha, Invited talk delivered at the Nuclear Physics Meet, Institute of Physics, Bhubaneswar; 26 - 30 June, 2015)

8. Tarun Kumar Jha, Invited talk in the Neutron Star Workshop, 20 - 21 November, 2014 at NCRA-TIFR, Pune.

9. Tarun Kumar Jha, series of 4 lectures delivered at the Winter School on Accelerator, Nuclear and Particle Physics from March 29 to April 04, 2014 at Physics Department, Banaras Hindu University, Varanasi.

10. Tarun Kumar Jha, Invited Lecture delivered at the UGC Sponsored state level workshop - Recent Advances in Theoretical Physics, at Navyug Science College Surat, (January 2012).

11. Tarun Kumar Jha, Invited Lecture series, delivered at the UGC Sponsored state level workshop Recent trends in Astronomy & Astrophysics", at Navyug Science College Surat, (January 2011).

12. Tarun Kumar Jha, invited talk in the conference SURROGATE-2013 at M S University Baroda, India (24 - 25 January 2013).

13. Dr. RadhikaVathsan, "Complementarity and Uncertainty", invited talk at the KSTA-BUB lecture series in Frontier Areas of Research, Bangalore University, 27 Sept 2013

14. RadhikaVathsan, Aspects of Complementarity and Uncertainty\, invited talk at Quantum Information Processing and Applications, HRI Allahabad, 4 Dec 2013

15. Dr. Chandradew Sharma, Expert Speaker, The Indian Association of Physics Teachers Workshop on Statistical Mechanics, for physics teachers, held at BITS Pilani K K Birla Goa Campus, March 22-23, 2013

16. Chandradew Sharma,Expert Speaker, The Indian Association of Physics Teachers Workshop on Electromagnetic Theory for College Teachers held at BITS Pilani K K Birla Goa Campus, March 10-11,2012

17. Chandradew Sharma, PCPV 2013 Workshop, Fountain Hotel Mahabaleshwar, India February 19-23, 2013

18. Kinjal Banerjee, Expert Speaker, The Indian Association of Physics Teachers Workshop on Gravitation for College Teachers held at BITS Pilani K K Birla Goa Campus,2014

19. P N Deepak, Expert Speaker and Organiser, The Indian Association of Physics Teachers Workshop on Electromagnetic Theory for College Teachers held at BITS Pilani K K Birla Goa Campus, Goa from March 10-11, 2012

20. P N Deepak, Expert Speaker, The Indian Association of Physics Teachers Workshop on Quantum Mechanics for College Teachers held at BITS Pilani K K Birla Goa Campus, Goa from March 12-13, 2011
21. P N Deepak, Expert Speaker, The Indian Association of Physics Teachers Workshop on Einstein's theory of relativity, held at BITS Pilani K K Birla Goa Campus, Goa, from August 16-17 2014
22. E. S. Kannan, Invited Guest Lecture, PSGR Krishnamaal College of Women, Pelamedu, Coimbatore on September 3rd, 2015. Topic: Nanotechnolgy - Lessons from Nature
23. Prasanta Kumar Das, Expert Speaker, The Indian Association of Physics Teachers Workshop on Quantum Mechanics for College Teachers held at BITS Pilani K K Birla Goa Campus, Goa from March 12-13, 2011
24. Prasanta Kumar Das, Expert Speaker, The Indian Association of Physics Teachers Workshop on Statistical Mechanics, for physics teachers, held at BITS Pilani K K Birla Goa Campus, March 22-23, 2013
25. Prasanta Kumar Das was invited by the Physics department, Indian Institute of Technology,Indore in November,2014 to give a seminar based on my recent work on "Braneworldradion and its phenomenology".
26. Prasanta Kumar Das was invited by the Physics department,Indian Statistical Institute,Kolkata in May, 2015 to give a talk over there based on my recent work on "Noncommutative phenomenology".
27. Toby Joseph, Expert Speaker, The Indian Association of Physics Teachers Workshop on Electromagnetic Theory for College Teachers held at BITS Pilani K K Birla Goa Campus, Goa from March 10-11, 2012
28. Toby Joseph, Expert Speaker, The Indian Association of Physics Teachers Workshop on Quantum Mechanics for College Teachers held at BITS Pilani K K Birla Goa Campus, Goa from March 12-13, 2011
29. Toby Joseph, Expert Speaker, The Indian Association of Physics Teachers Workshop on Statistical Mechanics, for physics teachers, held at BITS Pilani K K Birla Goa Campus, March 22-23, 2013.

Participant in workshop / conference
1. P N Deepak, XLIV PANDA Collaboration Meeting held at International Centre, Goa, India from March11-15, 2013
2. P N Deepak, DAE-BRNS Workshop on Hadron Physics held at Bhabha Atomic Research Centre, Mumbai, India from October 31-November 04, 2011
3. Ram Shanker Patel, 57th DAE Solid State Physics Symposium, IIT Bombay, Mumbai
4. Prasanta Kumar Das, International Workshop on the High Energy Physics phenomenology, Mahabaleshwar, Pune, 2nd January to 15th January, 2012

5. Prasanta Kumar Das, Workshop – TopHiggs-2012, Centre for High Energy Physics, IISc, Bangalore, 24th August to 26th August, 2012
6. Chandradew Sharma, Workshop on B Physics at the LHC, Kolkata (Hotel the Sojourn), March 2-4, 2012
7. Chandradew Sharma, Top-Higgs Meeting at CHEP, IISc Bangalore, August 24-26 2012

Examiners

a. P. Nandakumar was an examiner for the PhD qualifying examination of one student from Calicut university. Set up the question paper for Nonlinear Optics
b. P. Nandakumar, SunilkumarV , and A.V.Kulkarni were examiners for National Graduate Physics Examination (NGPE)-2015's last phase involving a laboratory examination.
c. A.V.Kulkarni was involved in designing laboratory questions and in setting the laboratory for NGPE-2015
d. A.V.Kulkarni was a resource person in the Resource generation camp-2013 organized by HomiBhabha center for science education (HBCSE) for selecting & preparing the Indian Physics Olympiad team from 4th -7th Sep 2010 & 6th Feb - 10th Feb 2011.
e. A.V.Kulkarni was a resource person in Orientation cum Selection Camp for Physics theory for winners of InPhO(Indian Physics Olympiad) organized by HBCSE from 14th May - 21st May 2012.

Reviewer of journal papers

1. Prasanta Kumar Das has reviewed papers submitted to "Advances in High Energy Physics", "Progress of Theoretical and Experimental Physics", "Proceedings of the National Academy of Sciences, India Section A: Physical Sciences"
2. E.S.Kannan has reviewed papers submitted to "Nanoscale Research Letters", "Journal of Applied Physics"
3. Sunilkumar V has reviewed papers submitted to " 'Modern Physics Letters A'
4. Toby Joseph has reviewed papers submitted to "Physics Teacher"

Members of committees

1. Tarun Kumar Jha is a member of the Indian Physics Association
2. Chandradew Sharma - member of National organizing committee for HIGGSTOP-2013 . The workshop was held from 25th February to 27th February, 2013.

49. State whether the programme/ department is accredited/ graded by other agencies? If yes, give details. NIL

50. **Briefly highlight the contributions of the department in generating new knowledge, basic or applied.**

Faculty members are working in diverse areas.

A group working in Optics has designed and constructed a low cost confocal laser scanning microscope affordable to most Indian Laboratories. They have also designed and constructed a Photothermal microscope to detect Gold Nanoparticles as small as 5 nm at fast acquisition rates. The group developed a LabVIEW based imaging software that can be used for multiple imaging techniques. They have utilized these developments to for Confocal imaging of nuclear transport of dye labeled Dextrans and DNAs

The group working in General theory of relativity is working on Loop
Quantum Gravity (LQG) that is a very promising candidate quantum gravitytheory. In their the group paper managed to rewrite such a theory in the form of a SU(2) gauge theory. This opens the door to subsequent Loop quantization of theories with torsion.

A group working in Econophysics carried out a model independent analysis of the Bombay Stock Exchange(BSE) and find significant autocorrelation among the individual sectors and cross--correlation among sectors of BSE. This indicates that the Random Walk Hypothesis is not applicable in modeling the Indian markets.

A group is applying Nonlinear dynamics techniques in neuroscience and found Mixed mode oscillations in forced Hodgkin-Huxley neurons.

There is a group working in nuclear Astrophysics. They construct models based on nuclear theory to explain massive stars as neutron stars. Their model of neutron stars can explain the structure and dynamics of neutron stars which may have exotic particles such as Hyperons in their core. Their model could also explain the observed mass, radius and rotational frequencies of few pulsars. Apart from that the same model was also applied to predict the critical temperature of Liquid-Gas phase transition at low density and low temperature. Their research is also on the nuclear interactions and their effect on the equation of state at various density ranges. Currently they are working on investigating and estimating the gravitational wave strain amplitude from pulsars.

One faculty member has been built a model for animal trail shapes in the presence of guiding structures. The model predicts corner following and corner avoiding behavior in the presence of right angled guiding paths on a surface.

There is also an interest in studying physics problems emerging from undergraduate concepts. In this regard, one faculty member has studied the motion of a particle sliding on a rotating table in the presence of friction has been studied analytically as well a numerically. The study predicts an angle dependent escape velocity for the particle at different locations on the table. They also proposed an alternate way to determine the coefficient of friction based on the studies.

51. **Detail five major Strengths, Weaknesses, Opportunities and Challenges (SWOC) of the department.**

Strength

1. Research groups with high potential and whose research output has been growing over the last 5 years.
2. Passionate teachers who have been doing an excellent job at teaching.
3. Msc (Hons) programme that is strong in its depth, coverage, flexibility, and project work
4. Good students in our MSc programme and some of the best students are pursuing PhD's

Weaknesses

1. Not enough visibility vis-a-vis research to attract more PhD students
2. Not adequate high-end experimental infrastructure for experimental research though significant growth has occurred over last five years.
3. Certain areas of physics are not adequately represented in the department.

Opportunities

1. A greater emphasis & encouragement is being laid on research at our university. This will enable the department to strengthen its research programme& research output
2. Attracting students from other universities to join PhD programmes by offering summer internships and projects
3. Many students have a strong interest in physics but take up engineering disciplines. We can attract such students to Physics by introducing minor programmes, and relevant electives that they can take as their 'open' electives or encouraging them to pursue on-campus first degree thesis.
4. Introduce new postgraduate programmes in collaboration with other departments.

5. Introduce a new undergraduate programme that give student an opportunity to either pursue a career in research or in industry.
6. Transfer knowledge & technology developed in our laboratories to the industry.

Challenges

1. To train students and design curriculum such that Physics students can be absorbed into attractive inter-disciplinary & industry careers too.
2. To attract our own students into careers in Physics
3. Attracting students into our PhD programmes since we have competition from several established IIT's and research institutions with a long history of research.
4. Obtaining funding for research and to grow our PhD programme.

52. Future plans of the department.

1. Grow our PhD programme and at least double the PhD students strength in next 3-4 years.
2. Increase research funding, output and to raise the department's research activity at the level of the best universities in the country.
3. Introduce Minor programmes in physics related areas.
4. Design new electives that may attract students of other disciplines.
5. Introduce a new programme at the undergraduate level to enable students to either take up a research career or a job in the industry.
6. Introduce postgraduate programmes in collaboration with other departments.

53. Any other information regarding your department which you would like to include.

1. International Collaboration : Ram Shanker Patel - Active collaboration with Deprtment of Microtechnology and Nanoscience, Chalmers University of Technology, Sweden. Spent Two summers (From 01.06.2013 to 03.06.2013 and 15.06.2014 to 15.07.2014)