Self-Study Report – Volume I
Cycle III

Profile of the Institute and Criteria Wise Inputs

Submitted for Re-accreditation to
The National Assessment & Accreditation Council
Bengaluru

Submitted by

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI.
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Birla Institute of Technology and Science, Pilani
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Souvik Bhattacharyya, PhD, FNAE, FNASc, FWAST
Vice-Chancellor & Senior Professor

FOREWORD BY VICE CHANCELLOR

It gives me immense pleasure to present the Self Study Report (SSR) of Birla Institute of Technology and Science, Pilani (BITS Pilani), a multi-locational university with campuses in Pilani, Dubai, Goa and Hyderabad. The Institute was established in 1964 in collaboration with MIT and has completed 50 glorious years of igniting the young minds. The Institute established its first off campus center in Dubai in the year 2000 followed by K.K. Birla Goa Campus in 2004 and Hyderabad Campus in 2008. BITS Pilani currently offers undergraduate, post-graduate and Ph.D programmes in science, engineering, pharmacy, management and social sciences to over 12,000 students.

BITS Pilani was accredited at the five-star level (A*****) by the National Assessment and Accreditation Council (NAAC) in 2000. BITS Pilani volunteered for re-accreditation by NAAC in 2009 and was accredited with CGPA of 3.71 on a 4-point scale at 'A' grade. Dubai and Goa campuses were part of this re-accreditation, and indeed the NAAC team had also visited the Goa campus as a part of its process of assessment.

It is pertinent here to mention that the Prof. P N Tandon committee set up in 2009, to review existing Institutions Deemed to be Universities, placed BITS Pilani in the highest category of 38 institutions (of a total of 130), satisfying most of the criteria for the Deemed University status, with a score of 41 out of a maximum of 45, with 43 being the highest score accorded (one institution received a score of 43, and six including BITS Pilani, a score of 41).

The Institute has been continuously ranked as number one private university by several reputed publications such as *India Today*, *Data Quest*, and *Outlook* who also ranked BITS Pilani among the top 10 engineering institutes along with the IITs. In the QS rankings of 2015, BITS Pilani was placed at number 95 among universities in the BRICS countries, and between 201 and 250 among universities in Asia. We believe we can do much better in the near future with improvement in metrics such as research particularly translational research, entrepreneurship, pedagogy, social engineering and outreach.

The unique importance of integrating work experience into the educational process has been a recurring theme in the recommendations of successive policy documents on education. In the context of engineering education in particular, while there has been significant creation of capacity in the last few decades, the inability to bridge the gap between theory and practice, and the low level of industry readiness of the graduates that results, has remained a matter of serious concern. This is especially so given the rapid pace of evolution of technology. This is where BITS Pilani has done exemplary work through several decades through the Practice School, and the Work Integrated Learning Programme (WILP) which are outstanding models of industry-academia cooperation. WILPs are technical continuing education programmes designed for employed professionals. These meet the needs of industry, students and universities in developing, delivering and reflecting on learning experiences that benefit everyone.

BITS Pilani ensures that appropriate orientation and training is given to students so that all the objectives are attained. The Practice School programme presents a shining example that has addressed this subject effectively over the last four decades. This is unmatched in our country to the depth and breadth it is conducted. The model has ensured value for all stakeholders, the students, the industry, and the Institute. A spin-off benefit is a significant number of pre-placement offers of employment. For the Institute, the programme offers the means for its faculty members to engage with industry, obtain valuable feedback on its educational programmes, and potentially build partnerships. It is a model worthy of study, adaptation, and adoption by other Institutions; we urge regulatory bodies and the government to take note so that we can spread this model to other systems and institutions.

To instill a spirit of community service, the Institute encourages the students to participate in several outreach programmes through NSS and other student bodies such as NIRMAN, YUVA etc. The Institute also organizes cultural activities, academic and sports activities across all campuses and also participates in national and international competitions. Students of BITS acquire life skills, soft skills and communication skills through extensive participation in a number of extra-curricular activities organized by the student clubs.

We take pride in stating that BITS Pilani has always been in the forefront in harnessing technology for both academic matters and governance. As a pioneering effort in this country, BITS has been conducting BITSAT, an online admission test for the past eleven years without any glitch. This examination is conducted across the country in sixty different locations over twenty days, with around 165,000 examinees competing for 2200 seats. This reflects our commitment to use technology to ensure that our admissions process is fair, transparent, and environment-friendly.

As a part of our internationalization initiatives, BITS started admissions for International students in 2015, admitting 28 students at the Hyderabad campus. This year we have expanded international admission to Goa campus as well; we have admitted 28 students in Hyderabad campus and 18 in Goa campus this year. These students were admitted on the basis of their scores in the advanced SAT. With growing number of students from different countries, we look forward to providing enriching global experience inside and outside the classrooms and laboratories to its diverse student population.

BITS Pilani is the only institute in the country and one amongst the few in the world to establish CISCO tele-presence facility connecting all its four campuses. Using this facility, the problem of quality faculty is addressed through live and seamless delivery of lectures from one campus to other campuses. This facility has also helped in various critical university processes including faculty recruitment, conducting viva-voce examinations and academic and administrative discussions across all four campuses without travelling to these locations. The Institute has also implemented ERP covering the entire life cycle of students, payroll, HR, purchase process etc.

Birla Institute of Technology and Science, Pilani
Pilani | Dubai | Goa | Hyderabad

Souvik Bhattacharyya, PhD, FNAE, FNASc, FWAST
Vice-Chancellor & Senior Professor

BITS Pilani has become a leading centre amongst the academic institutes in Innovation, Incubation and Entrepreneurship. The Institute has set up a Centre CIIE, an integrated structure for academic and incubation services related to entrepreneurship across our 4 campuses with the mandate of facilitating technology transfer & commercialization, executing filing of patents, custodian of IPR of BITS, supporting entrepreneurial activities, interfacing with technology business incubators of all campuses and fostering collaboration with alumni and industry for several entrepreneurial activities. This year we are competing with the very best in this country seeking support under the Atal Incubation Mission under NITI-Aayog. We are partnering with other organisations in such efforts including CSIR-CEERI, Pilani. Further, the Institute has set up technology-based incubators in all its Indian campuses with support from DST, BIRAC and DIETY. Moreover, the Alumni take an active role in mentoring the students in entrepreneurship related activities and in the pursuit of higher education.

Our aggressive plan to recruit research-focused faculty members continues to gain traction. In the last 5+ years, we have made over 500 faculty offers out of which nearly 400 have joined us from about 43,000 applicants. I am glad to share that a significant number of them have doctoral or post-doctoral experience from the leading institutes in India or abroad. Going forward, we propose to empower existing faculty in various ways to ensure they contribute to growth and excellence at BITS Pilani.

Our Ph.D programme and sponsored research projects are now feeding into each other's growth. Success in these two areas gives us the confidence that we are on track to be recognized globally for our focus on research and the number of Ph.D students in our university has grown from 417 to over 844 in last 5 years. In order to bolster our research capabilities, major research equipment worth Rs. 15 Crore have been procured by BITS Pilani during 2015-16. Under Centre of Research Excellence in Water, Waste water and Energy Management (CORE WWEM) funded internally, five ongoing major projects worth Rs. 2.34 crore are currently supported and new projects will be identified to enhance our research and innovation for societal benefit.

We continue our journey towards excellence in higher education and research and strive to become a leading university in the world in the near future.

Prof. Souvik Bhattacharyya
Vice-Chancellor & Senior Professor

ABBREVIATIONS

1.	ACB	-	Academic Counselling Board
2.	ACC	-	Academic Counselling Cell
3.	AMC	-	Annual Maintenance Contract
4.	ARCD	-	Academic Registration and Counselling Division
5.	ARD	-	Academic Research Division
6.	ARPD	-	Academic Resource Planning Division
7.	BITS	-	Birla Institute of Technology and Science
8.	BITSAA	-	BITS Alumni Association
9.	BITSAT	-	BITS Admission Test
10.	BITSCAN	-	BITS Annual Newsletter
11.	BITSMUN	-	BITS Model United Nations program
12.	CAD	-	Computer Aided Design
13.	CAL	-	Central Analytical Lab
14.	CAT	-	Common Admission test
15.	CCSH	-	Committee for Combating Sexual Harassment
16.	CDDT	-	Center for Desert Development Technology
17.	CDF	-	Campus Development Fund
18.	CEL-	-	Center for Entrepreneurial Learning
19.	CET	-	Center for Educational Technology
20.	CEWRM	-	Center for Excellence in Water Resource Management
21.	CFL	-	Compact Fluorescent Lamps
22.	CIIE	-	Center for Innovation, Incubation and Entrepreneurship
23.	CMS	-	Course Management System
24.	CORE	-	Center of Research Excellence
25.	CREED	-	Centre for Renewable Energy & Environment Development
26.	CSD	-	Centre for Software Development
27.	DAC	-	Doctoral Advisory Committee
28.	DC	-	Data Center
29.	DCA	-	Departmental Committee for Academics
30.	DDF	-	Departmental Development Fund
31.	DIT	-	Department of Information Technology

32.	DR	-	Disaster Recovery
33.	DRC	-	Departmental Research Committee
34.	DRS	-	Department Research Support
35.	DST	-	Department of Science and Technology
36.	EDUSAT	-	Educational Satellite
37.	EOL	-	Extraordinary Leave
38.	ERP	-	Enterprise Resource Planning
39.	EWYLP	-	Earn while you learn Programme
40.	FDTS	-	First Degree Thesis
41.	FIST	-	Funds for Infrastructure in Science and Technology
42.	GCC	-	Gulf Cooperation Council
43.	GMAT	-	Graduate Management Aptitute Test
44.	HDD	-	Higher Degree Dissertation
45.	HoD	-	Head of the Department
46.	HR	-	AFM – High resolution Atomic Force Microscopy
47.	I/C	-	Instructor In Charge
48.	ID	-	Instruction Division
49.	IDR	-	Inter Disciplinary Research
50.	IKAC	-	Institutional Knowledge and Analysis Cell
51.	ILL	-	Inter Library Loan
52.	IPC	-	Information Processing Center
53.	IPCD	-	International Programmes and Collaboration Division
54.	IQAC	-	Internal Quality Assurance Cell
55.	ISA	-	International Student Admission Scheme
56.	ITW	-	Intensive Teaching Workshop
57.	KVPY	-	Kishore Vaigyanik Puraskar Yojana
58.	LAN	-	Local Area Network
59.	LC-MS	-	Liquid Chromatography and Mass Spectrometry
60.	LED	-	Light Emitting diode
61.	LMS	-	Learning Management System
62.	Mbps	-	Megabits per second
63.	MGPV	-	Mean Grade Point Value
64.	MOOC	-	Massive Open Online Courses

65.	MOODLE	-	Modular Object Oriented Dynamic Learning Environment
66.	MoU	-	Memorandum of Understanding
67.	MPLS	-	Multi- Protocol Level Switching
68.	NAAC	-	National Accreditation and Assessment Council
69.	NMR	-	Nuclear Magnetic Resonance
70.	NPTEL	-	National Programme on Technology Enabled Learning
71.	NSS	-	National Service Scheme
72.	OPAC	-	Online Public Access Catalogue
73.	OPERA	-	Outstanding Potential for Excellence in Research and Academics
74.	PDF	-	Professional Development Fund
75.	PS	-	Practice School
76.	RAF	-	Recreation Activity Forum
77.	SAP	-	Special Assistance Programme
78.	SAT	-	Scholastic Assessment Test
79.	SCIO	-	Scio benevolent foundation
80.	SDET	-	Software Development and Educational Technology
81.	SEM	-	Scanning Electron Microscopy
82.	SFC	-	Student Faculty Council
83.	SIRI	-	Society involved in reinventing India on campus
84.	SPOC	-	Small Private Online courses
85.	SRCD	-	Sponsored Research and Consultancy Division
86.	SWD	-	Student Welfare Division
87.	TA’s	-	Teaching Assistants
88.	TBI	-	Technology Business Incubator
89.	TLC	-	Teaching Learning Center
90.	TP	-	Tele-presence
91.	UAE	-	United Arab Emirates
92.	UC	-	Utilization Certificate
93.	UGC	-	University Grants Commission
94.	VOIP	-	Voice Over Internet Phone
95.	WILP	-	Work Integrated Learning Programmes
96.	XRD	-	X-ray diffraction

EXECUTIVE SUMMARY

INTRODUCTION

Birla Institute of Technology and Science (BITS), Pilani, henceforth also referred to as "Institute" is an all India University established under Section 3 of the UGC Act. It is privately supported, fully residential and admits both male and female students. Apart from main campus in Pilani, it has campuses in Dubai (UAE), Goa and Hyderabad.

The primary objectives of the Institute are:

1. To provide for and promote education and research in the fields of Technology, Science, Humanities, Industry, Business, and Public Administration
2. To collate and disseminate effective ideas, methods, techniques and information in such fields as are likely to promote the material and industrial welfare of India
3. To train young men and women able and eager to create and put into action such ideas, methods, techniques and information.

The Institute is a dream come true of its founder late Mr. G.D.Birla, an eminent industrialist. What started in early 1900s as a small school, blossomed into an institution of high repute. The Institute was initially registered in 1964 as a Society under the Rajasthan Societies Registration Act of 1958. Subsequently, by notification published in the Gazette of India dated the 27th June, 1964, the Ministry of Education, Government of India, declared that the Institute being an "*institution for higher education shall be deemed to be a University*". During the early years of its inception, i.e., 1964 to 1970, the Institute with the support of Ford Foundation Grant had the advantage of having collaboration with Massachusetts Institute of Technology (MIT), USA. It adopted the semester system, modular structure of courses, continuous and internal evaluation, letter grading, Practice School, etc., in the year of 1972. It also created institutionalized linkages with the industries in the form of Practice School courses which form integral components of a degree programme. Over a period of time, the Institute also introduced several flexibilities and features in its educational programmes such as Dual Degree option, Practice School for all disciplines and off-campus Work Integrated Learning and Collaborative programmes for large number of industry personnel.

Dr. K.K. Birla, Chancellor, realized the need for greater number of promising graduates in the field of science and technology in shaping up the nation's development. Hence, under his patronage, BITS established further three campuses, one in Dubai, UAE and the others in Goa and Hyderabad. While BITS Pilani, Dubai Campus started functioning in the year 2000, the Goa Campus and Hyderabad campuses started functioning in 2004 and 2008 respectively.

After Dr. K.K. Birla's demise, Dr. Kumar Mangalam Birla was elected as the Chancellor and Smt. Shobhana Bhartia was appointed as the Pro-Chancellor of the Institute. Under the leadership of young and dynamic Chancellor, BITS is on the path of scaling greater heights.

EDUCATIONAL PROCESS

The Institute operates its educational programmes in all the three tiers, namely, Integrated First Degree, Higher Degree and the Doctoral Degree. All programmes in the Institute are designed to allow as many components of science and applied science as are necessary for the graduates of the programmes to function effectively and efficiently in the technology driven society. All programmes contain certain structural commonality and the common courses are invariably operated together for the students who are required to take the courses. Similarly, irrespective of the ultimate degree for which a student qualifies a large factor of this commonality between all students creates an educational basis which provides an easy professional linkage, communication and group activity among students graduating in different degrees. This similarity among different students graduating with different degrees is further welded in a stronger professional bond when they work as interns in the Practice School stations or as members of a team working on research and development projects. Open electives requirement in the curriculum allows students to explore courses in disciplines other than their own. They also provide them an opportunity to pursue interdisciplinary courses.

The Institute offers degree programmes in Engineering, Sciences, Technology, Pharmacy, Management and Humanities. Admission is highly competitive in all campuses. For Indian Campuses, admission is made on an All-India basis purely on merit, with the best students being drawn from across the country and opting for all its degree programmes. Admissions to all first degree and higher degree programmes are made through a computer based online test spread over a period of about 40 days at more than 50 centers across the country and it is conducted by the institute. Additionally, BITS also offers direct admission to the Board Toppers who obtain first rank in any central or state level Board examination. Recently, BITS has also opened its doors to candidates holding foreign passport based on Scholastic Assessment Test (SAT) score under the International students scheme with an aim of introducing transnational diversity.

For Dubai campus, admission is made on merit, based on the scores of school leaving examination with a minimum requirement. International students are also admitted in Dubai campus.

Features of BITS Educational System and academic flexibilities

Semester System where calendar is planned well before the beginning of the semester and is strictly adhered to.

Continuous and Internal Evaluation System comprising regular tests, seminars, group discussions, assignments, quizzes and a comprehensive examination leads to a holistic assessment of student performance.

Letter Grading System where letter grades A, A-, B, B-, C, C-, D and E are awarded to the student based on the total performance of the student. It is relative to the performance of others taking the same course. These letter grades stand for performance quality:
A (Excellent), A– (Very Good), B (Good), B– (Above Average), C (Average), C– (Below Average), D (Poor) and E (Exposed).

Choice of Electives from a large pool of elective courses and are under the categories of Discipline electives, Humanities electives and Open electives. These include project oriented courses, emerging area courses, and many other discipline specific areas for students to branch out and excel. Many project oriented courses offered as electives act as a vehicle to bring out the creativity of students in design, development, computer software applications, organizational and many other aspects. Within the broad contour of the requirements of the degree, a student chooses his/her sequence of courses and electives (under the three categories: Humanities, Discipline, and Open) to complete the required number of courses and (credit) units.

Institutionalized Linkages with Industries is a recurring theme in the realm of educational reform and innovation linking university education with industry. Since its very inception in 1964, the Institute has been committed to University-Industry linkages. Beginning in 1973, the Institute has taken pioneering initiatives towards the development of institutionalized linkages with industry, through its (i) Practice School, (ii) Technology Innovation Center, and (iii) Off-campus Work-Integrated Learning Programmes and Off-campus Ph.D. Aspirants' Scheme (Ph.D. programme).

Dual Degree scheme provides flexibilities of Dual Degree (between Science and Engineering and vice versa) enabling students to work for and complete concurrently two first degrees. Dual degree also serves the purpose of attracting brilliant students to our Science programmes. All students admitted to Science programmes are given an opportunity to work under this scheme for a second degree from one of the professional programmes. Admission to the dual degree is based on the performance of students during their first year at BITS. As all programmes are modular and several modules are common, normally a student can complete second degree by spending one or one and half years extra. For highly meritorious students, there is provision for dual degree in two engineering programmes.

Transfer Opportunities for Meritorious Students provide transfer option within first degree, first degree to higher degree or to Ph.D. degree thereby facilitating bright students to get the respective transfer to a degree of their choice.

Admission in both the Semesters is a hallmark of BITS. The Institute makes admission in both the semesters depending upon the availability of seats and facilities. In case of the first tier of the formal system, bulk of the admissions is made in the first semester. In view of the available structural flexibilities it is possible to accommodate a small number of equally competitive students in the second semester also, thus making feasible a unique feature of the Institute, namely, admission in the second semester.

Open, Transparent and Adaptive System where all corrected answer papers are returned to the students after evaluation within a stipulated time, with expected solutions and marking schemes being displayed on the notice boards immediately after the test/exam . Question papers of previous semesters are made available on the library web-site and also in the library. All instructors have to submit the copies of all tests, quizzes and comprehensive papers along with their expected solutions to the instruction division, which evaluates and ensures the quality of all these papers.

Declaration of semester examination results is normally made within 10 days of last examination.

Enrichment of faculty: Continuous efforts are made to enhance the teaching learning experience by equipping teachers with innovative teaching methodologies through the Intensive Teaching Workshops and the Teaching Learning Center of the Institute. Faculty are also encouraged to participate in the University Immersion and Industry Immersion schemes of the Institute for better exposure.

Research Components at all 3-tiers of Education promotes participation of students in research activities through courses such as First Degree Thesis (FDTS), Higher Degree Dissertation (HDD), Doctoral Thesis, Project courses such as Lab Projects, Computer Projects, Design Projects, Study Projects, Technology Innovation Centre Projects, etc. The creative and talented pool of students at BITS Pilani is actively engaged in carrying out project work at Practice School stations as well. They also contribute towards research activities by participating in Conferences, Seminars, Symposia and Workshops. Faculty members at BITS Pilani are also engaged in active research and consultancy projects leading to extramural sponsored funding which facilitates doctoral research.

Up-gradation of Courses is a continuous process at BITS. The instructor or the team of instructors can, within the broad framework of a course, modify the course handout and include latest topics in the course. Standard textbooks are prescribed for a given course. Further, assignments based on computer applications, library survey, laboratory work, etc., encourage students to gain deeper insight in the course. The students are also asked to present their assignments to their faculty in a seminar session which also improves their communication skills.

Continuous Feedback is obtained from faculty, student, industries, practice school organizations, campus interview teams, alumni and parents. Structured feedback is collected anonymously from students regarding each course through a planned questionnaire at least once in a semester. Further 24x7 online feedback systems are also available to students to provide qualitative feedback. The suggestions are conveyed to the respective course instructors within the same week to improve the conduct of the course. In addition, Student Faculty Council (SFC) facilitating class committee meetings between students and faculty has been recently added to the feedback process. A quantitative summary of feedback is prepared and conveyed to the respective instructors. Faculty members who teach a course have the freedom to customize the course within the broad contour of the course description that has been approved. The instructor(s) of the course(s) can also give reports and suggestions on the course operation and modification of the course offering.

Student Counselling is provided to all students and in a more intensive manner to those who do not fare well in the evaluation components. A committee called Academic Counselling Board (ACB) monitors their programmes and gives guidance to help them improve their performance. The committee meets the students regularly and monitors their performance in various tests, quizzes, etc., and also interacts with the different course instructors to get feedback regarding the student performance. In addition, the Academic Counselling Cell (ACC), comprising of faculty members and students, is also involved in mentoring students. The institute has also recently evolved a mechanism in which all students of the first year are divided into small groups and each group is assigned a faculty member as advisor to provide academic and personal guidance.

Apart from these the academic performance of each student is monitored by the instructor as well as the instructor-in-charge by conducting regular assignments, tests and quizzes.

Whenever necessary, personal counselling is also provided by the instructor, the instructor-in- charge of various courses and the warden for improving the students performance. A Professional Counsellor is also available to students in all campuses for consultation.

RESEARCH AT BITS

Research at BITS is an integrated activity that encompasses teaching and utilizes its linkages with the outside world of Academia and Industry. A large number of students from all the three tiers are involved in Research. At first-degree level, a one-semester full-time thesis course and at the higher degree level, a dissertation course offer excellent research opportunities to the students. In the doctoral programme, a large number of Ph.D. students located on-campus and off campus are actively engaged in research work in diverse areas. The institute's linkages with R&D centers of industries and other institutions throughout the country and even abroad have given a forward thrust to its research activities.

A number of young faculty members are able to achieve the twin objectives of teaching and pursuing the Ph.D. degree of the institute. Opportunities are also provided to full time research scholars and faculty for carrying out part of their research work at centers within the country as well as abroad. The institute's widely acclaimed Ph.D. Aspirant's scheme enables professionals of high standing and proven competence, from collaborating organizations to pursue the Ph. D degree of the institute without disturbing them from their professional settings. Employed professionals working in the vicinity of campuses can also pursue Ph.D. under the recently introduced part time Ph.D. programme of the Institute.

STUDENT SCHOLARSHIPS:

A large number of scholarships, fellowships and other financial assistance are available to the students of the institute. About 30 % of the students receive some form of financial assistance from the Institute. Merit scholarships and Merit cum Need scholarships are given to meritorious students of the Institute. In addition, students can get financial support under the Earn While You Learn Programme (EWYLP). Under this scheme, students are selected for part-time jobs such as tutorial work, office assistance or other services to the student community. Some students are also selected as Professional Assistants each semester for well-defined tasks such as course development, laboratory development work and for other tasks in Divisions and Units. In addition, student scholarships are also available through External foundations including alumni and charitable trust's like Angira foundation, Sir Ratan Tata Trust etc.

UNIVERSITY-INDUSTRY LINKAGES

Practice School:

All Integrated First Degree and Higher Degree Programmes of the Institute provide Practice School (PS) option. BITS is strongly committed to the view that university education must be oriented so as to (i) meet the rapidly changing needs & challenges of the environment, (ii) help people become more capable of facing unfamiliar, open-ended real-life situations, and (iii) bear an economic relevance to society. The Practice School (PS) method of education links the university with the professional world, by bringing the reality of the world of work into the educational process. BITS has introduced industry internship as integral part of its curriculum. Students, under the supervision of the faculty, are involved in applying the knowledge acquired in the classroom to finding solutions to real life problems in the industrial locations.

Each student has to do an industry internship of seven and half months before he/ she graduates. The PS programme in the BITS curriculum has two components, namely PS-I of two months duration implemented during the summer following the 2nd year and PS-II of five and a half months duration implemented during either of the semesters of the final year. The special features of the PS method of education, viz., (i) the work of the students is supervised and evaluated by faculty and professionals from the industries, (ii) the credits earned by the student count towards the total credit requirement of the degree, and (iii) the PS option is available to students of all disciplines, making it a bold and radical educational reform with no parallel.

INFRASTRUCTURE

The core strength of BITS is in terms of expertise and infrastructure. University creates and enhances infrastructure to promote good teaching learning environment. BITS Pilani University focuses and facilitates research, in all disciplines. The university has built up-to-date facilities in classrooms which include among others, the provision of LCD projector in every class room, Audio systems to support animated presentations, educational videos to provide good learning environment.

Since its inception, the Institution practices residential system and provides hostel rooms to all UG, PG and Ph.D./M.Phil. students. Strategic growth of expansion plan (physical infrastructure) is set in order to meet the increase in number of students / faculty / non-teaching staff.

Institute has created Central Research Facility housing some sophisticated equipment for use by faculty and students, across all the campuses. Field emission type SEM, NMR, HR-AFM, XRD, LC-MS, Flow cytometer, Confocal Microscopy are a few such equipment's. The institute buildings are Wi-Fi enabled. Wi-Fi hotspots are created in other part of the campuses. The local area network is built using 1G/10G fibre optic backbone and offers 100 /1000 Mbps desktop connectivity to faculty members and students for promoting the teaching and learning environment. This enables optimal use of resources and creates a neutral research ambience for faculty and students.

New laboratories are constructed. Renovation, up-gradation of laboratories, expansion and modernization of facilities are an integral part of University growth plan.

The enhancement of infrastructure and reinforcement of the existing infrastructure on a continuous basis consistent with growing need of the institute are a priority and demand our constant attention. Further, as technology advances, the existing infrastructural facilities are constantly updated. Relinquishing and elimination of obsolescence is also paid sufficient attention. The institute has earmarked more than 1400 crores in its growth plan for infrastructural expansion of three Indian campuses in the next few years.

Library:

The libraries are housed in state-of-the-art buildings close to all academic blocks of the Institute spread out in 1.59 Lakh sq.ft (14784 Sq Mts) area across four BITS campuses. With attractive interiors and a seating capacity, the libraries include well-lit reading halls, stacks, display area, e-library, audio-visual library and study carrels. The libraries have a collection of over 2.8 Lakhs volumes of books and manuscripts, a good collection of rare books with back volumes since 1920s. The highlights of BITS libraries in four campuses are as follows:

SL No	Details	Pilani	Goa	Hyderabad	Dubai
1.	*Total Area of Library in (Sq Mts)	4792.50	3512	5100	1378.68
2.	*Total seating capacity	750	600	425	300
3.	Print				
	• Books	205852	34854	26500	18000
	• Back Volumes	33286	1881	300	340
	• PhD Theses*	1157	37	21	04
	• HD Theses	250	60	303	376
4.	Average number of books added during the last three years	1062	1364	3978	1126
5.	Average number of walk-ins (per month)	11500	15600	21480	17500

The wireless internet in the libraries provides Internet connectivity even for the readers' laptops. The library also has a good collection of printed journals, full text e-journals and important databases for access to students and faculty. BITS Pilani is also a partner in the networking of university library programme of INFLIBNET.

Computing Facilities:

Information Processing Center (IPC) or similar facility, takes care of the IT related requirements of all individual campuses. It maintains terminal rooms (Labs) to provide centralized computing facilities to all students and laboratories for teaching and research needs of Computer Science department. These labs/terminal rooms have Desktops and Workstations. It also maintains ERP Disaster recovery rack that serves ERP needs of Pilani, Dubai, Goa, and Hyderabad campuses. Internet facility is available at all hostel rooms, cafeteria, library, staff quarters, and all laboratories within the campuses.

All users can work on Unix/Linux or Windows XP environments. With these computing facilities, laboratory work for courses like Engineering Graphics, Computer Programming, Data structures, Operating Systems, Computer networks etc. are being conducted. All these above computers are connected to uninterrupted power supply for safe operations. IPC is also responsible for maintaining the computing infrastructure for research activities related to computing infrastructure from Chemistry, Computer Science Department, etc. under sanctioned projects from various agencies like DIT, UGC, and DST etc.

IPC is also involved in designing and maintaining Tele-presence facility that is used to connect Pilani, Goa, Hyderabad and Dubai campuses (faculty/students) for organizing tele-meetings, research discussions, and conducting classes through tele-presence mode.

Campus-wide Network:

Bridging the geographical distances: BITS Connect 2.0, is the first ever multi-campus virtual university in India. BITS Connect 2.0 is a multi-million dollar project that envisions bringing state-of-the-art tele-presence and inter-connectivity to all four campuses of BITS. It enables remote learning and participatory coursework, collaborative research and remote recruitment.

By bridging the geographical distance across campuses and global knowledge centers, this platform facilitates collaboration among its faculty, students, industry partners and alumni, for education, research and mentorship. BITS Connect 2.0 aims to enable:

- **Industry Relations & Recruitment**: Any company can remotely recruit students or engage in research collaboration.
- **Remote Teaching**: Specialized electives can be offered to students in all 4 campuses by the speaker at any one campus.
- **Remote Meetings**: Faculty and administrative staff meetings can be held via tele-presence, which gives an experience of physically being present in the same conference room.
- **Web Conferencing**: Faculty members can conduct web conferences (audio + video + content sharing) with other researchers across the world.
- **Embryo 2.0:** Alumni can remotely interact with students at all 4 campuses simultaneously.
- **Online Publication of Course Content**: All courses can be recorded and streamed online.

Student Housing and other facilities:

All campuses except Dubai, are fully residential and hostel accommodation is provided to all students. Every campus has adequate separate single tier accommodation for girls and boys with modern amenities. As Dubai campus caters the education needs of students from Dubai and other parts of UAE, several students are day scholars with facilities like 1000 single occupancy rooms are available in Dubai Campus.

Student Activities Centre

Every campus has a Student Activities Centre housed in a separate building where students have their union office and rooms for various activities. This building also has badminton courts, a squash court, a Table tennis room, a Health Club, gymnasium etc. Amphitheatres and food kiosks are also available for students.

Cultural and Recreational Activities

The Institute campuses have the following clubs and societies: Music, Dance, Hindi Drama, English Drama, Hindi Press, English Press, Creative Activities, and Mime clubs; English Language Activity, Hindi Activity societies, Photography Club and Cultural societies. These are entirely managed by the students and have been nurturing the creative and cultural talents of the students. In addition, Recreational Activity Forum, Swimming Club, and Health Club membership are open to students and staff. The Institute also organizes Theatre and Dance workshops. In all campuses, students conduct cultural, technical, sports festivals annually for national and international students and also participate in various all India level annual cultural, sports and technical fests. These fests provide a platform for students to enhance their leadership potential and are popular among the students across the country.

Games and Sports

Games and sports are integral part of BITS life and are organized through the Sports Club. The Institute has Physical Education Instructor, Sports Instructors, Coaches, Life Saver and other supporting staff. Facilities for the following games and sports are available: Football, Hockey, Cricket, Basketball, Volleyball, Tennis, Badminton, Table Tennis, Athletics, Gymnastics, Health Club, Swimming, Weight lifting, Aerobics, Yoga, and Martial Arts etc.

Medical Facilities

Medical centres are present in each campus. They cater to the medical needs of the students and staff residing in the campuses. They also provide medical facilities to those residing outside the campuses, people working in Banks, Post Office and other offices, located in the campuses. The campuses also have an ambulance equipped with all facilities to transfer the patients to major hospitals in case of emergency. Special arrangements have been made with nearby hospitals to treat referred cases from BITS on a priority basis.

PLACEMENT AND CAMPUS INTERVIEWS

Student Placement in the Institute is managed by a professional team headed by the Chief Placement Officer and campus- specific Placement Managers. On an average, 350 companies visit various campuses of the Institute every year to interview students who are about to graduate. The number of such interviews has grown considerably over the years. As the student-population in the final year is divided into two batches with one batch going to practice school in the first semester and the other in the second, only one half of the final year students remain available for campus interview during a particular semester. Hence many organizations find it worthwhile to conduct the campus interviews in both the semesters so that they can interview both the batches on the campus itself. The Institute also tries to arrange interviews for practice school students in and around their own practice school stations. During 2014, about 85 % placement was achieved across the four campuses.

INTERNATIONALISATION OF HIGHER EDUCATION

The Institute has signed Memorandum of Understanding (MoUs) with a number of foreign institutions whereby students and faculty of the Institute can carry out their research work in the laboratories of these institutions. Both the students and the faculty of four campuses have carried out research projects at the laboratories of Uniformed Services University of the Health Sciences (USUHS), Maryland (USA); New South Wales University (Australia); Helsinki University (Finland); etc. Many students also carry out their practice school projects in R&D organizations in USA, France, Italy, Singapore etc. In addition, a few students of foreign universities have worked on projects and courses at BITS. These exchanges provide the much needed global experience to BITS students and faculty. Many state of the art hands on workshops and seminars are periodically conducted by experts from foreign institutions.

PROFILE OF THE INSTITUTE

1. Name and Address of the University

Name:	BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE	
Address:	VIDYA VIHAR, PILANI	
City: PILANI	**Pin:**333031	**State:** RAJASTHAN
Website: www.bits-pilani.ac.in		

2. For Communication: (updated as on July, 2016)

Designation	Name	Telephone with STD Code	Mobile	Fax	Email
Vice Chancellor	Prof. Souvik Bhattacharyya	01596-242090 01596-515247	-	01596-244183	souvik@pilani.bits-pilani.ac.in
Pro Vice Chancellor (s)					
Registrar	Prof. Siva Subramanian (Acting)	01596-242192 01596-515310	-	01596-244183	sivasub@pilani.bits-pilani.ac.in
Steering Committee/ IQAC Co-ordinator	Prof. R. N. Saha	O: +971 4 2753700/ 2753777(Direct)	-	+9714 4200844	rnsaha@dubai.bits-pilani.ac.in;

3. Status of the University

State University	
State Private University	
Central University	
University under Section 3 of UGC (Deemed University)	√
Institution of National Importance	
Any other (pls specify)	

4. Type of University

Unitary; (**Deemed University)**	√
Affiliating	

5. Source of Funding

Central Government	
State government	
Self- financing	
Any other (please specify)	√ Privately funded

6.

a. Date of establishment of the University: 18/06/1964 (18th June, 1964)

b. Prior to the establishment of the university, was it a/an

i. PG Centre — Yes [ ] No [√]

ii. Affiliated College — Yes [√] No [ ]

iii. Constituent College — Yes [ ] No [√]

iv. Autonomous College — Yes [ ] No [√]

v. Any other (please specify):

If yes, give the date of establishment: BITS became full- fledged Degree College in 1943.

7. Date of recognition as a university by UGC or any other national agency

Under Section	DD	MM	YYYY	Remarks
i. **2f of UGC***				
ii. **12B of UGC ***				
iii. **3 of UGC #**	18	06	1964	
iv. **Any other ^ (specify)**				

We have enclosed UGC certificate as **Appendix 1**.

8. Has the university been recognized

a. By UGC as a University with Potential for Excellence?

Yes [ ] No [√]

If yes, date of Recognition _____ (dd/mm/yy)

b. For its performance by any other governmental agency?

Yes [√] No [ ]

If yes, Name of the agency **National Assessment & Accreditation Council** and date of Recognition (last accredited) : **29/01/2009.** (**Details attached in Appendix 2 and Appendix 3)**

9. Does the University have off Campus Centers

Yes [√] No [ ]

10. Does the University have off shore Campus

Yes [√] No [ ]

If yes, date of establishment: BITS has an off shore campus in Dubai which started operations from September 2000.

Date of Recognition: MoHRD Ref No.F-34-18/2000-U-3 dated 6th November 2000.

11. Location of the campus and area.

	Location *	**Campus area in acres**	**Built up area in sq. mts**
i) Main campus area	Pilani (Rural)	331 acres	2,89,393
ii) Other campuses in the country	Goa (Semi Urban)	178 acres	1,21,954
	Hyderabad (Urban)	200 acres	1,76,398
iii) Campuses abroad	Dubai (Urban)	14.7 acres	59,711

(* Urban, Semi-urban, Rural, Tribal, Hilly Area, any other (Please Specify).

12. Provide information on the following: In case of multi-campus University, please provide campus-wise information.

SL No		**Pilani**	**Goa**	**Hyderabad**	**Dubai**
1	Auditorium/seminar complex with infrastructural facilities	√	√	√	√
2	**Sports facilities**				
	Playground	√	√	√	√
	swimming pool	√	-	-	√

	Gymnasium	√	√	√	√
	Any other (please specify				
3	**Hostel: Boys' hostel**				
	Number of hostels and rooms	14 hostels 3137 rooms	12 hostels 2063 rooms	6 hostels 2222 rooms	4 hostels 912
	Number of inmates	3105	2040	2196	602
	Girls' hostel				
	Number of hostels and rooms	1 hostel 626 rooms	2 hostels 371 rooms	2 hostels 590 rooms	1 hostel 180
	Number of inmates	612	320	578	145
	Facilities				
	Residential facilities for faculty and non-teaching	√	√	√	√
	Cafeteria	√	√	√	√
	Health centre	√	√	√	√
	Inpatient	√	√	√	√
	Outpatient	√	√	√	√
	Ambulance	√	√	√	√
	Emergency care facility	√	√	√	√
	Facilities like banking,	√	√	√	√
	Post office,	√	-	√	√
	Book shops	√	√	√	√
	Transport facilities to cater to the needs of the students and staff	-	-	-	√
	Facilities for persons with disabilities	√	√	√	√
	Animal house	√	-	√	-
	Incinerator for laboratories	√	-	-	√
	Power house	√	√	√	√
	Waste management facility	√	√	√	√

13. Number of institutions affiliated to the university :

Type of colleges	Total	Permanent	Temporary
Arts, Science and Commerce	Not Applicable		
Law			
Medicine			
Engineering			
Education			
Management			
Others (provide details)			

14. Does the University Act provide for conferment of autonomy (as recognized by the UGC) to its affiliated institutions? If yes, give the number of autonomous colleges under the jurisdiction of the University

Yes [ ] No [√] Number [ ]

15. Furnish the following information:

	Particulars	**Number**	**Number of Students**
	a. University Departments	43*	
	• Undergraduate	38	11837 on campus 21183 WILP
	• Post graduate	20	
	• Research centres on the campus	12	
	b. Constituent colleges	NA	NA
	c. Affiliated colleges	NA	NA
	d. Colleges under 2(f)	NA	NA
	e. Colleges under 2(f) and 12 B	NA	NA
	f. NAAC accredited colleges	NA	NA
	g. Colleges with Potential for Excellence (UGC)	NA	NA
	h. Autonomous Colleges	NA	NA
	i. Colleges with Post graduate Departments	NA	NA
	j. Colleges with Research Departments	NA	NA
	k. University recognized Research Institutes/Centres	NA	NA

**Dept of Civil Engineering was started in Dubai Campus in first semester 2016-17*

16. Does the university conform to the specification of Degrees as enlisted by the UGC?

Yes [√] No [ ]

If the university uses any other nomenclatures, please specify.

17. Academic programmes offered by the university departments at present, under the following categories: (Enclose the list of academic programmes offered)

Programmes	**Number**
UG	10 + 10 (WILP) = 20
PG	14 + 19 (WILP) = 33
Integrated Masters	6
M.Phil.	NA
Ph.D.	All disciplines
Integrated Ph.D.	NA

Certificate	NA
Diploma	NA
PG Diploma	NA
Any other (please specify)	NA
Total	59

18. Number of working days during the last academic year 210

19. Number of teaching days during the past four academic years.

165 163 164 180

('Teaching days' means days on which classes were engaged. Examination days are not be included)

20. Does the university have a department of Teacher Education?

Yes [ ] No [√]

If yes,

a. Year of establishment _____ (dd/mm/yyyy)

b. NCTE recognition details (if applicable) Notification No._____ and Date _____ (dd/mm/yyyy)

c. Is the department opting for assessment and accreditation separately?

Yes [ ] No [√]

21. Does the university have a teaching department of Physical Education?

Yes [ ] No [√]

If yes,

a. Year of establishment _____ (dd/mm/yyyy)

b. NCTE recognition details (if applicable) Notification No._____ and Date _____ (dd/mm/yyyy)

c. Is the department opting for assessment and accreditation separately?

Yes [ ] No [√]

22. In the case of Private and Deemed Universities, please indicate whether professional programmes are being offered?

Yes [√] No [ ]

If yes, please enclose approval/recognition details issued by the statutory body governing the programme: Not Applicable

23. Has the university been reviewed by any regulatory authority? If so, furnish a copy of the report and action taken there upon.

- Visit by the UGC review team in 2009.
- Reviewed by MHRD appointed P.N. Tandon Committee in 2009; BITS was ranked in highest category by the committee.

24. Number of positions in the university

	Teaching faculty					
Positions	**Professor**	**Associate Professor**	**Assistant Professor**	**Others**	**Non-Teaching Staff**	**Technical Staff**
Sanctioned by the UGC/University/ State Government	The faculty positions for the University are 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.				1046	
Recruited	81	145	325	136	1046	
Yet to Recruit	No vacant positions					
Number of Persons working on contract basis				391	61	

25. Qualifications of the Teaching Staff

Data as on 30th June, 2015.

Highest Qualification	Professors		Associate Prof		Assistant Prof		Lect		Total
	M	F	M	F	M	F	M	F	
Permanent Teachers									
D.Sc/D. Litt									
Ph.D.	67	9	104	35	213	78	1	1	508
M. Phil.					2		1	5	8
PG	5		5	1	28	4	78	50	171
Temporary Teachers									
Ph. D									
M. Phil.									
PG									
Part Time Teachers*									
Ph.D.					93	29			122
M. Phil.					9	3			12
PG					212	45			257

26. Emeritus, Adjunct and Visiting Professors

	Emeritus	Adjunct	Visiting
Number	1	1	2

27. Chairs instituted by the university:

	Chairs
School/Department	1) **Shri. B. K. Birla and Smt. Sarala Birla Chair Professors are instituted:** This Chair Professorship helps recognize and reward excellence in teaching and 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. At Present three professors are awarded Chair Professorship in the institute.

28. Students enrolled in the university departments during the current academic year, with the following details:

Students	UG		PG		Integrated Masters		M.Phil		Ph.D		Integrated Ph.D		D.Litt /D.Sc		Certificate		Diploma		PG Diploma	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
From the state where the university is located	100% of UG/PG students are admitted through BITSAT. BITS has single entry mechanism with no reservation and management seats. Admissions are not state wise. In Indian Campuses, board toppers from all state boards are given admission under the Direct admission scheme for Board toppers. Student body has representatives from all the states of India and other countries.																			

From other states of India	
NRI students	BITS Pilani has an alternate merit based mode for admitting international students to the integrated first degree programmes through SAT scores. In the academic year 2015-16, 28 international students are admitted to the Hyderabad campus. In addition Dubai campus has foreign students from Oman, Kuwait, Bahrain, Qatar and Saudi Arabia.
Foreign Students	
Total	

*M – Male F – Female

29. 'Unit Cost' of education

(Unit cost = total annual recurring expenditure (actual) divided by total number of students enrolled)

a. Including the salary component = 2.21 lakhs (Indian Campuses); 4.87 Lakhs (AED 30490) for Dubai Campus;

b. Excluding the salary component = 1.23 lakhs (Indian Campuses); 2.66 Lakhs (AED 16612) for Dubai Campus;

30. Academic Staff College: Not Applicable

a. Year of establishment

b Number of programmes conducted (with duration)

a. UGC Orientation
b. UGC Refresher
c. University's own programmes

31. Does the university offer Distance Education Programmes (DEP)?

Yes [√] No [ ]

If yes, indicate the number of programmers offered:

Since 1979, BITS, Pilani has been participating in the human resource development activity of industries by offering continuing education programmes in science and technology areas through its Work Integrated Learning Programs. The following degree programs are offered to employed professionals from a diverse spectrum of industries.

The list is given below

Degree and Programs	
B.Tech.	**M.Tech.**
Engineering Design	Automotive Engineering
Engineering Technology	Design Engineering
Information Systems	Embedded Systems
Manufacturing Technology	Environmental Engineering
Power Engineering	Manufacturing Management
Process Engineering	Microelectronics

M.B.A.	Pharmaceutical Operations and Management
Consultancy Management	Quality Management
Manufacturing Management	Science Communication
Quality Management	Software Engineering
M.Sc.	Software Systems
Information Systems	Systems Engineering
M.Phil	Telecommunications & Software Engineering
Hospitals &Health Systems Management	

Off-Campus Programs offered under Institutional Collaboration:

S.No.	Degree	Discipline	Collaborating Organization
1.	B.Tech.	Marine Engineering	Tolani Maritime Institute, Induri
2.	B.Tech.	Nautical Technology	Tolani Maritime Institute, Induri
3.	B.Optom.	Optometry	• Sankara Nethralaya, Chennai • LV Prasad Eye Institute, Hyderabad • The Tun Hussein Onn National Eye Hospital, Malaysia
4.	M.Phil.	Optometry	Sankara Nethralaya, Chennai

Are they recognized by the Distance Education Council? Not Applicable

32. Does the university have a provision for external registration of students?

Yes [√] No [ ]

If Yes, how many students avail of this provision annually?

BITS permits its students to pursue courses and off campus thesis with its collaborating universities. Ph. D students under the exchange program are also permitted to register as external students. Many professionals from Industries register as external students and work under the Part Time Ph. D and Ph.D Aspirant Schemes of the Institute.

33. Is the University applying for Accreditation or Re assessment? If Accreditation, name the cycle.

Cycle 1 [ ] Cycle 2 [ ] Cycle 3 [√] Cycle 4 [ ]

Re-Assessment [ ]

34. Date of accreditation* (applicable for Cycle 2, Cycle 3, Cycle 4 and re-assessment only)

Cycle 1: 07/02/2000 (dd/mm/yyyy), Accreditation outcome/Result: A*****
Cycle 2 : 29/01/2009 (dd/mm/yyyy), Accreditation outcome/Result : **A grade (CGPA – 3.71/4)**

Enclosed NAAC accreditation certificate **(Appendix 2 and Appendix 3).**

35. Does the university provide the list of accredited institutions under its jurisdiction on its website? Provide details of the number of accredited affiliated/constituent/ autonomous colleges under the university.

Not Applicable

36. Does the establishment of Internal Quality Assurance Cell (IQAC) and dates of submission of Annual Quality Assurance Reports (AQAR).

The Internal Quality Assurance Cell was established at BITS on 25/05/2004. The composition of IQAC members for the institute consists of Vice chancellor, Respective Campus Directors, Director – off campus programs, senior faculty members, and three external members from industry. The IQAC of the Institute actively monitors the quality sustenance issues and promotes positive changes for quality enhancement through its meetings and discussions.

AQAR **:** Yet to be submitted.

37. Any other relevant data, the university would like to include (not exceeding one page).

HISTORY

The Birla Institute of Technology and Science (BITS), Pilani is an all-India Institution declared as deemed to be university established under Section 3 of the UGC act. It is privately supported, fully residential and admits both male and female students. The primary objectives of the Institute are "to provide and promote education and research in the fields of Technology, Science, Humanities, Industry, Business, Public Administration and to collate and disseminate in such fields, effective ideas, methods, techniques and information as are likely to promote the material and industrial welfare of India" and to "train young men and women able and eager to create and put into action such ideas, methods, techniques and information".

The Institute was initially registered as a Society under the Rajasthan Societies Registration Act of 1958 on the 13th May, 1964. Subsequently, by notification published in the Gazette of India dated the 27th June, 1964, the Ministry of Education, Government of India, declared that the Institute being an institution for higher education shall be "deemed to be a University". The Institute started functioning with effect from 1st July, 1964 with late Shri G.D. Birla as its Founder Chairman.

The Institute started as a small "Pathshala" in Pilani way back in the year 1901 by Seth Shiv Narainji Birla with one teacher for educating his grandsons, late Shri G.D. Birla and late Shri R.D. Birla. Pilani was then a small isolated desert village in Rajasthan. The Pathshala evolved slowly and steadily into a High School in 1925 and became an Intermediate College in 1929. The Birla Education Trust was founded in the same year. The Intermediate College developed into a Degree College in 1943. In 1947, this college was raised to postgraduate level. In 1950, Pharmacy courses were started in this college, and in 1952, it was bifurcated into College of Arts and the College of Science, Commerce and Pharmacy.

During World War II, the Government of India established a Technical Training Centre at Pilani for the supply of technicians for Defense Services and industry. In 1946, late Shri G.D. Birla decided to convert it into an engineering college with degree programmes in Electrical and Mechanical Engineering. Master's programme in Electronics was started in 1955. B.E. programmes in Civil Engineering and Chemical Engineering were started later. In 1964 with the inception of the Birla Institute of Technology and Science, the colleges, viz., Birla College of Science, Commerce and Pharmacy, Birla College of Arts and Birla College of Engineering situated at Pilani, as also all properties, movable and immovable, together with educational facilities, hostels, staff quarters, playgrounds, etc., became part of the Institute and all these properties were vested in it. During the early years of its inception, i.e., 1964 to 1970, the Institute with the support of Ford Foundation Grant had the advantage of having collaboration with Massachusetts Institute of Technology (MIT), USA. It adopted the semester system, modular structure of courses, continuous and internal evaluation, letter grading, etc. It also created institutionalized linkages with the industries. Over a period of time, the Institute also introduced several flexibilities in its educational programmes.

Dr. K.K. Birla who took over as the Chairman of BITS in 1983 was deeply involved and closely associated with his visionary father in running both the earlier Birla Colleges and the current institute BITS, since its inception. With his spirited involvement in all the activities of the Institute, he was able to see the vision of his father Late Shri G.D. Birla unfolding. Taking over the responsibility of running the institute, Dr. K.K Birla who became the Chancellor in 2003 realized the need for greater number of promising graduates in the field of science and technology in shaping up the nation's development. Hence he initiated an increase in the number of students at Pilani campus during 1999 which gradually carried the total strength from 2500 to 4000. Under his patronage, BITS started expanding by establishing three campuses, one in Dubai in the year 2000, in Goa in the year 2004 and in Hyderabad in the year 2008.

After the sad demise of Dr. K.K. Birla on 30 August 2008, Dr. Kumar Mangalam Birla was elected as the Chancellor and Smt. Shobhana Bhartia was appointed as the Pro-Chancellor of the Institute. Under the leadership of young and dynamic Chancellor, BITS has been taking steps to scale greater heights.

2020 – A Strategic Plan for BITS

The Institute has embarked on a journey to become one of the leading universities in the world by the year 2020. Initially, a task force was constituted to prepare the Vision 2020 document and the draft 'Vision 2020' was released in February 2009. After several deliberations and discussions, Vision 2020 was formalized and logically split into 3 yearlong milestones, known as 'Mission Programmes'. First such milestone, Mission 2012, was accomplished in the year 2012, after being formally launched in October 2009.

Mission 2012 focused and achieved significantly in six thrust areas - Academic Programs & Pedagogy, People, Research & Consultancy, Campus Life, Infrastructure & Facilities and University Administration. 16 Task Forces comprising of more than 110 faculty members were involved in realizing 33 different goals under these six thrust areas. Several initiatives such as curriculum benchmarking and redesign, strengthening student feedback, seed grant, research initiation grant, sabbatical leave policy, performance appraisal, faculty recruitment among others were fully completed and institutionalized into regular operations. BITS Pilani is the first Indian University in the country to take 'Engagement Survey' by Gallup for its students, faculty and staff. Off Campus programmes (WILP), initially an intrinsic part of the People thrust area, was recognized to be a significant component in realizing Vision 2020. Several initiatives to engage with the industry have been taken up that will be achieved over 2-3 years.

In March 2013, Mission 2015, the next milestone in the journey towards Vision 2020, was formally launched. The Mission 2015, expected to bring a quantum jump in the aspirations of the objectives set forth, entails focusing on 7 imperatives: Faculty & Staff Development, Industry Engagement, Inter-Disciplinary Research, Internationalization, Innovation & Entrepreneurship, Quality Assurance & Assessments and Technology Enablement. One team per imperative has been identified and the teams are working on refining and pursuing the goals.

A growth plan for the next 10 years has been developed and is under implementation. While projecting a growth in number of students from 11,000 to more than 17,000 by 2020-21 across its four campuses, the plan outlines a strategy for transforming BITS into a research-focused university while continuing to consolidate its First degree and Higher degree programmes. Establishment of new research labs is an important ingredient of the growth plan, for which the plan envisages an aggressive push to sponsored research grants from Govt. agencies and from industry. As a result of extensive efforts to benchmark the First degree and Higher degree programmes against the best in the world, the curricula of all First degree and Higher degree programmes have been completely re-designed while ensuring greater focus on discipline-specific courses, on courses in Humanities, and on hands on learning through lab-based experimentation and thesis work. The new curriculum was implemented from August 2011.

Transforming BITS into a research-focused university is at the top of BITS' agenda. To take that forward, BITS has undertaken several measures. These include (i) Significant increase in the number of "teaching assistantships" that offer tuition waiver and stipend to full-time Ph.D students and (ii) Streamlining of its processes from admissions to evaluation of Ph.D dissertation. BITS has undertaken several initiatives to encourage, facilitate and incentivize faculty to seek and execute research grants.

In November 2011, the Chancellor Dr. Kumar Mangalam Birla formally announced the project "Parivartan" to modernize and expand the physical infrastructure in Pilani. The project, with an outlay of over Rs. 651 crores., is well on its way to completion by 2016-17. Phase-I of the project, consisting of a new academic building, new student hostel, a workshop, and faculty housing has already been completed. The phase-II involves renovation of existing academic spaces, hostels and houses. The plan also covers complete overhaul of the underlying systems for water supply, electricity distribution, sewage treatment, etc. While the Hyderabad campus became functional in 2008, Phase 2 of the project with an outlay of Rs. 374 crores is in various stages of completion. Similarly, expansion of Goa Campus with a planned budget of Rs. 425 crores has also started and construction of new academic buildings, hostels and staff quarters are in progress. From 2013, Dubai campus is fully owned by BITS Pilani and improvement and up-gradation of the campus has been initiated.

In the year 2000, BITS Pilani, was accredited by NAAC with the highest possible rank of A***** (A five Star). In 2008-2009, the NAAC peer team visited BITS campuses at Pilani, Goa and Dubai and BITS Pilani, has been reaccredited with CGPA 3.71 on four point scale at the highest 'A' grade.

Criteria - wise Inputs

1 CRITERION I: CURRICULAR ASPECTS

1.1 Curriculum Design and Development

The Institute operates its educational programmes in all three tiers, namely, the Integrated First Degree, Higher Degree and the Doctoral Degree. All programmes of studies are based on the principle that a series of courses make up the hierarchy of the structure where each course is self-contained but nevertheless acts as a bridge between what precedes and what comes after. A formal contact hour is such that a student is invariably required to spend several times of these hours towards self- study. Attempt here is to awaken curiosity in the mind of the student and train him to think rationally and scientifically and enable him to face the unfamiliar.

Features of BITS Educational System and academic flexibilities:

- Semester System
- Choice based credit system
- Modular and Flexible Structure
- Continuous and Internal Evaluation
- Transparency in evaluation
- Letter Grading
- Integrated & Broad Based Education Strong in Foundation Courses
- Institutionalised Linkages with Industries
- Flexibilities of Dual Degree (between Science and Engineering and vice versa)
- Transfer Opportunities to higher degrees M.E./M.Pharm/ M.B.A and Ph.D. Programmes for Meritorious Students.
- Admission in both the Semesters.
- Open and adaptive processes
- Research Components at all 3-tiers of Education
- Interdisciplinary Programmes.
- Functional Administrative Structure

The Institute has been participating in the human resources development activities of the industries by evolving several degree programmes and by integrating the working environment of the employees with the learning environment required by the Institute. As part of the Human Resource Development programmes of specific organizations, the Institute conducts off campus degree programmes at its various off campus centres as a means of continuing education for employed professionals. For conducting all these programmes, the collaborative organizations are required to participate by extending physical and other facilities and by agreeing to integrate their work requirements with the institute's academic requirements for the pursuit of the degree programme.

1.1.1 How is the institutional vision and mission reflected in the academic programmes of the university?

BITS' vision is to serve humanity by educating young men and women so as to enable them to lead the development of the country and the world at large. Falling in line with this vision, our programs are structured to provide a strong foundation in Sciences, Engineering, and Humanities while cultivating cross-disciplinary integrated learning and thinking. Moreover, our programs are offered and operated with strong linkages to the workplace and inculcate a sense of service in our students and create future leaders.

1.1.2 Does the university follow a systematic process in the design and development of the curriculum? If yes, give details of the process (need assessment, feedback, etc.).

The university follows a systematic process for designing, developing and for making changes in the curriculum. Changes in the curriculum as well as new programs are proposed by individual departments after a thorough discussion with all faculty members in the department across all the campuses of BITS Pilani. Senate of BITS Pilani meets three to four times a year to discuss all such proposals and approve them.

The Senate can also appoint a separate committee for implementing major structural changes in the curriculum which cuts across many departments. Such an exercise was last undertaken in 2010 for each discipline, when the curriculum of BITS was benchmarked against that of reputed Universities across the globe. Based on the exercise, changes in the curriculum were recommended, discussed, and then decided. The changes were then rolled out from 2011 onwards.

BITS has also put in place a process for systematic and periodic review of the curriculum at large. This includes collecting continual feedback from the students, faculty, alumni, and industry as well as using the feedback to bring in changes in the curriculum. Beyond this, every two to three years, BITS invites experts as Visiting Committees and Curriculum Review Committees for reviewing different aspects of the Departments, which include faculty, research, and the curriculum. Due weightage is given to the feedback received from industry partners through Practice School and Placement Coordinators. Individual departments then work towards ensuring that the suggested changes are adopted quickly to keep pace with changing developments in academic as well as industry requirements.

These committees are constituted of external experts from academia and industry in India. One round of review by visiting committees was completed during 2012-2013. Current round of reviews of all the programmes, department wise, by external curriculum review committees have started in July 2015 and is expected to be completed by March 2016. This will be followed by internal discussions with the intent of introducing further changes.

1.1.3 How are the following aspects ensured through curriculum design and development?

∗ Employability

The curriculum at BITS includes several structural and pedagogic components that develop skills in the student making him/her employable. These are mainly: (i) Practice School Options (I and II), (ii) Project Type courses (iii) Laboratory Components and (iv) Periodic curriculum restructuring based on feedback.

Practice School: All First Degree and Higher degree students of BITS Pilani are provided with the option of Practice school. This exposure enhances employability. Practice school for first degree students has two components:

- Practice school-I (5 Unit- Course) of two months duration offered to all First Degree students during summer following the second year and
- Practice school-II (20 Unit- Course) of five and half month's duration offered during either semester of the final year. Practice school for higher Degree Students has only one component:
- PS in the final (fourth) semester of their program.

Practice school-I is the first exposure to the world of work. It enables students to develop and refine their linguistic, communication and inter-personal skills, both by its very nature, and by its various evaluation components, such as seminar, group discussion, project report preparation, etc. This broad-based core education, strong in mathematics and science and rich in analytical tools, provides the foundation necessary for the student to understand properly the diverse nature of real-life problems.

Practice school-II offers the direct involvement of the student in problem-solving efforts that are specific to the industry. Students are encouraged to work independently and are required to defend the technical aspects of their work through periodic written and oral presentations. Emphasis is laid on realizing the importance of team work, development of leadership qualifies, and the need for effective time management.

- **Project Type Courses:**

Students are expected to carry out project type courses also during their on campus stay. This encourages them to work on open ended projects of their interest and exposes them to proper and effective use of various laboratory equipment's, software tools, and other important aspects required to complete a project. Students can gain credits for such projects as they are mentored, supervised, and graded by faculty in a structured fashion. These credits can be counted against elective requirements. Project Type Courses also include Laboratory Projects and Design Projects.

- **Laboratory / Practical Components**

The curriculum includes a significant proportion of hands-on / practical components supported by fully equipped modern laboratory infrastructure.

- **Updated curriculum based on feedback**

Feedback is also obtained on a regular basis from the recruiting companies through the placement cells and through direct interactions with alumni/recruiters. Such feedback is useful in long term curriculum restructuring and also in course content / reference updation.

- **Entrepreneurship**

BITS Pilani, in association with the Department of Science and Technology (DST), Government of India has established a Technology Business Incubator (TBI) in all the three Indian campuses. TBI promotes the development of technology enabled ventures and supports entrepreneurial leadership across all disciplines, facilitates entrepreneurial activity amongst students, and invites entrepreneurs to use TBI services so as to develop end products for commercialization. Many student startups are currently operating in the campuses.

∗ Innovation

- Each course includes a minimum amount of open-book evaluation and a minimum amount of evaluation which is not a conventional time-bound test (that is, it includes take-home assignment / practical work / teamwork / seminar or other such components).

- Many projects or theses taken up by first degree students as well as dissertation by higher degree students lead to innovation in terms of new idea/process/product development.

- Students also engage in innovative co-curricular projects during Technical festivals and also take part in projects for external competitions.

- Students have brought laurels to the University by presenting their work at national and international levels. Some of the well-recognized achievements are: Two projects in Robotics named "Acyut" and IFOR developed robots with novel features have won recognition and awards at various platforms across the globe. In another project named "Inspired Karters", students of BITS Pilani conceptualized, designed, manufactured, and tested a single-seater, open-wheeled Formula type race car which has participated in various competitions of international repute organized by Society of Automotive Engineers and won accolades.

- BITS has a well-established **Technology Innovation Center,** which enables industry to bring live projects to campuses. Students mentored by faculty in BITS , participate in such projects and contribute to innovative product development for the industry.

∗ Research

- Research components at all 3 tiers of education promote participation of students in research activities through courses like First Degree thesis, Higher Degree dissertation, Doctoral thesis, Project courses like Lab Oriented Projects, Computer Oriented Projects, Study oriented projects, Technology Innovation Centers, Sand Box lab, etc.

- The creative and talented pools of students also work towards their research interest by opting for off campus thesis abroad and also in R&D organizations registered as our Practice School stations. The outcome of these research activities are reflected in the form of co-authorships in research publications, as well as student- participation in conferences, symposia, seminars and workshops.

- Several students at all levels also participate in research and development projects led by faculty and sponsored by research organizations, industry, or the Government.

1.1.4 To what extent does the university use the guidelines of the regulatory bodies for developing and/or restructuring the curricula? Has the university been instrumental in leading any curricular reform which has created a national impact?

BITS Pilani, has been a pioneer in structuring its curriculum and pedagogy as well as in the processes of instruction. As such many of our best practices are precursors to those developed by regulatory bodies. The institute curriculum was recently bench marked with universities in India and abroad. BITS Pilani, has kept up with changes in curricular trends in India and abroad while operating within the regulatory guidelines in India as well as in Dubai. Number of our innovations has been followed to introduce reforms in the higher education sector. Linkages with industry as a part of curriculum, is one such leading reform.

1.1.5 Does the university interact with industry, research bodies and the civil society in the curriculum revision process? If so, how has the university benefitted through interactions with the stakeholders?

On-campus Programs:

The Practice School division of the University collects feedback from industry about the performance of the students during Practice School-I and Practice School-II. This feedback process also includes information on the industry relevance of the courses taught, level of the industry-related skills acquired by students through the courses, and familiarity of the students with tools, technologies, and best practices of the industry. This feedback is then used to fine tune/modify the curriculum of the various programs offered by the university.

The Placement Division which interacts with personnel from industry who come to the University to conduct campus interviews, also collects feedback from the industry. Then it forwards the feedback to the concerned departments which then incorporate required elements into the curriculum.

BITS Pilani also carried out a major structural revision of its curriculum in 2010-11. In 2010 each program offered by the University was benchmarked by BITS Pilani against top Universities (in India/ abroad) in that discipline. Curriculum was then re-designed by our faculty based on the benchmark results. The redesigned curriculum was rolled out in 2011.
Visiting committees consisting of academics of reputed institutions and industries in India were invited by each Department in BITS Pilani to assess teaching, research, and institutional processes as well as to guide in improving the same.

These visiting committees visited each department in 2012-2013 and their feedback was used to strengthen the curriculum. The University plans to invite such committees every three years.

In addition, BITS Pilani has started a process of inviting external committees specifically for curriculum review in each Department as well as for the University. These external committees include academics from reputed institutions as well as subject experts from industry in India. This process has been started in July 2015 and is likely to be completed in January 2016.

These curriculum review committees visit one of the campuses after having read and understood the documented curriculum and give detailed feedback at course content level including on pedagogy, laboratory practices etc.

Also recently, BITS Pilani has hired an external consultant to conduct a structured survey among the employers of BITS Pilani graduates. These survey results were then summarized, interpreted, and presented by the consultant in a workshop for faculty representatives and leadership of the University. BITS will use this in long term planning and design of the curriculum.

Off-campus Programs (Work-Integrated Learning Programs):

Work Integrated Learning programs (WILP) of BITS Pilani are offered to working professionals employed in the industry and who want to pursue advanced study and earn a degree. As such feedback from students in these programs is very industry specific and rich in detail. BITS Pilani uses such feedback to tune its course contents.

Several Work Integrated Learning programs are offered in partnership with specific organizations (in public / private sector) for the career growth of their employees. BITS collects feedback from these employers about the suitability / relevance of the course contents as well as recent practical advances in the field and incorporates such feedback into the curriculum.

BITS Pilani has also conducted HR workshops to identify skill needs in different industry sectors. Requirements identified / stated by industry leaders in such workshops are fed back to program design teams in the university

Recently, BITS Pilani has engaged external consultants including academicians to conduct a survey and interact with various stakeholders for its Work Integrated Learning Programs (WILP). They involved faculty, students, and employers and conducted a sample study of one of the WILP programs and some courses. The intent is to obtain a comprehensive view of all aspects of student engagement in WIL programs including content delivery, teaching & learning support. BITS Pilani will use this study to enhance the quality of WILP. The University is in the process of engaging the same consultants as well as others to broaden the scope of the study of other programs as well.

1.1.6 Give details of how the university facilitates the introduction of new programmes of studies in its affiliated colleges.

Not applicable. [BITS Pilani does not have any affiliated colleges.]

1.1.7 Does the university encourage its colleges to provide additional skill-oriented programmes relevant to regional needs? Cite instances (not applicable for unitary universities).

Not applicable

1.2 Academic Flexibility

1.2.1 Furnish the inventory for the following:

***Programs taught on campus**

BITS Pilani offers programs at three tiers:

- Integrated First Degree programs, which are of 4 years (normally 8 semesters) duration, with an input qualification of 10+2.
- Higher Degree programs, which are of 2 years (4 semesters) duration, with an input qualification of First Degree of BITS or equivalent.
- Ph.D. program.

A comprehensive list of all programs offered by BITS Pilani at its different campuses is listed below. The programs are defined and a common curriculum is stipulated by the University. Students are admitted and degrees are issued by the University on graduation, although a program may be operated (i.e. classes conducted) in one or more of the four campuses of BITS Pilani.

Programmes	BITS Pilani campus at	P	G	H	D
01. Integrated First Degree Programmes					
B.E.(Hons.):	Chemical Engg.	√	√	√	√
	Civil Engg.	√		√	
	Computer Science	√	√	√	√
	Electrical and Electronics Engg.	√	√	√	√
	Electronics and Communication Engg.			√	√
	Electronics and Instrumentation Engg.	√	√	√	√
	Mechanical Engg.	√	√	√	√
	Manufacturing Engg.	√		√	
	Biotechnology			√	
B. Pharm.(Hons.)		√		√	
M.Sc.(Hons.):	Biological Sciences	√	√	√	
	Chemistry	√	√	√	
	Economics	√	√	√	
	Mathematics	√	√	√	
	Physics	√	√	√	
M.Sc.(Tech.):	General Studies	√			
	Finance*	√			
	Information Systems*	√	√	√	
02. Higher Degree Programmes					
M.E.	Biotechnology	√	√	√	√
	Chemical	√	√	√	
	Civil	√		√	
	Communication Engineering	√		√	
	Computer Science	√	√	√	
	Design Engineering	√		√	√
	Embedded Systems	√	√	√	
	Manufacturing Systems Engineering	√			
	Mechanical	√		√	
	Microelectronics	√	√		√
	Software Systems	√			√
M. Pharm.		√		√	
M.B.A.		√			√
M.P.H.*					
03. Ph.D. Programmes		√	√	√	√

P - Pilani; G - Goa; H - Hyderabad; D -Dubai * Students no longer admitted (since 2013)

- **Work Integrated Learning Programs**

  The following degree programs are offered to employed professionals from a diverse spectrum of industries.

Degree	Discipline
B.Tech.	Engineering Design
	Engineering Technology
	Information Systems
	Manufacturing Technology
	Power Engineering
	Process Engineering
M.Sc.	Information Systems
M.B.A.	Consultancy Management
	Manufacturing Management
	Quality Management
M. Tech.	Automotive Engineering
	Design Engineering
	Embedded Systems
	Environmental Engineering
	Manufacturing Management
	Microelectronics
	Pharmaceutical Operations and Management
	Project Engineering & Management
	Quality Management
	Science Communication
	Software Engineering
	Software Systems
	Systems Engineering
	Telecommunications and Software Engineering
Integrated M.Tech.	Software Engineering
	Software Systems
	Systems Engineering
M.Phil.	Hospital & Health Systems Management

Note: The B.Tech. and M.Tech. degree nomenclatures were introduced in the academic year 2014-15, in place of B.S. and M.S. degrees respectively. Students are no longer admitted to B.S. or M.S. programs.

Off-Campus Programs offered under Institutional Collaboration

S.No.	Degree	Discipline	Collaborating Organization
5.	B.Tech.	Marine Engineering	Tolani Maritime Institute, Induri
6.	B.Tech.	Nautical Technology	Tolani Maritime Institute, Induri

7.	B.Optom.	Optometry	• SankaraNethralaya, Chennai; • LV Prasad Eye Institute, Hyderabad; • The Tun Hussein Onn National Eye Hospital, Malaysia
8.	M.Phil.	Optometry	SankaraNethralaya, Chennai

*** Overseas programmes offered on campus**

Not applicable

*** Programmes available for colleges to choose from**

Not applicable

1.2.2 Give details on the following provisions with reference to academic flexibility

a. Core / Elective options

At BITS Pilani, all programs include Core and. Elective options. A significant proportion of electives is mandated for each program. Furthermore, course requirements are structured under different categories at each level.

- **First Degree Programs (on-campus)**

Category-wise course and (credit) units requirement for all First Degree programs (i.e. B.E. (Hons.), B.Pharm., M.Sc.(Hons)., and M.Sc. (Tech.) programs) are stated in the table below:

Category of courses		**Number of courses**	**Number of Units (credits)**
Foundation courses (including Sciences, Mathematics, Technical Arts, and Engineering Foundation)		17	43
Humanities Electives		3	8
Discipline	Core	10 to 16	33 to 48
	Electives	4 to 9	12 to 27
	Total	15 to 20	57 to 60
Open electives		5 (min)	15 (min)
Practice School / Thesis		2 / 1	25 / 16
Total (All)		**41 (min.)**	**141(min.)**

As can be observed, the curriculum is broad-based requiring students to go through a strong set of foundation courses and Humanities electives. The discipline requirement focuses on the specific subject or specialization of the program (e.g. B.E.(Hons.) Mechanical Engineering or M.Sc.(Hons.) Chemistry) which is further divided into core and electives categories. In

addition every student in any program is expected to pursue open electives (i.e. courses in any discipline offered in BITS) to further enhance multi-disciplinary learning and open up opportunities for students. Finally, a student is expected to pursue an academic Thesis on-campus or a Practice School in a workplace setting. Practice School is offered in two parts (a 5 unit course in the summer after the second year of the program, and 20 unit course in either of the two semesters in the fourth / final year of the program). Further details of Practice School are mentioned under the response to 1.1.4 .

Within the broad contour of this requirement a student may choose his/her sequence of courses and choose his/her electives (under the three categories: Humanities, Discipline, and Open) to complete the required number of courses and (credit) units. Of course, there is a pre-requisite structure governing access to specific courses. Higher Degree Programs (on-campus)

The following table gives details about the core / elective options available for higher degree (ME / M.Pharm) students:

Category of courses	Number of courses	Number of Units (credits)
Core	6 to 8	24 to 32
Elective	5 to 7	20 to 28
Dissertation or Practice School	1	16 (Dissertation*)
		20 (Practice School)

* In some M.E. programs, students have the option of pursuing a Dissertation for a whole year (instead of a semester) in lieu of reduced coursework.

The following table gives details about the core / elective options for MBA students:

Category	No. of courses	No. of units
Core	15 to 20	40 to 60
Electives	4 to 6	12 to 18
Practice School or Dissertation	1	20 or 16

Work Integrated Learning Programs

The normal input and curriculum requirements for Work Integrated Learning Programs are given below:

1. Curriculum requirements for B.Tech. programs for working professionals:

Normal Input: Employed professionals holding a Technical Diploma or B.Sc. degree with adequate preparation in Mathematics, and having adequate, relevant work experience.

Note: Since these are programs for candidates with advanced standing, there are certain waivers that have been notionally given.

Category	Number of Courses Required	Number of Units Required
I Foundation Courses	5-10	15-40
II Discipline Courses		
Discipline Core	8-12	26-48
Discipline Electives	3-9	9-36
Coursework Sub-Total	24 courses (min)	84 units (min)
III Project Work	1	16
Total	25 courses (min)	100 units (min)

2. **Curriculum requirements for M.Sc. programs for working professionals:**
Normal Input: Three-year undergraduate degree in relevant disciplines with adequate and relevant work experience.

Category	Number of Courses Required	Number of Units Required
I Foundation Courses	2-8	6-32
II Discipline Courses		
Discipline Core	5-10	15-40
Discipline Electives	2-6	6-20
Coursework Sub-Total	15 courses (min)	52 units (min)
III Project	1	8 -20
Total	16 courses (min)	72 units (min)

3. **Curriculum requirements for MBA degree programs for working professionals:**
Normal Input: Employed professionals holding an Integrated First Degree of BITS or its equivalent such as B.E. / M.Sc., with adequate, relevant work experience.

Category	No. of Units Required	No. of Courses Required
Management Core	24-40	6-8
Domain Core	16-25	4-6
Discipline Electives	3-15	1-3
Subtotal	52 (min)	13 (min)
Project	12	1
Total	64 (min)	14 (min)

4. **Curriculum requirements for M.Tech. programs for working professionals:**
Normal Input: Employed professionals holding an Integrated First Degree of BITS or its equivalent such as B.E. / M.Sc., with adequate, relevant work experience.

Category	No. of Units Required	No. of Courses Required
Core Courses	0-36	0-8
Discipline Electives	15-48	4-12
Subtotal	48 (min)	12 (min)
Dissertation	16	1
Total	64 (min)	12 (min)

5. **Curriculum requirements for Integrated M.Tech. programs for working professionals:**
Normal Input: Employed professionals holding B.Sc. / BCA or its equivalent with adequate preparation in Mathematics, and adequate, relevant work experience.

Category	Number of Courses Required	Number of Units Required
I Foundation Courses	5-10	15-32
II Discipline Courses		
Discipline Core	12-16	42-66
Discipline Electives	6-12	20-36
Course-Work Sub-Total	28 courses (min)	96 units (min)
III Dissertation	1	16
Total	29 courses (min)	112 units (min)

b. Enrichment courses

- BITS Pilani offers courses in Literature, Liberal Arts (Music, Film, Theatre), and Religious Studies for the intellectual enrichment of its students. Students are encouraged to take these courses as part of their curriculum to meet their Humanities Electives requirement or Open Electives requirement. Students are enabled to take some of these courses via an audit option. A few examples include

    - Short Film & Video Production
    - Appreciation of Indian Music
    - Introduction to Western Music
    - Popular Literature and Culture of South Asia
    - Lighting for Theatre and Films
    - Shrimad Bhagavad Gita
    - Performance Design
    - Gandhian Thoughts
    - Introduction to Carnatic Music
    - Introduction to Hindustani Music
    - Critical Analysis of Literature and cinema
    - Comparative Indian Literature

- BITS Pilani has started tie-ups with other Universities to enable externally offered enrichment courses to its students:

    - A course in *Information Law & Cyber Law* is taught in the Hyderabad campus by faculty experts from NALSAR, Hyderabad.
    - A course in *Management of Cross Cultural Engineering Teams* is offered via technology by a consortium of Universities led by University of Southern California, USA.

c. Courses offered in modular form

All courses are structured in a modular fashion although they are normally expected to be completed within a semester duration. In project type courses or Thesis/Dissertation type courses students may extend the duration to complete the work required depending on the nature of the problem being solved or project being pursued.

d. Credit accumulation and transfer facility

BITS Pilani has initiated tie-ups with a few Universities abroad for credit transfer facility. The process is based on a Memorandum of Understandings (MoUs) between BITS and the other University ensuring formal issuance of credits (and transcripts for the same). Equivalence of units between the universities is stipulated on a case-by-case basis (i.e. per partnering university) and thereafter students are allowed to accumulate and transfer from one university to the other.

e. Lateral and vertical mobility within and across programmes, courses and disciplines

- **On-campus programs - First-Degree Students**
  Any student admitted to a first degree program at BITS Pilani can seek a lateral transfer to another program / discipline. Such lateral transfers are offered on a competitive basis determined by the academic performance of the students subject to availability of seats in the target program / discipline.

  Any first degree student may also seek vertical mobility to a higher degree program in the same discipline. Such vertical transfers are offered on the basis of academic performance of the student.

- **On-campus programs - Higher-Degree Students**
  Any higher degree student may also seek vertical mobility to the Ph.D. program. Such vertical transfers are offered on the basis of academic performance of the student.

1.2.3 Does the university have an explicit policy and strategy for attracting international students?

Yes! In order to introduce trans-national diversity and to embark upon making **BITS Pilani** a **Global University**, BITS Pilani has started the admissions into First Degree Programmes to the International students through **'International Student Admission (ISA) Scheme'** w.e.f. the Academic Year – 2015-`16 in the Indian campuses. Any student who is not a citizen of

India is eligible to apply through this scheme for which the admission will be based on performance in Scholastic Assessment Test (SAT) conducted by the College Board (USA) in Mathematics, Physics, and Chemistry and fulfilling minimum academic requirements of BITS. In the academic year 2015-16, 28 international students are being admitted to the Hyderabad campus.

As a part of their annual marketing plan, the Dubai Campus visits several international schools offering IB, UK and American Curriculum that cater to more than 20 nationalities. It also participates in Educational Exhibitions and Career Fairs held in neighboring countries such as Oman, Kuwait, Bahrain, Qatar and Saudi Arabia to attract international students. Consulates of a few countries are also contacted to assist and promote the Dubai Campus amongst the students of their country. Presently Dubai campus has students from Jordan, UAE, Pakistan, Syria, Bangladesh, and Palestine.

1.2.4 Have any courses been developed targeting international students? If so, how successful have they been? If 'no', explain the impediments.

Specific programmes/courses have not been developed targeting only international students, but starting from the academic year 2015-16, we are admitting international students into existing programmes of Indian campuses.

1.2.5 Does the university facilitate dual degree and twinning programmes? If yes, give details.

Yes. BITS, Pilani facilitates dual degree programs at the first degree level where a student can seek to pursue two first degree programs concurrently. Typically, most students admitted to M.Sc. (Hons) programs choose to pursue a B.E. (Hons.) program as well, to enhance their employability skills.

A second degree is offered to students on a competitive basis of their academic performance in the first year of their first degree program subject to availability of seats in the target discipline. Such dual degrees enable a student to learn cross-disciplinary subjects and techniques, which they can effectively use later in pursuing research and/or development in inter-disciplinary areas.

Specifically, combinations of Science and Engineering degrees allow the student to learn basic sciences as well as practical engineering skills enhancing opportunities in their career. Further, a First Degree student can get transferred to higher degree or MBA and can get both degrees. Similarly, both first degree and higher degree students have an option of vertical transfer to the Ph.D. program of the Institute. No twining programs are offered in BITS Pilani.

1.2.6 Does the university offer self-financing programmes? If yes, list them and indicate if policies regarding admission, fee structure, teacher qualification and salary are at par with the aided programmes?

BITS Pilani does not offer self- financing programme

1.2.7 Does the university provide the flexibility of bringing together the conventional face-to-face mode and the distance mode of education and allow students to choose and combine the courses they are interested in? If 'yes,' give operational details.

BITS Pilani, has put in place a high end Tele-presence facility across its campuses with full-fledged classrooms linked to the facility. Using this, courses are conducted by an expert faculty in one campus and students are enrolled in multiple campuses. Also, courses are taught on a collaborative basis by faculty across campuses where each faculty brings in their expertise to bear on the course. Several such courses are being delivered over the Tele-presence system in each semester by drawing faculty expertise across multiple campuses.

BITS Pilani has started offering courses using flipped / blended class models on MOOC (Massive Open Online courses) platforms. BITS Pilani is now a contributing member on edX^{TM}. Two courses (Computer Programming and Microprocessors &Interfacing) have been designed, developed, and offered across campuses.

BITS Pilani, has also been offering courses using a desktop-computer-based tele-conferencing facility for the last decade or so. This mode is used for Work Integrated Learning Programs where students can attend lectures sitting in front of their desktops. In addition WIL programs also make available recorded lectures as well as other content via Moodle, a Learning Management System.

1.2.8 Has the university adopted the Choice Based Credit System (CBCS)? If yes, for how many programmes? What efforts have been made by the university to encourage the introduction of CBCS in its affiliated colleges?

BITS Pilani has been following the Choice Based Credit System since 1973. For each program a minimum number of credit units are stipulated for completion of the program and specialization. Apart from mandatory courses required to obtain a degree, a student has the option to choose several elective courses. These elective requirements are further categorized into Humanities Electives, Discipline Electives, and Open Electives.

A separate pool of courses is earmarked as Humanities Electives and a separate pool of courses is earmarked as discipline electives for each program and specialization. Open Electives requirement can be met by courses in any discipline.

Furthermore, a student can use the Open Elective slots coherently to obtain a focus on a given area leading to a Minor certificate. Certain courses may also be audited i.e. student may complete the course without seeking credit units.

The student can sequence the courses subject to pre-requisites of specific courses, so that student can complete the requirements of the program at his/her own pace. BITS Pilani does not have colleges affiliated.

1.2.9 What percentage of programmes offered by the university follow:

- **Annual system**
- **Semester system**
- **Trimester system**

Birla Institute of Technology & Science has adopted the semester system for all its programs since its inception i.e. from the academic year 1964-65. There are two semesters in each academic year. Additionally, students have the option of pursuing courses of at most 10 units during a summer term, which is roughly half of the typical 18 to 20 units a student pursues during a semester.

1.2.10 How does the university promote inter-disciplinary programmes? Name a few programmes and comment on their outcome

On-campus Programs

BITS, Pilani has always taken an integrated approach to its curriculum particularly at the first degree level. Students of all first degree programs are required to complete a set of foundation courses in Mathematics, Physical and Life Sciences, Engineering, and Humanities.

Some of the Degree programmes at BITS like Biotechnology and Manufacturing Systems Engineering, are inherently inter-disciplinary in nature requiring involvement from multiple departments. In order to further enable students to acquire inter disciplinary skills and hands-on training, the University has set up a number of centers and laboratories of research & development: Centre for Software Development, Centre for Robotics & Intelligent Systems, Centre for Biotechnology, Centre for Renewable Energy and Environment Development, BITS – Motorola Embedded Controller Application Centre, Process Control Lab, Centre for Waste, Water and Energy, Centre for Entrepreneurial leadership etc. The Institute also encourages interdisciplinary research and many undergraduate, higher degree and doctoral students are working on interdisciplinary projects with productive outcomes. Many of the electives in areas of Environment, Energy, Data Analytics, Materials, and Nanotechnology offered by the Institute are also interdisciplinary in nature. An off campus M.Tech in Environmental Engineering in collaboration with Pollution Board has also been introduced.

The Open Electives requirement in the curriculum allows students to explore courses in disciplines other than his/ her own discipline. They also provide them an opportunity to do interdisciplinary courses.

Furthermore, students can accumulate open elective credit units to acquire a minor certificate. Minor certificates allow students to obtain knowledge and skills in a discipline different from the program or specialization the student is enrolled in. Minor programs have been started in different areas including (i) Finance, (ii) English Studies, (iii) Film & Media, (iv) Philosophy, Economics, & Politics, and (v) Materials Science & Engineering. Among these, the Materials Science and Engineering Minor is interdisciplinary in itself, drawing courses from Physics, Chemistry, Biology and Biotechnology, Mechanical Engineering, and Chemical Engineering.

Off-Campus Programs

BITS Pilani offers several interdisciplinary programs as part of Work Integrated Learning Programmes (WILP) suited to the needs of industry: e.g. B.Tech. Power Engineering, B.Tech. Engineering Technology, B.Tech. Process Engineering, M.Tech. Embedded Systems, M.Tech. Telecommunications and Software Engineering, and M.Tech.Manufacturing Management. Many of these programs are successfully pursued by professionals working in the industry to enhance their skills and career growth.

1.3 Curriculum Enrichment

1.3.1 How often is the curriculum of the university reviewed and upgraded for making it socially relevant and/or job oriented / knowledge intensive and meeting the emerging needs of students and other stakeholders?

Curriculum Revision Process

The last major revision of the curriculum was implemented in 2011 after benchmarking the curriculum followed in BITS with that of reputed Universities in each discipline.The up-gradation of courses is a continuous process at BITS. The instructor or the team of instructors can, within the broad framework of a course, modify the course hand out and include latest topics in the course. Standard textbooks are prescribed for a given course. Further, assignments based on computer applications, library survey, laboratory work, etc. encourage students to gain deeper insight in the course. The students are also asked to present their assignment to their faculty in a session which also improves their communication skills.

Departments can at any time put forward proposals for upgrading or making changes in the curriculum. These proposals are discussed and approved by the Senate of BITS Pilani during its meetings that are held three to four times in a year.

Departments draw their inspiration for changes from the teachers' experience, student feedback, feedback from industry obtained by Practice School Office and Placement Office.
The feedback from industry is often focused on industry specific requirements and employability skills. This is curated and distilled into curricular contents and constructs by our faculty.

BITS invites Visiting Committees (of experts from other academic institutions in India) to assess the strengths and weaknesses of Departments in terms of research, teaching, and institutional practices. The last set of visits to each Department happened in 2013 and we expect to sustain these visits every three years.

In addition, BITS has also initiated a curriculum review for each discipline/program by external experts from academia and industry in India. These reviews have been started in July 2015 and are expected to be completed by March 2016.

Furthermore, BITS has started employing external consultants to interact with industry in a comprehensive way to assess whether our students meet the expectations of their employers as well as to assess the strengths and weaknesses of our programs vis-à-vis the external world. Two such exercises have already been carried out in the context of our on-campus and off-campus programs.

Curricular Components

Curriculum of BITS Pilani enables students to take an integrated approach to cross-disciplinary learning. Specifically, most of our Science students also pursue an Engineering degree concurrently through our dual-degree scheme to enhance their employability skills while retaining their strength in core Sciences.

All first degree students who are not doing a dual degree also get to pursue Open Electives in any discipline(s) of their choice. Students are further allowed to choose their Open Electives in a concentration to obtain a minor (e.g. a minor in Finance, or in Materials Science & Engineering, or in Philosophy, Economics, & Politics) to enhance the social relevance and/or job orientation of their education. BITS also offers a large array of courses in emerging areas such as Environment, Energy, Data Analytics, Materials, and Nanotechnology, among others, which can be taken as open electives. This list of courses is constantly growing.

1.3.2 During the last four years, how many new programmes at UG and PG levels were introduced? Give details.

1. M.E Mechanical with specialization in Thermal Engineering was introduced in 2012.
2. M.E Civil with specialization in Water Resources was introduced in 2012.

∗ **Inter-disciplinary**

- Minor programs have been introduced in (i) Finance (ii) Materials Science and Engineering, (iii) English Studies, (iv) Film and Media, (v) Philosophy, Economics & Politics.
- M.Tech in Environmental Engineering through off campus mode.

∗**Programmes in emerging areas**

A 36-month integrated ME program in Computer Science with specialization in Information Security was introduced in 2013 for students who have completed a B.Sc. with Mathematics and/or Physics as main subjects.

1.3.3 What are the strategies adopted for the revision of the existing programmes? What percentage of courses underwent a syllabus revision?

<u>Strategies for review and revision of existing programs</u>

- **Review at the macro-level**
  - Benchmarking of the programs with comparable programs offered by reputed Universities.
  - Feedback and suggestions are also invited from experts from other academic institutions and the industry who are invited to the University to present their views every two to three years.
  - An external review of the curriculum has begun in July 2015 and all the departments are inviting experts to get feedback regarding the curriculum.
  - External consultants have been hired to conduct comprehensive surveys and obtain feedback from industry about the strengths and weaknesses of our students and/or our program.

- **Review at the micro-level**
  - Structured Feedback is collected anonymously from students regarding each course at least once in a semester.
  - Students can also give their feedback about courses and programs during class committee meetings.
  - Feedback is collected from Placement office, which also gets information regarding the preparedness of the students in placement interviews.
  - Feedback is also collected from Practice School office which has information about the performance of the students during practice school (internship)
  - Faculty who teach a course have the freedom to customize the course within the broad contour of the course description that has been approved. Such customization may depend on the nature of the student body and/or the discipline/specialization of the students enrolled. Teachers specify and communicate the details of such variation in the handout which acts as a contract between the teacher and the student in stipulating the syllabus for a course.

Process of revision of curriculum

- All revisions are discussed and approved by the Senate, an internal governing body of BITS Pilani. Senate is constituted of all Associate Professors and Professors across all campuses of BITS. The Senate meets three to four times a year to primarily discuss academic matters among other matters.
- Revisions are initiated by any faculty members. A Departmental Committee for Academics (DCA) enables discussion of the proposals internally within a Department and a cross-campus DCA enables discussion of the same across campuses for that Department.

- The Academic & Resource Planning Office enables inter-departmental discussion and in consultation with Instruction Office structures the proposal and determines the parameters (e.g. the credit units for a course) based on the proposal from the Department. This is in turn taken for discussion and approval by the Senate.

- When major structural revisions in the curriculum are to be undertaken cross-disciplinary committees are appointed by the Senate. The last major revision in 2011-12 (for on-campus programs) and in 2013-14 (for off-campus programs) involved several rounds of discussions and workshops and engaged about one-third of our faculty members across the campuses. The next rounds of reviews have been initiated (in July 2015).

Courses that underwent revision

- Approximately 60% of the total number of courses underwent a revision in syllabus (course description) during the curriculum revision undertaken in 2011-12 (for on-campus programs) and in 2013-14 (for off-campus programs).
- Since then a total of 102 new courses have been introduced in on-campus programs, a significant subset of which will also apply for off-campus programs in addition to about 20 new courses that have been introduced specifically for off-campus programs.

1.3.4 What are the value-added courses offered by the university and how does the university ensure that all students have access to them?

(i) Electives:

All first degree students have access to open electives from any discipline at BITS. Students use this opportunity to enhance their skills in other disciplines. A sample of such courses sought after by students are in the following areas:

a. Economics & Finance:
- Security analysis and portfolio management
- Financial Engineering
- Resource and Environment Economics
- Financial Management

b. Engineering
- Network Security
- Cryptography
- Image Processing
- Machine Learning
- Neural Networks & Fuzzy Logic
- Reconfigurable Computing
- Multimedia Computing
- Earthquake Resistant Design & Construction
- Urban Transport
- Green Buildings And Energy Conservation
- Environmental Impact Assessment
- Introduction To MEMS
- Computer-Aided Manufacturing
- Precision Engineering
- Reverse Engineering And Rapid Prototyping

c. Management & Entrepreneurship:
- Creating and Leading Entrepreneurial Organizations
- New Venture Creation
- Supply Chain Management
- Marketing Research

d. Introduction to Islamic Economy

e. Computing:
- Object Oriented Programming
- Data Mining
- Machine Learning

Introduction of Humanities electives as part of curriculum has helped reinforce the social and ethical value systems among the students. New courses like Professional Ethics, Management of Cross-Cultural Engineering Teams, Dynamics of Social Change, Srimad Bhagavad Gita, etc.

(ii) Project Type Courses

Project type courses provide an opportunity for the students to work on a live research or industrial project. Under the category of project type courses, students can do either a Study Project, a Lab project or a Design project. Students are supervised by faculty and assessed via components chosen on the nature of the project: literature survey and summarization, presentation (written and oral), design, development / implementation, and research contribution. Students are graded and each project typically carries three credit units. A first degree student can use at most three such projects in lieu of his/her discipline electives and two more in lieu of his/her Open/Humanities electives.

(iii) Practice School (PS) program

PS is an option available to all first degree students. While PS II is available in both semesters, PS I is available in Summer term (at the end of the second year). The Practice School option is made available in the final semester for higher degree students. The Practice School links the theory learnt in classroom to the practice adopted in industry.

The PS-I program is exposure-oriented and provides an opportunity to observe and learn in an industrial / work-place setting. This program enhances the students' thinking and ability to integrate the concepts they learn into a workplace environment. It also provides an opportunity to the students to learn and communicate with professionals.

The PS-II program allows our students to work on live problems in the industry towards the end of their program (i.e. in their final year, for first degree students) when they have obtained a fairly broad grounding in their discipline. They get to apply what they have learnt in a practical setting and on a large scale.

Equally significant is the fact that, they are being measured by parameters of the external world including human aspects, economic/financial aspects, and time constraints on design and development of products / processes. Quite often the projects in PS-II are inter-disciplinary in nature and require our students to leverage not only the knowledge and skills acquired in his/her discipline but also put to use the breadth that BITS offers in its curriculum. Students also learn to work in a team of professionals in an environment with a larger objective than merely solving a problem on paper. The PS program for higher degree students is akin to the PS-II program for first degree students in structure but typically a higher degree is placed for PS in a location requiring higher order problem solving requirements including design and research.

1.3.5 Has the university introduced any higher order skill development programmes in consonance with the national requirements as outlined by the National Skills Development Corporation and other agencies?

No. Presently the institute is working to introduce such programmes.

1.4 Feedback System

The BITS Educational System is a goal seeking, adaptive and self- corrective system. The Instruction Division, Faculty Peer Groups and the students are continuously involved in safe guarding the interests of the educational processes and maintenance of standards. The Instruction Division organizes the feedback and monitoring process of the institute. The functioning of BITS feedback mechanisms have established the credibility of the system, infused confidence among both faculty and students, increased active participation by motivated persons, improved mutual trust and has given a fillip to educational commitment and optimism.

1.4.1 Does the university have a formal mechanism to obtain feedback from students regarding the curriculum and how is it made use of?

Yes, BITS Pilani, has four-tier student feedback system which is used to facilitate quality sustenance and improvement measures in the instruction and curriculum design processes. These are mentioned below:

I. 24 × 7 online feedback system is managed by the Instruction Division (ID). The students can share their feedback online (both on instruction and courses) for all courses that they have registered for during a semester.

II. This feedback is reviewed and communicated on real time basis to the faculty members. This helps the faculty members to improve their teaching practices and also the feedback on courses is used in improving the course content.

III. Hardcopy feedback in the form of questionnaire for all Lecture, Tutorial and Practical classes are collected by the student volunteers around a month before comprehensive examination for each course and submitted to the ID. The analysis is shared before the commencement of the ensuing semester with all the faculty members through Head of Department (HOD). This method helps the faculty members to take future corrective measures in teaching and curriculum design.

IV. Direct feedback from student volunteers is taken and maintained by ID. A team of four to eight students from each department is formed by ID to collect feedback of all the courses and of instruction. The student volunteers are required to discuss with their friends (i.e. juniors, peers and seniors) in collating the feedback. These are then shared with the departments from time to time in order to take necessary action for enhancing the quality of the programmes.

V. Student Faculty Council (SFC) is constituted by each department as per the guidelines of ID (Instruction division). It comprises of student representatives from all years for all categories (boys and girls, different programmes, first degree, higher degree etc.) and faculty members (i.e. Professor, Associate Professor, Assistant Professor and Lecturers). The SFCs collect feedback from the students and share with individual faculty members and ID.

In addition to on-campus feedback system, the Practice School (PS) and Work-Integrated Learning Programme (WILP) Divisions have other feedback systems in place. Practice School Division obtains feedback for the PS courses (PS-I, PS-II) and acts upon it regularly.

For WILP, the WILP Division collects periodic feedback on the teaching and learning process from students and other stakeholders including industries and collaborating organizations through an online feedback survey, and uses the feedback analysis to improve the programme curricula, academic and pedagogic aspects of the courses, and faculty engagement.

1.4.2 Does the university elicit feedback on the curriculum from national and international faculty? If yes, specify a few methods such as conducting webinars, workshops, online discussions, etc. and its impact.

BITS also actively seeks feedback from the academic peers during various conferences seminars and workshops held in the institute. On an average more than 100 such programs are conducted every year across the four campuses and departments of BITS. Feedback is also obtained from faculty who visit and participate in various conferences and seminars held in India and abroad and during their interaction with the other national and international faculties during the visit. The feedback of these interactions is shared by each faculty in the institute by giving a seminar on his/her experiences during the visit.

In addition, visiting committees comprising of eminent academicians and researchers from institutes across the country are invited to review the curriculum periodically.

BITS has a scheme of University immersion for sponsoring young faculty to visit internationally reputed universities abroad to gain an understanding of best practices of teaching and learning in international universities. The departments periodically benchmark international universities for their program curriculum and interact with the faculty members of those universities for upgrading and refining the curriculum on a regular basis.

BITS alumni who are distinguished academicians in other universities are also involved with the curriculum feedback process. They actively participate in these interactions during the alumni global meets. The feedback received from all these sources are sent to respective departments for initiating necessary changes like up-gradation of curricula etc

1.4.3 Specify the mechanism through which affiliated institutions give feedback on curriculum enrichment and the extent to which it is made use of.

Not applicable.

1.4.4 What are the quality sustenance and quality enhancement measures undertaken by the university in ensuring the effective development of the curricula?

BITS Pilani undertakes several measures for effective development of the curricula and pedagogy.

Quality improvement at the micro-level:

- Routine anonymous feedback from the students as well as qualitative feedback from Student Faculty Council (or Class Committees comprised of students and faculty) is incorporated into the curriculum by Departments.

- Feedback received from the industry via our Placement Office and our Practice School office enables teachers and departments to review the curriculum internally every semester.

- The process of evaluation is ensured to be quick and transparent. Teachers are required to evaluate answer scripts/sheets within a week of any evaluation component. Furthermore answer scripts / sheets are returned to the student who may seek a clarification / re-evaluation with the teacher. The teacher is required to consider all such requests, provide a clarification as to the marking and/or re-evaluate the answers. This ensures complete transparency of evaluation but at the same time, the teacher gets to learn whether the students have learnt or not. Thus, the teachers get feedback on the effectiveness of teaching and learning.

- Teachers are enabled to customize the syllabus of a course within the broad contours of an approved course description. This customization in the form of exercises / cases and/or variation in emphasis allow the teacher to adapt to the student body and its variations (in preparedness, in discipline of study, or in maturity/experience).

- The hand outs issued by the teacher to the students at the beginning of a course establishes a contract between them regarding the syllabus, coverage / scope, and level of the course as well as the objectives / outcomes and forms in which they are assessed.

- The process of modifying curriculum and pedagogy at the micro-level is fairly swift but rigorous ensuring that they remain nimble and robust.

Quality improvement at the macro-level:

- A systematic process is followed for review and redesign of the curriculum. Review processes include:
    - Benchmarking
    - external review of curricula by experts in academia and industry
    - qualitative interaction with visiting committees on faculty strength and subject expertise in BITS Pilani

Redesign process is consultative and decentralized with opportunity for every faculty member to contribute to and critique the curriculum. This results not only in a well-designed curriculum but also a sense of ownership and effective execution of the curriculum.

- BITS Pilani has established a **Teaching and Learning Center (TLC)** in each of its campuses with committed faculty, time and budget. The ambit of TLC includes:

    - Support for professional development of faculty and technical support staff involved in teaching like lab demonstrators.
    - Support for research and innovation in teaching and learning processes
    - Training of instructors in technology-enhanced learning

- BITS Pilani also conducts workshops and training for its faculty members to enhance their skills in technology-enhanced learning (e.g. use of online learning platforms), in program and course design (e.g. formulating program objectives / outcomes and translating the same to course level learning objectives / outcomes). These workshops and training are offered with a blend of internal and external expertise.

- BITS Pilani has also employed external consultants – particularly in its off-campus / Worked Integrated Learning Programs – for comprehensive quality assessment of teaching, learning, and student engagement.

2 CRITERION II: TEACHING-LEARNING AND EVALUATION

2.1 Student Enrolment and Profile

2.1.1 How does the university ensure publicity and transparency in the admission process?

BITS Pilani offers degree programs both in on campus and off campus mode. For these programs publicity and transparency is ensured through various means as given below.

Publicity:

On Campus: The admission notification is made nationwide through leading newspapers in English and regional languages as well as through digital media. The advertisement is released about two months in advance of the last date for applying and is also put up on the BITS admissions website. The entire application process is online. Posters are also sent to different schools/colleges giving details of the complete application process.

Off Campus: BITS Pilani, has been offering Work Integrated learning programmes as a means of continuing education for employed professionals. The admission notification is made nationwide through leading newspapers. The advertisement is released about two months before the last date for applying and is also put up on the BITS WILP Admissions website. In addition, programmes are also advertised through the digital media including professional networking websites. Promotional emails are also sent to prospective candidates, industry leaders and collaborating organizations.

Transparency:

On campus: The complete process from applying to admissions and result declaration is online and computer (software) driven. All the relevant information like application status, test dates/slots, test score, admissions result; etc., are announced and are made available on the admission website. The BITSAT results are declared to the students at the examination centre immediately after the test. The cut-offs for all the programmes are also announced through website. The whole Process is computerized and there is no manual intervention of any kind. Each and every activity is recorded through log files.

Off campus: The entire process from candidates applying for admissions and declaration of results is online and computer (software) driven. Once the candidates enter the required details online, they can download and print their application form. The duly completed application forms with relevant enclosures are received by post and carefully scrutinized at the Admissions Office. All the relevant information like application status, fee payment status, and admission status are promptly announced and are made available on the WILP Admissions website.

2.1.2 Explain in detail the process of admission put in place by the university. List the criteria for admission: (e.g.: (i) merit, (ii) merit with entrance test, (iii) merit, entrance test and interview, (iv) common entrance test conducted by state agencies and national agencies (v) other criteria followed by the university (please specify).

On Campus: BITS Pilani has a three-tier education process:

i) Integrated first Degree programmes (UG)
ii) Higher Degree/MBA Programmes (PG) and
iii) Doctoral programmes.

Merit is the only criteria for admission to each of the above programs.

1. For admission to Integrated first Degree programmes: Three Indian Campuses.

a. BITS Admission Test (BITSAT)

The admission process for these three tiers at the three Indian campuses (Pilani, KK Birla Goa and Hyderabad) is explained below:

Admissions to all these programmes are made purely on merit. The merit position of the candidate is based on the score obtained by the candidate in a Computer based Online Test (BITSAT) conducted by BITS, Pilani.

Eligibility: (i) For admission to all integrated first Degree programmes except B.Pharm. (Hons.): Candidates should have passed the 12th examination of 10+2 system from a recognized Central or State board or its equivalent with Physics, Chemistry, and Mathematics and adequate proficiency in English. (ii) For admission to B.Pharm.(Hons.): Candidates should have passed the 12th examination of 10+2 system from a recognized Central or State board or its equivalent with Physics, Chemistry, and Biology and adequate proficiency in English. However candidates with PCM subjects may also apply for Pharmacy program.

Further, the candidates should have obtained a minimum of aggregate 75% marks in Physics, Chemistry and Mathematics subjects (if they have taken Mathematics in BITSAT) or a minimum of aggregate 75% marks in Physics, Chemistry and Biology subjects (if they have taken Biology in BITSAT) subjects in 12th examination, with at least 60% marks in each of the Physics, Chemistry, and Mathematics / Biology subjects. Only Students who are appearing for 12th examination in that year or who have passed 12th Examination in last year are eligible to appear in the BITSAT.

If candidates have taken more than one attempt in 12th class or its equivalent, only their latest performance is considered, provided this attempt has been for the full component of subjects/courses prescribed.

b. Direct Admission to Board Toppers

The admission process of the Institute has always ensured guaranteed admission to all the students who obtained first ranks in their respective board examinations. This has given a very vital input of highly meritorious students from all over India. First rank students of all the central and state boards in India every year are given direct admission to the program of their choice, irrespective of their BITSAT score as per the eligibility criteria mentioned above.

c. Admission of International students in Indian Campuses

Candidates holding foreign passport and having valid Scholastic Assessment Test (SAT) and SAT Subject Tests scores are also eligible to apply for admission under "International Students Scheme". This is introduced in this academic year (2015-16) and admissions are made for the BITS- Pilani, Hyderabad Campus. Candidates who have taken SAT and SAT Subject Tests conducted by College Board (USA) are eligible to apply for admission to different first degree programmes at BITS Pilani, Hyderabad Campus subject to following criteria:

- Citizens of a country other than India only are eligible under this scheme.
- The candidate should have passed the qualifying examination (grade 12) with Physics, Chemistry, and Mathematics conducted by the country's or province's Board of Higher/Senior Secondary Education, including those in India, or its equivalent examination recognized by Association of Indian Universities such as the "A" levels (conducted by Cambridge International) or the International Baccalaureate, etc.
- Candidates should be proficient in English.
- The candidate should have obtained a minimum of 75% aggregate marks (or average grade of 7.5 on 10 point scale), in Physics, Chemistry and Mathematics in the above examination. Additionally, he/she should have scored at least 60% marks (or grade of 6.0 on 10 point scale) in each Physics, Chemistry, and Mathematics.
- The candidate should have a minimum aggregate score of 1600 (out of maximum of 2400) in SAT, as also a minimum aggregate score of 1600 (out of maximum of 2400) in SAT Subject Tests in Physics, Chemistry and Mathematics Level 2.

d. Admission to BITS Pilani, Dubai Campus.

Admission to BITS Pilani, Dubai Campus is based entirely on the candidate's merit, facilities available and availability of seats in the discipline preferred. The merit is determined based on the aggregate percentage of marks obtained by the candidates in the Qualifying Examination (12th grade or equivalent). Since BITS Pilani, Dubai Campus is primarily established to cater to the educational requirements of the residents of the GCC (Gulf Cooperation Council) and neighboring countries, the process takes place through merit lists for the GCC and NON-GCC candidates. Candidates from GCC countries are offered admission on priority.

Eligibility: (i) For admission to any of the above programmes, Candidates must have passed the requisite Qualifying Examination, which is the General Secondary Education Certificate Examination of Ministry of Education, UAE or Senior School Certificate Examination of the Central Board of Secondary Education (CBSE-12th grade), New Delhi, India, or its equivalent from any recognized State, National or International board with Physics, Chemistry and Mathematics

(ii) The candidates must have obtained a minimum 60% overall aggregate of marks in the qualifying examination and must have a minimum aggregate of 60% in Physics, Chemistry & Mathematics subjects with at least 50% marks in each subject. However, for admission to B.E. (Hons.) Biotechnology, Candidates with Physics, Chemistry and Biology will also be accepted with a minimum aggregate of 60% in Physics, Chemistry and Biology subjects with at least 50% marks in each subject. Instead of marks, if any letter grades or GPA are awarded (or any other system of evaluation), their equivalences in marks will be decided by the Admissions Committee.

(iii) As English is the medium of instruction, good proficiency in English is essential for admission. Candidates who have completed their qualifying examination from Non-English medium must have secured a minimum TOEFL Score of 500 in paper based test or 61 in internet based test or have an IELTS Score of 5 or above. If necessary, they will also be assessed by a campus committee for English proficiency.

2. Admissions to Higher Degree programmes

Admissions to the Higher Degree Programmes (M.E./M.Pharm.) are made purely on merit. The merit position of a candidate is based on the score obtained by him/her in a Computer based Online test (BITSHD) conducted by BITS, Pilani. The online test will be conducted at dedicated centers at different cities of India.

Eligibility: The candidate should have obtained a minimum of 60% aggregate in the qualifying examination, i.e., Integrated first degree of BITS in the same discipline or its equivalent.

Admissions to MBA programme at its Pilani campus, are made on the basis of CAT /GMAT scores together with group discussion (GD) and interview(s) of candidates. The candidates are shortlisted based on their CAT/GMAT scores and such shortlisted candidates are required to appear for Group Discussion and Interview to be held at designated cities in India. The program duration is normally four semesters.

Eligibility: Candidates with B.E./B.Tech degrees in Engineering disciplines or a Master's Degree in any discipline from any recognized university or any Integrated First Degree of BITS are eligible. Further, candidates should have obtained minimum of 60% aggregate marks in qualifying degree. While the eligibility for higher degree programmes (M.E./ M.B.A.) offered at Dubai Campus is the same as above, admissions are based on the performance in the qualifying degree and admission test and/or interview.

3. Admission to Doctoral programmes

Admissions to Doctoral programmes are based on Test and /or interview conducted by the respective departments.

Eligibility: Candidates with Higher Degree such as M.E./M.Pharm./MBA /M.Phil of BITS or its equivalent with a minimum of 60% aggregate in the qualifying examination are eligible. Candidates with an M.Sc./B.E./B.Pharm or an equivalent degree with a minimum of 60% aggregate may also be considered for Ph.D. admission subject to their suitability and competence.

For Ph.D. Programme in Humanities and Social Sciences, candidates with an M.A. and with minimum of 55% aggregate may also be considered. Shortlisted candidates will be called for a written test and/or interview for selections.

4. Admission to Work Integrated Learning programmes.

The Institute is one of the very few universities in India, which has ventured into Work Integrated Learning Programmes in science and technology areas. In order to maintain the standard as well as rigour required in this area, the Institute could cater only to those inputs, which have the facilities and environment for such a learning process. So the Institute treats these degree programmes as continuing education programmes for employed professionals. Hence admissions are offered only to candidates who are already employed and whose organizations sponsor them in their academic pursuit subject to the candidates having the required academic qualifications.

These degree programmes are Work Integrated Learning Programmes. Hence, candidates who are engaged in work in the relevant professional areas only can get admission The final offer of admission would be based on candidate's educational background, academic achievements, work profile, relevant work experience, profile of the employing organization.

2.1.3 Provide details of admission process in the affiliated colleges and the university's role in monitoring the same.

Not Applicable

2.1.4 Does the university have a mechanism to review its admission process and student profile annually? If yes, what is the outcome of such an analysis and how has it contributed to the improvement of the process?

The university reviews its admission process periodically. Before 2005, the admissions to integrated first degree programmes were purely based on the marks obtained in 12th class. But since 2005,admissions are based on the computer based online test (BITSAT). To even out the possible differences in student performance and evaluation across various Central/ State Boards, the eligibility criterion was changed in 2013 from a minimum of aggregate 80% marks to 75% marks in Physics, Chemistry and Mathematics subjects.

In order to introduce trans-national diversity and to embark upon making BITS Pilani a global university, merit based mode for admitting international students to the integrated first degree programmes was introduced recently. Any student who is not a citizen of India is eligible to apply through this scheme for which the admission will be based on performance in Scholastic Assessment Test (SAT) conducted by the College Board (USA) in Mathematics, Physics, and Chemistry. In the academic year 2015-16, 28 international students are admitted to the Hyderabad campus. An office of international students has been established in Hyderabad campus. To increase number of international students in Dubai campus scholarship is provided to meritorious GCC nationals.

To encourage admission to Pharmacy Programme, provision was also made in BITSAT for admitting student with Physics, Chemistry and Biology subjects in class XII. To promote entry of Girl students in technical education they are given concession in BITSAT application fees. Depending on the high demand existing for BITS Pilani admission from the students, operational increase in number of centres, up-gradation of technologies are regularly carried out.

The WILP Admission process and the profiles of the applications received as well as those of students admitted are reviewed periodically before the admissions are announced for each semester. Any improvements required in the operational processes are implemented as and when necessary. The processes are automated with technology support wherever required, thereby improving the operational efficiency and the number of candidates shortlisted.

2.1.5 What are the strategies adopted to increase / improve access for students belonging to the following categories:

∗ SC/ST ∗OBC ∗ Women ∗Persons with varied disabilities ∗ Economically weaker sections ∗ Outstanding achievers in sports and other extracurricular activities

BITS admits students solely on the basis of merit, based on their BITSAT score. It does not capture information on SC/ST; OBC in the application form. For Dubai campus Board marks is only criteria. However, during the BITSAT examination, support for students with varied disabilities is given in the form of scribe, extra time etc.

However, once students join BITS, scholarships are available for women and members from economically weaker sections of the society. Also announcements of scholarship schemes by the central government are widely publicized among the students

For physically disabled students, ramps / Elevators are provided for their easy access to all facilities on different floors. At Dubai Campus, physically challenged students meeting the academic entry requirements are given concession on the tuition fee throughout the programme subject to satisfactory academic performance in each semester.

2.1.6 Number of students admitted in university departments in the last four academic years:

	Year 1		**Year 2**		**Year 3**		**Year 4**	
Categories	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
SC	Information on SC/ST; OBC is not captured in our application form as the admissions are purely based on merit.							
ST								
OBC								
General								
Others								

2.1.7 Has the university conducted any analysis of demand ratio for the various programmes of the university departments and affiliated colleges? If so, highlight the significant trends explaining the reasons for increase / decrease.

Programmes	Number of Applications	Number of students admitted	Demand Ratio
UG			
2010	139234	2062 (450)*	67.52
2011	123677	2128(421)	58.11
2012	136904	2127 (436)	64.36
2013	166260	2148 (335)	77.40
2014	186181	2273(306)	81.90
PG			
2010	4428	443 (95)	9.99
2011	4571	342 (77)	13.36
2012	4825	364 (97)	13.25
2013	5549	384(106)	14.45
2014	5172	363 (122)	14.24
Ph.D.			
2010	425	90(36)	4.72
2011	461	151(55)	3.05
2012	1173	136(77)	8.62
2013	964	168(65)	5.73
2014	773	122(46)	6.33
Integrated Masters	NA	NA	NA
Integrated Ph.D.	NA	NA	NA
Certificate	NA	NA	NA
Diploma		NA	NA

*Number in the bracket refers to girl students

The University analyses its demand ratio every year. In general the demand has been increasing. Over the years it is observed that the cut-offs for various programmes are increasing. The number of applications received for admissions is also more for similar number of seats. To accommodate the number of applicants appearing for tests, number of BITSAT centers is increased every year across the country.

2.1.8 Were any programmes discontinued /staggered by the university in the last four years? If yes, please specify the reasons.

Presently admissions to M.Sc. (Tech) Information Systems; M.Sc. (Tech) Finance; M.E. in Electrical with specialization in Power Electronics & Drives; Masters in Public Health are not made. These are based on feedback from the stakeholders.

2.2 Catering to Student Diversity

2.2.1 Does the university organize orientation / induction programme for fresher's? If yes, give details such as the duration, issues covered, experts involved and mechanism for using the feedback in subsequent years.

At the time of admission, the university organises a day long orientation programme in order to familiarise the new students with the Academic Programmes at BITS and to give them an idea about their campus life and co-curricular activities. The Vice Chancellor, Director, and senior faculty members meet the parents of Freshmen at an interactive session organized at the time of admission.

Issues covered and experts involved during Orientation for New Students:

- Address by Vice Chancellor
- Address by Director
- Academic Curriculum, Course Design, Academic Flexibilities, Industry Interface (Practice School), Evaluation & Grading Hostel & Campus Life, Medical facilities, Academic Counselling, Registration and Time Table are delivered by the respective Dean/Associate Dean.
- Students' Union Activities delivered by President & General Secretary, Students' Union

Special Session for Higher Degree & Ph.D. Students is conducted by Dean/Associate Dean, Academic, Resource Planning Division; Dean/Associate Dean, Academic Research Division; and Dean/Associate Dean, Instruction Division. The students are also offered individual interaction with a senior member of the faculty to clarify their queries. The Admissions Office administers a questionnaire to seek feedback of all admitted students on the Admission process and the feedback is used to improve the process in the following year.

Faculty members act as Advisors and Mentors for groups of students to guide them in the registration process, and encourage them to discuss any matter academic and non-academic with them during their stay at BITS. Students can also approach their wardens for any help or guidance related to academic or personal matters. Hostels have Resident and Non-resident Wardens drawn from the faculty. In addition, there are Hostel Superintendents to assist the Wardens in matters related to the upkeep of the hostels and attending to the needs of the students.

2.2.2 Does the university have a mechanism through which the "differential requirements of the student population" are analysed after admission and before the commencement of classes? If so, how are the key issues identified and addressed?

On the day of admission, every student is interviewed by a set of senior faculties. As an outcome of this interview, admission division prepares a list of students who would need extra support/guidance in terms of their soft skills development. This list is passed onto other divisions like Languages and Humanities to prepare extra training/support for improving their skills. For quite a few M.E. programs (e.g. BioTechnology, Software Systems), or M.Pharm., there may be variations in the input in which case deficiency is identified and the student is asked to take these deficiency courses. Such identification is done soon after admission and typically within the first week or 10 days students are informed of deficiency in their requirements and courses are prescribed for them.

For all M.E./M.Pharm students, communicative English is required. Students with deficiency are identified and Technical Communication course is prescribed.

2.2.3 Does the university offer bridge / remedial / add-on courses? If yes, how are they structured into the time table? Give details of the courses offered, department-wise/faculty-wise?

Yes! While the academic preparation required for the admission to each degree has been clearly spelt out, there is a provision in the Institute's Academic Regulations whereby brilliant students whose prior preparation has been marginally deficient in terms of stated courses/subjects may also be admitted with the condition that they are required to do additional courses over and above those prescribed for a student with normal preparation and the sequence is determined by the institute.

This flexibility is invariably used in the case of higher degree programmes where students may come without sufficient exposure to courses like probability & statistics, computer programming etc. Need based Bridge Courses are also planned for students admitted under international students scheme.

2.2.4 Has the university conducted any study on the academic growth of students from disadvantaged sections of society, economically disadvantaged, physically handicapped, slow learners, etc.? If yes, what are the main findings?

Not done.

2.2.5 How does the university identify and respond to the learning needs of advanced learners?

There are instances within BITS Pilani and its campuses where an advanced learner has completed his course requirements well before (six months) the term of his/her graduation ends. This is possible because a student could overload himself/herself by taking extra credits during his/her studies at an earlier stage within the university. This helps the student to accelerate his progress and complete the program at a faster pace. Students can also register for extra courses beyond the unit requirement during their program tenure at no additional cost.

When a candidate for any programme in the three tiers of education of the Institute comes with a preparation beyond the minimum requirement for admission in that programme, the admission of such a candidate is handled under what is known as admission with advanced standing. While such admission is not available as a matter of right, at the time of admission the Institute would spell out in detail the advanced credit it proposes to give to the candidate and the matter would be handled within the framework of the Institute's operation for normal students.

Essentially the guiding principle is two-fold: the courses the candidate has already done before entering the Institute cannot be repeated and also that the time spent elsewhere is not wasted. Such an open-ended situation is handled on a case by case basis. It is important that the candidate supplies all the pertinent data in respect of syllabus of courses taken by him/her, examinations passed, question papers of the examinations and the grades/marks obtained by him/her in different subjects.

A candidate who is shortlisted for such admissions would be asked to come to Pilani and explore a workable programme that would be appropriate for him/her before admission is completed. If required, the candidate may have to take certain examinations in various subjects that he/she has completed before a prescribed programme is pronounced for him/her there onwards.

2.3 Teaching-Learning Process

2.3.1 How does the university plan and organise the teaching, learning and evaluation schedules (academic calendar, teaching plan, evaluation blue print, etc.)?

The institute has a well-defined organization structure and delineation of important functions. The instruction Division (ID) is one of the functional units of the institute which has the responsibility of organizing teaching, learning activities by pooling resources from various departments and ensuring teaching across the institute is carried out in an efficient and effective manner.

a) The Year wise academic calendar is planned in advance. Before the starting of each semester, the ID prepares the Time-Table which contains academic calendar, offered courses and other details that include Instructors, class hours, classrooms, mid-semester examination date and comprehensive examination dates. Time table also contains details of humanities electives, list of equivalent courses, pre-requisite details, audit type course details, textbook etc. The BITS educational program allows several flexibilities to the students and teachers. Students have flexibilities like course wise passing, choice to accelerate or decelerate his program according to his capability and wide choice of electives which cuts across year, level and disciplines.

b) Hand out for each course is prepared by the faculty before start of the semester that includes all the details regarding course plan, course objectives, text book, reference books details and evaluation details. The students can get sufficient information about the course objectives beforehand from the hand outs and can have pre-studies. ID collects hand-outs from the instructors and makes those available in the ID website.

2.3.2 Does the university provide course outlines and course schedules prior to the commencement of the academic session? If yes, how is the effectiveness of the process ensured?

A detailed orientation is given to all newly admitted students on various aspects. During that time, they are provided with an Institute Bulletin which contains in detail the curricular structure for their program along with the course content.Each course has a "Course Handout" which describes all the operational details of the course. This is in two parts. While Part I describes the general operational details applicable to all courses, Part II describes the specific details for a particular course in terms of scope and objective of the course, lecture-wise plan, learning objectives, text book, reference material, evaluation schedule, etc. Part I of the handout is available in the Timetable and Part II of the handout is also available to the students on the first day of class work by the respective course instructor-in-charge. For multi section courses involving multiple instructors, the course handout is prepared on consultation basis to ensure uniformity of operation.

The lecture wise learning objectives are clearly specified and are followed throughout the course. All the handouts are available in the Course Management Tool and Instruction Division website for access to students. The entire process is effectively monitored by Instruction Division centrally for all courses offered in a given semester and regular feedback is collected from the students.

2.3.3 Does the university face any challenges in completing the curriculum within the stipulated time frame and calendar? If yes, elaborate on the challenges encountered and the institutional measures to overcome these.

No. The University does not normally face any problem in completing the curriculum within the stipulated time frame and calendar. This is mainly due to the availability of excellent faculty members and meticulous planning of Instruction Division. Before the start of a given academic year, the academic calendar along with the holidays is released for the academic year. While it is planned, Instruction Division does a detailed analysis for each semester and ensures that there are enough working days to complete the curriculum in a given semester. For several years, we have had no disruption in academic calendar in last few decades.

2.3.4 How is learning made student-centric? Give a list of participatory learning activities adopted by the faculty that contributes to holistic development and improved student learning, besides facilitating life-long learning and knowledge management.

Students are encouraged to use the knowledge they already possess to learn new things, which gives them time for reflection. In this student-centric approach for teaching, teachers become facilitators or just partners in learning of their students. Through curriculum design and assessment, teachers shift the focus towards performance in real-world contexts. They try to create organized and cohesive experiences to assist students to make connections to vital concepts.

In addition, each undergraduate course should have at least 20% evaluation in the form of open book/ take home and 40% for higher degree students. This is achieved by adapting the teaching methodologies suited for the students. The participatory learning activities adopted by the faculty include the following:

- Encouraging Participation in class room discussions/ seminars/workshops
- Solving challenging problems in the tutorial classes. Practicing active learning sessions in tutorials
- Giving assignments on emerging areas related to the course
- Development of models, involving in doing projects
- Publication of papers in journals or conferences
- Arranging Field visits
- Facilitating Industry internship etc.

2.3.5 What is the university's policy on inviting experts / people of eminence to deliver lectures and/or organize seminars for students?

Inviting experts/people of eminence to deliver lectures is decentralized to the departments. Each department can suggest eminent experts in their department area and accordingly they are invited. Their travel, stay, honorarium etc. are taken care by the institute. Several guest lectures on emerging areas keep happening as a routine in the institute. In addition, each departmental student associations also plan guest lectures/workshops in a given semester.

Lectures by eminent speakers including distinguished alumni on different topics are arranged regularly through the BITS Embryo platform. The tele-presence facility of the institute is used to beam the invited lectures arranged in a campus to be viewed across all campuses, thus ensuring high level of student participation. For example, visit by Nobel Laureate Shri Kailash Satyarthi to Pilani campus, and his lecture benefited students and faculty across all four campuses.

2.3.6 Does the university formally encourage blended learning by using e-learning resources?

BITS Pilani has been a pioneer Institution in the use of Information and Communication Technologies (ICT) for various purposes including teaching and learning. Extensive use is made of e-learning resources by individual instructors. Faculty members can, and do, use online resources and lectures as part of their courses. They can also video tape their lectures and put them online. Many faculty members use an online learning system on which they post their presentations and notes, as well as assignments etc. The entire university is enabled with internet connectivity including hostel rooms that encourages blended learning by way of providing access to website containing e-learning resources. All course related materials are uploaded in the learning management system which can be accessed by all students via internet at any point of time.

BITS has partnered with the MIT & Harvard's massive open online course (MOOC) platform edX to offer MOOCs to its own on-campus and off-campus students as well as students outside BITS. Now BITS is offering two courses using edX platform in all 4 campuses (Computer Programming; Microprocessor & Interfacing). Our own customized and enhanced version of the Open edX^{TM} based MOOC / SPOC Platform, 'Any-Learn' is now ready to create, host and offer courses, depending upon our convenience and schedule. This is already connected to the National Knowledge Network.

Blended Learning initiatives, with high-quality recorded e-content and interactive asynchronous e-learning environments through an integrated Learning Management System, have been thrust area for enhancing the quality of delivery of courses in our Work Integrated Learning Programmes. Lectures have been recorded for several courses at the state-of-the-art digital studios in Pilani, Goa and Hyderabad campuses, and the digital content has been integrated with the online delivery.

2.3.7 What are the technologies and facilities such as virtual laboratories, e-learning, open educational resources and mobile education used by the faculty for effective teaching?

Extensive use of e-learning resources is made by faculty. Faculty members can, and do, use online resources and lectures as part of their courses. Many faculty members use an online learning management system on which they post their presentations and notes, as well as assignments etc. The entire university is enabled with internet connectivity including hostel rooms that encourages blended learning by way of providing access to website containing e-learning resources.

BITS has also built studios – one each in Pilani, Goa, and Hyderabad campuses – which enable faculty to video tape their lectures and make them available online. In addition, BITS is also experimenting with in-class recording of lectures. Video content for more than 25 courses have been developed and are offered online for our Work Integrated Learning programs.

All course related materials are uploaded in the learning management system which is a version of Moodle internally customized by BITS. The learning management system can be accessed by all our students via internet at any point of time. Two courses have been offered via the edX^{TM} EDGE platform for our students, as BITS is now a contributing partner on edX. Furthermore BITS has developed its own customized and enhanced version of the Open edX^{TM} based MOOC / SPOC Platform named 'Any-Learn' to create, host and offer courses, depending upon our convenience and schedule. This is already connected to the National Knowledge Network.

The students are encouraged to use open educational resources such as NPTEL, EDUSAT, e-journals to supplement text book teaching. Central Library subscribes to 24 X 7 e- books database where students and faculty members can have access to over 15000+ e books. The library has thousands of books in electronic format and more are being added constantly.

2.3.8 Is there any designated group among the faculty to monitor the trends and issues regarding developments in Open Source Community and integrate its benefits in the university's educational processes?

The Institute has a Software Development and Education Technology (SDET) Unit which is responsible for integrating software usage including Open Source software in the educational process. Linux and associated open source software are used widely as a result, particularly, in developing internal portals for academic administration. In addition, SDET has been responsible for customizing Moodle and Open edX for our

internal use. SDET is headed by a Chief (who is currently Professor of Computer Science) and includes a few other faculty members responsible for deploying technology in education and several students working on specific projects. In addition, for our Work Integrated Learning Programs, there is a separate Content Development & Delivery unit headed by an Associate Dean. The Content Development & Delivery unit has incorporated several open source platforms for recording and hosting digital content for WILP.
There is also a full-time IT team headed by an IT manager for WILP who is responsible for identifying and integrating open source software into educational processes.

The Institute has set up Teaching Learning Centre (TLC). It involves in improving the overall teaching – learning environment at BITS Pilani and headed by a Professor-in-charge, who is supported by Faculty-in-charges from all the four campuses of BITS Pilani. There are a few nucleus members in each campus to support the Faculty-in-charge. The Centre carries out-research on innovative teaching pedagogy, collects good practices of teaching learning from all over the world and disseminate among the faculty, conducts intensive teaching workshops and invites experts from India and abroad to deliver lectures on relevant topics. TLC with the support of many faculty members are active followers and users of open source software material who accordingly ensure that the successful experiments are integrated in the University's educational processes.

2.3.9 What steps has the university taken to orient traditional classrooms into 24x7 learning places?

Extensive use of e-learning resources is made by individual instructors. Faculty members can, and do, use online resources and lectures as part of their courses. They can also video tape their lectures and put them online. Many faculty members use an online learning system on which they post their presentations and notes, as well as assignments etc. The entire university is enabled with internet connectivity including hostel rooms that encourages blended learning by way of providing access to website containing e-learning resources. All course related materials are uploaded in the learning management system which can be accessed by all students via internet at any point of time.

In addition, each undergraduate course should have at least 20% evaluation in the form of open book/ take home and 40% for higher degree students. Students are encouraged to utilize the various resources available and work at home which would enhance their learning.

2.3.10 Is there a provision for the services of counsellors / mentors/ advisors for each class or group of students for academic, personal and psycho-social guidance? If yes, give details of the process and the number of students who have benefitted.

At the beginning of each semester the HOD with his departmental colleagues interact with their students regarding the courses being offered and advise the students regarding them.

When the student is unable to meet minimum academic standards and his/her backlog becomes large, he/she comes under the purview of Academic Counselling Board (ACB). A Student Mentoring Committee is made for every semester. This consists of faculty and students who mentor students under the purview of Academic Counselling Board on a one-on-one basis.

Academic Counselling Cell (ACC) comprising of faculty members and students also works tirelessly throughout the year for counselling of students pertaining to academic and non academic needs. The number of students varies for every semester. Sample data for one semester is given in the Table below.

Number of students under ACB for the Semester II 2014-15

Campus	Pilani	Goa	Hyderabad	Dubai
No.	154	108	51	106

Professional Counsellor is available in every campus for personal student consultation pertaining to all psychological needs. Every students of BITS has a team of Wardens under the Chief Warden in Student Welfare Division to support and counsel them on their academic and non academic needs.

In addition we have started Manamali projects a Stanford university initiative, in all four campuses for monitoring and psycho-social guidance to help students with anxiety and stress. This project will help students to learn about their stress/anxiety and tools and techniques to control and overcome it, and, as a result, become more focused in academic and professional activities to become a happier individual. Based on the student survey conducted, the students were informed about the level of stress and were given opportunity to receive one of the programs. This project helps students to learn techniques to manage stress by their personal efforts.

2.3.11 Were any innovative teaching approaches/methods/practices adopted /put to use by the faculty during the last four years? If yes, did they improve learning? What were the methods used to evaluate the impact of such practices? What are the efforts made by the institution in giving the faculty due recognition for innovation in teaching?

Each faculty is given freedom to innovate in teaching with an aim to awaken the curiosity of the student and generate habits of rational thinking in him/her. The added role of a teacher is to help the student in comprehension of ideas and the creative use of knowledge along with the organization and correlation of facts learnt in the classroom.

The faculty members of the University develop content and deliver their lectures in an effective manner to enrich the knowledge of the student's community. They continuously do research to evolve with innovative teaching methodologies. Some of the innovative teaching methodologies adopted are:

- Use of the audio visual facilities
- Use of smart board : Use of smart board gives the benefit of traditional black board teaching with sufficient intermittent time for them to derive formulation, make notes and grasp the topic at their pace. In addition, this gives the benefit of a quick review of the previous class slides in the next class, which gives them a continued momentum in learning. This also helped them to review the whole course covered till then at least 4-5 times in a semester. This greatly enhanced the learning of students in the course.
- Use of Research articles from journals, You tube demonstrations, animations and lab demonstrations for flavour of latest advancements
- Use of special soft wares like Matlab, Scilab software for Numerical Analysis and other courses, MATHEMATICA software for geometrical interpretations of the solutions.
- Use of online submission and subsequent evaluation of the programming assignment through competitive coding platforms like hackerrank.com which helped the students get exposure to real world programming challenges and in turn helped them in their placement process
- Designing tutorial problems, assignments, lecture notes and other relevant materials through internet via learning management systems and that can be assessed by the students at any time.
- Introduction of flipped model of classroom facilitating active learning
- Offering MOOC based courses to cover large student populations
- Task based problem solving and peer oriented learning methodologies like group assignment, mini projects etc.
- Open book tests which can have questions of problem solving nature

Based on the entrepreneurial interest of the students, Innovative courses like New Venture Creation, Brand management etc. are being offered. Also, designs based tools like Auto CAD are offered, which are popular among students. Many of the large first year courses are offered in Multi section mode with number of instructors making it a unique model to follow. All the above measure/initiatives enhance and improved the learning outcomes.

Institute recognizes the excellence in teaching through the annual appraisal mechanism every year and promotions. In addition, it is planned to institute teaching excellence awards every year.

2.3.12 How does the university create a culture of instilling and nurturing creativity and scientific temper among the learners?

The following methods are followed to instill and nurture creativity and scientific temper among the learners.

- In many courses, students are encouraged to come up with innovative solutions to existing problems. That ensures that the work done has a practical meaning, and hence the solution could be deployed and/or commercialized after initial start.
- Exclusive project type courses in each department or other departments are offered for the students
- The students are encouraged to participate in symposiums/seminars organized by reputed institutions.

- Students are encouraged to participate in the seminars/ conferences/ workshops organized by the departments regularly.
- Students organize technical festivals which last for 3-4 days and show cases the technical projects, paper presentation, workshop on emerging technologies and several innovative quizzes, events and games etc. The organization of the event of this large magnitude helps in development of the interpersonal, team building, planning, crisis management, handling of participants with diverse background and event management skills of the students.
- University has setup a Centre for Innovation, Incubation and Entrepreneurship at all campuses. It encourages and foster this activity includes the necessity for students to think out-of–the-box and create projects and activities that cut across disciplines.
- Sandboxx is a multi-disciplinary platform to develop technologies in the domains of Internet of Things, Wearable Technologies and Consumer Electronics. This lab is for facilitating student ideas and implementation with easy access to equipment and tools such as sensors, microprocessors, power tools etc.
- Robotics Laboratory: Robotics Laboratory aims to provide all necessary facilities for the students to develop their understanding in upcoming areas of robotics. The basic role of this lab is to provide the experimental environment for industrial manipulators and the path planning strategies for mobile robots and also has facilities to understand structured courses such as, Mechanisms and Robotics, Study oriented projects, Lab oriented projects, and Dissertation and Thesis works. The labis well equipped with the elementary and advanced equipment such as, Scorbot-ER-4U, 4 DOF manipulator with teach pendent & software, multiple sets of Docile X robot, Omni wheel robot loaded with sonars, experimental sensor kits by NI, smart vision system, etc.
- Design contest: Centre for Innovation and Incubation conducts Idea Contests annually and invites applications from students for viable solution to emerging problems. Students regularly participate in design contest organized by other institutions
- Other than class room teaching BITS also has Practice School Program which instils problem solving and scientific temper among the students and they work on real life problems of the industry.

2.3.13 Does the university consider student projects mandatory in the learning programme? If yes, for how many programmes have they been (percentage of total) made mandatory?

∗**Number of projects executed within the university**

∗ **Names of external institutions associated with the university for student project work**

∗ **Role of faculty in facilitating such projects**

In First Degree, Students can register for up to five project type courses (3 units each) against their discipline elective or open elective as a part of the curriculum for each degree program. The projects are categorized as Study Projects, Lab Projects and Design projects. 100% of students from each discipline avail this opportunity and register for project type courses. The students are expected to identify a faculty supervisor for the project, who assigns a specific problem and guides and monitors the student throughout the semester to work on the problem and its logical conclusion.

The structure also contains a category of courses such as Practice School (PS)/Thesis (TS), which attempts a synthesis of earlier courses and gives a glimpse of the application of these courses. They carry higher weightage and are to be pursued when student can

ensure sufficient time and attention throughout the allotted period. In particular, the Practice School components are to be pursued exclusively full time throughout the allotted period. There is no provision for taking other courses along with a Practice School component courses.

Thesis can be done either on campus or in an off campus organization. Each student can register for thesis between 9-16 units in a semester. A student pursuing a 16 unit Thesis must pursue it exclusively full time throughout the allotted period and there is no provision for taking other courses along with it. A student pursuing a 9 unit Thesis may concurrently pursue at most 3 courses (totaling at most 9 units) and will not be allowed to pursue any other course/component. Students are encouraged to pursue their projects/off campus thesis in any research organization/ reputed institute/ industry with prior permission.

In case of Higher degree programmes, it is also mandated that at least 40% of evaluation components should include research-oriented activities like Literature Survey, Seminars/Presentations, Research Summaries, Design/Development of processes/products/artifacts Experimental or Quantitative Analysis of processes/products/phenomena and Design of Experiments.

In all these, active participation from the faculty is mandated. All the projects are guided and evaluated by the faculty members of the Institute. In case of Practice School, BITS faculty stationed at various outside centers monitor and evaluates the progress of the students.

For off campus thesis, it is mandatory to have a co-supervisor from BITS apart from the supervisor from the university or research organization, who will be responsible for the evaluation and assessment of the student performance.

S.No	Off campus thesis centers	S.No	Off campus thesis centers
1	CSIR-National Institute of Science, Technology and Development Studies, New Delhi	26	ABBG, Banglore
2	JP Morgan Reseach Center. Mumbai	27	University of Kansas , USA
3	Tata institute of Fundamental Sciences, Mumbai	28	MIT Media Lab India Institute , Mumbai
4	IIT Delhi, Delhi	29	Virginia Technology,USA
5	Department of Medicinal Chemistry, University of Kansas	30	Nanyang Technology University , Singapore
6	IIT Hyderabad	31	University of Alberta, Edmonton
7	University of Massachusetts, Boston, Massachusetts, United States of America	32	Technological University,Singapore
8	Tata institute of Fundamental Research for mathematics, Mumbai	33	Delhi University
9	ABB Global industries servies Ltd, Banglore	34	TIFR,Mumbai
10	Kyoto Unviersity, katura Nishikyo, Japan	35	Indian Institute of management
11	Telecom Paris Tech, Paris, France	36	Reddy lab, Hyderabad
12	Mathematical Institute LMU, Germany	37	International School of Engineering, Hyd
13	TIFR , Mumbai	38	Hoston, Universtiy US
14	Microsoft research India ,Banglore	39	Microsoft, Banglore
15	Indian Statastical Institute , Calcutta	40	New York, University, Canada
16	The University of western ontario,	41	NUS Singapore

17	Indian Institute of Science, Banglore (IISC)	42	Telecom Paris Tech France
18	IIT Bombay	43	TIFR Mumbai
19	IIT Madras	44	TIFR, Mumbai
20	Pilani Campus , Rajasthan	45	Microsoft research India ,Banglore
21	University of Winconsin, USA	46	TCS, TRDDC,Puna
22	Mathematical Institute, Oxford University Chennai	47	MIT USA
23	Indian Institute of Sciences Bangalore.	48	ICTS,TIFR, Bangalore
24	International Institute of information Technology, Gachibowli, Hyderabad.	49	DRDL Kanchanbhag, Hyd
25	School of computer engineering, Nanyang	50	IIM,Ahmedabad

Some of the off campus thesis centers and PS organizations (operates in more than 170 stations) are listed below:

Practice School operated List	**Practice School operated List**
[24]7 iLabs , Bangalore	Bundl Technologies Private Limited (Swiggy) , Bangalore
Adaequre , Hyderabad	Bundl Technologies Private Limited (Swiggy) , Gurgaon
Aditya Birla Chemicals(Thailand)Ltd- Sulphites , Thailand	Bundl Technologies Private Limited (Swiggy) , Hyderabad
Aditya Birla Science & Technology Company Ltd. , Mumbai	Bundl Technologies Private Limited (Swiggy) , Mumbai
Akira Consultancy Private Limited , Bangalore	CA Technologies , Hyderabad
Alliance Infotech , Noida	Cadence Design Systems India Pvt Ltd. , Bangalore
Altair Engineering India Pvt. Ltd. , Bangalore	Carwale (Automotive Exchange Pvt. Ltd.) , Mumbai
Amazon Development Center , Bangalore	Central Building Research Institute , Roorkee
Amazon Development Center , Chennai	Central Electronics Engineering Research Institute , Chennai
Amazon Development Center , Delhi	Central Electronics Engineering Research Institute , Pilani
Amazon Development Center , Hyderabad	Central Leather Research Institute (CLRI) , Chennai
Analog Devices , Bangalore	Central Road Research Institute , New Delhi
Anov IP , New Delhi	Century Rayon , Mumbai
ARM Embedded Technologies Private Limited , Bangalore	Centre For Development Of Imaging Technology , Trivandrum
ARM Embedded Technologies Private Limited , Noida	Cignex Datamatix Technology , Noida
Aurum Equity Partners , Gurgaon	Cisco Systems (India) Pvt. Ltd. , Bangalore
Atul Ltd. , Valsad	Credit Suisse , Mumbai
Avaya India Private Limited , Bangalore	DBOI (Deutsche Bank) , Mumbai
Avaya India Private Limited , Pune	CSR Ltd. , Noida
Bain Capability Center Pvt. Ltd , Gurgaon	Credit Suisse , Pune
Beckman Coulter (formerly Real Metrix India P Ltd) , Bangalore	CSR , Bangalore

belong.co , Bangalore	Development Consultants Pvt. Ltd. (DCPL) , Mumbai
BHARAT DYNAMICS LTD , Hyderabad	Divgi Warner Pvt Ltd , Pune
Bharat Forge Ltd , Pune	Dorsch Consult (India) Pvt. Ltd., , Mumbai
Blue Jeans Network India Pvt. Ltd. , Bangalore	DreamWorks Animation , Bangalore
Bosch , Bangalore	Dupont Knowledge Center , Hyderabad
Broadcom India Pvt Ltd , Bangalore	Eaton Technologies , Pune
EBay India Development Centre , Bangalore	J.P. Morgan Services India Pvt. Ltd , Mumbai
EMC , Bangalore	JDA Software Solutions , Bangalore
Ericsson Global India Pvt. Ltd. , Bangalore	JDA Software Solutions , Hyderabad
Ernst & Young L.L.P. , Bangalore	Khosla Labs , Bangalore
Ernst & Young Pvt Ltd. , Chennai	KPMG , Bangalore
Exotel Techcom Pvt. Ltd. , Bangalore	KPMG , Gurgaon
Exponentia data , Mumbai	KPMG , Mumbai
Faiveley Transport Rail Technologies India Ltd (FTRTIL) , Hosur	Lama Capital Management , Gurgaon
Fiber Link , Bangalore	Lantiq India Pvt. Ltd. , Bangalore
Fiorano Software Technologies Pvt. Ltd. , Bangalore	Leap Consulting , Trivandrum
Flipkart Internet Services Pvt. Ltd , Bangalore	LEXINNOVA , Gurgaon
Garg Webtech Pvt. Ltd. , Bangalore	Mahle Filters India Ltd , Gurgaon
Genpact , Bangalore	Mahle Filters India Ltd , Pune
Geometric Limited , Mumbai	Media Iq Digital , Bangalore
Global Logic , Bangalore	Mercedes Benz , Bangalore
Grey Orange Robotics Pvt. Ltd. , New Delhi	Moldtek India , Hyderabad
Grasim Industries Ltd. , Nagda	Mordor Intelligence , Hyderabad
Grasim Industries Ltd. , Kumarapatnam	Morningstar , Mumbai
Goldman Sachs India Pvt. Ltd. , Bangalore	MSCI Barra, Quantitative Equity Research , Mumbai
Halliburton Technology Center , Pune	My smart price , Hyderabad
Here Maps - A Nokia Company , Mumbai	Myntra.com , Bangalore
Hike , Gurgaon	National Aerospace Laboratories , Bangalore
HILTI India Pvt. Ltd. , New Delhi	National Centre for Biological Sciences , Bangalore
Hindustan Unilever Research Centre , Bangalore	National Chemical Laboratory , Pune
Hourglass Research , Mumbai	National Council of Applied Economic Research , New Delhi
Housing.com (Locon Solutions Private Limited) , Mumbai	National Entrepreneurship Network , Bangalore
IDeaS - SAS , Pune	National Institute of Science and Tech. Dev. Studies (NISTADS) , New Delhi
IFB Industries , Goa	National Instruments Systems (India) Pvt. Ltd. , Bangalore
IMI Mobile , Hyderabad	NetApp , Bangalore
Indian Institute of Chemical Technology , Hyderabad	NextGen PMS Pvt. Ltd , Bangalore
Indian Institute of Petroleum , Dehradun	Nomura Services India Pvt , Mumbai
Infinera , Bangalore	Nutanix Technologies India Pvt. Ltd. ,

	Bangalore
Inside View , Hyderabad	Nvidia Graphics , Bangalore
Intel India Technology Pvt. Ltd. ,	Nvidia Graphics , Pune
J.P. Morgan Chase , Bangalore	Opera Solutions , Noida
J.P. Morgan Chase , Mumbai	Oracle India Pvt Ltd. , Bangalore
Oracle India Pvt Ltd. , Hyderabad	Tata Autocomp Systems Ltd. , Pune
Practo Technologies Pvt. Ltd. , Bangalore	Tata Motors , Dharwad
Qubole , Bangalore	Tata Motors , Jamshedpur
Reckitt Benckiser , Gurgaon	Tata Motors , Lucknow
Reflexis Systems India Pvt Ltd Pune	Tata Motors , Pune
Rovi Corporation , Bangalore	Tata Technologies , Pune
Sabre Holdings(Formely Sabre Travels) , Bangalore	Techture Structures Pvt Ltd. , Nagpur
SAP Labs , Bangalore	Tega Industries , Kolkata
Sattva Media & Consulting Pvt Ltd , Bangalore	Tensilica , Pune
Sellerworx Online Services Limited , Bangalore	TESCO Hindustan Service Centre , Bangalore
Shell Technology Center , Bangalore	Texas Instruments (I) Pvt. Ltd. , Bangalore
Silicon Image R&D Pvt Ltd , Hyderabad	Thermax India , Pune
Skoda Auto India Pvt. Ltd. , Aurangabad	Tiny Owl Technology Pvt. Ltd. , Mumbai
Skoda Auto India Pvt. Ltd. , Gurgaon	Tonbo Imaging Pvt Ltd. , Bangalore
Skyline Consulting Engrs Pvt. Ltd. , Nagpur	Value Edge India , New Delhi
Sokrati Technologies Pvt. Ltd. , Pune	VMS (Vakil Mehta Seth) Consultants Private Limited , Mumbai
Spicer India Ltd. , Pune	VMware Software India Pvt. Ltd. , Bangalore
Spicer India Ltd. , Satara	Walmart Global Technology Services , Bangalore
SRF Ltd. , Gurgaon	Worley Parsons India , Hyderabad
ST Microelectronics(I) Pvt.Ltd. , Greater Noida	Worley Parsons India , Mumbai
Stayzilla - Inasra Technologies , Chennai	Zinnov Management Consulting Pvt. Ltd., Bangalore , Bangalore
Steelwedge Software Inc. , Hyderabad	Zoomcar India Pvt. Ltd. , Bangalore
Stellar Software Technologies Pvt Ltd , Hyderabad	ZS Associates , Gurgaon
Stellarix Consultancy Services Pvt Ltd , Jaipur	ZS Associates , Pune
Symantec Software Solutions Pvt. Ltd. , Bangalore	Zynga Game Network India Pvt. Ltd. , Bangalore
Tangoe India Softek Pvt Ltd , Bangalore	
TAS Analytic Services , Bangalore	

2.3.14 Does the university have a well-qualified pool of human resource to meet the requirements of the curriculum? If there is a shortfall, how is it supplemented?

Yes, the university has a well-qualified pool of human resources to meet the requirements of the curriculum. Further, visiting faculty (on short-term or full-time contract) as well as guest faculty have been used for specialized topics. In addition, to further enrich the programme, it is supplemented by inviting experts from well-known reputed institutions/ industries.

The tele-presence facility enables inter-connectivity of all four campuses of BITS and promotes remote learning participatory coursework, collaborative research and remote recruitment. By bridging the geographical distance this platform facilitates utilization of teaching expertise and resources across campuses.

2.3.15 How are the faculty enabled to prepare computer-aided teaching/ learning materials? What are the facilities available in the university for such efforts?

Every faculty is given a personal laptop/ desktop and other computing equipment at the time of the joining the Institute. The institute provides latest software to its faculty to help in creating learning material. All the classrooms are equipped with projectors and A/V systems to enable the faculty in delivering and testing these learning materials. The institute also has specialized studio rooms to video record their lecture sessions with necessary IT support.

MOODLE (Modular Object Oriented Dynamic Learning Environment) which is a popular open source LMS (Learning Management System) is used by our faculty. It allows the instructor of each course to share course content (lecture slides, reading material) and create discussions through forums with the students. It also allows the instructor to create a variety of graded assessments for the students. A workshop was conducted on PeopleSoft - Moodle integration that will ensure that all users of ERP will also be users on MOODLE.

2.3.16 Does the university have a mechanism for the evaluation of teachers by the students / alumni? If yes, how is the evaluation feedback used to improve the quality of the teaching-learning process?

Student Feedback: Yes. In a given semester, feedback is collected twice a semester as given below:

- Mid-Semester Qualitative Feedback collection during 8th week using Moodle (CMS)
- Feedback Collection via Questionnaire during the 13th – 14th week (Ten day window) of a semester.
- The Class Committees comprise of students and faculty who obtain regular feedback from students, which is discussed and incorporated into the curriculum by the respective Departments.

In addition, there is a 24 x 7 online student feedback collection process and the feedback is shared with the concerned faculty & HoD. The Feedback and Monitoring Cell within the Instruction Division regularly interacts with several student members of the class committee of each department to get a qualitative feedback on the faculty and the courses offered by them.

The information is shared with faculty to enable them to improve the teaching and learning process. In case of any assistance, they can also take the assistance of the faculty team from Teaching Learning Centre.

Alumni Feedback: BITS has extensive network of alumni who actively participate in the feedback process through BITSAA global meets, embryo lectures, student placement process and regular visits to campuses etc. The feedback received is shared with the departments for necessary improvements.

2.4 Teacher Quality

2.4.1 How does the university plan and manage its human resources to meet the changing requirements of the curriculum?

The innovative educational process at BITS aims at strengthening academic degree programs more purposeful and to improve the employability of its graduates. The role and responsibility of the faculty is central to quality teaching, research and operation of a continuous evaluation system. All the classes have to be held as planned and the entire syllabus has to be completed within the stipulated time. Examinations have to be conducted as per schedule and results have to be declared within specified deadlines. Since BITS emphasizes on Integrated education, many courses are taught by inter disciplinary teams.

The Coordination and monitoring of courses, and appointment of faculty needs meticulous planning and rigorous implementation. The institute puts in conscious effort to recruit motivated & research-focused faculty with outstanding academic background and potential to excel in research & teaching through six step robust and transparent recruitment process. The process involves initial screening of applications followed by a cross-discipline review of the short-listing done by various departments in a given campus. This is then followed by a cross-campus review by the university-level short-listing committee. Shortlisted candidates then go through a rigorous interview by the selection committee comprising of external experts along with BITS leadership.

Depending upon the changes in the curriculum, the university manages its human resources through different ways as mentioned below:

i. University has established a new center for teaching and learning named as Teaching Learning center (TLC) with extension to each campus, which helps the faculty to improve the quality in teaching. It also provides help to prepare the course content or deliverables for the new courses and new academic programmes.

ii. Exposure to Universities abroad and immersion in Industries within India: A faculty member at the level of assistant professor and above, after completion of three years of service, becomes eligible for exposure to Universities abroad / immersion for a defined period in an Industry in his /her area of interest, within the country through immersion program, wherein he/she could spend up to two months (during summer vacation period). Besides personal development these two policies also promote international / national collaboration on interdisciplinary cutting edge areas with different Academic institutes and industries. BITS Pilani provides the financial support to all faculty, identified through separate processes. It helps faculty member to gain and understand, how classroom or, laboratory based instructions are organized or, imparted in different foreign universities of repute. It also helps in curriculum redesigning, and developing case studies.

Through these programmes it is expected that faculty members will experience / gain:

- first-hand exposure to current/latest advances in research
- an understanding of lab resources required to initiate research or to use (or to program) equipment
- an understanding on how classroom- or lab-based instruction is organized or imparted

- an understanding of research methodology, cross-disciplinary collaboration, or collaboration across institutions /industries
- first-hand exposure to processes undertaken by companies for design, manufacturing, marketing, logistics, etc.,
- further, gain an understanding of how theory learnt in classrooms is translated into practice on the job floor.

iii. BITS Pilani encourages Faculty members to participate in seminars/ advance training/schools or workshops in India and abroad. They are also granted extra ordinary leaves/special casual leaves to attend seminars and conferences. There is also a provision of sabbatical (study leave) to facilitate the teachers to update themselves in teaching and research, which can be availed for 2 years. Salary benefits are also protected during the sabbatical. Further, the faculty members are encouraged to avail fellowships in India or abroad.

(iv) University organizes lectures by experts on different topics. It also appoints visiting faculty members for short periods (from 6 month to 2 years) for handling courses in different departments.

(v) Subject Workshops are periodically conducted for enhancing the teaching and learning process for several courses offered for Work Integrated Learning Programmes. These workshops are facilitated by relevant eminent experts drawn from the industry and academia, wherein faculty from all campuses and off-campus locations participate in discussions regarding various aspects including the course content and its relevance to the changing needs of the industry, planning and organization of the course, approaches to effective blended-learning, enabling experiential learning through projects, assignments, case studies and laboratories, and planning the evaluation components to achieve the course objectives and learning outcomes.

(vi) In addition, in order to maintain good standards in teaching, all new faculty are inducted into an Intensive Teaching Workshop that is conducted every semester and runs for the whole semester where senior faculty help and guide new faculty in lecture preparation, presentation, communication as well personality training. This is also supported by Languages Laboratory housed in Humanities and Social Sciences Department where facilities are available for overall improvement of communication in terms of listening and speaking. These measures orient them towards the BITS model of teaching and reinforce best practices.

(vii) In addition, experts talks are arranged with help of our Alumni network over skype, telepresence from across the globe for the benefit of students and faculty by a separate body called “Embryo”.

(viii) Professional Development allowance: BITS Pilani provides reimbursable Professional Allowance for its Faculty members. An amount of up to Rs 1.0 lakh with maximum carry forward amount to next year of up to Rs 2.0 lakhs, is provided at Assistant Professor or above level. Further, Rs.25,000/- per year with maximum carry forward of Rs 50,000/- ,is extended for Lecturers and Visiting faculty. This allowance may be utilized to support travel to national/international conference of repute, buying books & journals, membership of professional bodies and other academic purposes.

(ix) Higher degree and first degree students are given financial assistance from University to assist faculty members in developing laboratory courses.

BITS Pilani, has a conducive atmosphere to discuss various issues related to teaching, research and administration on various platforms. Various committees have been formed to facilitate the teaching and research potential of the faculty members. For example, Departmental research committee (DRC) facilitates PhD programme of the department and student faculty council (SFC) ensures a good interaction between teachers and students.

What sets BITS apart from its peers is its unique practice school programme. Practice school I (PS 1), a programme of 2 months duration, offered during the summer term after the students have completed two years of course work. The programme is run with the supervision of faculty members, which also provides an opportunity for updating knowledge on latest developments in relevant fields and technological advances.

Practice School provides an exposure for teachers and gives them a unique opportunity to update their class room teaching. Practice School-II, of five and a half months duration, is operated round the year, July to December and January to June. This is done principally to make available a continuous stream of well-prepared students to work on developmental projects in industry. Faculty located at our off-campus centres mentor these students and also involve in their professional development activities. These steps facilitate the faculty to meet the changing requirements of the course curriculum.

2.4.2 Furnish details of the faculty:

Data as on 30th June, 2015.

Highest Qualification	**Professors**		**Associate Prof**		**Assistant Prof**		**Lect**		**Total**
	M	F	M	F	M	F	M	F	
Permanent Teachers									
D.Sc/D. Litt									
Ph.D.	67	9	104	35	213	78	1	1	508
M. Phil.					2		1	5	8
PG	5		5	1	28	4	78	50	171
Temporary Teachers									
Ph. D									
M. Phil.									
PG									
Part Time Teachers*									
Ph.D.					93	29			122
M. Phil.					9	3			12
PG					212	45			257

Guest Faculty: They are suitably qualified Professionals specifically drawn from the industry and with a passion for academics, to participate part-time in instruction, during the evenings or weekends. Along with suitable honorarium, such an engagement also provides them with an opportunity to interact with our regular faculty on and off-campus, and to participate in activities related to curriculum design and content development.

2.4.3 Does the university encourage diversity in its faculty recruitment? Provide the following details (department / school-wise).

Department	% of faculty from the same university				% of faculty from other universities within the state				% of faculty from other universities outside the state				% of faculty from other countries			
*Campus	P	G	H	D	P	G	H	D	P	G	H	D	P	G	H	D
Bio	25	6.25	9	25	5	6.25	0	0	70	75	91	75	0	12.5	0	0
Chemical	67	21.43	10	0	0	0	0	0	16	57.14	35	50	17	21.43	55	50
Chemistry	0	0	13.34	0	11.11	0	20	0	88.89	94	53.32	100	0	6	13.34	0.00
Civil	29.4	-	13.33	-	0	-	6.67	-	70.6		53.33	0	0	-	26.67	-
CSIS	45.83	9.52	6.25	73	4.17	4.76	25	0	37.5	76.2	68.75	27	12.5	9.52	0	0
EcoFin	50	0	11.1		0	0	11.1		50	90	66.7	0	0	10	11.1	
EEE and I	36.11	33	13	15.38	0	0	13	0	63.89	67	65	76.92	0	0	9	7.7
HSS	26.31	12.5	0	50	10.52	18.75	50	0	42.1	50	50	50	21.07	18.75		0
Maths	6.25	0	0	0	12.5	12.5	20	0	75	81.25	80	100	6.25	6.25		0
Management	28				7				65				0			
Mechanical	54	28.86	36.37	22.2				0	46	64	50	66.6	0	7.14	13.63	11.15
Pharmacy	18.9		10		12.1		10		69		80		0			
Physics	0	0	0	0	14	0	15	0	72	87	77.5	100	14	13	7.5	0

Campus* P=Pilani; G= Goa; H = Hyderabad; D = Dubai.
(Highest qualification has been considered.)

2.4.4 How does the university ensure that qualified faculty are appointed for new programmes / emerging areas of study (Bio-technology, Bio-informatics, Material Science, Nanotechnology, Comparative Media Studies, Diaspora Studies, Forensic Computing, Educational Leadership, etc.)? How many faculty members were appointed to teach new programmes during the last four years?

BITS Pilani is focused to recruit quality faculty members across all discipline through its robust and transparent recruitment process. As the institute also gives a lot of weightage on interdisciplinary research on cutting edge areas, faculty members are probed minutely during the rigorous interview process. Departments ensure that majority of the newly recruited faculty members through our stringent recruitment process are aligned to the institute's future goal of offering new programs. In the last five years 301 faculty members joined the Institute. Several of new faculty joined are experts/have experience in above mentioned new and emerging areas of study.

BITS Pilani has put in place a high end tele-presence facility across its campuses with full-fledged classrooms linked to the facility. Using this, courses are conducted by an expert faculty in one campus and students are enrolled in multiple campuses. Also, courses are taught on a collaborative basis by faculty across campuses where each faculty brings in his/her expertise to bear on the course. Several such courses are being delivered over the Telepresence system in each semester by drawing faculty expertise across multiple campuses.

BITS has been partnered with the MIT & Harvard's massive open online course (MOOC) platform edX to offer MOOCs to its own on-campus and off-campus students as well as students outside BITS. Now offering two courses using edX platform in all 4 campuses (Computer Programming; Microprocessor & Interfacing), our own customized and enhanced version of the Open edXTM based MOOC / SPOC Platform, 'Any-Learn' is now ready to create, host and offer courses, depending on our convenience and schedule. This is already connected to the National Knowledge Network. This ensures optimal utilization of faculty resources across the campuses.

2.4.5 How many Emeritus / Adjunct Faculty / Visiting Professors are on the rolls of the university?

Emeritus: 1, Adjunct Faculty: 1, Visiting Professors: 2

2.4.6 What policies/systems are in place to academically recharge and rejuvenate teachers (e.g. providing research grants, study leave, nomination to national/international conferences/ seminars, in-service training, organizing national/international conferences, etc.)?

BITS has the following systems in place to recharge and rejuvenate teachers:

Seed Grant: The Seed Grant scheme of Birla Institute of Technology and Science, Pilani 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. An interim review of the policy will be performed.

Objectives:

- To aid a faculty to start a research program that has the potential to sustain by attracting funds from external agencies.
- To test a novel idea and to generate preliminary results before submitting proposals to external agencies.
- To promote inter-faculty collaboration in emerging areas.
- To promote generation of IPR and product/process development.
- To attract and retain talent.

1. Research Initiation Grant:

The Research Initiation Fund is designed to attract faculty to BITS to perform quality research. This policy together with the Seed Grant Scheme provides a substantial package to begin a scholarly research program at BITS.

Objectives:

- To enable research and related activities for a newly recruited faculty who has significant potential to attract external funding.
- To attract high quality faculty

Grants are awarded soon after joining BITS for up to Rs. 2 Lakhs and the amount should be spent within 24 months of appointment. (Based on requirement and progress an additional amount of Rs. 2 Lakhs may be considered after an year. This is to initiate research activities in BITS).

2. Additional Competitive Research Grant for New Faculty

This scheme is over and above the research initiation grant and the seed grant.

Objectives:

- This scheme will provide up to Rs. 10 Lakhs to a new faculty to initiate research by procuring equipment, etc., to establish facility necessary for his/her research.
- This additional research grant will be awarded to a new faculty on a competitive basis and based on a well-documented research plan in the form of a proposal.
- The scheme will support on an average one-third of new faculty in each campus.

3. Chair Professorship

Chair Professorship helps recognize and reward excellence in teaching and 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.

4. Centres for Research Excellence

Several projects under the theme area of Waste, Water and Energy are funded by the institute to focus on and promote research in interdisciplinary and emerging areas. BITS Pilani launched virtual Centre for Research Excellence in "Waste, Water, and Energy Management in May, 2014. Under this programme, 5 projects have been supported with committed funding of Rs. 2.34 Cr. to undertake development of solutions to real problems in managing waste and water. These are inter-disciplinary R&D projects requiring cross-discipline and cross-campus collaboration amongst faculty.

5. OPERA Award (Outstanding Potential for Excellence in Research and Academics)

The OPERA awards are established (75 awards over 3 years) 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. While the funds to establish these 75 awards will come from BITS, in the future we will establish more such awards from donations sought from alumni & well-wishers. The award consists of Rs.3.00 Lakhs per year for a 5 year period of which up to 1.8 lakhs per year can be taken as an additional incentive to salary while the remaining amount is to be used for academic activities defined in guidelines.

6. Reimbursable Professional Allowance for faculty

To cover expenses related to one's profession, including books, supplies, travel, etc. Allowance shall be Rs. 1 Lakh per year for Assistant Professor or above and Rs 25000/- per year for Lecturers and Visiting Faculty. Also for Lecturers a pool of Rs. 75,000 is made available for every 5 Lecturers (or equivalently once in a Lecturer's tenure of approx. 5 years) specifically for travel to present paper at a Tier 1 or 2 conference in India or abroad. Unspent funds may be carried forward to next year. The university also provides Special Casual Leave to attend and present papers in International Conferences held in India or abroad. The university provides leaves and funding for National Conferences as well.

7. University Immersion Scheme

The university has the provision of sending faculty members for Industry-Immersion and Abroad-University-Immersion programs to enhance their knowledge in various emerging fields, for which full funding is provided. The university provides accommodation to the delegates and bears some portion of the expenditure for organizing conferences.

8. Sabbatical Policy

The university also has a policy for sabbatical leave for the faculty. Under this scheme, a faculty member is eligible for one-year Sabbatical Leave after the completion of six years of continuous service at Assistant Professor Level or higher with satisfactory record of performance in the most recent annual performance review. The faculty receives 50% of the salary during the Sabbatical Leave, while the balance will be paid in 4 equal installments over the next two years together with interest calculated @ 6% per annum.

2.4.7 How many faculty received awards / recognitions for excellence in teaching at the state, national and international level during the last four years?

The details of faculty awards in teaching are furnished below

S.No.	Year	Faculty/ Student Name (s)	Recognition/Award	Awarding Body
1	2014	Amit Kumar Gupta	S.Venkateswaran Faculty Excellence Award	BITSAA
2	2011	Arya Kumar	Faculty Excellence Award	BITSAA
3	2012	D. M. Kulkarni	Prof. S. Venkateswaran Faculty Excellence Award 2012	BITSAA
4	2010	N.N. Sharma	Kris Ramachandran Faculty Excellence Award	BITSAA
5	2014	R N Saha	"Pharmacy Professional of the Year 2013" Award	Indian Association of Pharmaceutical Scientists and Technologists
6	2013	V.S. Rao	Eminent Educationist Award	Indus Foundation during their Indo global education summit – 2013

2.4.8 How many faculty underwent staff development programmes are during the last four years (add any other programme if necessary)?

Academic Staff Development Programs	Number of Faculty				
Campus wise	***Pilani***	***Goa***	***Hyd***	***Dubai***	***Total***
Refresher courses	11	08	04	0	23
HRD programs	02	06	01	0	09
Orientation programmes	01	11	32	06	50
Staff training conducted by the university	96	51	38	06	191
Staff training conducted by other institutions	33	36	16	07	92

2.4.9 What percentage of the faculty have

***been invited as resource persons in Workshops / Seminars /Conferences organized by external professional agencies?**

4-5% of faculty members have been engaged with industries as resource faculty in conducting workshops and executive education programs, and have participated in faculty industry immersion program. 10% of faculty have been invited as resource persons for workshops/seminars and international or national conferences.

***participated in external Workshops / Seminars / Conferences recognized by national / international professional bodies?**

Almost all faculty member of the University participated in Workshops / Seminars / Conferences least once in the last five years. The percentage may vary from department to department.

***presented papers in Workshops / Seminars / Conferences conducted or recognized by professional agencies?**

Almost every faculty member of the Institute attended Workshops / Seminars / Conferences and presented papers in the last five years. The percentage may vary from department to department.

***teaching experience in other universities/national institutions and other institutions and international experience in teaching?**

All positions recruited at Assistant Professors and above in BITS, are required to have Ph.D. in a relevant discipline from an institution of high repute and potential for excellence in teaching and research. Most of the faculty appointed by the institute have prior experience in either teaching or research within the country or abroad.

***industrial engagement?**

Yes, BITS Pilani has a University-Industry linkage Cell known as Practice School (PS). Practice School serves as a platform that facilitates and promotes partnership and intellectual exchange between the academia and industry. Faculty members are involved in monitoring and mentoring Practice School students in the industry location. More than 50% of the faculty members participate in various industry engagement activities through PSI, PSII, and WILP. BITS also encourages industry immersion for its faculty members. In the last 2 years 20 faculty members have participated in this programme.

2.4.10 How often does the university organize academic development programmes (e.g. curriculum development, teaching-learning methods, examination reforms, content / knowledge management, etc.) for its faculty aimed at enriching the teaching-learning process?

All newly recruited faculty members undergo Intensive Teaching Workshop (ITW) at BITS. ITW is organized by senior faculty members in each campus and focuses on enabling new faculty members to improve their teaching skills. In addition, subject specific teaching workshops are conducted periodically for specific departments.

In 2010-11, BITS Pilani took up a complete review and redesign of the curriculum. As part of this exercise several workshops were conducted on benchmarking parameters and curriculum models to enable faculty to evaluate the programs offered and design a new curriculum.

In total about 150 faculty members across our campuses participated in these workshops. Currently an external review of the curriculum is under process. BITS intends to go through another set of curriculum design workshops for its faculty in early 2016.

Over the last year five workshops were conducted to familiarize about 250 faculty members with MOOC platforms, flipped classes, and blended learning approaches. In addition, several faculty members have been enabled to participate in workshops on flipped / blended classrooms, online platforms for teaching and learning, and mobile access conducted by partners of BITS or other agencies.

Two subject-specific curriculum development workshops have been conducted in 2015 for faculty members offering Work Integrated Learning Programs in Engineering Technology, Software Engineering, and Software Systems.

BITS Pilani has set up a Teaching Learning Centre (TLC). It is involved in improving the overall teaching - learning environment at BITS Pilani. The Centre carries out research on innovative teaching pedagogy, collection of good practices of teaching learning from all over the world and disseminate among the faculty, conduct intensive teaching workshops and invite experts from India and abroad to deliver lectures on relevant topics

2.4.11 Does the university have a mechanism to encourage

- **Mobility of faculty between universities for teaching**

  BITS Pilani has a provision of sabbatical (study leave) for duration up to two years. Faculty members have been availing this facility and getting opportunity to take teaching and research work in other institutions. The university also encourages teachers to apply for international exchange programme (e.g. INSA, DAAD, Fulbright, etc.). In addition, a faculty may avail "extraordinary leave" (EOL) without pay for up to 2 years at a time after three years' service at BITS for research and teaching assignments outside BITS.

- **Faculty exchange programmes with national and International bodies**

  The university also encourages teachers to apply for international exchange programmes (e.g. INSA international bilateral programme, German academic exchange service DAAD, Fulbright fellowship etc. BITS Pilani gives full support to the faculty as per rules (e.g. Leave with salary). Further, the Faculty of BITS Pilani University have the opportunity to participate in Teaching Mobility programme under International exchange as per MOUs with various Universities abroad. Faculty members are encouraged to apply for scholarships for teaching visits from the Centre for International Relations.

2.5 Evaluation Process and Reforms

2.5.1 How does the university ensure that all the stakeholders are aware of the evaluation processes that are in place?

An orientation program is conducted for students in the beginning of the year to appraise them of all academic aspects including evaluation details. Bulletin of the University which is updated and published in the beginning of each academic year and given to each newly admitted student clearly describes the evaluation process of the courses conducted in a continuous and internal manner by the faculty who teaches these courses. Also the Timetable made for all courses by the Instruction Division in the beginning of the semester is provided to each student before they register for a set of courses clearly mentioning about the general guidelines for evaluation, for example: the components of evaluation for each course that will be selected from tests, quizzes, home assignments, lab-work, viva-voce, project reports, term papers, seminars, comprehensive examination, etc. For lab courses the specific components with the related weightage for a particular course will be announced in the class. The dates/time for tests and comprehensive examination are already printed in this Timetable and the students are aware of this beforehand at the time of registration for any course before the classwork starts.

Apart from these, the students are provided with the course handouts by the course In-charge which clearly specify again the date and time for scheduled tests and comprehensive examination apart from all other components pertinent to that specific course like quizzes, home assignments, lab work, project report, viva-voce, seminars etc. Dates for conducting tutorial test and / or open book test / assignments / quiz are announced by the instructor-in-charge of the respective courses. Additionally, an announcement of every evaluation component is also made publicly through notices displayed in the notice boards and Learning Management Systems one week prior to the conduct of the exam. The details of seating arrangements, syllabus along with clear make-up policies are spelt out here.

2.5.2 What are the important examination reforms initiated by the university and to what extent have they been implemented in the university departments and affiliated colleges? Cite a few examples which have positively impacted the examination management system.

Right from its inception, BITS has been vigorously pursuing reforms in examinations as suggested by various education commissions. As a result, the following processes have become standard practices to be followed by all faculty in all courses over the past four decades. During the period under review, they have been further strengthened. BITS believes that learning and evaluation go hand in hand. So whenever new pedagogies are adopted, it necessitates in new methods of evaluation, which have been developed.

i. Continuous evaluation throughout the semester, including a final comprehensive examination.
ii. Total internal evaluation for all courses, except PH D thesis.

iii. Various types of evaluation suiting the needs of individual courses, viz., written tests, written quiz, online quiz, lab examination, seminar presentation, group discussion, viva. In the case of project type courses, submission of a final report before deadline and presentation/viva; in the case of industry internship (called Practice school in BITS) different kinds of evaluation components viz., diary writing, seminar, report, quiz, etc.

iv. Every course must have at least 10 % open book evaluation. During the period under review, this percentage has increased in number of courses.

v. Number of courses where online examination components are there has increased during the period under review. These are conducted through Moodle software.

vi. Online lab exams are also used to test and groom the coding problem solving skills of students.

vii. A beginning has been made to offer some courses in the flipped mode, where course material in video form is available to students and class room interaction is used for more involved discussion of the topics. The materials in digital form for these courses contain embedded quizzes so that the student can self evaluate himself.

viii. BITS has been following relative grading wherein the teacher will award letter grades based on the performance of the class. There were 5 letter grades (A, B ,C, D ,E). Based on feedback from stakeholders, the division of grading has been made finer with 8 levels (A, A-, B, B-,C,C-, D , E) during the period under review.

2.5.3 What is the average time taken by the university for declaration of examination results? In case of delay, what measures have been taken to address them? Indicate the mode / media adopted by the university for the publication of examination results, e.g. website, SMS, email, etc.).

The final result of a given semester is normally declared within three weeks from the completion of the comprehensive examination after completing all the checks and balances. Printed grade sheets are sent to students.

The marked answer books of the tests / assignments are normally distributed in the classroom within ten days after the examination on two consecutive turns, beyond which the same may be collected from Instructor's chamber within one week. In case of comprehensive examination, the answer books are distributed / shown to the students within four days at a pre-announced venue and time before finalization of the grades. Request for recheck of the answers must be made immediately upon receipt of the answer books.

2.5.4 How does the university ensure transparency in the evaluation process? What are the rigorous features introduced by the university to ensure confidentiality?

The marked answer books are normally distributed in the classroom within ten days after the examination on two consecutive turns, beyond which the same may be collected from Instructor's chamber within one week. In the case of comprehensive

examination the answer books are distributed/shown to the students at a pre-announced venue and time before finalization of the grades. Request for recheck of the answers must be made immediately upon receipt of the answer books.

At the time of or before the distribution of marked answer books, performance vis-a-vis the expected correct answers are discussed. The highest, lowest, and average marks are also announced simultaneously.

The question papers are set by the teachers teaching the course, and these are printed by the teachers in a secured place equipped with printing facilities for question papers located in each campus. No access is given to any other persons not associated with the examinations and enough precautions are taken to maintain confidentiality. Printed question papers are collected and preserved by the teachers in protected places and then used in the examination. The examination answer books are collected by the course In-charge (teacher) or submitted directly to the course In-charge who examines these answer books (along with other teachers associated with the teaching and the setting of the question papers for the same course).To ensure the quality of question papers and the accuracy of assessment of student answer scripts, the following procedures are involved:

- After completion of a particular evaluation component students get to see the marking scheme and solutions for that component displayed on the notice board. A copy of the same is also submitted by the instructor-in-charge (I/C) of the course to the Instruction Division at the end of the semester along with the question papers for all the evaluation components.
- Every instructor discusses the answers and the break-up of marks with the students so that the students are aware of what was expected of them.
- Instructors strive to ensure uniformity in marking. This is adhered to, especially in the case of multi-section courses (involving a team of instructors), through marking of a given question by the same instructor in all the scripts of the students registered in that course.
- In the spirit of continuous internal assessment, answer scripts of all the components are evaluated and returned to the students for their keeping within a week of holding the evaluation component. The students are also informed about the class average, highest and lowest marks so that they can gauge their relative performance.
- Upon distribution of the marked answer scripts to the students, if any student wants to get a particular answer rechecked, the same is attended immediately. Due care is also taken to ensure that a student does not get a chance to tamper with the answer script while requesting for a recheck.
- To facilitate efficient evaluation of answer scripts and to provide accurate and timely feedback to students of Work Integrated Learning Programs, BITS Pilani has implemented a Digital Evaluation System wherein the answer scripts are scanned digitally and made available to the faculty for online evaluation. Students can view their evaluated answer scripts online.
- Scrutiny: Students are allowed to apply for scrutiny for the results of any course, if they are not satisfied with the results mentioned in the grade sheet, which is

looked again by the Course In-charge critically to address the grievances mentioned in the scrutiny forms. If there is any error detected, that is corrected after scrutiny, and if there is any change in the grade for the course after scrutiny, the grade is submitted again to the examination committee who verify the facts before passing the new grade in place of the old grade after scrutiny. And, if there is any change of grade after scrutiny, the student is given a "Revised" grade sheet.

2.5.5 Does the university have an integrated examination platform for the following processes?

- **Pre-examination processes – Time table generation, OMR, student list generation, invigilators, squads, attendance sheet, online payment gateway**
- **Examination process – Examination material management, logistics, etc.**
- **Post-examination process – Attendance capture, OMR-based exam result, auto processing, generic result processing, certification, etc.**

The Instruction Division of the institute finalizes the examination schedule and faculty and infrastructure resources for the smooth conduct of examinations. All facilities are optimally utilized according to a flexible time table generated centrally.

The time table is made and distributed to the students in the beginning of each semester before the registration for the courses by the students. They use this time table to register their courses based on their eligibility, class timings, tests and comprehensive examination dates/time printed in this time table. Student lists for the courses are generated by the ARC Division immediately after the registration for courses are completed by the students.

Examinations are conducted by the Instruction Division of the campuses with the help of the respective Course In-charges who are supported by the University by supplying answer books and providing question paper printing facility, seating arrangements and invigilators for examination halls Date/time of examination for every course is mentioned in the Timetable made and published in the start of each semester, and these dates and timings are followed for examination without any exception.

As a result all examinations are conducted smoothly and in time. Attendance is taken in each examination hall for each course during the examination and the numbers are matched with the number of answer books collected in that examination hall at the end of the examination, before handing over the answer books directly to the course In-charge who will be examining them. All examinations are strictly monitored by the Instruction Division for start in time, proper sitting arrangement and invigilation duty in every examination hall. The final marks (grand total) are obtained by adding all components of marks of the said course, and are submitted to the Academic Registration and Counselling Division (ARC Division) where they are uploaded in the ERP system for the registered students of a particular course, and a histogram is generated from these final marks. Based on the histogram, grading is done by the Course In-charge (along with other instructors, if any, involved in that course) and the grades are uploaded against the awarded marks for the students and a hard copy of the report is generated thereafter.

This hard copy of the report (for every course) is presented by the Dean, ARC Division to the examination sub-committee of the campus and finally to the examination committee of the University which takes a serious look into each report containing highest, lowest, average marks for that course and the mean grade point value (MGPV) and accordingly decides to pass it or suggests some changes to the Course In-charge.

After the results are passed, grade sheets are generated for every student for their registered courses of that semester and handed over to the respective student. Even after this, students are allowed to apply for scrutiny for the results of any course, if they are not satisfied with the results mentioned in the grade sheet, which are again critically scrutinized by the Course In-charge critically to address the grievances mentioned in the scrutiny forms. If there is any error detected, it is corrected after scrutiny, and if there is any change in the grade for the course after scrutiny is submitted again to the examination committee, who verify the facts before passing the new grade in place of old grade after scrutiny. And, if there is any change of grade after scrutiny, the student is given a "Revised" grade sheet. When a student completes all his/her courses for graduation, the eligibility for graduation for the student is verified and then the transcript is printed for each graduating student.

Finally the certificate is printed for the award of the degree to the student which is signed by the Registrar, Vice-Chancellor, Chancellor and the concerned campus Director. Also, the list of graduating students is then placed before the Senate of the University for its approval, and then it is placed before the Board of Governors' meeting for its final approval. After obtaining this approval the students are awarded the degree during the convocation ceremony.

Students who are not having sufficient exposure to higher degree level courses are required to do courses, at least six courses (not less than 24 units) over two semesters before taking Ph.D. qualifying examination. Even some students may be recommended additional need based courses during his research work.

2.5.6 Has the university introduced any reforms in its Ph.D. evaluation process?

The entire Ph.D. program of the institute has been strengthened as part of Mission 2012 initiative and various reforms have been introduced. Departmental Research Committees have been constituted under Mission 2012. The Departmental research committee (DRC) functioning in each department, facilitates the Ph.D. programme of the Institute along with the Academic Research Division, and takes care of processes from admission to final thesis submission of a Ph.D. candidate.

The Ph.D. Monitoring and Evaluative processes are regularly reviewed and periodically revised by the Research Board of the Institute. Hence Process up-gradation for Quality enhancement is a continuing feature of BITS Research agenda.

Ph.D. qualifying examination (Ph.D. QE): Each Ph.D. student is mandated to pass the Ph.D. qualifying examination before he can be formally admitted to any Ph.D. programme.

- Ph.D. QE is conducted based on two research subareas. One of these must be in the sub-discipline in which he/she proposes to undertake research.

- The Qualifying Examination tests the student's knowledge, grasp of fundamentals and his/her ability to use them in unknown situations.
- Ph.D. QE normally consists of written and oral tests.

Semester work

Each student registers in (i) Teaching Practice-1/Practice Lecture Series-1 and (ii) Ph.D.. Seminar course, followed by (i) Research Methodology-1 and (ii) Ph.D.. Seminar, in the second semester. After the research proposal is approved, from the following semester onwards student additionally registers for Ph.D. thesis courses till thesis submission.

Ph.D. Research Proposal:

Once a Ph.D. student clears the required qualifying examination, he/she submits two copies of a research proposal along with a summary sheet in the prescribed format to the Departmental Research Committee (DRC). DRC gets it reviewed by Doctoral Advisory Committee (DAC) members and arranges for an oral presentation. Based upon their recommendation, approval of (i) supervisor (and co-supervisor), (ii) the research topic together with the detailed proposal and its summary, (iii) the research plan, and (iv) the place of research work, as per requirement is granted.

Ph. D thesis evaluation

On completion of research, the Ph.D. student submits two copies of draft thesis to DAC members through DRC for its evaluation. DAC members review and give comments to the candidate for improving the contents. DRC also arranges a pre-submission seminar where supervisor, co-supervisor, DAC member and other faculty will be invited. After successful completion of the seminar, the student can prepare his final thesis. The candidate will check the thesis for plagiarism and will submit it for evaluation.

The thesis will be examined by three examiners appointed by the Vice-Chancellor. The supervisor(s),shall be one of the examiners. The examiners will give separate reports, each report concluding with a final and unequivocal verdict on the thesis in terms of only one of the following three alternatives:

(i) The thesis is approved for the viva-voce examination, or
(ii) The thesis requires revision and resubmission, or
(iii) The thesis is rejected.

When a thesis has been approved unanimously by the examiners, a viva-voce on the thesis will be conducted at the respective campus in the presence of the (i) Supervisor (ii)at least one external examiner, and (iii) Co-supervisor(s), if any.

2.5.7 Has the university created any provision for including the name of the college in the degree certificate?

Not Applicable

2.5.8 What is the mechanism for redressal of grievances with reference to examinations?

Examination papers (answer books) are examined by the examiner or a group of examiners (all internal evaluation), marks are entered in the marks list of the specific courses and then the answer books are distributed (given back) to the students within 10 days from the date of examinations either in the class rooms or after announcing the date/time/venue of distribution. Students after receiving the answer books go through them to ensure the proper evaluation of all questions, award of marks/part marks for all questions. If they are not satisfied, they immediately give them back for recheck of the question / answer book before leaving the distribution hall. The teacher (examiner) collects back all the papers requested for recheck, re-evaluates them accordingly, tabulates the changes of marks, if any, and then redistributes the rechecked papers to the concerned students. Thus, the examination and evaluation system is very transparent. Also the marks for every test and any other components are either displayed in the notice boards and/or uploaded in the site specific for the course that is available to all registered students pertaining to that course. Also, mid-semester grades and pre-comprehensive total marks are either displayed or uploaded in the specific website before the final examinations are conducted. Students verify their marks, and error or dispute, if any, is brought to the notice of the Course In-charge who takes care of the issue instantly after verifying/cross checking the matter. Apart from these, grade sheets are handed over to the respective student after the final results are passed by the examination committee of the University.

After this, students are allowed to apply for scrutiny of the results of any course, if they are not satisfied with the results mentioned in the grade sheet. The scrutiny applications are sent to the Course In-charges who look again at the results critically to address the grievances mentioned in the scrutiny forms. If there is any error detected, that is corrected after scrutiny, and if there is any change in the grade for the course after scrutiny, it is submitted again to the examination committee, who verify the facts before passing the new grade in place of the old grade after scrutiny. And, if there is any change of grade after scrutiny, the student is given a "Revised" grade sheet.

2.5.9 What efforts have been made by the university to streamline the operations at the Office of the Controller of Examinations? Mention any significant efforts which have improved the process and functioning of the examination division/section.

In place of a Controller of Examinations, , examinations in BITS Pilani are conducted by the Instruction Division (ID), while Academic Registration and Counselling (ARC) Division takes care of accepting and processing the final results. In both cases, the final results are processed with the help of the respective Course –in-Charges who are supported by the University by supplying answer books and by providing question paper printing, seating arrangements and invigilators for examination halls. A special software has been developed for test scheduling, seating arrangements and invigilation duty. Additionally, the results of all courses are handled by the Academic Registration and Counselling (ARC) Division that is fully automated with ERP system.

The final marks (grand total) of a course are uploaded by the Course in-Charge for the registered students of that particular course, and the histogram is automatically generated from the final marks. Based on the histogram, grading is done by the Course in-Charge

(along with other instructors, if any, involved in that course) who sets the ranges for each grade calculates the grades which are reflected against the awarded marks for the students and. A hard copy of the report is automatically generated thereafter by the computer system. Efforts to automate the whole process through ERP are ongoing.

This hard copy of the report (for every course) is presented by the Dean, ARC Division, to the examination sub-committee of the campus and finally to the examination committee of the university (comprising of Registrar, Vice-Chancellor, Directors and some senior faculty members) who take a serious look into each report containing highest, lowest and average marks for that course and the mean grade point value (MGPV) and accordingly decide to pass it or make suggestions for moderation to the Course in-Charge. After the results are passed, grade sheets are generated for every student for their registered courses of that semester and handed over to the respective student.

Even after this, students are allowed to apply for scrutiny of the results of any course, if they are not satisfied with the results mentioned in the grade sheet, which is looked at again by the Course in-Charge critically in order to address the grievances mentioned in the scrutiny forms. If there is any error detected, it is corrected after scrutiny, and if there is any change in the grade for the course after scrutiny, it is submitted again to the examination committee which verifies the facts before passing the new grade in place of the old grade after scrutiny. And, if there is any change of grade after scrutiny, the student is given a "Revised" grade sheet.

When a student completes all courses for graduation, the eligibility for graduation for the student is verified and then the transcript is printed for each graduating student. Finally, the certificate printed from the ERP system at the University level for the award of degree to the student; thesis signed by the Registrar, Vice-Chancellor, Chancellor and the concerned campus Director. Also, the list for graduating students is then placed before the Senate of the University for its approval, and is then sent to the Board of Governors for its final approval. After obtaining this approval the students are awarded the degree.

2.6 Student Performance and Learning Outcomes

2.6.1 Has the university articulated its Graduate Attributes? If so, how does it facilitate and monitor its implementation and outcome?

BITS has articulated its Graduate Attributes as follows:

A graduate of BITS will be:

- An innovative problem solver, with sound conceptual knowledge, strong analytical skills, and a variety of soft skills as well as
- A well rounded individual with leadership potential.

BITS ensures that the curriculum emphasizes both breadth as well depth. BITS also provides sufficient options / flexibilities for students in the form of subjects chosen for study, multiple modes of teaching and learning, problem solving experience with extensive practical / hands-on, real-life projects, and structured industry internships.

Equally importantly, BITS has strived hard to enable an open environment for its students to engage in academic, co-curricular, and extra-curricular activities with readily available but non-intrusive faculty support. All of this is implemented and monitored by faculty on-campus and off-campus as well as a strong and systemic collaboration with industry and the outside world.

2.6.2 Does the university have clearly stated learning outcomes for its academic programmes? If yes, give details on how the students and staff are made aware of these?

Yes, the University has clearly stated learning outcomes for its academic programmes. Learning outcomes and details of all academic programmes are published in the University bulletin every academic year.

In addition, the learning objectives / outcomes of a program are translated into learning objectives / outcomes for each individual course in a program. These are listed in a hand out, which acts an academic contract between the student and the teacher. The Instruction Division displays the course hand out of each course before the starting of classes. This hand out is available to each student at the beginning of a course.

2.6.3 How are the university's teaching, learning and assessment strategies structured to facilitate the achievement of the intended learning outcomes?

The learning outcomes are incorporated in the curriculum of each discipline. The various structural flexibilities provide not only scope for multi-point entries but also enable the system to accommodate many legitimate educational and operational needs of students. To achieve intended learning outcomes, and to improve the quality of teaching, ITW (Intensive Teaching Workshop) is organized for newly joined faculty members. Also, some expert talks are arranged for all the faculty members.

The Teaching Learning Centre (TLC) of the Institute has been formed for the professional development of BITS faculty as well as non-teaching academic staff associated with teaching activities (laboratory technicians, demonstrators).The mandate for the TLC is to improve the overall teaching learning practices at BITS. The TLC also aims at engaging research in various aspects of teaching and learning. Further, it aims to adopt the best practices in teaching and learning from various educational institutions across the globe through direct or indirect modes. These processes help the teaching staff to enhance their instruction capabilities and also provide a platform for them to assess their communication skills in an effective manner. This also reflects on their teaching quality which, in turn, indirectly reflects on student and peer feedback obtained during the annual appraisal of their performance.

There is a regular feedback system from the students through a four tier feedback system (mentioned in 1.4.1) as well as a system of peer feedback. The strategies adopted by the Institute for feedback are multi-pronged. They include Online Feedback, Direct Feedback,

Hard Copy Feedback, and a Student Faculty Council, which collect the learning outcomes for various courses of respective programs.

These inputs are shared with Instructors to correct any deficiencies. There is ample scope for mid-course correction by implementing such strategies. In terms of improving learning, the Institute library provides the best support to the students. It has a huge collection of latest text books, reference books, Journals, Proceedings and Theses.

Periodically, talks by experts are organized for students in campus classrooms as well as through webinars to make them aware of recent trends in their fields. There is collaboration with different foreign universities to introduce web based courses for enhancing the learning of students. There is also a chamber consultation hour for each course, announced in the course handout, during which students can engage with instructors.

For evaluating and strengthening the learning outcomes, assessment strategies are fully structured through the following steps:

i. A course hand out for each course is displayed to the students before the commencement of classes for that semester. It includes all the details regarding the course plan, course objectives, learning outcomes, text book details and assessment details.
ii. It is the Institute's policy to keep an OPEN BOOK component: at least 20% of the assessment for First Degree and 40% for the Higher Degree .
iii. Continuous evaluation components designed and conducted by the Instructor of each course enables a customized assessment strategy for courses. The assessment process not only involves a mid-semester examination and a comprehensive examination but it also includes evenly spread, and continuous assessment through tutorials, quizzes, projects, seminars and assignments.

2.6.4 How does the university collect and analyse data on student learning outcomes and use it to overcome the barriers to learning?

Student learning outcomes data collection mechanisms are present in the form of

i. 24×7 feedback system through web,
ii. SFC (Student Faculty Council) for each department which gives the feedback for the courses and the instructors and also provides suggestions of student & faculty members to the Instruction Division (ID)
iii. Course feedback at the end of semester, and
iv. Peer feedback

This data is analyzed at the Department level, Campus level and University level. The level of achievement of students' learning outcomes is measured through several periodic evaluation components like quizzes, assignments, projects and written examinations and the student performance is analyzed to identify areas for improvement.

The learning outcome of every course is calculated based on the data collected of the grades for the courses offered in every semester. To understand the outcome of the evaluation a document named Grand Analysis is prepared for respective courses and the % of total students awarded with A, A-, B…E grades is calculated. This is matched against

the earlier performance of students in the course and against the performance of the students in other courses.

The University has an Examination Committee and a Campus level Examination Subcommittee which look at the student learning outcomes. The committees study the grading done for courses and give recommendations to the course Instructor-in Charges.

The academically weak students are usually referred to the Academic Counseling Board of the Institute. Students under the purview of Academic Counselling Board (ACB) interact with an assigned faculty mentor from time to time and get guidance for further improvement. Also, the Academic Counselling Cell (ACC) assigns faculty and senior students for academic mentoring.

Each campus has a Professional Counselor for students in need of psychological counseling problems to foster their well-being on campus and to help students actualize both personal and career goals. The sessions are individual and confidential. The counselor interacts with students discussing all issues which affect their academic performance and helps students in resolving their psychological issues.

2.6.5 What are the new technologies deployed by the university in enhancing student learning and evaluation and how does it seek to meet fresh/ future challenges?

Keeping in mind the future challenges in the field of student learning and evaluation, the University has undertaken new technology initiatives as given below:

i. Introduced web-based courses in the Massive Open Online Courseware (MOOC) platform to increase its technology footprint in education which improves the learning experience of students . It has also enabled BITS Pilani to venture into the online offering of courses.

ii. Some courses (e.g. Engineering Graphics, Computer Aided Design, etc.) are offered on the online platform for better learning.

iii. For a few courses, flipped classes with a MOOC type approach have been initiated. Here, students listen to the recorded lectures and discuss the problems at the tutorial sessions offered during the class hours.

iv. One Tele-Presence (TP) classroom is established in each campus of the University for organizing telepresence lectures. 12 to 15 courses are offered every semester by faculty members of different departments and different campuses.

v. It is enhancing student learning, as students of one campus may learn and consult faculty members from another campus. It also enhances the learning experience through peer discussion and feedback.

vi. All the classrooms are equipped with state -of –the- art technology. Wireless LCD projectors with Wi-fi connection are introduced in almost all the classrooms. This allows the use of all multimedia course material.

vii. State-of-the-art technology infrastructure is deployed to deliver high-quality synchronous and asynchronous instruction for Work Integrated Learning Programmes (WILP).

viii. Instructor-led live lectures are delivered through web-based desktop video conferencing, and the recorded lectures are also made available on-demand through a Moodle-based Learning Management System, which provides many more facilities for asynchronous interaction among students and faculty, as well as for providing access to several e-learning resources and for conducting online assessments.

ix. Turnitin software is used for checking plagiarism of project reports and assignments for all project type courses, Dissertations/Theses. This ensures originality and quality control.

x. The Learning Management System (LMS) developed by BITS is available to all faculty and students to provide a platform for notifications, discussion forums, online quizzes, online projects and assignments. These tools also provide the students a platform to discuss course topics and clarify their doubts with their instructors.

xi. The recently established Teaching Learning Centre continuously explores newer ways similar to those listed above to help overcome future challenges.

3 CRITERION III: RESEARCH, CONSULTANCY AND EXTENSION

3.1 Promotion of Research

3.1.1 Does the university have a Research Committee to monitor and address issues related to research? If yes, what is its composition? Mention a few recommendations which have been implemented and their impact.

Research Board; A subcommittee of the senate of the Institute, deals with matters related with Ph.D. programme run by the Institute and its decisions are reported to the Senate. The mandate of the Research Board is to deliberate and evolve policies concerning all issues related to research undertaken by faculty and students as part of PhD programmes and as sponsored research and consulting.

The Research Board is composed of:

1. Chairman- Vice Chancellor (ex-officio)
2. Vice- Chairman- Dean ARD (ex-officio)
3. Secretary- Registrar (ex-officio)
4. Directors of all four campuses (ex-officio),
5. Deputy Directors (ex-officio)
6. Dean, Sponsored Research and Consulting (ex-officio),
7. Chief Research & Development Officer (ex officio)
8. Six faculty members (Assistant Professors or above) to be nominated by Senate for a term of 2 years (as a guideline, there should be:
   a. at least one faculty from each campus,
   b. at least one HoD of an Engg. department,
   c. at least one HoD of a Science or Pharmacy department,
   d. at least one HoD of Department of Humanities& Social Sciences or Economics & Finance or Management),

1. One or more experts may be invited by chairman on a case-to-case basis,

Some recommendations made by Research board in past two years and their impact.

SL No	Recommendations	Impact
1.	To replace the requirement of existing Teaching Practice-II (BITS C792T) by Research Methodology-II (BITS E662) courses for on-campus students. It is also proposed to replace Practice Lecture Series-II (BITS E794 T) by Research Methodology-II courses for Ph D aspirants, from Academic Year 2014-15. The Ph D eligibility requirement shall be modified accordingly.	Streamlined PD programme according to UGC guideline
2.	All PhD supervisors, while issuing a certificate at the time of thesis submission will ensure that the thesis is free from plagiarism. An anti- plagiarism software may be used for this purpose. The primary responsibility of any copyright violations in the thesis would remain with the student as the author of the thesis.	Helped the PhD students and supervisor to maintain highest ethical practice in research
3	A student admitted as Full Time scholars is allowed to take transfer to Part time scheme provided-	Many students who have completed substantial

	- the student satisfies the basic eligibility criteria for admission to 'Part Time scheme'. The one year of work experience requirement will not be applicable in case of transfer. - the student has completed 20 units of Ph.D. thesis course. - the Ph.D. supervisor, co-supervisor and respective DRC are in agreement for such transfer. The DRC may also recommend the transfer of a student from Part-Time to Full Time category, provided research positions are available. Approval for such transfers will be granted by Dean ARD.	work towards Ph.D. have been placed in good organization.
4	The duration for submitting final Ph D thesis (including all extensions and semester withdrawals) be limited to 14 semesters to be counted from the semester following the passing of Ph D qualifying examination. If a candidate fails to submit his/her final thesis during this period, he/she will be discontinued from the programme. The female candidates who have availed maternity leave during this period may be given one extra semester for thesis submission.	Imposition of limit on duration of PhD programme has increased the seriousness and quality of research.
5	Institute scholarship and stipend to the Ph D student admitted after 1st Aug 2011 or later will be limited for first five years from the date of admission.	More PhD students were supported from Institute funding
6	The total number of Part Time student be limited to 40% of the existing full time Ph D students in a Department	Allowed intake of more full time PhD students in each department

The Research Board in its earlier capacity was also involved in decisions pertaining to Ph.D. topic approvals, change of supervisor, etc., which are now handled by the Doctoral Counselling Committee.

3.1.2 What is the policy of the university to promote research in its affiliated / constituent colleges?

BITS Pilani has no affiliated colleges

3.1.3 What are the proactive mechanisms adopted by the university to facilitate the smooth implementation of research schemes/ projects?

For smooth and fast operations, BITS Pilani has created two separate divisons

1) The Academic Research (ARD) for handing of Ph.D, Higher degree Disserations and First Degree thesis.

The Academic Research Division, coordinates the research components of the higher degree programs (ME and Ph. D) offered by all disciplines. BITS Pilani provides regular students and working professionals an excellent opportunity to pursue their higher studies under the M.E, M. Pharm and Ph.D. degree programs. BITS offers attractive scholarships/partial tuition fee waiver schemes for deserving students. Research opportunity is available to all students enrolled in Higher Degree programs under several identified thrust areas across disciplines institute-wide.

For smooth implementation of various operational process under university Dean of ARD, every campus has an Associate Dean for fast decision and implementation.

2) Sponsored Research Consultancy Divisions (SRCD) for handling the sponsored research and industrial consultancy activities across campuses. The mandate of SRCD are -
   - To help and motivate the faculty members in obtaining research grant from national and international agencies by submitting research projects.
   - To promote collaborative research activities with industries.
   - To encourage participation of faculty in national and international conferences and forums and of repute;
   - Publication of research papers, monographs, etc.
   - To support new and innovative areas of relevant research leading to product or process development.
   - To promote establishment of industry sponsored research centers.
   - To identify areas and create an environment for consultancy services to be taken up by different academic groups and individual faculty
   - Implementation of internal funding schemes like Seed Grant, Additional Competitive Grant, Research Initiation Grant etc.

The SRCD nucleus members provide a broad range of services and resources, including assistance in finding funding opportunities, providing examples of successful proposals, grant writing and coordination for the development of large research proposals, assisting faculty in making cross-campus connections, communicating with officials at funding agencies, coordinating internal and seed grant awards. The Institute also provide assistance in terms of:

∗ advancing funds for sanctioned projects

At times, there is a time gap between sanction of a project by a Government funding agency and actual release of initial or subsequent installments of approved funds.

In such cases, the Institute considers favorably advance of funds to facilitate continuation of project work against the due funds from the Project approving agency.

∗providing seed money:

BITS Pilani provides seed money for research to each new joining faculty – Assistant Professor and above through the following schemes.

SEED Grant Scheme: With a view to transform BITS into a research-led university, it was decided to provide funds for research to such faculty members so that they begin to (a) guide/support PhD students, (b) publish their work in leading journals, and (c) seek additional research funding from external agencies.

In the first lot, 10 projects were approved in 2011, at an outlay of Rs 108.95 lakhs. These have since been completed and have resulted into 64 publications and also externally funded 12 projects at a sanctioned amount of Rs 265.58 lakhs. These projects also supported 13 PhD scholars.

In the second lot, 10 projects were approved in 2013, at an outlay of Rs 100.8 lakhs. The final review of these projects is due in next quarter. These projects have already resulted in 16 publications and approval of 07 projects at sanctioned amount of Rs 219 lakhs. These projects are also supporting 13 PhD scholars.

Research Initiation Grant: It is designed solely to attract faculty to BITS to perform quality research. This grant is extended to all new faculty who makes an application and limited up to Rs 2 Lakh.

Additional Competitive Grant: This scheme is over and above (a) the usual Rs. 2 Lakh given to eligible new faculty as "Research Initiation Grant", and (b) the Seed grant made available on a competitive basis to existing eligible faculty to initiate research. Under this scheme, 21 new Faculty members have been provided with a grant of Rs 174.9 lakhs during the year of 2014-15.

International Travel Grant: A total of 189 Assistant Professors and above have received travel grant from the institute (61 from Pilani 92 from Goa and 36 from Hyderabad).

∗Simplification of procedures related to sanctions / purchases to be made by the investigators;

BITS has a dedicated sponsored research and consultancy division (SRCD) headed by a university-wide Dean and Campus wise Associate Deans to facilitate smooth initiation and execution of the projects. SRCD office coordinates the approvals, advances and reimbursements in distinct formats together with Purchase & stores, Finance offices and the Head of the Institution. While the purchase office maintains the records of purchase through stores, finance keeps track of budgets at individual heads of the sanctioned projects.

The purchase process is well optimized and the policies of the funding agencies as applicable are strictly followed. Rate contracts are facilitated to enable swift procurements and deliveries. The purchase department facilitates vendors, negotiations, compliance and awards of contracts through ERP. Institute also facilitates by way of identified shippers to reduce costs of shipments, make contracts with bonded warehouses for duty exemption etc.

∗autonomy to the principal investigator/coordinator for utilizing overhead charges:

The faculty engaged in sponsored R&D projects have total autonomy upto 60% of overhead so generated will be added to the "Professional Development Fund (PDF)" of the PI (and co-PI and investigators) to be used by them for their "professional development".

- If an investigator decides to spend up to 2 months during summer vacation to work on the project, then he/she may, with the approval of the campus Director, use part of his/her PDF to pay himself/herself an equivalent of up to one month salary (in a manner similar to the payment made to a faculty member when he/she is required to stay back during the summer vacation). The campus Director(s) would normally welcome this and accord approval. Professional Development includes expenses towards attending a conference or workshop, etc., procurement of equipment, supplies, books, etc., subscription to membership of professional societies, etc.
- 20% will be added to the "department development fund (DDF)" of the concerned departments for them to develop their education and research programmes or empower their faculty, and
- The balance 20% will be added to the "campus development fund (CDF)" of the concerned campuses for them to expand or improve its programmes, processes or infrastructure or empower their faculty.

∗ Timely release of grants

Once an approval/sanction letter is received, the SRCD office maintains a database of such approvals/ sanctions. SRCD office communicates and follows up with agency and provides feedback to the PIs, enables submission of bonds specific to requirements of agencies. We also have a Chief R&D officer who helps us coordinate with various agencies outside BITS.

Once the amount for R&D support is included in the Annual Budget, the Dean / Associate Deans (SRCD) have full authority to use / release funds for the stated projects / activities. The funds received by the Institute against sponsored projects are also immediately made available to the Principal Investigator for Project activities.

∗ T**imely auditing**

Periodical auditing - internal and external is systemized and is done in a timely fashion

∗ Submission of utilization certificate to the funding authorities :

The UCs , on receipt of details from PIs, are prepared on priority, as this helps the Institute to get funds from funded agencies and avoid delay in completion of projects on this this count.

3.1.4 How is interdisciplinary research promoted?

∗ between/among different departments /schools of the university and ∗collaboration with national/international institutes / industries.

Most real life problems are interdisciplinary. BITS Pilani has therefore taken specific measures to encourage faculty members to take up such projects with its own funding as also from industry and governmental funding agencies.

BITS Pilani has, identified "Interdisciplinary research" as one of the major imperative for mission- 2015. Institute promotes problem based research involving faculty from different disciplines and from across campuses.

The mission team has identified few areas such as Water Waste and Energy, Remote sensing, disaster management, agriculture and cold chain, soft computing, biomedical instrumentation, tissue engineering, nano medicine, health science, disaster management and drug delivery etc, where BITS has core strength in terms of expertize and infrastructure. Conducted two IDR workshop for faculty members to provide thrust on inter disciplinary research. Two workshops on IDR were conducted in November 2014 and November 2015. In both the workshops faculty members from all the four campuses were invited in one of the campus and experts were invited from industries, government agencies, and international research centers, to discuss real life problems which requires inter disciplinary team to solve problems.

Faculty members were made to work in a team to work on real life problems, think of problem solution and work on research proposals. They are encouraged to submit fine-tuned proposals to national and international funding agencies.

BITS Pilani launched Centre for Research Excellence in "Water, Waste, and Energy Management in May, 2014. Under this programme, 5 projects have been supported with committed funding of Rs. 2.34 Cr. to undertake development of solutions to real life problems in managing waste, water and energy. These are inter-disciplinary R&D projects requiring cross-discipline and cross-campus collaboration amongst faculty. While these projects are slated to be completed in summer of 2017, our Faculty already received approval for additional funding of Rs. 1.22 Cr. from external sources for 3 projects.

BITS has established a centre called "Doctoral Training Centre" in Computational Biology. It is an interdisciplinary initiative for tackling important challenges in Biosciences by combining expertise in Biological Sciences, Computer Science, Physics and Mathematics.

The institute also has an excellent online collaboration tool trough Telepresence facility to enable interaction among experts and faculty of various campuses. Institute also enables support for national and international seminars and conferences to be organized on campus and allow various faculties to interact at same platform with diverse disciplines.

BITS has signed MoUs with various Institutes, universities of national and international repute and Industries. The Sponsored Research and Consulting Division (SRCD) through its offices facilitate such MoUs and facilitate research activities such as exchange of faculty and scholars, joint workshops and conferences, lectures by eminent scientists etc. The new division International Program and Collaboration Division (IPCD) through its offices enables international activities such as MoUs, invite international funding agencies to enable awareness on campus. The new scheme of Industry immersion and university immersion within India and abroad for collaboration has been instituted wherein faculty visits universities and industry to initiate collaboration invite in.
Support to invite industry and academia experts for initiating interdisciplinary research is also provided to enable seminar series, invited lectures by eminent scientists. BITS faculty members of different campuses have sponsored projects in interdisciplinary areas in collaboration with other institutes/universities of India and abroad.

The IDR culture is also reflected in the student research projects. BITS system allows a student to carry out FD thesis or HD dissertation under the joint supervision of faculty belonging to different disciplines or different institutes.

3.1.5 Give details of workshops/ training programmes/ sensitization programmes conducted by the university to promote a research culture on campus.

The University has taken several initiatives in promoting research culture in all of its four campuses. Several research related workshops were conducted in past four years.

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. Industry day was organized at Hyderabad campus by inviting Senior Administrator of Industries and having close interaction with faculty members of all four campuses. They worked on various ways to establish and enhance collaboration with industries and promote research culture on real life problems.

IDR workshop: Two workshops were conducted on IDR during 2014 and 2015 inviting faculty members from all four campuses and experts from industries, research institutes both national and international. They discussed on real life problems and formulated research problems by forming team for submission to internal funding or external funding.

Engineers Day: Institute organized Engineers day and arranged lectures by experts and discussed on research opportunities.

Science Day Celebration: Institute celebrates science day every year in February where faculty members and students participate. Faculty members delivered lectures on recent development in various areas of sciences to motivate students and faculty in research.

Technical Fest: Students in all four campuses organized technical festivals like APOJEE (Pilani), Techno fest and Enguinity (Dubai) Quark(Goa) ATMOS (Hyderabad), where students presented various technical ideas in live demonstration. Some of the ideas are further pursued in research and development. Students also participated in various national and international technical competition with their experimental models like robots, drones all terrain vehicles, formula cars and bring laurels to institute by winning such competition.

Workshop/training programme: Various departments of all four campuses regularly organize seminars, symposiums workshops, conferences, by inviting national and international experts to motivate students and faculty towards research. Institute provides financial support to faculty members and students to participate in national and international conferences seminars etc. The details of the workshop specifically devoted to promote research culture are given in Annexure 3.

3.1.6 How does the university facilitate researchers of eminence to visit the campus as adjunct professors? What is the impact of such efforts on the research activities of the university?

BITS Pilani promotes the academic interaction of faculty members with the eminent persons by arranging invited talks and symposium. Individual departments identify and invite eminent persons, distinguished alumni to guide faculty and students on research. During their visit, they interact with faculty members and students, conduct special lectures related to the recent development in the field of their expertise. Some of the experts are also offered position of visiting faculty to supplement class room teaching. Some time departments organize workshops on research methodologies and advanced areas of their disciplines. These interactions improve the research environments in the respective departments and help the faculty members to establish fruitful collaborations.

3.1.7 What percentage of the total budget is earmarked for research? Give details of heads of expenditure, financial allocation and actual utilization.

17 % of the total budget was allocated for research in FY 2014-15. Actual utilization under various head of expenditure is given below:

Account Head	Budget Allocation (Rs) in Lakhs	Actual Utilization (Rs) in Lakhs *
Operating Expenses: (Include scholarship, fellowship, Lab Consumables & Chemicals, Research Course Development, Journal & Magazines, Travel etc)	6463.75	6096.03
Capital Expenses		
Lab / Institute Utilities	1230.11	1123.74
50% Share towards research equipment sanctioned by government agencies	517.73	129.85
Seed Grants	99.66	18.51
CORE - WWE / IDR	104.00	37.90
Research Initiation Grants	480.00	4.53
Total	8895.26	7410.59

(*This data is for three Indian campuses)

3.1.8 In its budget, does the university earmark funds for promoting research in its affiliated colleges? If yes, provide details.

Not Applicable.

3.1.9 Does the university encourage research by awarding Post Doctoral Fellowships/Research Associate ships? If yes, provide details like number of students registered, funding by the university and other sources.

BITS encourages Post-Doctoral fellows to join various departments as research scientist/ research associates having their own grants. Currently, seven such fellows are working in Biological sciences and Chemistry departments. Six of them are getting stipend from DST and one from CSIR.

3.1.10 What percentage of faculty have utilized the sabbatical leave for pursuit of higher research in premier institutions within the country and abroad? How does the university monitor the output of these scholars?

1.6% of the total faculty availed sabbatical leave. Each faculty member has to submit a report of work done during sabbatical leave and give a presentation in his/her respective department.

3.1.11 Provide details of national and international conferences organized by the university highlighting the names of eminent scientists/scholars who participated in these events.

S No	Title	Date	Organized by
Pilani Campus			
1	DAE Symposium on Nuclear Physics	20-24 December, 2010	Physics Department
2	Indo-Taiwan Workshop on Nano, Microelectronics & Embedded Systems	24-25 September, 2010	EEE Department
3	National Conference on Green and Sustainable Chemistry	19-21 February, 2010	Chemistry Department
4	Empowering Women in Developing Countries through Better Healthcare and Nutrition	22-24 April, 2010	Women Studies and Societal Development UNIT
5	Short Filmmaking Workshop	5 -8 February, 2010	Humanities and Social Sciences Department
6	Workshop on Intellectual Property Rights	25 April, 2010	Entrepreneurship Development and IPR Unit
7	Workshop on Science, Innovation and Discovery	10 May, 2010	BITS Pilani and CEERI, Pilani
8	Workshop on Issues in Patenting	9 September, 2010	IPR Unit
9	Short Filmmaking Workshop	11- 17t August, 2010	Humanities and Social Sciences Department
10	Workshop on IBM RSE and RSA tools	27-30 April, 2011	CSIS Department
11	Symposium on Advances in Chemistry	26 March, 2011	Chemistry Department
12	National Conference on Contemporary Trends in Biological and Pharmaceutical Research	12-13 March, 2011	Pharmacy and Bio. Science Department
13	International Conference on Sustainable Manufacturing: Issues, Trends and Practices	10-12 November, 2011	Mechanical Engineering Department
14	Workshop on Residual Life Assessment of thermal power Plant components	14-15 February, 2011	Mechanical Engineering Department
15	Workshop on Umberto©5	1– 4 November, 2011	Mechanical Engineering Department
16	MEMS Design Workshop using COMSOL	19-24 February, 2011	Mechanical Engineering Department
17	Summer school on CAD for MEMS Design	18 -30 June, 2011	Mechanical Engineering Department
18	Northern Region software on MEMS Design using COMSOL, Intellisuite and Coventorware	18 Feb - 2 March, 2011	Nanomaterials & National MEMS Design Center
19	Workshop on Tools and techniques of Statistics and Simulation	29 Sept- 1 October, 2011.	Mathematics Department

20	National Workshop on Structural Health Monitoring and Rehabilitation	19-20 Sept., 2012	Civil Engineering Department
21	Conference on Technological Advancements in Chemical and Environmental Engineering (TACEE-2012)	23-24 March, 2012	Chemical Engineering Department
22	8th Annual Session of Students' Chemical Engineering Congress "SCHEMCON 2012" with the theme "Energy Efficient Technologies for Green Environment"	21-22 September, 2012	Chemical Engineering Department
23	One day symposium on “Recent Trends in Chemical Sciences”	25 March, 2012	Chemistry Department
24	Control system design using MATLAB	16-20 July , 2012	EEE Department
25	Two- day 3rd ELT@I International Conference	8-9 October, 2012	Humanities and Social Sciences Department
26	Short Film and Video Production	18-20 Febuary, 2012	Humanities and Social Sciences Department
27	National Conference on Modeling, Computational fluid Dynamics and Operations Research	4-5 February, 2012	Mathematics Department
28	Workshop on Rapid Prototyping	11-12 March, 2012	Mechanical Engineering Department
29	National Conference on Condensed Matter Physics	24-25 February, 2012	Physics Department
30	Workshop on Analytical Instruments for Chemical and Environmental Engineers (WAICEE-2013)	22-23 March, 2013	Chemical Engineering Department
31	Data Analytics & Applications (IWDAA 2013)	26 Feb - 1 March, 2013	CS IS Department of Pilani and Goa campus
32	Advanced Electronic Systems	21-23 September, 2013	CSIR-CEERI & EEE Department
33	Texas Instruments C2000 & MSP 430 Microcontroller	22-2 October, 2013	CSIR-CEERI & EEE Department
34	Control system design using MATLAB for NTPC Engineers	21-26 October, 2013	CSIR-CEERI & EEE Department
35	Modeling and Computation	23-24 February, 2013	Mathematics Department
36	Indo-German Workshop on Green Manufacturing	7 November, 2013	Mechanical Department
37	36th Annual Management Convention Interface 2013	1- 3 February, 2013	Management Department
38	National Workshop on Molecular Techniques: Cell to DNA (MTCD-2014)	10-12 Apri, 2014	Biological Sciences Department
39	Impact of PMGSY Roads on Accessibility in Rural Areas	5-6 September, 2014	Civil Engineering Department

40	Workshops on best digital design tools used in Civil and Mechanical Engineering design	18 October, 2014	Civil Engineering Department
41	Nano- and Functional Materials (NFM 2014)	7-8 November, 2014	Chemistry Department
42	Theatre Training workshop on the Art of Designing and Direction	15 Dec. 2014 - 4 Jan., 2015	Humanities and Social Sciences Department
43	National Conference on Recent Trends and Developments in Operations Research	22-23 February, 2014	Mathematics Department
44	National workshop on LaTeX and MATLAB for Beginners'	24-28 December, 2014	Mathematics Department
45	One day workshop on Solar cooker building	8 April, 2014	CREED, Mechanical Engineering Department
46	Workshop and Training on Current Research Trends in Condensed Matter-Material Science	7-8 March, 2014	Physics Department
47	Organized Research Scholar Day on to facilitate sharing of research activities among the PhD scholars	23 March, 2014	Physics Department
KK Birla Goa Campus:			
1	From RNA to protein: A Comprehensive Workshop	3-9 June, 2012	Biological Science Department
2	The art of preparing research proposals and IPR management	3 November, 2012	Academic Research Division
3	Recent Developments in Renewable Energy Sector	4 December, 2012	Mechanical Engineering Department
4	BITS-IUCAA Workshop on Gravitational Waves Data Analysis	17-21 December, 2012	Department of Computer Science & Information Systems
5	Workshop on Research methods and Data Analysis	4 February, 2012	Academic Research Division
6	Workshop on Cross Cultural Behavioural Simulation for the faculty of Goa Campus	2 March, 2012	Humanities and Social Science Department
7	National Workshop on Advanced School on Graph Algorithms	23-27 July, 2012	Mathamatics Department
8	Introductory Workshop on Scilab	9-10 July, 2012	Mathamatics Department
9	Faculty Development Program for Engineering and Technical courses	27 - 28 September, 2012	Mathamatics Department
10	Emerging Technologies: Micro to Nano 2013 (ETMN-2013)	23- 24 February, 2013	EEE Department and CSIR-CEERI
11	Environmental Management and Audit	25 Feb.- 1 March, 2013	Biological Science Department
12	International Workshop on Data Analytics & Applications (IWDAA - 2013)	26 Feb - 1 March, 2013	Computer Science Departments of Goa and Pilani campus

13	Two –day workshop on "Negotiations and Negotiating	8-9 March, 2013	Humanities and Social Science Department
14	National Workshop on Innovative Pedagogies for Enhancing the Employability Skills of Students	4-6 September, 2013	Humanities and Social Science Department
15	Introduction to Graph and Geometric Algorithms	17-19 January, 2013	Mathematics Department and School of Technology and Computer Science, Mumbai
16	Mathematical Foundation of Advanced Finite Element Methods	26 Dec., 2013 to 3 Jan. 2014	NMI Bangalore and NPDE-TCA, IIT Bombay at KK Birla Goa campus, Goa.
17	MATHEMATICA	24-25 July 2013	Mathematics Department
18	International Conference on Emerging Miniaturized Technology Micro to Nano ETMN 2013	22-23 February, 2013	EEE department
19	Four Days workshop on Computational Fluid Dynamics (CFD)	2- 5 January, 2013	CSE department
20	International Conference on Emerging Miniaturized Technology	22-23 February, 2013	Chemical Engineering Department
21	Conference on Decentralized Biogas digesters and their slurry management	20- 22 February, 2014	Biological Science Department
22	Indo- Uk International Workshop On Advanced Materials And Their Applications In Nanotechnology (Aman 2014)	17- 19 May,2014	BITS Pilani, KK Birla Goa campus
23	Ind-Chile Workshop on Big Data	4-6 June, 2014	Computer Science Departments
24	International Conference on Towards Ecocultural Ethics : Recent Trends and Future Directions	9-11 October 2014	Humanities and Social Science Department
25	workshop on Expectations from Faculty Members for Deeper Industry Engagement	11 Nov., 2014	Practice School Division
26	Introductory workshop on MATLAB for students	20-21 Sept., 2014	Physics Department
27	Pro-E workshop	15-16 November, 2014	Mechanical Department
28	ANSYS-CFD	15-18 December, 2014	Mechanical Department
29	Workshop on Einstein's Special Theory of Relativity	16-17 August, 2014	Physics Department
Hyderabad Campus			
1	National Symposium on Current Trends in Pharmaceutical Sciences (CTPS)-2012	17 Nov., 2012	Pharmacy Department
2	Molecular Modeling and Drug Design	18 Nov., 2012	Pharmacy Department
3	Recent Trends in Switch Gear and Protection	5-7 July, 2012	Mechanical Department

4	Introduction to Graph and Geometric Algorithms	17-19 January, 2013	Mathematics Department
5	Mathematical Foundation of Advanced Finite Element Methods	26 Dec., 2013 to 3 Jan., 2014	Mathematics Department
6	MATHEMATICA	24-25 July 2013	Mathematics Department
7	Workshop on Basics & Operational Aspects of Stock (Market) Trading	16 Sept., 2013	Economics and Finance Dept
8	One day Workshop on SPSS : Hands on experience	27 April, 2013	Economics and Finance Department
9	One day Workshop on Indian Trade and Banking	16 April, 2013	Economics and Finance Department
10	Workshop on Autodesk REVIT Architecture' as a pre-ATMOS event	31 Sept. - 1 October, 2014	CEA, Hyderabad Campus
11	Round Table Discussion on Peace, Diplomacy and Culture	14 February, 2014	Humanities & Social ScienceDepartment
12	Workshop on Learning Basic Sanskrit	26 February to 5 March, 2014	Humanities & Social ScienceDepartment
13	Energy and Carbon Footprinting Analysis	16 Sept., 2014	Humanities & Social ScienceDepartment
14	National Conference on Technology, Policy and Community: Small Experiments in Sustainability	4 - 15 March, 2014	Humanities & Social ScienceDepartment
15	Panel Discussion on Women and Leadership	1 March, 2014	Humanities & Social ScienceDepartment
16	Workshop on Advanced Scientific Writing Skills	12 November, 2014	Humanities & Social ScienceDepartment
17	Human Diseases Symposium	15-16th March, 2014	Humanities & Social ScienceDepartment
18	National Conference on Advanced Materials for Defence and Aerospace	22 December, 2014	Dept. of Chemical Engg / Dept. of Physics
19	Work shop on Research Methodology	11-12 April, 2014	Civil Engineering Department
20	Symposium on Technology, Policy and Community: SMALL EXPERIMENTS IN SUSTAINABILITY	14 - 15 March, 2014	Humanities & Social ScienceDepartment
21	Panel Discussion on Women and Leadership	1 March, 2014	Humanities & Social Science Department
22	Workshop on Advanced Scientific Writing Skills in collaboration with Achievers' League USA	12, November 2014	Humanities & Social Science Department
23	Symposium on Chemical Indian Space Technology-Present and Future" (NSIST-2014)	1 May,2014	Mechanical, EEE, CS, Departments
24	SERC School on Theoretical High Energy Physics	1 June, 2014	Physics Department

Dubai Campus			
1	International conference on cloud computing	8-10 December,2012	CS& IS Department
2	Workshop on Business process simulation	26 November, 2012	CS& IS Department
3	Student Workshop on MEMS- An introduction to modelling	12 November, 2012	EEE Department
4	CETA Knowledge Quest – 2013	February, 2013	BITS, Pilani - Dubai Campus
5	What corporates expect from young graduate engineers	22 April, 2013	BITS, Pilani - Dubai Campus
6	Collaborative Processes of Institute, students and Alumni for Industry readiness	17 September, 2013	BITS, Pilani - Dubai Campus
7	Entrepreneurship as a carrier option for young men and women	28 November, 2013	BITS, Pilani - Dubai Campus
8	Data mining and its Applications	18 December, 2013	CS& IS Department
9	A workshop on tall buildings	21-23 September, 2014	Civil Engineering
10	4th Annual International conference on Advances in Biotechnology	10-11 March, 2014	Biotech Department in collaboration with GSTF, Singapore
11	International Conference on Biotechnology & Bioengineering	29-30 October, 2014	Biotech Department in collaboration with Association of Microbiologists

3.2 Resource Mobilization for Research

3.2.1 What are the financial provisions made in the university budget for supporting students' research projects?

BITS Pilani supports Ph.D students in terms of stipend and contingency. All Ph.D students are provided scholarship to cover full or partial tuition fee. A total of Rs 166,069,150 has been allocated for FY 2015-16 for this purpose. Travel support is given to students for attending conferences within India.

3.2.2 Has the university taken any special efforts to encourage its faculty to file for patents? If so, how many have been registered and accepted?

BITS encourages its faculty to file patents. The SRCD office conducts patent awareness workshops across the Indian campuses together with the Center for Entrepreneurial Learning (CEL), the Center for Innovation Incubation and Entrepreneurship (CIIE) both supported by BITS own resources. The patent workshops are also conducted with the support from MSME Govt of India. BITS has a policy for intellectual policy. A process for filing patent has been established. An Institute IP committee (IIPC) has been constituted for the purpose. BITS has also formed one professional group to facilitate drafting of patent applications approved by IIPC. The Institute also supports utilization of part of overheads to create or manage IP owned form sponsored projects. For filing patents form sponsored projects, agency guidelines are followed.

Patent Applications filed through BITS Pilani Since 2010 under sole ownership of BITS Pilani

S. No.	Name of Inventors	Department	Title	Patent Application Number
1	Dr. Perumal Yogeeswari; Dr. Dharmarajan Sriram; Anantaraju Hasitha Shilpa and Medapi Brahamam	Pharmacy	Cathepsin D Inhibitors and compositions thereof for treating breast cancer	1763/DEL/2015
2	Dr. RajKumar Gupta; Mr. V.P. Devanarayanan and Dr. V. Manjuladevi	Physics	A novel opto-mechanical system for measuring surface plasmon resonance	2644/DEL/2014
3	Prof. Radhakrishnan Mahesh and Mr. Muthu Venkatesh Sudali	Pharmacy	PDE4 inhibitor compounds for treating anti-depressant and anxiolytic related disorders	1290/DEL/2014
4	Dr. A. K. Das and Mr. Deepak Pakalapati	Biological Sciences	Oligonucleotides for the detection of Plasmodial sp and an assay thereof	3944/DEL/2012
5	Vijay Kumar and Dr. Niti Nipun Sharma	Mechanical Engineering	Surface Modification for Hafnium Oxide (HfO2) for Microfluidics Applications	2453/DEL/2012
6	Sachin Ulhasrao Belgamwar and Dr. Niti Nipun Sharma	Mechanical Engineering	Method of producing uniform mixture of copper and carbon nanotube in bulk for copper metal nanocomposite	2454/DEL/2012
7	Dr. A. K. Das and Narayan Jalan	Biological Sciences	Temperature inducible promoter derived and modified from	3004/DEL/2010

			Enterococcus faecium DJ1 plasmid, and its use in E. coli for production of desired protein	
8	Dr. Dalip Kumar and Mr. Gautam Patel	Chemistry	Sulfoximine Derivatives as Anticancer Agents	2973/DEL/2010
9	Prof Sanjay Kumar Verma, S. Ramachandran, and Pankaj Kumar Jain	Biological Sciences	Rapid Non-Enzymatic process for the reduction of Chromium (III) by the NOSTOC CALCICOLA immobilized on Silica Gel	582/DEL/2008
10	Deshmukh Ketaki Ramesh; Dr. Kowshik Meenal and Ramanan Sutapa Roy	Biological Sciences	A method of forming nanovehicle plasmid DNA complex for bacterial transformation	1529/MUM/2013
11	Dr. Chakrabarty Dibakar; Baveja Mansi; Pereira Clarice Geneviv; Chanda Chandrasekhar; Rastogi Akriti and Pathan Jigni Sayeda	Biological Sciences	An in vitro spectrophotometric assay method for sequentially measuring formation of a fibrn clot and fibrinolysis activity	1370/MUM/2013
12	Anant Kamath; Kratarth Goel; Raunaq Vohra and Dr. Veeky Baths	Biological Sciences	A brain controlled device automation and control system	2643/DEL/2014
13	Dr. Shalini Upadhyay	Humanities and Social Sciences	Method and System for Generating Spiritual Intelligence and Research Performance Indices	264/Mum/2013
14	Yogeeswari Perumal; Sriram Dharmarajan; MadhuBabu Battu	Department of Pharmacy	A compound for treating inflammatory neuropathic pain and cancer	2945/DEL/2014
15	Dr. Suman Kapur	Department of Biological Sciences	A portable apparatus, a ready to use kit and a process for rapid detection of pathogens and its susceptibility levels to antimicrobial agents in a fluid sample	2783/DEL/2013
16	Dr. Suman Kapur	Department of Biological Sciences	Medical Instrument used detecting growth of pathogens and its susceptibility levels to antimicrobial agents in a fluid sample	Indian Patent No. 267834

Patent applications filed under sponsored projects with collaborators

S. No.	Name of Inventors	Department	Title	Patent Application Number	PCT International
1	Bhand Sunil, Pal Souvik	Department of chemistry (Goa)	A biosensor kit for detection and analysis of chemical pollutants,	3456/MUM/2013	Not applied
2	Bhand Sunil, Chandra Sudhir, Pandya Hardik, Bacher Gautam & Kanungo Lizy	Department of chemistry (Goa) and CARE IIT Delhi	Device for Analysis of Mycotoxins	1203/MUM/2013	PCT/IN2014/000176, filed on March 19, 2014

3	Bhand Sunil, Chandra Sudhir, Pandya Hardik, Tiwari Ruchi, Mishra Rupesh Kumar	Department of Chemistry (Goa) and CARE IIT Delhi	Analyte Sensor Chips	933/MUM/2012	PCT/IN2013/000205, Date of Filing: 28 March 2013 US Patent filed 2014
4	Anupama KR	EEE&I (Goa)	Design and Development of condition based monitoring of Pipelines using Wireless sensor Networks	GAIL Project	Indian Patent filed No awaited
5	Suman Kapur	Biological Sciences (Hyderabad)	Low Cost Point of Care Device for the detection of blood glucose levels,	Indian Patent application No. 1646/DEL/2014	A No. PCT/IN2015/000251
6	Yogeeswari, P.,Sriram, D., Kumar, A.S.K. et al.,	Pharmacy (Hyderabad)	Novel N-Spiro substituted compounds.	Indian Patent 263536	(Granted on 5th Nov 2014)
7	Saketh, D.V.S., Srikanth, V., Yogeeswari, P., Sriram, D.,	Pharmacy (Hyderabad)	Novel compounds as modulators of AKT.	Indian Patent Application No. 5707/CHE/2014 (13/11/2014)	-

Patent applications filed through BITS Pilani in joint ownership with collaborator

S. No.	Name of Inventors	Department	Title	Patent Application Number
1	Prof. S. K. Verma, Prof. V. K. Chaubey G. Rajahari, IC Design Group, CEERI,; and Bose Subhash Chandra, IC Design Group, CEERI,	Biological Sciences Electrical and Electronics Engineering, BITS Pilani - Pilani Campus IC Design Group, CEERI,	A protein biosensor based biologically active arsenic species detection system and method thereof	3476/DEL/2014
2	Prof. Sunil Bhand and Mr. Souvik Pal	Department of Chemistry (Goa) PED BARC & MGM Mumbai	A micro-trench based biochip device for screening of infectious diseases using Gold nano-particles / nano-coating	3620/MUM/2015 dated 23-Sep-2015

3.2.3 Provide the following details of ongoing research projects of faculty

The list of projects are given department wise in the departmental evaluative reports and are also available as supporting document in Annexure 3.

Pilani Campus	Year Wise	**Number**	**Total Grant received (Rs in lakh)**
University Awarded Projects	2010-11	0	0
	2011-12	22	101.35
	2012-13	39	58.1
	2013-14	55	295
	2014-15	46	26
	Total	162	480.45
Minor projects	2010-11	0	0
	2011-12	17	34
	2012-13	30	26
	2013-14	41	22
	2014-15	37	26
	Total	125	180
Major projects	2010-11	0	0
	2011-12	5	67.35
	2012-13	9	32.1
	2013-14	14	273
	2014-15	9	
	Total	37	372.45
Other Agencies National and International Pls Specify	2010-11	58	285.50
	2011-12	61	275.20
	2012-13	95	818.22
	2013-14	121	488.92
	2014-15	127	702.71
	Total	462	2570.55
Minor projects	2010-11	1	595
	2011-12	1	0
	2012-13	3	1.00
	2013-14	13	10.86
	2014-15	10	6.77
	Total	28	613.63
Major projects	2010-11	57	285.00
	2011-12	60	275.20
	2012-13	92	817.22
	2013-14	109	478.06
	2014-15	117	695.94
	Total	435	2551.42
	Grand Total	**1249**	**6696.50**

K.K. Birla Goa Campus	Year Wise	Number	Total Grant received in Rs lakhs
University Awarded Projects	2010-11	0	0
	2011-12	16	54.15
	2012-13	26	107.65
	2013-14	25	209.74
	2014-15	25	205.84
	Total	92	577.38
Minor projects	2010-11	0	0.00
	2011-12	13	25.90 (RIG)
	2012-13	19	12.00 (RIG)
	2013-14	19	25.84 (RIG)
	2014-15	18	10.00 (RIG)
	Total	69	73.74
Major projects	2010-11	0	0.00 (Nil)
	2011-12	3	28.25 (Seed I)
	2012-13	7	41.50 (SeedII)
	2013-14	6	(CORE I 131)
	2014-15	7	Addl Comp Grant (40)
	Total	23	240.75
Other Agencies. National and International Pls Specify	2010-11	35	206.65
	2011-12	31	142.10
	2012-13	48	309.38
	2013-14	57	316.23
	2014-15	60	280.19
	Total	231	1254.55
Minor projects	2010-11	3	1.78
	2011-12	2	0
	2012-13	2	1.82
	2013-14	2	3.82
	2014-15	2	3.82
	Total	11	11.24
Major projects	2010-11	32	204.87
	2011-12	29	142.10
	2012-13	46	307.56
	2013-14	55	312.41
	2014-15	58	276.36
	Total	220	1243.30
	Grand Total	**646**	**3400.96**

Hyderabad Campus	Year wise	Projects	Total Grant received (Rs in lakh)
University Awarded	2010-11	0	0
	2011-12	6	33.60
	2012-13	20	39.94
	2013-14	19	60.54
	2014-15	11	111.40
	2015	11	88.50
	Total	67	333.98
Minor projects	2010-11	0	0
	2011-12	4	8.00
	2012-13	20	39.94
	2013-14	17	33.34
	2014-15	9	16.40
	2015-2016	12	88.50
	Total	62	186.18
Major project	2010-11	0	0
	2011-12	2	25.60
	2012-13	0	0
	2013-14	2	27.20
	2014-15	2	95.00
	Total	6	147.80
Other Agencies National and International. Pls Specify	2010-11	4	177.46
	2011-12	9	153.81
	2012-13	8	111.44
	2013-14	5	43.57
	2014-15	7	189.20
	2015	1	44.50
	Total	34	719.99
Minor projects	2010-11	1	6.51
	2011-12	8	66.06
	2012-13	9	36.94
	2013-14	5	28.10
	2014-15	3	14.20
	Total	26	151.83
Major project	2010-11	14	449.75
	2011-12	14	319.34
	2012-13	17	422.58
	2013-14	16	490.78
	2014-15	19	602.23
	Total	80	2284.69
	Grand Total	**275**	**3824.47**

3.2.4 Does the university have any projects sponsored by the industry / corporate houses? If yes, give details such as the name of the project, funding agency and grants received.

The Detailed list of Campus Wise Projects is provided below

S.No	Project Title	PI	Sponsoring Industry	Amount Sanctioned (Rs. In Lakhs)
	Pilani Campus Industry Projects			
1	Examination On Conversion Of Carbon Black To Carbon Nanotubes Using Arc Discharge Method	Dr N N Sharma	Aditya Birla Group	10.00
2	Natural And Engineered Lipasesfor Biodiesel Production	Dr Rajesh Mehrotra	Aditya Birla Group	10.00
3	Study On Physicochemical And Interfacial Properties Of Some Mixed Micellar Systems Of Novel Gemini And Conventional Surfactants In Water And Water-Organic Solvent Mixed Media	Dr Subit Saha	Aditya Birla Group	10.00
4	A Study Of Sludge Minimization During The Treatment Of Pickling Effluent And Recovery Of Metals From The Treated Sludge	Dr Anupam Singhal	Aditya Birla Group	10.00
5	Development And Usage Of Innovative Ductile Composite Material For Repair And Retrofitting Of Masonry Structures	Dr S B Singh	Aditya Birla Group	10.00
6	Identify Management Principles And Best Practices From NSU(National Singapore University) And IIT That Would Help BITS Management	Dr Anil Bhat	Aditya Birla Group	10.00
7	Characterization Of Immune Signaling Pathway In Anopheles Mosquitoes For Arresting Plasmodium Development	Dr Lalita Gupta	Aditya Birla Group	10.00
8	A Modeling And Design Framework For Social Networking Infrastructure On Mobile Devices Using P2P Overlays	Prof S Balasubramaniam	Aditya Birla Group	10.00
9	Development of Novel Synthetic Methods	Dr Anil Kumar/Dr. Dalip Kumar	Ranbaxy	27.50
10	Design Of Novel Drug Delivery Systems	Dr R.N. Saha	Torrent Research	2.00
11	Evaluation Of Carbapol for Newer Use As Pharmaceutical Excipients	Dr. R.N.Saha	Lubrizol	12.00
12	Modeling And Simulation Of Viscose Through Jet Pack Assembly	Dr. Suresh Gupta	Birla Cellulose Kharach	5.52
13	Developing A Smart Crop Management System Using Data Analytics	Dr. Navneet Goyal	IBM	9.50

	K.K. Birla Goa Campus			
1	Seawater Desalination Using Liquefied Natural Gas (LNG) Refrigeration	Prof. K. Srinivas	GAIL	382.21
2	Experimental And Simulation Studies On Coke Mitigation In Petroleum Refinery Systems	Prof. K. Srinivas	CHT	132.97
3	Design And Development Of Condition Based Monitoring Of Pipelines Using Wireless Sensor Networks	Dr. K.R. Anupama	GAIL	71.36
4	Roll On Roll Off Payload Design	Prof PM Singru	Lockheed Martin USA	12.48
1	Coke Reduction And Selectivity Increase In Allylchloride Process: Reactor Design And Engineering Studies	Dr. Srinivas Krishnaswamy, Co-PI:Dr. K. N. Ponnani	Aditya Birla Group	10.00
2	Studies On CO2 Capture From Flue Gas In Ammonia Plant And Used For Urea Plant In Fertilizer Industry.	Dr Srinivas Krishnaswamy	Aditya Birla Group	10.00
3	Design Of Peptides, Peptide Conjugates And Investigations On Their Antimicrobial Activity	Dr Halan Prakash, Co-PI : Dr Meenal Kowshik	Aditya Birla Group	10.00
4	Experimental Wear Analysis Of An Artificial Hip Implant Materials Using An Advanced Tribometer Customized For Bio-Tribological Studies	Dr DM Kulkarni, Co-PI: Anant Kulkarni, Dr. Hemant Kumar	Aditya Birla Group	10.00
5	Advanced Study On Association Of Salmonella Typhi Carriage And Its Link With Hepatobiliary Carcinoma Using RT PCR	Dr. Vijayashree Nayak Co-PI: Dr. K.M. Raghavendra	Aditya Birla Group	10.00
6	Testing Novel And Existing Materials For Manufacturing Tissue Engineered Heart Valves (Tehvs)	Dr A Ganguly	Aditya Birla Group	15.00
	Hyderabad Campus			
1	Bioconversion of statins	Prof. Suman Kapur	Ranbaxy Research Lab	4.45
2	Development Of Novel Anti tubercular Drugs ASTRA ZENECA	Prof. D.Sriram	ASTRA ZENECA	11.11
3	Development Of Novel Anti-Inflammatory Agents, Incozen Therapeutics Ltd., Hyderabad.	Prof. P. Yogeeswari	Incozen Therapeutics	21.00
4	"Growth Meter" – A System for Monitoring Growth in School going Children.	Prof. M B Srinivas	Indian Institute of Biotechnology Pvt. Ltd	3.20
5	Standardization Of ELISA For B - Endorphin	Prof. Suman Kapur	IIBT	6.10
6	Arogya-Health Care Delevering Program	Prof. Suman Kapur	Arogya-Health Care	2.08
7	Improvement Of Productivity In Monoclonal Anti-Bodies	Dr. Asma Ahmed	Iranian Company-Aryogen	4.55

8	Matlab Modelling Of A Novel Battery System For Hyderabad Batteries Limited	Dr. U. M. Rao	HBL Power Systems Ltd	2.0
9	Process Modeling And Validation Of Flotation Cell	Dr.Jeevan Jaidi	Tennova, Bangalore	7.83
10	Design Of Novel Drug Delivery System for Candidate Drug	Dr. Srikanth Charde & Dr. Punna Rao	Daewoong Pharmaceuticals Consultancy	5.27
	Dubai Campus			
	Product Redesigning Of Cable Pulling Winch	Dr.R.Karthikeyan	Elfit Arabia, Uae	AED 30000
	Lamcy Plaza Robot Repair	Dr R Ananad Kumar	Lamcy Plaza, Dubai	0.75

3.2.5 How many departments of the university have been recognized for their research activities by national / international agencies (UGC-SAP, CAS; Department with Potential for Excellence; DST-FIST; DBT, ICSSR, ICHR, ICPR, etc.) and what is the quantum of assistance received? Mention any two significant outcomes or breakthroughs achieved by this recognition.

Almost all the the eligible departments have received support under DST-FIST. DST-FIST grants have provided a significant impact on the research quality and research outcome as evident from increased number and quality of scientific publications as well as patents. The research capacity has certainly increased due to procurement of major research equipment's in the departments. The DRS-SAP has equally contributed to the human resources through increased number of Ph.D. students and research output.

Pilani Campus Departmental Projects Sanctioned

SL No.	Department	Agency share (in lacs)	BITS share (in lacs)	Amount in Lakhs
1	Biological Sciences	199.75	27.5	227.25
2	Chemical Engg	111.25	40.25	151.5
3	Chemistry	168.5	43.5	212
4	Civil	149.3	40	189.3
5	Computer Science & information system	26.5	26.5	53
6	EEE	116.5	72.5	189
7	Mathematics	141.5	50	191.5
8	Mechanical Engg	182.5	81.5	264
9	Pharmacy	255	67.5	322.5
10	Physics	100.5	29	129.5

K.K. Birla Goa Campus:

S.No	Department	Agency share (in lacs)	BITS share (in lacs)	Amount in Lakhs
1	Biological Sciences	20.5	20.5	41.0
2	Physics	49.25	49.25	98.50
3	Mechanical Engineering	40	40	80.0
4	Chemistry	38.5	38.5	77.0
5	EEE &IE	18	18	36.0
6	Chemical Eng	31	31	62.0
7	Mathematics	18.75	18.75	37.50

Hyderabad campus

S.No	Department	Agency share (in lacs)	BITS share (in lacs)	Amount in Lakhs
1	Civil Engineering	49.5	49.5	99.0
2	Biological Sciences	55	55	110.0
3	Chemistry	45	45	90.0
4	Pharmacy	33.5	33.5	67.0
5	Mathematics	24.5	24.5	49.0

Outcomes: Increased number of scholars for pursuing Ph.D. and increased research output in terms of publications by faculty and scholars.
Increased capacity for capability for research and consulting.

3.2.6 List details of

a. research projects completed and grants received during the last four years (funded by National/International agencies).

The details of projects completed and grants received are given in Annexure 3.

b. Inter-institutional collaborative projects and grants received

S.No	Project Title	PI	CO-PI	Funding Agency	Collaborating Agency/Industry	Amount
	Pilani Campus					
1	International Malaria research consortium for the development of novel classes of Antimalarials.	Dr. R Mahesh,	Dr. Lakshmi P. Kotra, Scientist, University Health Networks, Ontario, Canada Dr. Asif Mohammed, ICGEB, Mr. Jitendra N. Verma, MD, Lifecare Innovation	DBT	Life care Innovations, Gurgoan, International Centre for Genetic Engineering and Biotechnology	154.78

2	Design and Synthesis of Porphyrin Photosensitizers as anticancer agents	Dr. Dalip Kumar	Dr. Takeo Ito, Kyoto University, Japan	DST	Kyoto University, Japan	4.92
3	Sustainable High Performance Concrete Infrastructures	Dr. S.B Singh	Dr. Ravindra Dhir, Honorary Professor in the School of Civil Engineering, Birmingham univeristy	DST	UKIERI	£3,73,003
4	Flow through a membrane modeled of porous cylindrical particles using particle-in-cell approach	Dr. Ashish Tiwari	Dr. Fillipov Anatoly Nikolaevich, Dept. of Higher Mathematics, Gubin Russian State University of Oil and Gas, Moscow, Russia	DST (Sanctioned)	Russian State University of Oil and Gas, Moscow, Russia	12.86
	K. K. Birla Goa Campus					
1	Development of biosensors and micro-techniques for analysis of pesticide residues, aflatoxin, heavy metals and bacterial contamination in milk.	Dr. Sunil Bhand (Consortia PI) Department of Chemistry	Prof Sudhir Chandra & Prof R Chatterjee, Dr Naresh Kumar, Prof Neelam Verma Dr NN Ghosh Prof Ap Koley	C4/C10125 National Agricultural Innovation Project of ICAR & The World Bank USA	IIT Delh, NDRI Karnal, Punjabi University Patiala BITS Goa , Chemistry	Total 32.05
2	Synthesis of metal-organic-porous material based efficient chiral heterogenous catalysts by post synthetic modification and their applications in asymmetric reactions	Dr. Mainak Banerjee	Dr. Rahul Banerjee Scientist, Pune	02(0075)/12/EMR-II CSIR	(NCL, Pune)	2.22
3	Development and characterization of nanomaterials for biosensors and biocatalysis	Dr. N. N. Ghosh (Indian PI) Prof Paul Millner (UK PI)	Prof. Sunil Bhand Dr. C. K. Mitra	Indo – UK In the area of Advanced Materials (UKIERI-DST)	Prof. Paul Antony Milner, University of Leeds, Univ of Hyderabad BITS Goa	26.32

4	Imprinted polymer for sensing and removal of selected antibiotic and pesticide residue	Prof. Sunil Bhand (Consortium PI)	Dr. Y S Rajput, Prof. Sudhir Chandra,	NFBSFARA/PHT-4007/2013-14,ICAR	IIT, Delhi NDRI, Karnal	139.00
5	Searching for new physics in B-meson decay	Dr. Chandra dew Sharma	Dr. Rahul Sinha	2013/37P/34/BRNS BRNS DAE	Dept of Atomic Energy	19.74
6.	Study on EMT regulation through TGFβ/SMADs in gall bladder disease	Dr. Vijayashree Nayak	Dr. Utpal Roy Dr. Rajani Gaind	SB/SO/BB-0103/2013, SERB	VMMC & Safdarjung Hospital, Delhi	38.00
7.	Purification and characterization of a promising antifungal peptide (with special reference to Candida albicans and Cryptococcus neoformans) produced by a Wild-type Bacillus sp. and cloning of its structural gene	Dr. Utpal Roy	Prof. Dibakar Chakrabarthy (Goa)	SB/SO/HS/015/2013, DST	PGIMER Chandigarh	10.00
	Hyderabad campus					
1	Structure-guided Design of New Antibacterial Agents against Dormant Mycobacterium Tuberculosis	Prof.D.Sriram	Prof. G. Schneider, Structural Biology	DBT-VINNOVA	Laboratory, Karolinska Institute, Stockholm, Sweden	90.64
2	Development of new antiepileptic leads to suppress hippocampal leads to suppress hippocampal epileptic seizures	Prof. P. Yogeeswari	Dr. Oleana Isaeva, Department of Neurophysiology,	DST Indo-Ukraine	Neurophysiology, Bogomoletz Institute of Physiology, Kiev, Ukraine	7.74
3	Strategies against antibiotic resistance in Mycobacterium tuberculosis and Pseudomonas aeruginosa : new drugs for old targets and old drugs for new targets	Prof.D.Sriram	Prof. G. Schneider, Structural Biology Laboratory,	DBT-VINNOVA	Karolinska Institute, Stockholm, Sweden	61.92

4	Structured-based Design of Orphan nuclear Receptor Modulators to treat Diabetes and its complications by targeting RORalpha and Rev-erbalpha	Prof. P. Yogeeswari	Prof. Bart Staels, Inserm UMR1011 & UDSL, Université Lille Nord de France Institut Pasteur de Lille 1 rue du professeur Calmette BP245 59019 LILLE - France	INSERM -ICMR	Institut Pasteur de Lille 1 rue du professeur Calmette BP245 59019 LILLE - France	21.61
5	Development of Novel Compounds for the Treatment of Neural Complications of Diabetes	Prof. P. Yogeeswari	Prof. Isaura Taveres, Professor at Faculty of Medicine,	DST-Indo-Portugal	Medicine, Porto University, Portugal	6.04
6	Enzymes from Purine and Pyrimidine Biosynthetic pathway as targets for the development of Mycobacterium tuberculosis drugs	Prof. P. Yogeeswari	Prof. Santiago Diogenes, Instituto Nacional de Ciência e Tecnologia em Tuberculose , Centro de Pesquisas em Biologia Molecular e	DBT-cNPq	Funcional/IPB/PUCRS, Porte Alegre, Brazil	48.22

3.3 Research Facilities

3.3.1 What efforts have been made by the university to improve its infrastructure requirements to facilitate research? What strategies have been evolved to meet the needs of researchers in emerging disciplines?

Each department has been allotted budget for purchasing equipment/develop ICT infrastructure etc. These are required to cater to the specific needs of the department. The details are elaborated in the departmental evaluative reports.

Apart from these funds, University also provides budget for a central instrumentation facility named as Central Analytical lab (CAL lab) in each campus. This houses the major research equipments needed in sciences and engineering disciplines. The equipment purchased through this fund are utilized by multiple departments and hence housed at a central place wherein any user across the University can have access. The facility is open 24 x 7 to research scholars. The current budget allocation of CAL lab is Rs. 478 lakh for 2015-16. Approximately, 15 crores have been allotted to the 3 Indian campuses in the recent past for procurement of high end equipments and for improving the research infrastructure. Detailed list of equipments is given in Annexure

1. University has also allocated funds for each campus for high cost, sophisticated equipment under the Central Instrumentation facility like NMR, SEM, AFM, XRD confocal microscope, LC-MS etc.

To meet the needs of researchers in emerging disciplines, at the campus level and later at the University level, meetings are held before budget allocation and needs are identified. Already several equipment or instruments have been purchased/ordered to strengthen research in all the campuses.

A specific budget is also allocated for taking care of the computation research needs of the University. Availability of internet and wifi is ensured for facilitating the research needs. A high performance computing facility with a cloud computing cluster has recently been established in Goa Campus that caters to the high end research needs. Individual departments also build computational facilities for specialized research areas like Bioinformatics, Computer -aided -drug design, Computational Chemistry, etc., depending on the research thrust areas of the department.

Library resources are also annually updated keeping in view the research needs of faculty and students. Telepresence facility helps for interaction between researchers.

3.3.2 Does the university have an Information Resource Centre to cater to the needs of researchers? If yes, provide details of the facility.

The University has multiple Information resources as mentioned below:

1. **Academic Research Division (ARD):** The division looks after the overall PhD programme of the Institute. This includes PhD Admission, monitoring Pre-PhD course work, conducting PhD qualifying exam till the PhD thesis submission. There exists a dedicated website (link: http://www.bits-pilani.ac.in/university /Academic Research/Overview) where all useful resources related to the PhD programme is available. In addition, the division looks after the First Degree Thesis programme and the division website contain all useful information related to this programme.

2. **Sponsored Research & Consultancy Division (SRCD):**The division looks after all the Institute's sponsored projects and consultancy related issues. There exists a dedicated website (link: http://www.bits-pilani.ac.in/research at BITS pilani) where all useful information related to projects and consultancy is available.

3. **IPCD:** An International Programmes and Collaboration Division (IPCD) has been set up with representation in all the four campuses of BITS Pilani, to promote relations with renowned Institutions abroad. It provides an opportunity to students of BITS Pilani to complete a part of their first degree, higher degree, Ph.D. or Research and Development projects at various partner Universities abroad; and is a platform for faculty members to collaborate with peers at foreign Universities for active research work.

A dedicated website (link; http://www.bits-pilani.ac.in/university/ipcd/home) hosts the detail of MoUs describing student and faculty exchange programmes and collaborations with various foreign universities.

4. **Department and Faculty's homepage:** Each of the departments of the BITS campus has its own homepage, which is updated on a regular basis. Useful information regarding (i)Department's thrust area of research,(ii) Information about the Faculty member's research interests, current work(iii) Sponsored Project details, (iv) PhD students and their current line of research are available in the departmental website and as well as in the individual faculty's homepage.

   The office of the Dean of Faculty affairs (FAD) also helps to identify post-doc researchers such as INSPIRE Fellows or Visiting Faculty to BITS. The SRCD offices also disseminates the information on opportunities through emails and follows up with CRDO office. The information on research resources such as electronic journals and e -books is shared among faculty through the library which subscribes to various e-journals form Science Direct, Scopus, ACS, ASME, IEEE, etc., (across science and engineering disciplines) accessible to all the researchers (faculty and scholars).

   Research- related resources provided by the Library

   The Library supports the research initiatives of the faculty and research scholars by the following resources:

- Printed reference books subscription to various Printed journals, publications of CSIR, NISCAIR, Indian Academy of Sciences, etc.
- It also subscribes to multi user licenses for all the e journals, Research tools like Scifinder and access e-journals
- Assistance to faculty in buying books related to projects; to research scholars for access to specific papers through the inter library loan from the local institutions
- Display of the research papers published by the faculty in the international journals in the library
- Provision of good Wi-Fi connectivity and study carrels which are used by the research scholars, students, faculty and staff.

3.3.3 Does the university have a University Science Instrumentation Centre (USIC)? If yes, have the facilities been made available to research scholars? What is the funding allotted to USIC?

All campuses have following facilities that support research activities.

BITS has a central instrumentation facility named as Central Analytical lab (CAL lab) in each campus which houses the major research equipment/instruments.. The facility is open 24 x 7 to research scholars. The current budget allocation of CAL lab. is Rs. 478 lakh for 2015-16 for indian campuses. Approximately 15 crores have been allotted to the 3 Indian campuses in the recent past for procurement of high end equipments and for improving the research infrastructure. Detailed list of equipments is given in Annexure 1.

Central Workshop

The Central Workshop imparts training to students and caters to the maintenance & fabrication needs of the Institute. Students' training involves training all first degree students through the course "Workshop Practice" by imparting skills in various manufacturing processes like machining, fitting, carpentry, smithy, foundry, sheet metal, electroplating, welding, etc. and two computer oriented exercises, CNC Programming using Pro-E and Master CAM softwares and Manufacturing Simulation using FlexSim software. For B.E. (Mechanical Engineering) and B.E. (Manufacturing Engineering) degree courses, students are also imparted in-depth training in various other courses such as "Production Techniques", "Manufacturing Processes" and "Computer Aided Manufacturing". Apart from routine maintenance and training, the workshop also accepts fabrication jobs concerning the project works of students and also gives technical support for TBI works. The workshop houses Machine shop, Welding, Electroplating, Fitting, Smithy, Sheet Metal, Carpentry, Foundry, Metrology& CAM.

High Performance Computing Facility & Cloud Computing

Kosambi: A University-wide Internet-accessible High Performance Computing Facility at BITS Pilani, K K Birla Goa Campus. It currently comprises of 96 cores HPC machine from IBM with one head node and 6 compute nodes. Currently faculties will have login (on request basis) and can manage their account through remote login. Faculty colleagues in K. K. BIRLA Goa campus are already using this facility, along with a few from other campuses. The HPC Admin Team at Goa campus will be enabling this as a cloud computing facility to Pilani and Hyderabad shortly. Software(s) currently available in Kosambi are: OS - Red Hat Enterprise LINUX - 6.3 IBM CMM (Cluster Management Module) Mathematica 9.0 and other regular default RHEL open source software(s).

ICT Facility

Information Processing Center takes care of the IT related requirements of the entire campus. IPC maintains terminal rooms (Labs) to provide centralized computing facilities to the students and laboratories for teaching and research needs of Computer Science Department. These labs/terminal rooms are well equipped with desktops and work stations. Campus-wide network with dataports, wired and Wifi connectivity is maintained so as to ensure internet facility at all hostel rooms, cafeteria, library, staff quarters, and all laboratories within the campus. Some departments have independent computational labs with network clusters to take care of their specific research needs. For eg: Chemistry/Pharmacy/Biological Sciences have labs for research work pertaining to computer aided drug design and Bioinformatics etc..

3.3.4 Does the university provide residential facilities (with computer and internet facilities) for research scholars, post-doctoral fellows, research associates, summer fellows of various academies and visiting scientists (national/international)?

Yes, the institute facilitates residential facility on campus. All research scholars, post-doctoral fellows, research associates, summer fellows of various academies and visiting scientists working at BITS are provided suitable accommodation in hostel or staff quarters. All student hostels and staff quarters are provided with internet connectivity.

3.3.5 Does the university have a specialized research centre/ workstation on-campus and off-campus to address the special challenges of research programmes?

Yes, every department of all the campuses have identified specific research thrust areas. For encouraging and facilitating research in these areas and to address the special challenges, specialized research centres have been established. Details are given in 3.3.6.

3.3.6 Does the university have centres of national and international recognition/repute? Give a brief description of how these facilities are made use of by researchers from other laboratories.

Yes, the institute has the Research centres as listed below

SL. No	Name of the Centre	Description
1.	Center for Biotechnology	The Centre has in-house facilities of Genetic Engineering and Recombinant-DNA Technology. This Centre aims at taking up research and development projects from various sponsoring organizations, (establishments of University-Industry linkage) through various R&D contract projects and conducting periodic Workshops and hands-on training for faculty members, industry personnel and students in the area of advanced molecular biology/biotechnology and bioinformatics.
2.	Centre for Desert Development Technologies (CDDT)	The C-DDT mission is to make the desert areas of Rajasthan bloom through demonstration, extension, and development of world class desert development technologies-water and energy conservation in irrigation systems, rain water harvesting and ground water management, conservation and propagation of plants suited for the desert environment, and optimizing human existence in the desert ecosystem.

3.	Centre for Educational Technology (CET)	Its focus is on E-learning delivery systems, related web-services, live and stored video streaming as current thrust areas. Its mandate is to identify suitable educational technology solutions for on-campus, as well as off-campus, operations of the Institute and helps in their deployment.
4.	Centre for Materials Science and Technology	The objective of the Centre for Materials Science and Technology is to develop and implement projects related to modern materials such as smart materials, biomaterials, fibre-reinforced plastic composites and also related to conventional materials such as metals, ceramics and polymers. The Centre undertakes mechanical and non-destructive testing of various engineering materials and products for evaluating their mechanical properties and for evaluating defects such as cracks, voids, delamination, inclusions etc.
5.	Centre for Robotics and Intelligent System	The objective of the Centre for Robotics and Intelligent Systems (CRIS) is to develop prototypes that provide greater intelligence and higher versatility for robotic tasks under ever-changing constraints of the environment. This objective is set forth to make the Indian Industry competitive by developing indigenous technical skills, manpower and innovative spirit.
6.	Centre for Renewable Energy & Environment Development (CREED)	CREED is an interdisciplinary Centre that co-ordinates educational and research activities in the active areas of renewable energy and environment. The objectives of the Centre are (i) to conceive, develop and implement renewable energy applications and environment protection projects, (ii) to develop courses and organize awareness programmes, and (iii) to collaborate with external organizations in the areas of renewable energy education, training and technology development.
7.	Centre for Software Development (CSD)	The Centre for Software Development (CSD) is the first of the two major centres that comprise the newly formed Software Development and Educational Technology Unit (SDET Unit) at BITS-Pilani. The CSD has two wings, namely, the Media Laboratory and the Laboratory for Open Source Computing. Recently, as part of restructuring, the erstwhile Laboratory for Mobile Computing was made a constituent research laboratory of the Department of Computer Science & Information Systems., under the new name of Wearable, Pervasive Computing Networking Research Laboratory.
8.	Embedded Controller Application	This Centre was set up in Collaboration with Motorola India Ltd. The objective of the Centre is to impart detailed understanding of important features of

	Centre	embedded controller architectures and familiarization of advanced concepts in the field of embedded controllers through Students projects/Industrial projects, Imparting training to the industry professionals and running short term courses in the field of Embedded System design by developing course modules for these courses
9	Technology Business Incubator (TBI)	TBI promotes developing technology- enabled ventures in the areas of Information and Communication Technologies for telemedicine and healthcare, Biotechnology/Pharmaceutics Embedded systems, VLSI and other areas. Also TBI, supports entrepreneurial leadership across all disciplines, facilitates entrepreneurial activity amongst students, and invites entrepreneurs to use TBI services so as to develop end-products for commercialization
10	CORE	A virtual centre on interdisciplinary research in waste, water and energy management has been created to encourage technology/product development, real life problem solving in comprehensive manner. Internal fund is provided to 5 projects comprising research teams of cross campus and multidiscipline researchers.
11	TLC	TLC has been formed for the professional development of BITS faculty as well as non- teaching academic staff associated with teaching activities (laboratory technicians, demonstrators). The TLC also aims to engage research in various aspects in teaching and learning. Further, to bring best practices in teaching and learning across the globe, and share their experiences through direct or indirect modes are some objectives of this centre.
12	Centre for water resources	The centre for excellence in water resources management (CEWRM) was established in Hyderabad campus as national regional/ international centre to provide innovation in sustainable research, education and training in water resources management and allied fields.

3.4 Research Publications and Awards

3.4.1 Does the university publish any research journal(s)? If yes, indicate the composition of the editorial board, editorial policies and state whether it/they is/are listed in any international database.

No it does not publish any research journal.

3.4.2 Give details of publications by the faculty: (Last 5 years)

- Number of papers published in peer reviewed journals (national / international) : **5453**
- Monographs : **29**
- Chapters in Books: **269**
- Books edited : **59**
- Books with ISBN with details of publishers : **72**
- Number of publications listed in International Database: **2567**
- Citation Index (No. of citations for the university): Range - **0 – 6870 ;**
- SNIP : **0.4 - 1.4**
- SJR : **0.3 - 6.3**
- Impact Factor – range / average ∗h-index : **0.3 – 8.**

3.4.3 Give details of

***Faculty serving on the editorial Boards of National and International Journals**

Year	Faculty Name	International
2010	Bhupendra Kumar Sharma	Scientific Journals International
2010	S. B. Singh	International Journal of Earth Sciences and Engineering
		Journal of Korean Society of Civil Engineers
2011	A.K. Digalwar	International Journal of Manufacturing Systems
		Asian Journal of Industrial Engineering publishing
		Research Journal of Business Management
2011	B.K. Sharma	International Journal of Research and Reviews in Information Sciences
		American Journal of Mathematics and Sciences
		Exceling Tech Publisher, UK
		International Journal of Mathematics Trends and Technology
		International Research Organization of Computer Sciences
		Indian Journal of Research in Pharmacy and Biotechnology
2011	Sangeeta Sharma	AIMS International Journal of Management
		Journal of Humanities, Tripura
		JK Journal of Management & Technology
2011	Chandra Shekhar	American Journal of Operations Research
2011	Pushp Lata	Art and Culture, A Journal of Bioinfo Publications
		International Journal of Management
2011	V. S. Nirban	International Journal of Communication
2011	S.K. Verma	IUP journal
		GSTF journal of Biotechnology and Bioinformatics

2012	Chandra Shekhar	American Journal of Operations Research (USA)
2012	Balram Dubey	Mathematical Problems in Engineering
2012	Narendra Nath Ghosh	Journal of Nanoscience Letters
2012	Bhupendra Kumar Sharma	World Research Journal of Aeronautics and Aerospace Engineering
		Journal of Statistics and Mathematics
		International Journal of Mathematics and Computer Applications Research
		International Journal of Physics and Mathematical Sciences
		Journal of Mathematics, USA
		Bulletin of Society for Mathematical Services and Standards
2012	Shriniwas Arkatkar	Modern Traffic and Transportation Engineering Research
		International Journal for Traffic and Transport Engineering
		Transportation Research Group of India Magazine
2012	Sunil Bhand	The Journal Chemical Sensors
2013	C .B. Gupta	Mathematics, Statistics and Operations research
2013	C. Periasamy	International Journal of Science Engineering & Management.(IJSEM)
2013	Dalip Kumar	Chemistry & Biology Interface, (journal of Indian Society Chemists and Biologists) INTERFACE
2013	K.S. Raju	ISH Journal of Hydraulic Engineering, Taylor & Francis, U.K
2013	Meenakshi Raman	International Journal of Communication
2013	Narendra Nath Ghosh	Journal of Nanoscience Letters Science jet
2013	S. Bandyopadhyay-Ghosh	Microscopy Research
		Advances in Biomedical Engineering Research
2013	R.N. Panda	Journal of Nanomaterials
2013	Sunil Bhand	The Journal Chemical Sensors
2015	R. Anand Kumar	Editorial Board of Research Steering Committee (comprising of BPDC, Heriot Watt, Hult, RIT, Middlesex and Manipal). KHDA initiative

*** faculty serving as members of steering committees of international conferences recognized by reputed organizations / societies**

S.No.	Year	Faculty Name	International Conference Name	Organizing body/Society
1	2010	S K Verma	1st International Conference on Advances in Biotechnology, Singapore	Global Science and Technology Forum
2	2010	S K Verma	3rd International Conference on Advances in Biotechnology, Singapore	Global Science and Technology Forum
3	2011	Kuldip Singh Sangwan	18th CIRP International Conference on Life Cycle Engineering, Germany	CIRP, The International Academy for Production Engineering
4	2011	C.B. Gupta	The International Conference on Operations Research and Statistics	Global Science and Technology Forum
5	2011	S K Verma	2nd International Conference on Advances in Biotechnology, Bangkok	Global Science and Technology Forum
6	2012	Suresh Gupta	The International Congress on Chemical, Biological and Environmental Sciences	Higher Education Forum, Taiwan
7	2012	Narendra Nath Ghosh	CSIR SRF/RA Committee in the area of "Material Sciences (CHEM/24)	CSIR
8	2012	Suresh Gupta	International Congress on Chemical, Biological and Environmental Sciences	Higher Education Forum, Taiwan
9	2013	Chandra Shekhar	National Conference on Mathematical Modelling and Application in Science and Engineering (MMASE 2013)	Department of Mathematics, National Institute of Technology, Patna
10	2013	M.S. Soni	Asian Conference on Civil, Material and Environmental Sciences, Osaka, Japan 7-9 November 2013	Higher Education Forum, Taiwan
11	2013	K.S. Sanghwan	20th CIRP International Conference on Life Cycle Engineering	CIRP, The International Academy for Production Engineering
12	2013	S K Verma	4th International Conference on Advances in Biotechnology, Dubai	Global Science and Technology Forum

3.4.4 Provide details of

∗research awards received by the faculty and students

∗national and international recognition received by the faculty from reputed professional bodies and agencies

S.No.	Year	Faculty/Student Name (s)	Recognition/Award	Awarding Body
1	2010	Ram Kinkar Roy	Senior JSPS Fellowship	Japan Society for Promotion of Science
2	2010	Navneet Goyal and Poonam Goyal	IBM Scalable Data Analytics for a Smarter Planet Innovation Award	IBM
3	2010	N.N. Sharma	Kris Ramachandran Faculty Excellence Award	BITSAA
4	2011	Ankit Chaudhary	Best presenter award in the area of Soft Computing	International Conference on Computer Science and Information Technology, Bangalore
5	2011	Poonam Goyal	Recognition of Women in Data Mining Citation	9th Australasian Data Mining Conference, (AusDM 11) held in Ballarat University, Australia
6	2011	Jitendra Panwar	Visiting Professor Fellowship	INSA-NRF International Bilateral Exchange/ collaboration Program
7	2011	R.N. Saha	Shri. S. K. Birla and Smt. Sarala Birla Chair Professor of the Year	BITS- Pilani
8	2011	D. Sriram	Shri. S. K. Birla and Smt. Sarala Birla Chair Professor of the Year	BITS- Pilani
9	2011	Suman Kapur	Shri. S. K. Birla and Smt. Sarala Birla Chair Professor of the Year	BITS- Pilani
10	2012	Sandhya Mehrotra	Indo-Australia Early Career S&T Visiting Fellowship	Indian National Science Academy
11	2012	D. M. Kulkarni	Prof. S. Venkateswaran Faculty Excellence Award 2012	BITSAA
12	2012	Anil Kumar	ISCB Young Scientist Award	Indian Society of Chemists and Biologists, Lucknow and Harrison McCain Foundation award by Acadia University, Canada

13	2012	B. K Rout	Indo US Science and Technology Fellowship	Indo US Science and Technology Forum
14	2012	Vineet Kumar Singh	BOYSCAST Fellowship	DST, India
15	2012	Sonal Kumari	Canadian Govt. Commonwealth research scholarship	Government of Canada
16	2012	Sartaj Singh Manhas	Indian Academy of Sciences Summer Research Fellowship	Indian Academy of Sciences
17	2012	Aman Agarwal	Indian Academy of Sciences Summer Research Fellowship	Indian Academy of Sciences
18	2012	Udbhav Prasad	DAAD Summer Internship Program	DAAD, Germany
19	2012	Gyan Prakash	Excellence in Research Award 2012	IIT, Bombay
20	2012	Sankalp Singayapally	Indian Academy of Sciences Summer Research Fellowship	IISc, India
21	2012	Ekta Khetan	Khorana Program summer internship for summer research	University of Illinois Urbana-Champaign, USA
22	2012	Amit Nag and Subhas Ghosal	Selected under the scheme “bilateral collaborative exchange programme"	INSA, India
23	2013	Prabhat N Jha	Awarded Raman Post-doctoral Fellowship under Indo-USA knowledge initiative program	University Grant Commission, New Delh
24	2013	Indresh Kumar	INSA-Visiting Scientist Fellowship-2013 Award	INSA, New Delhi
25	2013	Yadav Dinesh	Rajeev Gandhi Leadership Award	India Peace Foundation
26	2013	Udbhav Prasad	Charpak Scholarship to visit Ecole Normale Superieure(France)	French Embassy, India
27	2013	R.N. Saha	Pharmaceutical Professional of the Year Award	Indian Association of Pharmaceutical Scientists and Technologists (IAPST)
28	2013	Anwaya Aras and Apoorva Deshpande	Anita Borg Memorial fellowship	Google, Inc.
29	2013	D. Sriram	UGC researcher award	UGC, India

30	2013	P. Yogeeswari	IASP 2014 Award for Excellence in Pain Research and Management in Developing Countries Award	15thWorld Congress on Pain, Buenos Aires, Argentina
31	2013	P. Yogeeswari	Shakuntala Amir Chand Prize 2010	Indian Council of Medical Research
32	2013	V.S. Rao	Eminent Educationist Award	Indus Foundation during their Indo global education summit – 2013
33	2013	Ben Anthony, Deol Adhithia, Jerin Philip, Samson Varghese	Best IDEA Prize	ESREC 2013 (Engineering Students Renewable Energy Competition 2013
34	2013	Deepan Kishore Kumar	First Rank	United Arab Emirates Undergraduate Student Research Competition (UGSRC)
35	2013	Deepan Kishore Kumar	Summer Undergraduate Research Fellowship	CALTECH, USA
36	2013	Adarsh Venkataraman Ganesan and Shruti Nambiar	MITACS Globalink Internship Award 2013	University of British Columbia, Canada
37	2013	Arihant Sogani	Scholarship Award	Upsilon Pi Epsilon (UPE), International Honor Society for the Computing and Information Disciplines
38	2014	Banashri Roy	Visiting Scientist Fellowship 2014-15	INSA, India
39	2014	Anil Kumar	Dr. Arvind Kumar Memorial Award	Indian Council of Chemists (ICC)
40	2014	Anshuman Dalvi	Fellowship	INSA, India
41	2014	Subashis Gangopadhyay	DAAD Fellowship for University Academics 2014	DAAD, Germany
42	2014	Asima Shaukat	INSA Inspire Faculty Award	DST, India
43	2014	Ranjit S Patil	INSA Visiting Scientist Award 2014	INSA, Govt. of India
44	2014	K.Srinivasa Raju	S.N.Gupta Memorial Award for Research Contribution to the field of Water Resources Engineering	Indian Society for Hydraulics
45	2014	Amit Kumar Gupta	S.Venkateswaran Faculty Excellence Award	BITSAA
46	2014	Praharsh Pai Raikar	MITACS Globalink Research Internship	University of Waterloo, Canada

47	2014	Amit Setia	Raman Post-Doctoral Fellowship	INSA, India
48	2014	Ramakrishnan Ganesan	Received Indo-US Science and Technology Forum (IUSSTF) Research Fellowship Award	IUSSTF
49	2014	Amit Kumar Gupta	UGC Research Award for contributions in Mechanical Engineering	UGC, Govt. of India
50	2014	Anomitra Banerjee	First prize in Old Guard Oral Presentation Competition(OGOPC)	ASME International Mechanical Engineering Congress and Exposition (IMECE-2014) held on NOV 15.2014 at Montreal, Canada
51	2015	Mihika Shivkumar, Varun Sharma, Matthew Abraham, Sean D'Rosario	victorious in the final round of Business Case Study Challenge	Middlesex University on 23 Feb. 2015
52	2015	Alok Rajiv and Lakshay Arora	Best idea - iBOX a physical cloud storage	The Cribb, Al Quoq organized by Turn8, 1st of May 2015

Apart from above several students and faculty have received best research paper award at national and international conferences/seminars etc.

3.4.5 Indicate the average number of successful M.Phil. and Ph.D. scholars guided per faculty during the last four years. Does the university participate in Shodhganga by depositing the Ph.D. theses with INFLIBNET for electronic dissemination through open access?

Year	No of Ph.D awarded	Ratio of faculty to Ph.D scholars guided
2011	35	0.11
2012	37	0.09
2013	46	0.11
2014	54	0.12
2015 till date	48	0.11

BITS Pilani participates in Shodhganga project and uploads all PhD thesis on its website.

3.4.6 What is the official policy of the university to check malpractices and plagiarism in research? Mention the number of plagiarism cases reported and action taken.

The BITS-Pilani University strongly endorse ethical practices in its research endeavour. The Code of Ethics in Research sets forth general principles of ethical conduct to guide faculty members and research scholars toward the highest ideals of scholarly research.

Academic offences and Plagiarism related issues are viewed very seriously in the University. The university provides guidelines to all research students to check and provide a report on plagiarism by using *Turnitin* software. While submitting the final Thesis /dissertation report to the supervisor, students are asked to submit OSI (Overall Similarity Index) report also (plagiarism report generated by Turnitin software). Faculty provide formative support to student in checking and understanding plagiarism and, if required, modifying report to

1) Reduce **Overall Similarity Index** (OSI) to less than 25% or less, and
2) Reduce **Individual Source similarity Index** (ISI) to less than 5% for every source.

The student's marks for the report are decreased in case a high OSI is reported. This is indicated beforehand to the students as it could even lead to RC (Registration Cancelled for that particular course) any time during the course of a semester/ at the end of the semester if final report submitted with high OSI and or ISI).

Code of Ethics for Research

All faculty, research staff, and students, Ph. D scholars should fulfil the responsibilities and obligations as stated below:

A. Competency in the conduct of research
- Conduct all research activities in accordance with the accepted standards of their discipline or thrust areas of research.
- Refrain from accepting or undertaking research assignments in which they lack competencies, unless collaborating with or being supervised by a more knowledgeable scholar.
- Avoid claiming a research competency that they do not possess in their research endeavour.

B. Accuracy of research data and reports
- Ensure that only genuine data, information and research results shall be reported in journals, conferences, and workshops.
- In case significant errors are found in the published data, researcher will take reasonable steps to rectify those via the issuance of erratum, retraction etc.

- Refrain from making misleading inferences or declarations which could be subject to misinterpretation.
- Avoid making exaggerated claims/results not found in research inquiry.

C. Acknowledgment of sources of data/information/other contribution to the research

- Not to plagiarize or steal ideas from others.
- Cite clearly all sources of information and data that are used.
- Give proper acknowledgment and credit to resource/funding sources of our research.

D. Openness and responsibility in the conduct and presentation of research

- Keep detailed and complete records of research undertaking and make it accessible to the public source once the research result is concluded.
- Be transparent in the use and disbursement of resources for our research.
- Declare promptly any conflict of interest in our engagement in research and presentation of research results.
- Respect the confidentiality of sources by not using or releasing data and information revealed to us in confidence.

Process followed in Ph.D programme to maintain ethical standards: Each department has constituted a Doctoral Research Committee (DRC) to monitor the academic research activities. DRC is chaired by HOD with 4-5 faculty members(Assistant Prof. and above) in the department. The following are in practice:

1. When a Ph.D. student is enrolled, DRC proposes the notional Ph.D. supervisor and in consultation with him, decides the course package required for the candidate.

2. Based on the research topic, two faculty members called as Doctoral Advisory Committee (DAC) are appointed to monitor the progress of the candidate. Periodic interactions are done to monitor the student's progress towards thesis submission.

3. Upon completion of the research work, a draft thesis is submitted before DAC and their suggestions are taken. Upon their consent, a pre submission seminar is conducted, the thesis title is approved and Ph.D. thesis is submitted. It is ensured that candidate has publication in at least two peer reviewed international journals.

4. To uphold the academic honesty and integrity with regards to the academic and research work in the global community, the thesis is checked using *Turnitin* software as a measure for anti-plagiarism.

3.4.7 Does the university promote interdisciplinary research? If yes, how many interdepartmental / interdisciplinary research projects have been undertaken and mention the number of departments involved in such endeavours?

Yes, Institute promotes and supports IDR by various measures as mentioned in Question 3.1.4. Institute supported several IDR projects and more or less all the departments are involved in some way or other in IDR. BITS Pilani has identified few areas such as Water Waste and Energy, Remote sensing, disaster management, agriculture and cold chain, soft computing, biomedical instrumentation, tissue engineering, nanomedicine and drug deliver etc., where university has core strength in terms of expertise and infrastructure.

BITS Pilani launched Centre for Research Excellence in "Water, Waste, and Energy Management in May, 2014. Under this programme, 5 projects have been supported with committed funding of Rs. 2.34 Cr. to undertake development of solutions to real problems in managing waste and water. These are inter-disciplinary R&D projects requiring cross-discipline and cross-campus collaboration amongst faculty. While these projects are slated to be completed in summer of 2017, our Faculty already received approval for additional funding of Rs. 1.22 Cr. from external sources for 3 projects.

3.4.8 Has the university instituted any research awards? If yes, list the awards.

Following research awards have been instituted by BITS Pilani

- Chair Professorship to recognize and reward excellence in research and teaching by a member of BITS faculty.
- The awards named OPERA awards (Outstanding Potential for Excellence in Research and Academics) are to facilitate and incentivize new faculty to join BITS and excel in research and teaching.

3.4.9 What are the incentives given to the faculty for receiving state, national and international recognition for research contributions?

Yes, due weightage is given during performance appraisal.

3.5 Consultancy

3.5.1 What is the official policy of the university for structured consultancy? List a few important consultancies undertaken by the university during the last four years.

BITS has a policy guidelines for faculty to undertake consultancy from industry/agency (both national and international) coordinated by Sponsored Research and consulting Division (SRCD). The policy states that the

eligibility of the faculty, the process for submission of proposals, budget guidelines, the MoU/agreements requirement, the execution process, the constraints, external consultants, retainership, conflicts of interest, to be added the total duration of consultancy during a year and exceptions.

Consultancy Projects

Sl.No	Title	PI	Funding agency	Department	Sanctioned amount in Lakhs
	Pilani Campus				
1	Evaluation of Anti-Diabetic Foot Cream	Dr. R. P. Pareek	TTK LIG Ltd., Chennai	Pharmacy	3.0
2	Optimization of extraction process of sennosides	Prof. R.N. Saha	SPIC, Alwar	Pharmacy	2.50
3	Optimization of up-gradation process of extracted products	Prof. R.N. Saha	SPIC, Alwar	Pharmacy	2.50
4	Development of stable formulation for selected combination drugs	Prof. R.N. Saha	IPCA Labs. Mumbai	Pharmacy	10.0
5	Development of aqueous parental formulation of a selected drug	Prof. R.N. Saha	IPCA Labs. Mumbai	Pharmacy	10.00
6	Verifying the structural evidence for presence of Sennosides	Prof. Hemant R. Jadhav	SPIC, Alwar	Pharmacy	0.50
7	Pharmaceutical Application Studies of Polymers Manufactured by BASF	Prof. Shrikant Charde	BASF	Pharmacy	2.00
8	A Clinical Validation Report of Vital track Telemedicine Solution	Prof. R P Pareek	Maestros Mediline Systems Limited, Mumbai	Pharmacy	1.0
9	Design optimization of Insulator Caps	Mani Sankar Dasgupta	Aditya Birla Nuvo	Mechanical Engg	5.0
	K K Birla Goa Campus				
1	Designing, System Integration, Installation, Commissioning and training operations for PILOT Units	Dr Ponani	Labcon	Chemical Eng	0.30
2	Study & Analysis of discharge of river sal from konkan railway/ E.S.I. Nallah, Salpem lake	Prof. M.Srikanth	PWD,Goa	Biological Sciences	-
3	Consumable, "Benchmarking of IFB detergent additives"	Prof. M.Srikanth	IFB	Biological Sciences	-
4	Pilot scale study of carbon dioxide sequestration using algae at the site	Prof. M.Srikanth	ONGC Hazira Gujarat	Biological Sciences	1.00
	Developing of Stem cell Biology	Dr.	Dr. Kedar, S	Biological	0.15

5	Lab	Angshuman Sarkar	Maternity, Infertility & Surgical Hospital Goa IVF Centre	Sciences	
6	To Establish COD (Cr) Quality testing method for sea water	Prof. M.Srikanth	Hitachi India Pvt. Ltd	Biological Sciences	2.50
7	Development of technologies for isolation of natural products	Dr. Mainak Banerjee	Kurade Agro Cuncolim Goa	Chemistry	0.90
8	Studies on two phase nozzles (nozzle system) and assistance in the generic design of novel SBR using two phase nozzles	Prof. Srinivas Krishnaswamy	R.D.Aga reserch , technology and innovation center Thermax ltd, pune	Chemical Eng	6.0
9	Environmental Studies of Goa s wild life sanctuary	Dr. Rayson alex	MOEF/GIZ GIZ, New Delhi, in collaboration with Forest Department, GoaGermany	Humanities Dept	2.50
10	CTO Research Sabbatical Role	Prof. Ashwin Srinivasan	Tata Consultancy Services (TCS)	CS IS	2.50
11	Analysis of FRP Sectional Panel Tanks	-	BTCL Composites Goa	Chemical	0.50
12	Thermo-structural Analysis of Sea Harrier Platform	Prof. B.J.C Babu	Indian Navy	Mechanical	0.50
13	Impact Evaluation on Empowerment of SC/ST candidates using ICT tools in the State of Goa	Dr. Ch. V. V. S. N. V. Prasad	Karnataka State Electronics Development Corporation	Humanities	0.50
14	Isolation of natural products from Kokum	Dr.Mainak Banerjee	Kurade Agro, Goa	Chemistry	2.25
15	Analysis of Stakeholders in Dr. Salim Ali Bird Sanctuary, Chorao, Goa.	Dr. Rayson Alex and Solano Da Silva	The German Development Cooperation (GIZ).	Humanities	2.68
16	Technical Education Quality Improvement Programme	Dr. Basavadatta Mitra	MHRD, GOI	-	-
17	To Establish COD (Cr) Quality testing method for sea water	Prof. M.Srikanth	Hitachi India Pvt ltd	Biological Sciences	16.00
	Hyderabad Campus				
1	Industry sponsored, Ranbaxy Research labs, Gurgaon	Prof. Suman Kapur	Ranbaxy Research Lab	Biological Sciences	4.45
2	Development of novel antitubercular drugs ASTRA ZENECA	Prof.D.Sriram	ASTRA ZENECA	Pharmacy	11.11
3	Development of Novel anti-inflammatory agents, Incozen Therapeutics Ltd., Hyderabad.	Prof. P. Yogeeswari	Incozen Therapeutics	Pharmacy	21.00
4	Indian institute of Biotechnology pvt. Ltd	Prof. M B Srinivas	IIBT	EEE	3.20
5	Standardization of ELISA for b - endorphin	Prof. Suman Kapur	IIBT	Biological Sciences	6.10
6	Arogya-Health care Delevering program	Prof. Suman Kapur	Arogya-Health care	Biological Sciences	2.08
7	Improvement of productivity in monoclonal anti-bodies	Dr. Asma Ahmed	Iranian Company-Aryogen	Chemical Engg	4.55

8	Matlab Modelling of A Novel Battery System For Hyderabad Batteries Limited	Dr. U. M. Rao	HBL Power Systems Ltd	EEE	2.00
9	Process Modeling and validation of flotation cell	Dr.Jeevan Jaidi	Tennova	Mechanical Engg	7.83
10	Design of Novel Drug Delivery System for Canidate Drug	Dr. Srikanth Charde & Dr. Punna Rao	consultancy	Pharmacy	5.27
11	Process Modeling and Validation of Flotation Cell: Development of 3-D Multiphase Turbulent Model (Phase-1)	Dr Jeevan Jaidi	Tenova Delkor India	Mechanical	7.83
12	CFD based Process Optimization of BQR15 Flotation Cell and Scale-up for Larger Cells (Phase-2)	Dr Jeevan Jaidi	Tenova Delkor India	Mechanical	18.16
	Dubai Campus				
1	Product Redesign Of Cable Pulling Winch Machine	Dr.R.Karthikeyan	Elfit Arabia, Ajman, UAE	Design Engineering	AED 30,000.

- **BITS Pilani** transferred three technologies to the start-up company **Yogee'S Bioinnovations Private Limited** at TBI, BITS-Pilani, Hyderabad campus. The technologies include one patented discovery of drug candidates useful for the treatment of epilepsy and neuropathic pain including diabetic neuropathy and trigeminal neuralgia. The other two technologies are innovative targeted therapy for neuropathic pain and breast cancer which would be taken up by the company for proof of concept and drug development.

- **BITS Pilani** transferred one technology related to a point-of-care device for measuring blood glucose sensing to the start-up company **Xcellence in Biological Innovations and Technologies Private Limited**.

3.5.2 Does the university have a university-industry cell? If yes, what is its scope and range of activities?

BITS has a strong interaction with Industry by way of various activities managed by different functional divisions and units. BITS Pilani has a University-Industry linkage Cell known as Practice School. The objective of Practice School Division is to foster academic and industry linkages in a structured manner to meet the rapidly changing needs and challenges of a professional workplace and enable students to acquire learning by applying the knowledge and skills they possess, in unfamiliar open ended, real life situations that bear an economic relevance to society.

The complex functions of the cell has been divided into

a) Planning & Development
b) Instruction & Evaluation,
c) Quality Assessment & Assurance
d) Publication & Documentation for easier manage

Practice School Program allows for a two-way information flow between industry and academia providing industry with information about curricula in academic departments and providing educators with information about technological advances in the industry that can be used for constant update of curriculum. The PS course has also played an important role in facilitating about 20% placement offers to the students on their successful completion of the course.

BITS Pilani offers degree programmes through Work Integrated Learning Programmes (WILP) for employed professionals to enhance their academic qualification while gaining significant professional experience at their respective employing organizations. The Work Integrated Learning Programs connects BITS to more than 200 industries and are specifically designed to integrate the learning with their working environment. Specific Programmes are also offered under Corporate Partnerships to leading organizations from several industries customized to suit their Learning & Development requirements. The concept, design and operation of Work Integrated Learning Programmes ensure rich learning experience for the students through Virtual Classrooms, Regular interactions through Learning Management Systems and access to reference materials through Digital Library.

The SRCD office also coordinates with Industries for undertaking the industry-relevant sponsored projects of. The Institute has a Centre for Innovation, Incubation and Entrepreneurship (CIIE) headed by a University level Professor - In -Charge and Campus level Faculty In-charges. The center coordinates with industry for undertaking innovative projects as well as facilitating industry engagement for R&D. In collaboration with the Department of Science and Technology, GoI, BITS Pilani has established a Technology Business Incubator (TBI) in its three Indian Campuses. TBI aims to provide a low cost and resource intensive sandbox where entrepreneurs can develop their product, services or process ideas towards commercialization. Further, Industry Day has been instituted to facilitate interaction of faculty experts from various industry and the faculty of BITS. 17 sponsored projects have been received form Aditya Birla Group of Industry and other organisations such as GAIL, Accenture, Lockheed Martin, etc.

3.5.3 What is the mode of publicizing the expertise of the university for consultancy services? Which are the departments from whom consultancy has been sought?

BITS has expertise for consultancy in all engineering disciplines and life science areas like Pharmacy, Biotechnology, Biology, Physics, Chemistry, Computer sciences, Economics and Finance, Humanities and Social sciences, Mathematics, Electrical, Electronics and Instrumentation Engineering, Chemical Engineering, Civil Engineering and Mechanical Engineering.

BITS publicizes its expertise through various department websites as well as through offices of SRCD, CRDO, TBI, CIIE. The faculty also visit various industries through Industry immersion to identify the opportunities for consultancy.

The various offices also facilitate participation in various industry events such as Chamber of Commerce, MSME etc. SRCD office provides financial support to invite industry experts to campus.

Mission-2015 industry engagement imperative team introduced new initiatives with the objective of achieving deeper industry engagement for about one-fourth of BITS Pilani faculty members by the turn of 2015.BITS Pilani became the first University in India to conduct a full-fledged Industry Day. Eleven top executives (CEO/CTO) of five reputed companies, namely, Hindalco, L&T, Tube Investments (Murugappa Group), Thermax and Tata Advanced Material Ltd (TAML) participated in the Industry Day. In addition, Industry immersion program and various industrial research projects are currently undertaken. Regular workshops were conducted by the Mission teams for deeper industry engagement and increased awareness among faculty members towards practice- based instruction and collaborative research with industrial organizations. The number of applications from faculty members for industry immersion programme increased four-fold from 2014 to 2015. Corrective measures were incorporated based on the feedback received from the faculty members returning from industry immersion.

3.5.4 How does the university utilize the expertise of its faculty with regard to consultancy services?

Faculty expertise is used in all the developmental activities of the Institute wherever required. For example, the Computer Science faculty members contribute in campus networking, ERP implementation, etc. Civil engineering faculty and staff take active interest in infrastructural development on campus.

3.5.5 List the broad areas of consultancy services provided by the university and the revenue generated during the last four years.

BITS has expertise for consultancy in all engineering disciplines and life science areas like Pharmacy, Biotechnology, Biology, Physics, Chemistry, Computer sciences, Economics and Finance, Humanities and Social sciences, Mathematics, Electrical, Electronics and Instrumentation Engineering, Chemical Engineering, Civil Engineering and Mechanical Engineering. The List of consultancy projects and their values is shown in 3.5.1

3.6 Extension Activities and Institutional Social Responsibility (ISR)

3.6.1 How does the university sensitize its faculty and students on its Institutional Social Responsibilities? List the social outreach programmes which have created an impact on students' campus experience during the last four years.

There are many social organizations actively working on campus like NIRMAAN, Udaan and Abhigyaan and SCIO in order to instil a sense of social fulfilment among students.

- **NATIONAL SERVICE SCHEME:** The Institute has a National Service Scheme (NSS) which enrolls about 200 students every year. NSS aims at developing amongst students a sense of participation in nation building through social work.

- **NIRMAAN:** Nirmaan Organization is a constructive citizen movement for an empowered India. This social Organization founded on 12th February, 2005 by a group of BITS Pilani University Students is now spread over all the BITS campuses Pilani, Hyderabad and Goa and also with full time chapters in Bengaluru and Hyderabad. Nirmaan has been phenomenal in creating greater impact in areas of educational initiatives, livelihood opportunities and socio-technological sectors. Currently the Nirmaan workforce stands at 1200 across India and corporate chapters at US, UK and Singapore.

- **Udaan:** It work for women workers is centered on three Es: Enlighten, Empower, and Engage. They aim to do this by teaching them arithmetic, alphabets, skills, and ideas to make them socially confident and aware.

- **ABHIGYAN:** It works towards the well-being of the people who work hard to make our lives at Goa Campus comfortable. Besides teaching the mess workers and security guards the rudiments of Maths, English and the sciences, they also teach their children.

- **Scio Foundation:** Scio is a non profit organisation that aims at forming a support structure for the current education system. In view of the current choices that students make, succumbing to peer and parental pressure, the need for an unbiased voice is really felt. They intend to reach out to students and counsel them to so that they can choose their career paths wisely.

List of social outreach programmes which have created an impact on students' campus experience during the last four years.

Campus	Event	Remarks
Pilani	NSS School	NSS volunteers of the campus cater to the needs and development of students in Pilani regarding regular academics, improving on their English speaking, basics in mathematics and science works in slots of one hour in the evening every day from Monday to Saturday.
Pilani	UDAAN,	Organized where students of various schools participated in different kinds of cultural events.
Pilani	Computer Literacy Program(CLP)	Through NSS scheme students thought the basics of computers to the locals of Pilani
Pilani	English and personality development	Taught basic spoken English and basic etiquettes
Pilani	Junoon	Two day Sports events like Cricket, Volleyball, Basketball, Badminton and various others for special child. Organized unified BOCCEE in association with ESPN, a major sports channel in India for people with special needs
Pilani	Oasis Stall	To promote the work of over 12 NGOs across the nation. The NGO's whose products were kept on sale are FOUR STEPS, GOONJ, KRITI, MESH, MUSKAAN, PARICHAY, TAP FOUNDATION, TENDER

		HEART, WOMEN SYNERGY, WWF, PRATHAM.
Pilani	Blood Donation Camp	over 1200 people volunteered for blood donation, 951 units of blood were collected,
Pilani	DHITI	Numerous NGOs across India were contacted for problem statements which were given out to the student community nationwide. The solutions received were scrutinized with the help of professors and the winners were chosen based on their presentations
Pilani	RTE Seminar	focus of the seminar was section 12 of RTE Act so people could know about the benefits they could seek
Pilani	Cleanliness Drive in	participated and gave a good start to the Prime Minister's Swach Bharat Mission.
Pilani	Raila Camp	The main objective was to get the basic right first. Mathematics was the main field of concentration with fun sessions of English at times.
Pilani	tree plantation camp	Spread awareness about the importance of trees and make the area greener and healthier.
Pilani	Agriculture Camp:	Conducted survey to know the situation of agriculture. Soil samples were collected and sent to the laboratories for details and results were conveyed to the villagers along with effective ways to help them improve their productivity and utilize the soil and climatic conditions to the fullest
Pilani	Matru Suraksha Camp	Conducted survey to know the situation of prenatal and post natal care.
Pilani	Health Camp	A general Health camp was organized for the people of Raila and health related issues were attend and medicines were provided free of cost.
Pilani	GHARINDA	The objectives were to find the health conditions, Medicines and facilities available and spread awareness about general treatment methods.
Pilani	Women Sanitation Camp	Aimed to find the details about the villagers and their living conditions and information about good eating and living habits were given
Pilani	GHUMANSAR Camp	to impart the basic knowledge of computers and its operating skills to the students studying in schools in and around the village.
Pilani	Parishod	Finding the living conditions, facilities available and problems related to water and electricity.
Pilani	General Survey	The survey showed that the water is having high fluoride content and many other impurities. Also the electricity was quite irregular and hence this problem was quite prevalent in these villages. The rest of the year, probable solutions were searched for and the feasibility measured
Pilani	Women Health camp	Spreading awareness about menstrual problems and distribution of sanitary Napkins.
Pilani	Jherli camp	BITS Pilani has been closely associated with the village of Jherli for the past five years and has played a minor but important role in the development of villages.
Pilani	HARINAGAR Camp	School Students are made familiar with a Computer and are provided the Basic knowledge of various features of MS Word, MS PowerPoint, MS Excel and Internet.
Hyderabad	World water Day	Water quiz was conducted
Hyderabad	Immunization and Blood Donation Camps	Conducted in Thimmapur and Devar Yemjal villages along with student volunteers
Hyderabad	Fluorosis and	Conducted in Pothayapalli and Adraspalli village with 85 volunteers

	General Check up Camp	
Hyderabad	IGNITE	Educating the children of construction workers at BITS Pilani, Hyderabad
Hyderabad	Carbon footprint free	Street Lights donated to Village Lakshmapur. Mass tree plantation was conducted
Hyderabad	Earth Hour	Was held in Hyderabad Campus
Hyderabad	SAHARA	Initiative to collect old clothes & stationery
Hyderabad	Marshal Arts Training	53 kids were trained
Hyderabad	Painting	The volunteers have painted the govt school in the adopted villages
Hyderabad	Voter Registration Drive	successfully registered 523 voters
Hyderabad	Carbon Foot Printing workshop	Renowned researcher and environmentalist, Mr. Sagar Dhara of CERENA foundation was the speaker of the day. The workshop was primarily focused on carbon foot printing calculation, result analysis and methods to reduce carbon footprints.
Hyderabad	Adoption of Thumkunta Village	NSS volunteers are teaching English & personality development for 8th and 9th students.
Hyderabad	Swatch Bharath campaign	Promoted cleanliness drive in the adopted villages and volunteers created awareness among the villagers
Hyderabad	Manthan	aims to provide a platform for various student run or student led Non-Governmental Organization and Social Enterprises to display their work, ideas and share their successes and efforts in the social sector with fellow student run NGOs, CSR wings in various Corporate Firms
Hyderabad	Environment and Animal Welfare Society	improve the waste disposal system Plastics dustbin providing Dump ALL and Biodegradable dustbin
Hyderabad	VIHANG	A sporting festival for the government school kids. Three , government schools participated in this event. Teachers were very supportive in organizing the event and kids were very enthusiastic in participation
Hyderabad	Veda	Aim of the fest was to expose the students to a vast amount of information and content that will help them to make a well-assessed career choice. Veda is being conducted since four years in the campus
Hyderabad	Vaidya- Medical Camp	Conducted by SCIO volunteers in association with Apollo hospitals in premises of the primary school, at Lakshmapur.
Hyderabad	Campus Tour	Students along with teachers of various schools in Hyderabad were invited to the campus. Students were delighted to know about the different branches available in engineering and their future prospects.
Hyderabad	VIDYA	organize career guidance workshops for the high school students to motivate them to pursue higher education and reduce the number of drop-outs in government schools
Dubai	Daan Utsav	The joy of giving week where several events were hosted which includes, a fund raiser Dandiya Night, the institute clean up drive, a thanks giving day for the supporting staffs, cloth collection drive and a day of interaction with special needs children.
Dubai	Pink Day	Breast Cancer Awareness Program
Goa	Udaan	They aim to do this by teaching them arithmetic, alphabets, skills, and ideas to make them socially confident and aware.
Goa s	Abhigyan	It works towards the well-being of the people who work hard to make our lives at Goa Campus comfortable. Besides teaching the mess workers and security guards the rudiments of Maths, English and the sciences, they also teach their children.

3.6.2 How does the university promote university-neighborhood network and student engagement, contributing to the holistic development of students and sustained community development?

Students of BITS are actively engaged in community development initiatives through participation in various student organizations like the NSS, Nirmaan, Udan, Abhyigyan, SCIO etc., which aims to contribute towards nation building through social work. In recent years student volunteers of the Institute are actively involved in the development of surrounding villages through activities like awareness camps, health and blood donation camps, women's self-support groups, creating educational initiatives and livelihood opportunities, etc. Students also invite children from orphanages and special needs school and engage them in fun games and other activities.

3.6.3 How does the university promote the participation of the students and faculty in extension activities including participation in NSS, NCC, YRC and other National/ International programmes?

The Institute encourages participation of the students and faculty members in various organizations operating within the campuses such as NSS, Nirmaan, etc. Adequate funds are provided for running the various programmes through these initiatives. Extension activities such as cleanliness drives, tree plantations and blood donations camps, etc, are regularly conducted with high level of student participation.

3.6.4 Give details of social surveys, research or extension work, if any, undertaken by the university to ensure social justice and empower the underprivileged and the most vulnerable sections of society?

Pilani Campus

The UGC sponsored Centre for Women Studies has been established at BITS, Pilani during March 2005. The objective of the Centre is to work towards upliftment of women and their families in the fields of social, economic and health through technological interventions. Centre has initiated various Social surveys research and extension work since 2005.

A research study on "Safe Motherhood and Access to Resources among Nomadic Populations in Desert Regions in Rajasthan, India and the Negev, Israel –A Comparative Perspective" has been conducted to examine the current situation of nomadic communities of Rajasthan with a particular focus on understanding the gender component of their lives. The study found that majority of the women did not use contraceptive for birth control, most pregnant women did not want to go to hospital, though they were aware of the need for vaccination and iron yet did not visit hospital due to fear of blood being taken and though majority of them were aware about importance of nutritional food; their economic factor was a barrier.

A research study on "A Sociological Study on Domestic Violence Against Women in Villages near Pilani, Rajasthan" was also carried out by the center with objectives of examining the prevalence of domestic violence against women in two selected villages; studying the nature of violence and its causes; examining the link between social variables and domestic violence against women. The study explored that domestic violence was prevalent in nearby villages of Pilani. Lack of proper education among respondents (victim) was found to be the main cause of domestic violence against women and though 21cases were found not a single one was reported to the police or NGO.

Another research study "Gender Discrimination at work place in and around Pilani, Rajasthan" was also conducted by the center to find out the different types and causes of gender discrimination at work place and the impact of such discrimination on the physical and mental health of individuals. The study concluded that not only women, but men are also discriminated in their working places and discrimination causes negative impact on the physical and mental health of the people.

A visual documentation on the status of women in different age groups in some selected villages in and around Pilani was prepared by faculty members to study the impact of activities of Government and non-government organizations that have been actively involved in areas related to women empowerment. Besides conducting research studies, the centre has initiated several workshops, training programmes and panel discussions for the benefit of the women and young girls of the campus and those in and around Pilani.

A series of **Awareness & Training Program on Effective Use of Domestic Electrical Appliances for on-campus Women'** was conducted to promote awareness regarding basic understanding about electricity, maintenance and repair of domestic electrical and electronic appliances and also about saving energy. The Centre has also organized a two day Training Program on *"Entrepreneurship Development - Day Care Centre"* for women. 12 women participated in this Workshop as a result of which a Day-care center has also been established in the campus.

A series of three and half months teaching and training **Course on Computer Literacy** for Rural Based Girls and Women" and Training Programme on Computer Awareness has also been offered by the centre to promote awareness regarding the use of computer, to take advantage of all information available on net and to build confidence and mitigate inhibition of handling Computer. After completion of the course, some of the candidates from previous batches have got employment in government, private schools and at computer training Institutes. The centre with collaboration of READ India, New Delhi conducted training programs for female and male members of Panchayati Raj Institutions in the selected Panchayats of Pilani, to make Panchayat members (especially females) capable enough to utilize their powers in efficient and effective ways; to make them aware of their judicious roles and responsibilities for community development as well as in ensuring social justice.

The UGC Centre for Women Studies, BITS, Pilani has initiated an activity on "Accessibility to Primary Healthcare for Villages around Pilani – A Telemedicine based Solution for Rural Women" at Sewa Bharti, Pilani to provide basic health check-up and monitoring in the village itself with help of Information and Communication Technology, to improve accessibility of health care and utilization of available primary health care for infants, children, women and elderly and to provide low cost health care to the villages. The UGC Centre for Women Studies at BITS, Pilani had also initiated the activity on recycling of paper by setting up the Mini Paper Recycling Unit to use the waste papers of the institute. Ten rural women were trained by TARA & CWS team on recycling of waste paper.

The UGC Center for Women Studies organized Workshop on 'Proper Sitting Posture" to promote awareness regarding necessity of proper sitting posture in day to day life and to follow right posture at workplace to increase work efficiency**.** A workshop was also conducted on "When to see a Gynecologist" at BITS, Pilani to make the women and girls understand the human body and how it works, to help them identify problems early so that they can be treated or kept from getting worse and to prepare them for healthy relationship and future pregnancies. 31 women and girls from BITS and CEERI campuses participated in this Workshop.

With the collaboration of NIRMAN organization the centre had also organized a training Programme on '*Pottery Making"*, at BITS, Pilani to provide vocational training oriented towards local and regional job prospects, to make optimum use of the local resources and to make the women empowered through vocational training. 35to 40 participants from BITS Campus and outside the campus were participated in this Workshop. Another workshop was conducted by the centre on "Obesity Management" with the objective of making people aware about the causes of obesity and the diseases caused by it, to help them for the real assessment of obesity and to make them aware about its management.

The centre had also organized a Workshop on "Common Errors in English" to make people aware about the types of errors committed, to make them find the reasons for the errors and to help them overcome the errors. 65 to 70 participants from different schools of Pilani participated in this Workshop.

UGC Centre for Women Studies organized a drawing competition for the girls and women on "Women Empowerment" on 23rdFebruary, 2013. The objective of the competition was to provide an opportunity to the young girls and women to observe and respond to the specific issues concerning women and girls on the theme. Nearly 55-60 participants from the campus participated in this competition. A debate competition among the school students of Pilani campus on "*Whether women Justify reservation policy in Panchayats*" on 16th November 2013, at BITS, Pilani . to provide a space for opening up / sharing the views regarding the reservation bill, to help the girls to understand their political right as citizen and to provide an opportunity to the young to observe and respond to the issues and help in further policy making.

The centre for women studies also organized an open forum discussion on "Breaking the Culture of Silence for combating the violence against women". The objectives of the workshop were to help the women and girls how to overcome the fear, stigma surrounding sexual violence, and to make the women aware of the legal rights or responsibilities and solution available to them, so that they can exercise them at appropriate time. In the series of its workshops related to pertinent issues of society, the center, organized a workshop on health and nutrition for young girls in the campus.

A Panel Discussion on "Legal Literacy: Are We Aware of our Rights?" was organized for the Women and girls of the campus to make women aware of their legal rights and responsibilities, in order to exercise and to help them recognize when a problem or conflict is a legal conflict and when a legal solution is available. UGC Centre for Women Studies in collaboration with the Nirmaan organization also organized a Candle march and Marathon in support of women's safety and justice for victims of gender abuse. Besides these activities, the centre has also been celebrating International Women's Day every year to pay respect and understand the importance of women, to make them realize their inner potential and to make them women come out of their routine work and have fun and enjoyment.

Goa Campus

Social surveys research and extension work is carried out by faculty members across all campuses. Few examples from one of the campuses is mentioned below:

A survey work was conducted among women, youth and lower income categories in Goa to estimate and assess risk propensity and self- esteem. A paper was presented in a New York Conference on Behavioural Finance and Economics on 19thSept, 2012. Subsequently the paper on self-esteem and risk propensity has been accepted for publication in Behavioural Finance and Economics Journal, USA. This survey has given mixed results. The vulnerable /low income group and male students (within age group <25) showed high risk behaviour but women showed low risk behaviour.

- Some faculty members are involved in social movements such as the Goa Bachao Abhiyan (GBA) and a village-level forum "The Pilerne Citizens Forum (PCF)" where the issues like land-use and governance. They conducted survey in 2013 to analyse remittance behaviour of unskilled labour migrants in Goa. Results have been analysed and a research paper titled:" Policy implications for financial inclusion of unskilled labour migrants: Insights from Goa " has been under the editorial review process of Taylor and Francis journal.

- Help Age India's "AdvantAge" Program seeks to mitigate the problems of elderly people through the promotion of Active Aging concept. Towards that end, new Members (i.e. elderly, marginalized population) and Associates (i.e. participating businesses) are created by providing economic incentives to the appropriate stakeholders.

In this study the operational aspects of Advantage program are studied using field data. It is found that the contribution of Associates varies in proportion to industry profit margins and elasticity of demand also plays an important role. 2) The beneficiaries of such initiatives are not just elderly people who are entitled to economic incentives and active aging opportunities, but also local businesses who can leverage marketing avenues such as advertising and 'socially responsible' branding. 3) Advantage program beneficiaries gain from increased access to health and lifestyle products, engage in social networking activities with a common cause and thus progress towards a healthy, active and socially meaningful life.

Impact Evaluation on Empowerment of women SC/ST Candidates Using ICT Tools in the State of Goa: A study was conducted to assess the impact of training programme conducted by the Karnataka Electronics Development Corporation (KEONICS). During April 2012 – May 2013, KEONICS offered training programmes to Empower women SC/ST Candidates using ICT Tools across 7 centres in the State of Goa. 800 ST candidates and 200 SC candidates were trained (3 batches) in Travel & Tourism, Hardware & Networking, Computerized Financial Accounting, Business Process Outsourcing and Web Designing using ICT tools. This training programme is the first of its kind offered by a Government Organization in the State of Goa under the aegis of the Department of Electronics and Information technology, Government of India. The primary objective of this programme was to impart employment-oriented computer training to SC/ST candidates in Goa. The impact of this training programme was assessed in terms of knowledge gain, overall personality, confidence, self reliance, social status and financial status, and employment generation.

A survey was conducted on 'General health and well being of children' battling alcoholic parents in Goa. In the survey it was found that many children were turning into orphans or being raised in single parent households. Education dropout rates were found to be higher in these children; degree of aggression was higher in children with alcoholic parents.

Hyderabad campus

Climate Change, Market and Livelihoods Survey: The survey mainly looks into the issues of rainfall variability, coping strategies and livelihoods of farmers in three irrigation projects. Field work was carried out with the help of local resource persons in Nizamsagar Project (Nizamabad District-Telangana); Left Bank Canal of Nagarjuna Sagar Project (Krishna District-AP) and Tungabhadra Low Level Canal (Kurnool District-AP). We 30 farmers in each of the 3 irrigation projects were interviewed to understand the changes adopted by them in their cultivation methods and cropping pattern.

Survey on Linguistics: The survey was carried out in Bastar, Chhatisgarh and covered an entire village of 50 families to get information about why people wish to send their children to English medium schools.

Agricultural Products Marketing: This study examines the farmers' benefits from procurement centers of branded retailers and also emphasizes on the environmental issues posed by the conditions and the working styles of procurement centers. The study finds that there exists a free flow of information between farmer and the branded retail store, which is absent in the market yard or the Rythu Bazar, and this information is one of the main keys to their success. With no commission costs and reduced transportation costs, these procurement stores have led to better price discovery. In spite of having few ill-effects, their emergence has created a new market model that yielded better benefits to the farmers.

Dubai Campus:

Students and faculty of Dubai campus conducted surveys on socially related problems. A study on learning ability of different abled school students was conducted by students under the guidance of faculty and it was found that learning ability of differently abled students can be higher if they are placed along with normal students instead of teaching them separately. A study on communication ability of lower level staff and workers in Dubai had been made and training programs accordingly was made for them.

3.6.5 Does the university have a mechanism to track the students' involvement in various social movements / activities which promote citizenship roles?

Every campus has Student Welfare Division that takes care of student mentoring, progression and support related activities. All the four campuses of the Institute have a student council which actively creates and maintains a database of all students involved in any extracurricular activity with the details of the activity. With this, the student council tracks the involvement of each student as well as the participation of the campus in general, in these activities. The university brings out an official publication biannual (semester newsletter), BITSCAN which records all students achievements and activities in addition to Institute related events.

In Hyderabad Campus at the time of general elections SIRI (society involved in reinventing India on campus) student organization actively participates in collecting voter id application forms and distributes the voter ID cards to all students in the University campus.

BITS MUN: BITS Model United Nations program (BITSMUN) is held in all campuses of the institute. BITS Pilani takes pride in being one of the pioneer MUNs in India, with promising state of the art infrastructure, an international platform for exposure, recognition and regular interaction. Over the years, the event has gained international repute, regularly hosting delegates from across the world. BITSMUN hosts the crème de la crème of the South Asian MUNing circuit, hosting delegates from India, Indonesia, Nepal, Kyrgyzstan, Bangladesh, Africa and Europe, bringing together over 350 young people annually, to discuss and debate on some of the world's most pressing issues

3.6.6 Bearing in mind the objectives and expected outcomes of the extension activities organized by the university, how did they complement students' academic learning experience? Specify the values inculcated and skills learnt.

The University through its extension activities inculcates the qualities of leadership in students by way of their participation in various social, sports and cultural activities. It brings in a sense of commitment towards society – contributing towards social, cultural and ecological and environmental causes. Such awareness can minimize the adverse effect to the people around them and society. Students are also made aware about energy savings and energy creation and various co-curricular activities are organized to make them better future citizen.

3.6.7 How does the university ensure the involvement of the community in its outreach activities and contribute to community development? Give details of the initiatives of the university which have encouraged community participation in its activities.

There are many social organizations actively working in BITS campuses like NSS, NIRMAAN, SCIO,SIRI (society involved in reinventing India on campus), Abhigyan, Udan etc. They organise various activities like Cloth Donation, Tree Plantation, Blood Donation, Campus Clean Up programs, Career Planning, Medical Camps, campus tour for School students, etc. These activities are sustained and mentored by the institute.

BITS Pilani, KKBirla Goa Campus, in association with Brotherhood, New Delhi organized the inauguration of "We Care Film Festival" (a Unique Film Festival) twice: during 12-13 February 2010 and 23 January 2015. This film festival aims at sensitizing youth on various issues related to people with disabilities and also on an inclusive society for such people through the medium of films. It invites films on disability issues from various parts of the world and screens them in educational institutions across India in order to create awareness among students. The festival is supported by various reputed organizations such as National Trust, UNESCO, UN Information Centre for Bhutan and India, etc.

3.6.8 Give details of awards received by the institution for extension activities and/contributions to social/community development during the last four years.

- In 2015, BITS Pilani Dubai Campus received bronze position in the category of Education and Capacity Building in Emirates Energy award (2015) given by Govt. of Dubai. Dubai campus received AED 25,000 as prize money along with memento and certificate.

- In May 2010, the Certificate of Appreciation was awarded by the Government of Dubai to BITS Pilani Dubai campus for the distinguished accomplishment in reducing consumption of electricity and water.

- NSS of BITS Pilani in all campuses organizes Blood Donation Camps that receive national level awards on a regular basis in and around campus.

- NSS unit of BITS Pilani bagged the Red Cross Award, on the World Blood Donor Day on 14th June 2010 for the highest unit of blood collection among educational Institutions of the country.

- NSS, BITS Pilani was honored by Indian Red Cross Society on 20thJune, 2014 for the highest collection of blood units among educational institutions of India during 2013-14. The trophy was presented by Dr Harsh Vardhan, Hon'ble Union Health Minister and Chairman, Indian Red Cross Society. Prof Anupam Singhal, NSS Coordinator and Mr. Sasanka Kiretti, NSS President received the trophy.

- BITS Pilani, K K Birla Goa Campus is also very active in contributions to social/community development.

3.7 Collaboration

3.7.1 How has the university's collaboration with other agencies impacted the visibility, identity and diversity of activities on campus? To what extent has the university benefitted academically and financially because of collaborations?

Through industry linkages: Over 24000 students have participated in the Practice School course during the period 2010-2015. Over 400 industries/research organizations in India and abroad have been an integral part of this program in which the students work under the active onsite guidance of more than 150 faculty members.

The Practice School course structure and the close interaction with the organization mentors have been beneficial to the students as well as faculty members in terms of their outlook towards practical implementation of academic knowledge in a professional working environment. Students receive on-the-job, one-on- one training in a work setting from skilled professionals, who provide the knowledge and expertise of their field.

Students learn by doing in actual situations through direct, hands-on experiences. They are evaluated and assessed by both their faculty coordinator and their onsite professional supervisor or mentor using an authentic, competency and performance-based model, portfolios and exhibitions.

Among the many positive educational outcomes of internships are practical experience, new skills and improved attitudes and behaviors. This unique BITS Pilani initiative has been its hall mark since the 1970s' and has been one of the reasons that has made BITS Pilani's stature par excellence in the field of higher education. This initiative has paved the way for the ever growing academia industry collaborations by way of MOUs and workshops. The sharing of PS experience by the students and faculty members has brought a sense of adaptability to the ever changing technological changes happening in the industrial world which is evident from increasing collaborations with the

industries. Contact through Practice School Programme allows for a two-way information flow between industry and educators providing industry with information about curricula in academic departments and providing educators with information about technological advances in the industry that can be used to constantly update the curriculum. The continuous interaction with industry has also played an important role in facilitating about 20% placement offers to the students on their successful completion of the course.

Statistics of Practice School Program 2011 - 15

PS II			
Year Wise	**No. of Students**	**No. of Orgns.**	**No. of Faculty**
2010-2011	2140	332	134
2011-2012	2618	344	134
2012-2013	2620	305	103
2013-2014	2530	288	101
2014-2015	2550	268	91
2015-16 (continuing)	1430	230	82
PS-I Statistics			
2010-2011	2269	293	127
2011-2012	2359	279	135
2012-2013	2361	272	128
2013-2014	2450	277	100
2014-2015	2393	256	97
2015 – 16	2531	292	137

Immersion Programs: BITS also encourages and supports its on-campus faculty members to spend few weeks in the industry by sponsoring an Industry Immersion Programme. This helps the faculty members to gain first-hand exposure to processes of industry and understand how theory is translated to practice on the job floor.

They also become aware of the technical challenges that companies face in respect of improved design, scaling up their operations, impact on environment, manpower, etc. paving way for collaborative research and consultancy projects with the university**.**

Work Integrated Learning Program: BITS has also extended its University Industry linkages to other avenues and offers degree programmes through Work Integrated Learning Programmes (WILP) for employed professionals to enhance their academic qualification while gaining significant professional experience in their respective employing organizations. These are degree programmes designed to integrate the academic content with the requirements of the workplace, and are conducted with the same level of rigor as the programmes offered on campus.

BITS also offers specific programmes under Corporate Partnerships to leading organizations from several industries customized to suit their Learning & Development requirements. More than 30 such programmes have been designed and are operative in various collaborative organizations.

Through International Collaboration: Many Professors (over 200) from foreign universities and experts from industries located abroad have visited BITS campuses and delivered lectures on specialized topics of their expertise. Some representative universities include University of Missouri, University of Maryland, Macquarie University, York University, RMIT University, Nanyang Technological University, Singapore, University of Louisiana at Lafayette, London Business School, University of S. California, University of Michigan, etc.

We have conducted several collaborative conferences and workshops with foreign universities.

I. International Conference on Wind Energy: Materials, Engineering and Policies (Nov 22-23, 2012) with Department of Wind Energy, Technical University of Denmark
II. DIy: Engineering the Eye (Jul 7-13 2013) with Massachusetts Institute of Technology, USA
III. Winter Institute in Global Health WIGH 2015 (7th to 16th January 2015, WIGH 2014 (17th to 25th January 2014) in collaboration with PACE University, New York, USA
IV. Summer Institute in Global Health 2013 (24^{th} June to 6th July) and WIGH-2013 (2nd Jan to 12th Jan 2013) in collaboration with Albert Einstein College of Medicine, New York, USA

To what extent has the university benefitted academically and financially because of collaborations?

- All students benefit academically through the exposure they get through the Practice School collaborations of BITS with various industries. Students also get attractive stipends during their PS-II financially benefitting them.

- In addition faculty members who participate in immersion programmes benefit in terms of funding for various projects.

- Joint-teaching with foreign universities has been conducted regularly (iPodia Alliance, University of Southern California, Los Angeles, USA).

- Faculty have received extramural research grants through international collaborative projects. Prof. D. Sriram (Sweden), Prof. P. Yogeeswari (Ukraine, France, Portugal and Brazil) and Prof. Suman Kapur (Sweden), Prof. R.Mahesh (Canada), Prof. Dalip Kumar (Japan).

- Cisco and BITS Pilani are tied up to enable student-faculty collaboration within and beyond the campus walls by connecting 11,000+ students and 700 faculty members. This tie up is the first-of-its-kind in India. It aims at creating a

dynamic and collaborative learning environment by connecting classrooms through an Multi- Protocol Label Switching (MPLS) based data network.

- This video platform enables professors to record lectures which can be replayed and accessed from any place having an internet connection. Also Tele-presence class rooms are used to deliver a course by a faculty from one campus to students of all four campuses. It allows BITS to call experts from across the globe for guest lectures. This technology will also help BITS for the placement of students.

- BITS Pilani received Cisco Digital Literacy Award 2015' for its project on "Integrated Scalable Multi-Location Immersive Tele-Presence environment across four campuses of the University". The award was given by Honorable Minister, IT & Communications, Shri Ravi Shankar Prasad to Prof. BN Jain, then Vice Chancellor, BITS Pilani.

3.7.2 Mention specific examples of how these linkages promote

∗ **Curriculum development:**

BITS Pilani collects feedback regularly from its industry partners. The university curriculum is continuously being innovated and refreshed to reflect the latest developments in technology and trends within industry.

Curriculum for: a) Masters in Public Health (MPH) in collaboration with Uniformed Services University, Washington, USA; b) Principles and Practices of Global Innovation (University of Southern California); c) New Venture Creation in collaboration with companies from USA namely Petasense, Jivox, SenSen Networks, The Find Inc, Sierra Atlantic) were developed.

∗**Internship:**

All students enrolled for degree programs at BITS Pilani, undergo two mandatory internships in industry through the structured Practice schools I and II in over 180 collaborating industrial partners. Practice School serves as a platform that facilitates and promotes partnership and intellectual exchange between academia and industry.
Many first degree and higher degree students went to foreign universities for bilateral government sponsored internships (namely MITACS fellowship, Khorana fellowship, Viterbi fellowship, SN Bose Scholarships and hosted by Institutes/Universities in USA.

Several universities regularly accept students from BITS to spend one full semester for pursuing research at their campuses. In the last five years over 300 students have gone to prestigious universities such as University of Zurich, University of Switzerland, MIT, University of Georgia, Purdue University, University of Wisconsin, National University of Singapore, University of Kansas, Kyoto University, University of New Mexico, York University, University of Alberta, etc.

∗On-the-job training

All students enrolled for degree programs at BITS Pilani, undergo two mandatory internships in industry through the structured Practice school I and II in over 180 collaborating industrial partners. Intensity & rigour of the Practice School Programme makes our students industry-ready to take on work life challenges. Some of the international practice school stations are Aditya Birla Chemicals, Thailand, DreamWorks Animation, Los Angeles, USA, Insead Business School, Singapore, HCL Technologies, Singapore, Histogenetics, New York, USA.

Most of the on campus faculty members are deputed as mentors to students participating in PS-1 every summer. This provides an opportunity for the faculty member to visit industries and get exposure and train themselves in industrial practices. This greatly facilitates them to develop industry oriented pedagogy and instruction.

*** Faculty exchange and development**

4-5% faculty members have engaged with industries as resource faculty in conducting workshops and executive education programmes. Faculty members are also encouraged to participate in industry immersion and University immersion programs of the Institute.

Industry immersion for faculty: The institute supports faculty members to spend a few weeks in the industry by Identifying companies which will accept them, provide travel and living support and granting the leave period as duty leave. In the last two years 20 faculty members have availed this benefit;

University immersion: The institute supports faculty members to spend a few weeks as visiting scholars in other reputed international universities by providing them travel and living support and granting the leave period as duty leave. In the last two years 48 faculty members have availed the benefit and have visited universities such as Florida International University, University of South Florida, Oklahoma State University, University of Virginia, Robert Gordon University, Duke University, Trinity College, Dublin, Warsaw University of Technology, Poland, University of South Dakota, Centre for Mathematics and Computer Science, Amsterdam, University of New South Wales, etc.

∗ **Research and publication:**

BITS Pilani has developed special collaboration with research organizations such as Uniformed Services University of Health Science, USA, LV Prasad Eye Institute, Hyderabad, National Institute of Pathology, New Delhi, Shankar Netralaya, Chennai, for collaborative research leading to PhD degree of the Institute. Under this scheme 45 students have completed Ph.D. degree of BITS Pilani in last five years. They have also published more than 150 research papers

Students awarded Ph.D Degree from BITS under Collaborative Research Program

Sl No	ID No	Name	Thesis Title
1	2005PHXF421P	VIKAS VATS	Modulation of Immune Response by Epithelial Cells During Chlamydia Trachomatis Infection
2	2006PHXF432P	GAYATHRI R	Molecular Techniques in the Identification of MDR-TB and Diagnosis of Tuberculosis
3	2001PH29094P	PAWAN KUMAR TIWARY	A Comprehensive Analysis of the Transcriptome in Human Colorectal Cancer Cells Lacking DNA Methyltransferases
4	2004PHXF423P	SHIPRA MEHRA	Study of Genetic Factors Associated with Cataractogenesis in Pediatric and Adult Cataract Cases
5	2004PHXF427P	TANVI AGRAWAL	Cervical Mucosal Immune Responses and Role of Antigen Presenting Cells During Chlamydia trachomatis Infection
6	2005PH29095P	PARIDHI GUPTA	Host Responses Associated with the Pathogenesis of Venezuelan Equine Encephalitis Virus in Mice and Evaluation of a Novel Approach to
7	2005PH29108P	MANISH BHOMIA	Role of MicroRNAs in Pathogenesis of Venezuelan Equine Encephalitis Virus and Development of Antiviral Strategies
8	2005PHXF027P	M.RAJESWARI	Study of Rigid Gas Permeable Contact Lens Wearers with Keratoconus and Contact Lens Fitting Methods in Irregular Cornea's
9	2005PHXF410P	PATEL GAUTAM DHARMENDRA BHAI	Design, Synthesis and Biological Studies of Some Novel Phosphodiesterase-4 Inhibitors and Anticancer Agents
10	2005PHXF417P	MALLIKARJUNA K	Molecular Mechanisms Involved in Intraocular Tumor Progression
11	2005PHXF418P	S. R. BHARATHI DEVI	Beneficial Effect of Amino Acids in Advanced Glycation End Product Induced Endothelial Dysfunction in Bovine Retina
12	2005PHXF419P	HEM CHANDRA JHA	Molecular Diagnosis and Pathogenesis of Chlamydia pneumoniae in Coronary Artery Disease Patients
13	2005PHXF426G	VENKATESWARA RAO P.	Optimizing the biogas production by anaerobic co-digestion suing statistical and decision making methods

14	2006PH29001P	Saumyaa	Inhibition of the Antibody Response to Heterologous Protein by streptococcus pneumonlge mediated by choline-binding protein(s)
15	2006PHXF005P	SELVI R.	In vitro Studies on the Mechanism of Glucose Lowering Effect of Amino Acids in CHO-K1 and Adipocytes and In vivo Studies on the Amelioration of Molecular Changes in Retina of Streptozotocin Induced Diabetic Sprague Dawley Rats
16	2006PHXF008P	PRASHANT. G.J.	A Study on Pharmacological Induction of Heat Shock Protein 70 as a Neuro protective Strategy for the Treatment of Stroke
17	2006PHXF021P	DHIRENDRA SINGH YADAV	Gene Expression Profiling and Genetic Variations in Oral Cancer Associated with Tobacco Consumption
18	2006PHXF023P	RAJNEESH JHA	Chlamydial Heat Shock Proteins (cHSP) 60 and 10 in Immuno pathogenesis of Female Genital Chlamydia trachomatis Infection
19	2006PHXF025P	BALLA MURALI MOHAN SAGAR	Characterization of Cancer Stem Cells in Retinoblastoma
20	2006PHXF431P	VENKATA SAI JYOTHI ALURU	Proteomic Profiling of Tear Fluid for Potential Biomarker Discovery in Dry Eye Syndrome
21	2006PHXF433P	SAMSON MOSES Y	Detection of Novel Mutations in UL23 Gene of Herpes Simplex Virus and UL97 Gene of Human Cytomegalovirus Conferring Drug Resistance and
22	2007PHXF011P	ARVIND SEMWAL	Pharmacological Interventions to Identify Potential Drug Candidates for the treatment of Neuropathic Pain
23	2007PHXF026P	PRADEEP SINGH CHAUHAN	Genetic Alteration and Multidrug Resistant Gene Expression Profile of Acute Leukemia
24	2007PHXF027P	KATTA SARITHA	Molecular Genetic Study on Age-Related Macular Degeneration (AMD) in Indian Patients
25	2007PHXF028P	VIDYALATHA P	Development of molecular genetic testing and transcript analysis of RBI gene mutations in retinoblastoma patients
26	2007PHXF029P	THOUDAM REGINA DEVI	Genetic Analysis and Gene Expression Profile in Gastric Cancer in High-risk Northeast region of India
27	2007PHXF030P	SUBHASH GADDIPATI	Characterization of Cultured Oral Mucosal Epithelial Cells and the Outcome after Autologus Transplantation of Diseased Ocular Surface
28	2007PHXF040P	Vijay Pratap Raghuvanshi	Study of lifestyles and their behavioural determinants leading to cardiovascular disease among different population groups
29	2007PHXF423P	Amit Kumar Subudhi	In vivo transcriptome analysis of plasmodium falciparum clinical isolates: Glimpses into molecular events in complicated malaria
30	2007PHXF425P	SEETHALAKSHMI T	The Anti-tumor effects and mechanisms of curcumin in human retinoblastoma cell lines
31	2007PHXF426P	VANDHANA S	Targeting Lipogenesis in Retinoblastoma: Evaluation of Chemical Inhibitors of Fatty Acid Synthase(FASN) as Anti-Cancer Agents
32	2007PHXF436P	ARPITA KULSHRESTHA	Studies on Drug Sensitivity in Leishmania donovani Field Isolates and Differential Gene Expression Analysis in Miltefosine Resistant Parasites

33	2007PHXF437P	GAJENDRA KUMAR KATARA	Studies on Host Immuno-determinants Modulated During Active Disease in Kala-Azar and Post Kala-Azar Dermal Leishmaniasis
34	2007PHXF438P	MISHI KAUSHAL	Contribution of Putative Susceptibility Genes and Genomic Alterations in the Occurrence of Breast Cancer
35	2007PHXF439P	RAKHSHAN IHSAN	Genetic and Epigenetic Alternatives in Lung Cancer Associated with Tobacco Exposure
36	2007PHXF440P	PRAGYA SRIVASTAVA	Immunomodulatory Role of Azithromycin and Doxycycline and their Therapeutic Potential in Treatment of Genital Chlamydia trachomatis
37	2007PHXF441P	APURB RASHMI BHENGRAJ	Antichlamydial Drugs Sensitivity and Emergence of Resistance in chlamydia trachomatis Isolated from Clinical Treatment Failures
38	2008PHXF014P	SWADHINYA A	Regulation of In Vivo Anti-Polysaccharide Responses to Intact Gram-Positive and Gram-Negative Extracellular Bacteria
39	2008PHXF021P	SOWMIYA M	Nucleic Acid Based Techniques for the Detection and Identification of Drug Resistance among Ocular Bacterial Pathogens
40	2009PHXF010P	P. Shanthi Latha	Study on breat cancer stem cells and their role in anti cancer drug response
41	2009PHXF018P	Ferdinamarie S.P.	Genetic study on ocular quantitative traits of glaucoma and myopia in Indian population
42	2009PHXF019P	Iyer Gomathy N.	Design and development of small molecule inhibitors targeting copper transporter 1 in copper mediated angiogenesis
43	2010PHXF037P	VASUNDHRA BHANDARI	Studies on Drug Susceptibility of Indian Leishmania donovani Isolates to Paromomycin
44	2010PHXF038P	Nalini V.	Evaluation of molecular targets in clinical management of Intra ocular tumors (Retinoblastoma and uveal melanoma)
45	2010PHXF040P	L. Dhanurekha	Phenotypic and genotypic methods for rapid detection and drug (first and second line) resistance of tuberculosis

∗Student Placement

Students generally get employment offers at the end of Practice School -2 based on their interaction with the industry/organization during the PS Programme. In an academic year, approximately 15 to 20 per cent of total students doing PS-II are offered a job by the organization. All students enrolled for degree programs are placed through the dedicated Placement Cell and nearly 40% post graduate students pursue higher education avenues in India and abroad. Foreign companies that visit our campuses include EPIC systems, USA and NCC International, Oman. Most of the multinational companies (Google, Intel, HP, Deloitte, Bosch, Alstom, etc.) visit us for hiring students.

3.7.3 Has the university signed any MoUs with institutions of national/international importance/other universities/ industries/corporate houses etc.? If yes, how have they enhanced the research and development activities of the university?

Yes, the university has signed a total of 58 MoUs from 2010 – 2015 with universities/industries present in India and abroad. These MOUs support both faculty and student exchanges and foster teaching and research collaborations. BITS Pilani has partnerships with more than 400 industries across the country with nearly 20,000 students enrolled through its industry linkages. BITS students do their off-campus thesis and go to partner universities for advanced electives in foreign locations.

1.	Concordia University, Montreal, Quebec, Canada	02/2010
2.	Cybage Software Private Limited, Pune	02/2010
3.	Technische Universitat Braunschweig, Germany	02/2010
4.	*Cypress Semiconductor Corporation, SAN JOSE, CA, USA	02/2010
5.	Faculty of Engineering and Graduate School of Science & Technology, Kumamoto University, Japan	03/2010
6.	Austria microsystems – India Design Centre, Hyderabad	04/2010
7.	Powerwave Technologies, Hyderabad	04/2010
8.	Central Electronics and Engineering Research Institute, Pilani	06/2010
9.	Carleton University, Ottawa, Canada	07/2010
10.	Eaton Technologies Private Limited, Pune	07/2010
11.	University of Savoie, Chambéry Cédex, France	
12.	Integrated Headquarters of Ministry of Defence (Army), New Delhi.	02/2011
13.	(a) University Health Network, Toronto, Canada; (b) Therapure Biopharma Inc., Mississauga, Canada; (c) International Center for Genetic Engineering and Biotechnology, New Delhi; and (d) LifeCare Innovations (Pvt) Ltd., Gurgaon, India.	04/2011
14.	Tata AutoComp Systems Limited, Pune	08/2011
15.	Aegis Centre for Entrepreneurship (ACE), Gurgaon	10/2011
16.	Satyam Computer Services Limited, Hyderabad	07/2011
17.	John Deere India Private Limited, Pune	12/2011
18.	La Trobe University, Melbourne, Australia	02/2012
19.	ETA Network of Education & Training, Dubai, UAE	02/2012
20.	Bharat Dynamics Ltd., Hyderabad	02/2012
21.	Avaya India Pvt. Ltd., Pune	05/2012
22.	BMC Software India Pvt. Ltd., Pune	05/2012
23.	University of Rhode Island, Rhode Island, Kingston, USA	06/2012
24.	Mediciti Institute of Medical Sciences (MIMS), Hyderabad	07/2012
25.	Mitacs Inc., Canada	11/2012
26.	UOP India Pvt. Ltd., New Delhi	11/2012
27.	International Center for Biosaline Agriculture (ICBA), Dubai	11/2012
28.	Kirloskar Oil Engines Ltd., Pune	12/2012

29.	USC Viterbi School of Engineering, USA	12/2012
30.	RAK Medical & Health Sciences University, UAE	12/2012
31.	New Mexico State University, USA	12/2012
32.	Mahindra and Mahindra, Nagpur	01/2013
33.	Tata Technologies Limited, Pune	7/2013
34.	Vedanta Aluminium Limited, Jharsuguda	9/2013
35.	"n+i" Network of Engineering Institutes, France	10/2013
36.	SKF India Ltd., Mumbai	2/2014
37.	Indian Naval Academy, Ezhimala	3/2014
38.	Infotech Enterprises Limited, Hyderabad	3/2014
39.	Cipla Limited, Mumbai	4/2014
40.	Goa State Pollution Control Board, Panaji	6/2014
41.	Pace University, New York	7/2014
42.	INFLIBNET Centre,Gandhinagar	8/2014
43.	NALSAR University of Law, Hyderabad	8/2014
44.	Florida International University, Miami, Florida, USA	8/2014
45.	IGATE Global Solutions Limited, Bangalore	9/2014
46.	University College, Dublin, National University of Ireland Dublin	11/2014
47.	Norwegian University of Life Science (NMBU), Norway	11/2014
48.	AMSA Renal Care, Dubai	11/2014
	Indian School of Business, Gachibowli, Hyderabad	12/2014
	Macquaire University, Australia	01/2015
	GE India Exports Private Limited, Hyderabad	02/2015
	Michigan State University, College of Engineering Michigan, USA	02/2015
	National Institute of Wind Energy (NIWE), Chennai	02/2015
	The University of Wisconsin- Madison, USA	10/2014
	University of Tartu, Astonia	04/2015
	National Institute of Wind Energy (NIWE), Chennai	02/2015
	The University of Wisconsin- Madison, USA	10/2014
	University of Tartu, Astonia	04/2015

3.7.4 Has the university-Industry interactions resulted in the establishment / creation of highly specialized laboratories / facilities?

Yes. Several Lab Facilities have been set-up and labs have been upgraded in conjunction with our industry partners the details of the same are given below.

Sr No	Name of the Industry	Lab/Equipment supported
	Pilani Campus	
1	ST Micro-electronics	'O' Lab
	Goa Campus	
1	Cypress Semiconductor	PSoC3(CY8CKIT-003); CY8CKIT-001
2	Atmel University Program, India	XMEGA-A1 XPLAINED(EVALUATION KIT)

3	Atmel University Program, India	ATMEL ATMEGA2560(ATAVRDRAGON)
4	Ducom Instruments (Asia)	Advanced Tribometer
5	Tektronix	Mixed Domain Oscilloscope (MDO4014-3)
6	Xilinx	KC705 DSP kit with High Speed analog, Spartan 6 based Atlys Development Board, VIVADO System design Tool (25 Licence) (Software), Artix-7 based Nexys 4 Development Board, Artix-7 based Basys3 Development Board ; ISE System Edition (25 Licence) (Software) Vivado Partial Reconfiguration Tool
7	Texas Instruments (EdGate technologies)	Analog System lab Kit (ASLK PRO)
	Hyderabad Campus	
1	Aditya Birla Group	TRIBOLOGY LAB
2	Sonnet Agencies	Electrostatic Spray coating system
3	Ducom Instruments	Four ball tester
4	Tenova Delkor India	Workstation: 512GB RAM with 36 Cores and 4TB Memory (Heat Transfer Lab)
5	Intel	Specialized Lab and Embedded System.
6	Cypress Semiconductor	
		MEMS Clean Room
		Electron beam evaporation unit ,Semiconductor Probe station, Wet bench; Furnace: . Spin-coater
	Dubai Campus	
	CISCO Lab	Fujisoft Technology, Dubai

4 CRITERION IV: INFRASTRUCTURE AND LEARNING RESOURCES

4.1 Physical Facilities

4.1.1 How does the university plan and ensure adequate availability of physical infrastructure and ensure its optimal utilization?

Institute has enough classrooms to accommodate the teaching needs of the number of students enrolled at a time. The class rooms, lecture halls, laboratories, equipment, etc. have been provided according to the existing norms laid by UGC. The classes are scheduled centrally in an optimum way to ensure best use of classrooms. The instruction division of the institute takes necessary steps for finalizing the schedule and optimization of the facility. All facilities are being used to the optimum according to a flexible time table generated centrally. In order to cater to increasing student numbers, in recent past institute added new class rooms with modern facilities. There are several class rooms with 100-400 capacities. Similarly, adequate accommodation has been provided for residence of faculty and staff. Sports facilities can be used both by students and faculty members at different time slots. All constructions have been taken up as per NBC rules and whenever a new project comes, suitable expansion programs are undertaken.

Each campus has a library that has a good collection of printed journals, full text e-journals and important online databases to students and faculty.

Every department has been provided with adequate number of wet and dry labs as required. These labs are sufficient enough to cater to the existing strength of students and also visiting students. The Head of Department of respective department or the concerned faculty chalks out a plan/schedule for optimization of labs by the students. Optimal utilization is ensured by putting different courses in the same lab facility. Every faculty has been provided with separate cubicles/rooms.

All the BITS campuses have large auditoriums (1200 or more capacity) and few small ones with capacity ranging between 100 to 250 and an open air amphitheater which are utilized for various events, co-curricular activities/extra-curricular activities, recruitments, meetings/seminars, conferences, ceremonies etc.

The institute being a 100% residential premises, has the provision of necessary housing units and hostels for its residents i.e. students, faculty, wardens and staff in all Indian campuses. Some housings have been dedicated to the visitors i.e. professors, research scholars, company professionals etc. As a lot of students in Dubai campus are local, not all students stay in the hostels of Dubai campus.

Institute is equipped with required recreation facility with provision of indoor and outdoor game facilities inside the campuses and these are well supported with adequate number of canteens/mess/refreshment centers for students and staff members.

4.1.2 Does the university have a policy for the creation and enhancement of infrastructure in order to promote a good teaching-learning environment? If yes, mention a few recent initiatives.

Yes, the university has got a policy to expand as per the requirement of infrastructure. The University creates and enhances infrastructure to promote good teaching learning environment, on a periodic and routine manner. BITS Pilani University focuses and facilitates research, in all disciplines. In all four campuses, both academic and spatial considerations has been initiated for students and faculty

- The university has built up-to-date facilities in classrooms which include among others, the provision of LCD projector in every class room, Audio systems to support animated presentations, educational videos to provide good learning environment. Choice of black boards vs. white boards is also being considered and implemented wherever necessary.

- Tele presence classrooms for cross campus classes, webex platform for conducting online classes, state of the art lecture recording studios under WILP division of the institute. Several software e.g. Turnitin, edx, have been procured to enhance the teaching learning environment at BITS Pilani.

- Institute has initiated exploring MOOCs as a platform for effective teaching on a trial basis in several courses. Similarly, several teaching modules have been created in-house for some courses on similar lines.

- Institute has created Central Research Facility that has very sophisticated equipment for the use of faculty and students, across all the campuses. Field emission type SEM, NMR, HR-AFM, Raman spectrometer (to be shortly installed), are few such equipment. More sophisticated equipments will also be added to the facility, periodically. The institute has earmarked significant budget in its growth plan, for the same, for the next few years.

- A new Teaching & Learning unit consisting of faculty members from different departments has been created during June, 2015 at each campus of BITS Pilani. The unit will conduct research on innovations in teaching learning methodology throughout the world and will also record efforts within the institute towards this direction. The unit plans to invite renowned personalities who have made significant contributions to the society in terms of their teaching efforts to motivate the faculty members of the institute. This unit also has the responsibility of organizing workshops to induct new faculty members into BITS Pilani system of education and train them in effectively dealing with the challenges involved with the profession

- New laboratories are constructed. Renovation, up-gradation of laboratories, expansion and modernization of facilities are an integral part of University growth plan and are undertaken now.

- In each of the campus Learning Management System (LMS) is used for web based access across the campus to course material, notices, etc., pertaining to course. The teacher uploads learning materials, notices, practice problems and students are able to access the same within the campus. This helps in maintaining a constant learning environment beyond the classroom on campus.

- The institute building is Wi-Fi enabled. Wi-Fi hotspots are created in other part of the campus. Adequate Internet bandwidth (around 300 Mbps) is provided to faculty members and students for promoting the teaching and learning environment in each campus.

- Since its inception, the Institution practices residential system and provides hostel rooms to all FD, HD and Ph.D. students. All the modern state of the art teaching aids are provided. Some of the old buildings such as hostels under the process of renovation are being expanded.

- Strategic growth of expansion plan (physical infrastructure) is set in order to meet increase in number of students / faculty / non-teaching staff. The enhancement of infrastructure and reinforcement of the existing infrastructure on a continuous basis consistent with growing needs of our university are a priority and demand our constant attention. Further, as technology advances, the existing infrastructural facilities are constantly updated. Relinquishing and elimination of obsolescence is also paid sufficient attention.

- Committed investment towards infrastructural development is a priority area for the Institute, and new facilities shall be added every year for the next four years. Pilani campus has taken up a massive expansion plan with a total investment of Rs.651 crores over the next few years. It includes the construction of a new academic block, hostel, housing for faculty, married Ph.D. students and non-teaching staff members, new science block and sewage treatment plant etc. The plan also includes renovation of existing hostels, faculty houses, academic and administrative blocks, auditorium and recreational facilities.

- With respect to Goa campus, it is proposed to increase the student strength from the present 2800 to 4800. This involves increasing the faculty strength from the existing 170 to 320 and staff strength from 175 to 320. The total budget for the expansion plan is Rs 425 crores to be executed in the coming 4 years. Major components of the project are: an academic block consisting of classrooms, seminar halls, faculty offices and labs (18346 sq. m.), student housing (1350 seats , 29480 sq. m.) , faculty and staff housing (226 houses, 30755 sq. m.) and other required infrastructure. Having completed the design stage and having obtained required clearances from the authorities, the construction activity will start soon.

- In the growth plan of Hyderabad campus, it is proposed to increase the student strength from the present 3276 to 5358 during the next 5 years. This involves increasing the faculty strength from the existing 182 to 335 and staff strength from 173 to 251.

- The total budget for the expansion plan is Rs. 374 crores, to be executed in the coming 4 years. Major components of the project are: an academic block consisting of classrooms, faculty offices and labs (13,906 sq. m.), student housing (322 Rooms – double occupancy, 31,747 sq. m.) , faculty and staff housing (64 flats, 29,505 sq. m.), sports facilities, girls mess and other required infrastructure (8,179 sq. m.). Since the design stage has been completed and most of the clearances have been obtained from the concerned authorities, the construction is expected to begin soon.

- In 2014, an initiative for improvement of BITS Pilani Dubai campus was taken up as "Improvement Plan 2016" for BPDC. Seven areas were decided for improvement like "Teaching & Academics"; "Research & Industry Engagement"; "Placement"; "Admission"; "Programme Review", "Campus Life" and "Infrastructure and Facilities". Team of faculty and senior staff worked on each area and suggested recommendations which are in implementation process. Tele-presence meeting room, TP Classroom are created to connect with three Indian campuses. Whole campus including academic and hostels are made fully wifi. Laboratories are upgraded, new equipment are added, sports facilities are improved. Further, though the campus was constructed in 2007-08, it is felt that up-gradation of campus including academic building, hostels and other places are needed to make it competitive international campus. Few architect firms are invited to suggest up-gradation /modification of the campus. Proposals are under review and will be taken up for Chancellor's approval.

4.1.3 How does the university create a conducive physical ambience for the faculty in terms of adequate research laboratories, computing facilities and allied services?

To create conducive environment for research, BITS has established several research labs /centres in engineering, sciences and social science disciplines to create facilities and support for various activities. Institute funding for up-gradation and procurement of modern research infrastructure has been increased.

Fifteen crores have been allocated in 2015-16 to the three Indian campuses for procurement of high end equipment/instrument and for up-gradation of research infrastructure. As a practice, every department has provision in annual budget to modernize and upgrade the research laboratories and facilities. Apart from this, schemes like RIG, seed grant and professional expenses help in adding to this physical ambience.

Recently, BITS Pilani has also launched Centre for Research Excellence in “Waste, Water, and Energy Management in May, 2014. Under this programme, 5 projects have been supported with committed funding of Rs. 2.34 Cr. to undertake development of solutions to real problems in managing waste and water. These are inter-disciplinary R&D projects requiring cross-discipline and cross-campus collaboration amongst faculty. While these projects are slated to be completed in summer of 2017, our Faculty already received approval for additional funding of Rs. 1.22 Cr. from external sources for 3 projects.

In addition, faculty members have access to all e-databases to enhance research infrastructure. High performance computing facility (HiPC) is created at campus to support the computational research. In addition, Institute also houses centralized computational facility on a cloud. Apart from this, every faculty is provided with laptop or desktop as per their choice.

The institute has a Computer Equipment Replacement policy to enhance faculty productivity by periodic replacement of computer systems and accessories for all faculty members as well as to provide for computers and accessories for all newly joined faculty. Under this policy, computer systems, peripherals and other accessories will be phased out and replaced every 5 years with a maximum expenditure of Rs. 50,000/- per faculty. List of labs with equipments is given in Annexure 1.

4.1.4 Has the university provided all departments with facilities like office room, common room and separate rest rooms for women students and staff?

University has provided fully furnished, well ventilated office rooms for each department that are connected through dedicated Wi-Fi & IT Networks. Every faculty has been provided with individual cubicles/rooms, shelf space and safety. The staff rooms are equipped with furniture, computers and peripherals. Separate rest rooms are provided for girl students and female faculty or staff. The meeting /common rooms are also provided. There are Faculty Lounges and Rest Rooms in adequate number available.

4.1.5 How does the university ensure that the infrastructure facilities are disabled friendly?

Most of the campus buildings have been provided with ramps, lifts, wherever applicable and restrooms dedicated to the differently abled population.

An assessment is made of their special needs and they are provided with the following amenities/facilities:

a. Mobility devices like Wheel-chairs, ramps and lifts are available.
b. Care is taken to allot ground-floor class rooms or classrooms that have elevator accessibility.

Access to the medical centre is also provided with the ramp. The Facility Management (FM) team in coordination with respective departments ensures all the needs of differently abled individuals are met.

4.1.6 How does the university cater to the requirements of residential students? Give details of capacity of the hostels and occupancy (to be given separately for men and women)

* **Capacity of hostels and occupancy**

All Indian campuses of Institute are fully residential and hostel accommodation is provided to all the students. However, in case of Dubai campus a lot of students are days-scholars as they stay close to Institute.
The details of the hostels campus wise are given below as on September 2015:

Campus	Total	Capacity	Occupancy
Pilani	Girls	626	612
	Boys	3137	3105
Goa	Girls	371	320
	Boys	2063	2040
Hyderabad	Girls	590	578
	Boys	2222	2196
Dubai	Girls	180	145
	Boys	912	602

*** Recreational facilities in hostel/s like gymnasium, yoga centre, etc.**

Yes recreational facilities like the ones listed below are provided

- Common rooms are equipped with DTH TV connection
- Indoor games like carrom, chess, table tennis, badminton
- Outdoor games like volley ball etc
- Screening of movies for students in campus by the Recreation Activity forum (RAF)
- Regional and cultural associations are active on campus and provide wholesome recreation through their events.
- Student activity centre within the campus and close to hostels houses sports facilities like table tennis, billiards, carrom, badminton, squash etc. Rooms have been given to various clubs like music, dance, drama club to plan their activities. Fully equipped gymnasium is present in all the student activities centres.

* **Broadband connectivity / Wi-Fi facility in hostels.**

Yes. Broadband connectivity / Wi-Fi facility is available in all the hostels of all campuses of the university.

4.1.7 Does the university offer medical facilities for its students and teaching and non-teaching staff living on campus?

All the four campuses have Medical Centre, which caters to the medical needs of the students and staff. The centres have full time Physicians who attend to the patients both in the morning and evening hours. Specialist's doctors like dental surgeon, Gynecologist, Pediatrician, ENT provide consultation during the week. A Medical Store is located near the Centre where medicines prescribed by the doctor can be procured. Medical centre in each of the campus is adequately equipped with diagnostic labs etc.
The institute has in place Medical reimbursement policy for faculty and staff and group insurance scheme for its students.

The institute maintains dedicated Ambulance Services available round the clock to transport students to the hospital in case of emergency. We have a tie up with several reputed private hospitals near the campuses to attend in case of serious illness or medical emergencies for specialized care. Computerization of OPD records, laboratory reports and medical billing is being implemented.

4.1.8 What special facilities are available on campus to promote students' interest in sports and cultural events/activities?

All the BITS campuses have large auditoriums (more than 1200 capacity) and few small ones with capacity ranging between 100 to 250 and open air amphitheatres which are utilized for various institute events, meetings/seminars etc.

University facilitates students to organize technical, cultural and sports events of large magnitude. Institute supports students in providing needed logistic support like security, equipment, technical manpower etc.

The organization of these events helps students in developing and honing event management skills. It inculcates in students soft skills like effective communication, interpersonal interaction, team spirit, leadership in etc.

All the campuses have variety of clubs, departments, associations and societies to nurture creative and cultural talents of the students like Music, Dance, Hindi Drama, English Drama, Poetry, Book reading, Hindi Press, English Press, Creative Activities, Mime, Art & Design, Photography etc. BITS being an all-India Institute, students have also established regional associations representing almost all Indian States which conduct special programs on their festive occasions, arrange food festivals of their state.

BITS Pilani Chapter of SPIC-MACAY organizes programmes by inviting eminent musicians, dancers, folk artists to promote Indian classical music and culture amongst youth.

All the campuses have facilities, grounds for indoor and outdoor games. The indoor facilities are Badminton, Table Tennis, Squash, Carom, Chess board, etc. while outdoor facilities are Basketball, Football, Hockey, Volleyball, Cricket, Tennis, Track& Field etc. are also there.

Physical Education department of the Institute aims at providing a safe and healthy atmosphere for its students and staff members. Each campus is equipped with Health Club, Swimming Club and Sports Club. Sports and fitness activities are supervised by the qualified and experienced staff members of the Institute.

A variety of fitness and wellness programs like Yoga and Martial Arts are conducted. Health Club is equipped with single and multi- stationed machines and weight training facilities.

4.2 Library as a Learning Resource

4.2.1 Does the library have an Advisory Committee? Specify the composition of the committee. What significant initiatives have been taken by the committee to render the library student/user friendly?

Yes, we do have Library committee for all the four campuses, where the members are nominated by the Vice Chancellor in his capacity as a Chairman of the Senate body. Library committee of each campus has representative from each of the Department with Librarian of that campus as the Chairman.The Library committee actively interacts with all stakeholders and introduces fruitful initiatives in the individual campuses. Some of the initiatives undertaken are given below:

- Committee plays an important role in increasing the no. of online databases, e-books, print journals, magazines, books and other resources to provide the better services to the library users.
- Inner architecture and other accessorial arrangements, provision of discussion rooms within the Library premises are also modified if and when there is sufficient demand for the same from students, after due deliberations among all the stakeholders.
- Creating awareness among the library users regarding use of library sources & services through a series of Library Orientation Sessions
- Taking students as Project Assistants to carry out the necessary developments in the library
- Thematic Displays of Books to enhance the usage of the library collection are being organised.
- Table of Contents service of selected journals department wise to increase the readership of print journals subscribed by the library.

- Library events are conducted regularly to increase the library usage. Library working hours are extended and student's entitlements are also enhanced to ensure the maximum utilization resources.

- Faculty Reading Room, A dedicated information desk, Help Desks, E-Zones are created in library to provide better services to the users.

- The Library provides support to students to run a book bank facility that is successfully running for a decade.

- Previous year's question bank in the digital library

4.2.2 Provide details of the following:

SL No	Details	Pilani	Goa	Hyderabad	Dubai
1	***Total Area of Library in** (Sq Mts)	4792.50	3512	5100	1378.68
2	***Total seating capacity**	750	600	425	300
3	***Working hours**				
	Working Days	9.00 am to 11.00 pm	9.00 am to 11.00 pm	9.00 am to 11.00 pm	7.30 am to 10.00 pm
	Weekly Holidays	9.00 am to 5.00 pm	10.00 am to 8.00 pm	9.00 am to 5.00 pm	10.00 am - 10.00 pm
	During Examination	9.00 am to 12.00 a.m.midnight	9.00 am to 12.00 a.m.midnight	9.00 am to 11.00 p.m.	7.30 am to 12.00 a.m.midnight
	During Vacation	9.00 am to 5.00 pm	9.00 am to 5.00 pm	9.00 am to 5.00 pm	7.30 am - 3.40 pm.

- **Layout of the library**

- **Reading Carrels:**
  The libraries in all the four campuses have adequate reading carrels that provide exclusive and undisturbed spaces for serious reading for library users

- **Lounge area for browsing**:
  The provision has been made for users to access e-resources seamlessly either using their own laptops or sufficient number of desktop computers with the help of LAN/Wifi in the library

* **Relaxed Reading Capacity:**
  All libraries in four campuses have enough seating capacity to accommodate users for comfortable reading

* **IT Zone for accessing E-Resources:**
  Each library in all four campuses have made available IT Zones with good number of computers for users to access E-resources seamlessly
* **Clear and prominent display of floor plan; adequate sign boards; fire alarm; access to differently-abled users and mode of access to collection**

All the four campuses of BITS libraries have the following

- **Clear and prominent display of floor plan** - The floor plan is prominently displayed on the notice board in the lobby area as well as on the library portal.
- **Adequate sign boards**: Library has adequate signage to guide users to the respective service points and resources for their easy access
- **Fire alarm:** Library has a fire alarm system as well as adequate fire extinguishers
- **Access to differently-abled users** and mode of access to collection: Library has prominent ramp for the differently-abled user at the entrance and they can move around anywhere in the library without any hindrances. We have open access system for the users.

4.2.3 Give details of the library holdings:

SL No	Details	Pilani	Goa	Hyderabad	Dubai
1	Print				
	Books	205852	34854	26500	18000
	• Back Volumes	33286	1881	300	340
	• PhD Theses*	1157	37	21	04
	• HD Theses	250	60	303	376
2	Average number of books added during the last three years	1062	1364	3978	1126
3	Non Print CD/DVD	2395	1413	1008	1333
4	Electronic • e-books,	28088	27844	27844	4000
	• e-journals	11745 (32 Databases)	9067 (18 Databases)	4110 (20 databases)	4779 (4 Databases.) Individual e-journals – 7

5	Special collections				
	• text books	12103	4730	3050	1100
	• reference books	1305	1326	967	1096
	• standards	399	Nil	Nil	Nil,
	• patents	Nil	Nil	Nil	Nil.
6	Book Banks	No	2100	No	381 volumes
7	Question Banks	The libraries maintain Question papers both in print and digital forms for last 5 years			

4.2.4 What tools does the library deploy to provide access to the collection?

a) OPAC

BITS Library is using Library Management Software (LMS). It can be accessed through library portal and internally through intranet URL. It is being used in all the four campuses.

b) Electronic Resource Management package for e-journals

We subscribe to Online databases providing access to e-journals. The access of these database is based on the IP addresses. The users can access these databases from anywhere in the campus including Library, Hostel, Staff quarters, Faculty Chambers, etc. The list is available on library website of respective campuses.

c) Federated searching tools to search articles in multiple databases

In all Indian campuses, we have implemented Discovery Tool of EBSCO for Federated Search service and we have named it as One Search.

d) Library Website

All campus libraries have their own library websites to provide access to various services as well as Databases, E- Books, Online Public Access Catalogue (OPAC), e-Journals, Institutional repositories etc. besides giving detailed information about the library, Rules and regulations, timings and the necessary contact details.

e) In-house/remote access to e-publications

Each campus library, as part of its website, provides a separate platform for accessing Institutional Repository i.e e-publications/ articles published by BITS Pilani faculty. The repositories also include Papers presented in conferences like slide presentations, Institute publications, reports, etc.

4.2.5 To what extent is ICT deployed in the library? Give details with regard to

SL No	Details	Pilani	Goa	Hyderabad	Dubai
1	Library automation	The entire library operation is automated using LMS. It takes care of the following activities: a) Circulation i.e. Issue and Returns and sending e-mails for transactions b) Patron (Users) Database c) Acquisition module to take care of acquisition of Books, Processing, Accession Register and Online Public Access Catalogue, d) Serial Control to take care of all journal subscription, vendor details, online reminders for non-receipt of journal issues etc. e) Reports and Statistics			
2	Total number of computers for general access	26 Computers	11 Computers	12 Computers	50 computers
3	Total numbers of printers for general access	5 Printers, 2 scanners	NIL	1 Printer, 1Scanner and 1 Photocopier (Outsourced)	4
4	Internet band width speed 2mbps 10 mbps 1 GB	400 Mbps	305 Mbps	245 mbps	250 mbps
5	Institutional Repository	Yes. E-Prints	Yes, D-Space.	Yes, D-Space	No
6	Content management system for e-learning	We have provided a user-friendly Library portals which provide access to the entire content of the library i.e. OPAC, Online databases, e-books, e-journals, Institutional Repository, Audio Visual Resources			
7	Participation in resource sharing networks/consortia (like INFLIBNET)	BITS Pilani campus is getting access to UGC-INFLIBNET resources. We also have a tie-ups with DELNET, JCCC, American Centre Library etc.		MoU with Al A in University of Science and Technology, AL Ain, UAE for a period of five years since Nov 2011 for sharing of library resources	

4.2.6 Provide details (per month) with regard to

SL No	Details	Pilani	Goa	Hyderabad	Dubai
1	Average number of walk-ins (per month)	11500	15600	21480	17500
2	Average number of books issued/returned (per month)	3096	2107	2378	2600
3	Ratio of library books to students enrolled	45:1	13:1	8:1	10:1
4	Average number of books added during the last four years	1056	1364	4914	1113
5	Average number of login to OPAC (per month)	9080	8020	12250	8190
6	Average number of login to e-resources (per month)	31905	10439	18677	9608
7	Average number of e-resources downloaded /printed (per month)	26588	2700 (only IEEE is 2000+) pm	2050	2500
8	Number of IT (Information Technology) literacy trainings organized (per month)	07	03	5	2

4.2.7 Give details of specialized services provided by the library with regard to

SL No	Details	Pilani	Goa	Hyderabad	Dubai
1	Manuscripts	The library has an excellent collection of rare books including a few manuscripts. As a part of C-DAC Digital Library project, 5000 books have been already digitized and are available for access on the website of Digital library of India Site.	No	No	No
2	Reference	Yes	Yes	Yes	Yes
3	Reprography /Scanning	The Library provides Photocopy Service during the working hours to the students @ 75 paise per page.	The Library does not provide; but the service is available in	Yes	Yes

		Strictly adhering to the copyright laws.	the same academic block.		
4	Inter-library Loan Service	The members of the library can avail Inter Library Loan (ILL) services to obtain the material that are not available. For one time request, irrespective of the number of items (books or articles) The charges of the library from where the material is being procured have to be paid by the member. These charges may include, photocopying, Courier charges and their processing fee if any.			
5	Information Deployment and Notification	The Members receive e-mail intimations when they borrow, return or reserve the books. Also when the books are overdue, they receive reminders. Library notifications are sent though e-mail			
6	OPACS	Yes, the Libraries of Indian Campuses has KOHA Opac. Dubai campus has OPAC through AUTOLIB LMS.			
7	Internet Access	The Libraries in all four campuses have provision for both Wifi and Lan Connections to access internet and online e-resources			
8	Downloads	Yes	Yes	Yes	Yes
9	Printouts	Photocopy and Printout facility are available in the library as an out sourced activity. For Dubai campus this service is provided by Library.			
10	Reading list/ Bibliography compilation	LMS has this facility online. We are making users aware of it. Every month a list of new arrivals is sent to all Faculty, students and Research Scholars.			
11	In-house/remote access to e-resources	The libraries proved IP & WiFi enabled access			
12	User Orientation	All Libraries in four campuses organise regular User Orientations programmes. Beginning of every academic session, the newly admitted students are given orientation. Training on using different databases are also conducted. Besides this, we also organise, database training sessions for the benefit of Faculty and students			
13	Assistance in searching Databases	An exclusive Information Desks have been created to help users to get assistance in searching the databases where trained library staffs help members with their requests.			
14	INFLIBNET/ IUC facilities	MOU has been signed with INFLIBNET to access free online databases through UGC-Infonet consortia and an anti-plagiarism software called URKUND. In addition, we are also uploading theses on Shodhganga - a repository for PhD theses			No

4.2.8 Provide details of the annual library budget and the amount spent for purchasing new books and journals.

SL No	Details	Pilani	Goa	Hyderabad	Dubai
	Budget for 2015-16 (Rs. In lakhs)	Rs. 1,93,23000	Rs.1,06,00,000	Rs 1,00,00,000	Rs. 10183000) 2015-16 AED 794,000
	Purchasing New				
	Books for 2014-15 (Rs. in lakhs)	Rs. 22,72312 (including 42 E-Books)	Rs.30,20698	Rs 31,47,670	AED 200,000 Spent AED 202,732 (Rs. 3446444)
	Journals for 2014-15 (Rs. in lakhs)	Rs. 1,41,26740 (267 Print Journals and over 11000 E-Journals)	Rs.73, 34914	Rs 53,52,330	AED 320,000 Spent 344,119 (Rs. 10183000)

4.2.9 What initiatives has the university taken to make the library a 'happening place' on campus?

Library organizes events related to books and books reading. Frequent book exhibitions are conducted in the campus. Topical display of books and other related materials are done during the National/International conferences etc.

Some of the initiatives taken in individual campuses to make the library as a happening place in the last one year are:

- Rashtriya Ekta Divas : A Display of Books on The Iron Man: to celebrate Birth Anniversary of Sardar Vallabh Bhai Patel
- Book Festival - A display of books covering a wide range of subjects
- Why Do I Love Books? Essay Competition for Students
- Celebration of World Book and Copyright Day - A Display of Books & Posters of World Renowned Authors was organized
- Celebration of International Yoga Day. A Display of books on Yoga and meditation was organised
- A Tribute to Dr. A P J Abdul Kalam - A Display of Books on and by Dr. A.P.J Abul Kalam

- Creative Short Story Contest was organized for the students. 77 students participated in creative story writing contest
- Celebration of Teachers Day - A Display of Books on Creativity and Innovation in Education and Prize Distribution for the winners of Creative short story contest
- Celebration of Hindi Divas - An exhibition of Hindi novels and literature books. In addition to above the library has organised 7 Orientation and Database training sessions in the last 12 months.
- Celebration of Engineers' Day. A Display of books on Cyber laws, Disruptive Technology, Technological Development, and Innovation was organised

4.2.10 What are the strategies used by the library to collect feedback from its users? How is the feedback analysed and used for the improvement of the library services?

Suggestion Boxes are kept prominently in all the libraries. The feedback forms are collected on a daily basis and proper replies and actions are taken and students are informed about the actions taken though e- mails.

Online feedback forms are available as part of the library portal including Survey form. The library staff responds to the queries raised as and when they are received. Suggestions/ feedback from the users through e-mails are addressed and communicated to the users on the action taken.

Exclusive telephone help line is provided by the library team members. Feedback is also obtained from the library committee. The library LMS KOHA has in-built features to help users interact with the Library staff about suggestions and recommendations. Users are encouraged to make use of them. Regular meetings are held with Student Council representatives, teachers and researchers.
The suggestions received from any other visitors to the BITS library (important guests, employee family members, etc) are also given due weightage and are considered for improvements. Ultimately the Library Committee, in consultation with the concerned authorities takes policy decisions after considering the feedback and oversees their implementation.

4.2.11 List the efforts made towards the infrastructural development of the library in the last four years.

Pilani Campus Library	**Dubai Campus Library**
• Air-conditioned Reading Room has been provided; • CCTV cameras are installed • Entry exit software installed to keep a record of the visitors. • Implemented Koha - Open Source Software as a Library Management System. • Added 30 new computers and implemented new interactive library portal • New LED Display Unit has been installed in	• RFID security system • High end cameras • Lighting migrated from traditional to LED. • Introduced network printer/photocopier/scanner and colour printer/Binding facility • Provides reference section with more seating capacity and

the library to promote library services and resources • New information desk and faculty reading rooms • User friendly book finders signage's	• Browsing section with 20 computers. • High speed WiFi facility
Goa Campus Library	**Hyderabad Campus Library**
• Subscription to 19 e-journal packages and 33 e-journals • Server Migration from Libsys to Koha • blue-tooth enabled scanners • Security Cameras at the entrance and baggage rooms • Glass Partitioned room was created to store text books	• Moved to this new library building • Provides more seating capacity, wide reading area. • High speed WiFi facility • High end cameras • Library interior with new signage

4.3 IT Infrastructure

IT Infrastructure & IT enabled services in the campus are provided to the Faculty / Offices / Departments / Students through a separate Division / Unit.

The following are the major activities of the Unit are:

- Planning & need forecasting For IT infrastructure of the institute.
- Continual upgrade of IT Infrastructure to provide cutting edge technology / services to facilitate enhanced teaching /learning experience.
- Annual budget preparation and project execution
- Centralized Hardware and software purchase
- Administration, monitoring and maintenance of campus wide Network infrastructure
- Maintenance of IT infrastructure
- System administration and Server co hosting
- Voice over IP (VOIP) , high definition Video Conferencing services
- Support centralized desktop and server computing
- Support for conducting remote placement interviews for students, and arranging guest talks from Alumni.
- E-Mail services for all the user
- Support for online exam, computer assisted teaching and learning
- Conduct of online entrance exam BITSAT for admission to FD and HD programs.

4.3.1 Does the university have a comprehensive IT policy with regard to

***IT Service Management:**

Institute has campus specific entity which is responsible for planning, specific need

forecasting for improvement of IT infrastructure of the individual campus, specific maintenance of the IT infrastructure and uninterrupted delivery of the IT services to the user community.

To take care of the day to day user issues, a complaint management portal/helpdesk is maintained where the individual user can register the complaint and can track the resolution status.

***Information Security:** The purpose of the policy is to minimize risk associated with Internet and email services, and defines controls against the threats of unauthorized access, theft of information and malicious disruption of services. To mitigate such risk, Periphery network security is implemented using Firewalls and UTM devices. These devices are configured in high availability mode and are capable of handling , intrusion detection, intrusion prevention , content filtering , application filtering , spam filtering , antivirus and malware detection and filtering these devices are also used for identity based network access control

***Network Security:** The university campuses have completely switched, high availability voice enabled network. Network has a layered architecture consisting of Security, Core, Distribution and Access layer. The users are segregated into different categories and each category can have different access . This is achieved by dividing the entire network into different logical network and access to these logical network is controlled by implementing the desired access policy.

***Risk Management:** The core components of the infrastructure providing critical services are implemented in a high availability Mode. The entire student , faculty, staff and administrative records are stored in the servers placed in Data Centre (DC) and Disaster Recovery (DR) site. DC and DR sites are located in Mumbai and Hyderabad respectively. In addition to this for all the critical infrastructure components ,provision for power backup, fire alarm etc has been made.

***Software Asset Management:** We categorize the software assets as open source software assets and proprietary software assets. The open source software assets are maintained for accounting purpose. The proprietary software assets used institute wide is maintained by computer centre / IPC. The software purchased for individual department's research and teaching is maintained by the concerned departments. The computer centre / IPC unit signs campus agreement with major software vendors such as Microsoft, Oracle, MATLAB etc to provide licensed copy of software and productivity tools to faculty and staff members of the institute.

***Open Source Resources :** To reduce the dependence on propriety software and tools, we strongly promote Open source software , tools and application . Currently institute supports various version of Linux operating system for training and production servers. Institute extensively uses open source software tools for supporting computers assisted learning, teaching, design. Some of the open source software tools used are Greenfoot, JDK, Star UML, VisualParadigm, Eclipse, G++ , gcc,, SSH,My-sql server & client, Virtual Box, gnuplot, gcj-jdk, Scilab Octave etc.

***Green Computing :** BITS strives hard to reduce the carbon footprint . Most of the administrative activities pertaining to faculty, staff and student are handled through the ERP servers placed in data centre. All the notices are electronically circulated through e-mails. The e-mail confirmation is allowed and is preferred over printed letters. All the news feeds are displayed through networked LCD TVs. BITS strictly discourages the use of printers and printed materials. The power reduction is managed by replacing the older and power hungry technology /devices with newer devices requiring less power eg. replacement of CRT monitors with LCD monitors .

4.3.2 Give details of the university's computing facilities i.e., hardware and software.

Summary of systems with individual configurations is presented below.

	Pilani Campus	Goa Campus	Hyderabad Campus	Dubai Campus	Total
Equipment	**Quantity**				
Servers*	27	11	6	6	50
Desktops	1115	723	1200	525	3563
Laptops	254	206	123	60	643

*Most of these servers are Intel based SMP (Symmetric Multi-Processing) servers. Further details are available as supporting documents with BITS.

*** Computer-student ratio**: 1:4 (institute wide)

***Dedicated computing facilities:** In addition to departmental computing facility, the institute has a central computing facility which has dedicated laboratories with desk tops and dedicated compute servers. These facilities can be used by faculty, students and departments. These facilities are created with a view to meet the academic computing needs of the user community.

***LAN facility:** The university campuses have state of art, completely switched, high availability voice enabled network. Network has a layered architecture consisting of Security, Core, Distribution and Access layer. The local area network is build using 1G/10G fibre optic backbone and offers 100 /1000 Mbps desktop connectivity. The Local area network of the institute consists of more than 18000 wired data port. In addition to wired port select section of the institute campus have Wi-Fi based network.

We are in the process of setting up the Wi-Fi based network in the entire campus to facilitate mobility. The existing network provides connectivity to academic /administrative buildings, library, faculty residences, guest house and student hostels.

***Proprietary software:** Server Operating System: Windows Server, Redhat Enterprise Server Client Operating System:Windows 8, VxWorks, QNX

***Software:** Matlab, Mathematica, Ansys academic research license, Ansys academic teaching license, Star-CMM+, Star-CD, ComSol, Auto CAD 2014, PTC creo 3.0,

PSCAD, MS Office, MS Visual Studio, MS SQL Server, Microsoft Volume license, Adobe Professional.

***Number of nodes/ computers with internet facility:** 3000

***Any other (please specify):** In addition to the facilities listed above the University has following infrastructure

- MPLS (Multi-Protocol Level Switching) Connectivity connecting Pilani, Hyderabad, Goa and Dubai campus with the Data centre co-hosted at Mumbai for the ERP and tele-presence applications
- Immersive Tele-Presence environment across four campuses of the University consisting of Tele-presence meeting rooms with eye to eye contact capability, personal desktop tele-presence system with support for network based recording
- University wide ERP system
- Massive Open Online Courses (MOOC) is offered through edX and Coursera platforms across all the campus.
- Multi-point video conferencing facility

4.3.3 What are the institutional plans and strategies for deploying and upgrading the IT infrastructure and associated facilities?

The Institute has a policy of upgrading the desktop / laptops every five years. The network upgrade cycle is of 7 to 10 years. The servers, peripherals and software upgrades are need based and a provision such upgrade is made in annual budget based on estimated needs. The institute plans to increase the internet speed by increasing the ILL capacity periodically (every six months to 1 year).

4.3.4 Give details on access to on-line teaching and learning resources and other knowledge and information database/packages provided to the staff and students for quality teaching, learning and research.

The institute provides access to open source, nationally and internationally available online teaching and learning resources such as NPTEL lectures , OCW etc. The institute library has a portal which supports 32 online databases including Online Public Access Catalogue (OPAC) which provides access to over 235000 print e-books. These databases put together provide access to over 11000 full text journals.

Beside this library also provides access to over 275 E- books from leading publishers such as Elsevier, Pearson, Tailor & Francis and Springer. Library also subscribes to 24*7 E-book which gives access to over 20000 high quality books in engineering and management. In addition to this institute lectures, on line journals, 24*7 online book access

4.3.5 What are the new technologies deployed by the university in enhancing student learning and evaluation during the last four years and how do they meet new / future challenges?

Gradually the traditional teaching methods are evolving. Many students prefer to learn the subjects at their convenience. So the online lectures are becoming popular now-a-days. BITS is providing facilities for those to meet the future challenges like:

i. BITS has introduced web based courses in MOOC (Massive Open Online Courseware) platform to increase its technology footprint in education. It improves the learning experience of students and ventured into online offerings of courses.

ii. One Tele-presence (TP) room is established in each campus of the University for organizing telepresence lectures. 12 to 15 courses are offered in every semester by faculty members of different departments and different campuses. It is enhancing student learning as student of one campus may learn and consult faculty member from other campus.

iii. Synchronous, online instruction is supported by state-of-the art technology for web-based desktop video conferencing. This is complemented by asynchronous instruction and learning facilitated by the Moodle-based Learning Management System which provides access to a variety of interactive learning resources.

iv. Turnitin software is used for checking plagiarism of project reports, assignments for all project type courses and Dissertation/Thesis. This ensures originality and enhances the quality

v. Learning Management System developed by BITS is available to all faculty and students to provide platform for online quiz, online projects and assignments. These tools also provide the students a platform to discuss course topics and clarify their doubts with their instructors.

vi. Specialized software tools like AUTOCAD, MATLAB, Pspice, SPSS, ACD chem ware, Alchemy are used in many courses.

vii. 160-180 capacity CISCO TP classrooms created in all four campuses connected with each other

4.3.6 What are the IT facilities available to individual teachers for effective teaching and quality research?

i. All the faculty members are provided with computer system (laptop or, desktop) and internet connectivity in office as well as in residence. Also in every five year there is provision of upgrading with new computer.

ii. There is also some facilities like printer, scanner etc. available in department offices for individual faculty usage.

iii. Also a wide range of e-books and e-journals are available through BITS

central library portal for effective teaching and quality research. Library collection along with its open access contents play significant role in enhancing the quality of teaching and research.

iv. Above and all, Wi-fi access is available throughout the campus for better connectivity.

v. Faculty members have access to all e-databases to enhance research infrastructure.

vi. High performance computing facility (HiPC) is created at campus to support the computational research.

vii. Institute also houses centralized computational facility on a cloud.

viii. In addition, some of the Departments have own computational facilities for their needs.

4.3.7 Give details of ICT-enabled classrooms/learning spaces available within the university? How are they utilized for enhancing the quality of teaching and learning?

(i) One Tele-presence (TP) room is established in each campus of the University for organizing Tele-presence lectures. TP room is equipped with LCD projector, Wi-fi access, teleconferencing facility with other campuses as well as with any place through internet. This facility helps students to discuss and to clarify their doubts with instructors from different campuses/other connected places. All these lead to better quality of teaching and learning.

(ii) All the classrooms are equipped with state of the art technology. Wireless LCD projectors, Wi-fi connection are introduced in almost all the classrooms.

(iii) There is a dedicated unit for students called Information Processing Center (IPC) which provides IT facilities like computers with internet connection, printers etc.

(iv) A wide range of e-books, e-journals are available through BITS central library portal for effective learning of students. BITS central library also provide e-catalogue which can be accessed through computer systems placed inside the library which helps the students to search for available books and journal in bound volumes.

4.3.8 How are the faculty assisted in preparing computer- aided teaching-learning materials? What are the facilities available in the university for such initiatives?

Faculty is assisted by teaching assistants (TAs) to prepare power point presentation and to develop course material, laboratory manual for the experiments of the laboratory classes. The TAs also help the instructors to conduct the laboratory classes.

For such initiatives, two types of TA ship are available:

- Higher degree teaching assistants
- First degree teaching assistants

BITS has also built studios – one each in Pilani, Goa, and Hyderabad campuses – which enable faculty to video tape their lectures and make them available online. In addition, BITS is also experimenting with in-class recording of lectures. Video content for more than 25 courses have been developed and are offered online for our Work Integrated Learning programs.

4.3.9 How are the computers and their accessories maintained?

The computer centre/ IPC has trained man power which helps in day to day maintenance of desktop computers , servers , network equipments and peripherals. In addition to this, IPC/ Computer centre signs Annual Maintenance Contract (AMC) and facility management contract with OEM/ vendors for taking care of the critical IT assets of the institute. Respective individual campuses of the institute sign agreements with Microsoft, Oracle, Matlab etc , under which institute gets access to the latest software and development/productivity tools. These agreements are annually renewed.

4.3.10 Does the university avail of the National Knowledge Network connectivity? If so, what are the services availed of?

Yes. NKN is available to BITS-Pilani, Pilani campus and currently we are in process of deploying an internally customized open source MOOC platform. The internet bandwidth obtained is used for providing internet access from the computers placed in Laboratories.

4.3.11 Does the university avail of web resources such as Wikipedia, dictionary and other education enhancing resources? What are its policies in this regard?

Yes. IT policy of the institute guides users through this process. Details are available in section 4.3.1

4.3.12 Provide details on the provision made in the annual budget for the update, deployment and maintenance of computers in the university.

	Amount (Rs. In Lakhs)				
Particulars	**Pilani campus**	**Goa campus**	**Hyderabad Campus**	**Dubai campus**	**Total**
Capital expenditure	605.1	305.1	45.35	862.2654	1512.7154
Recurring expenditure	162.7	163.1521	49.51	187.687	399.89697

4.3.13 What plans have been envisioned for the gradual transfer of teaching and learning from closed university information network to open environment?

The following are some of the initiatives done at BITS Pilani for the gradual transfer of teaching and learning from closed university information network to open environment:

- All course related materials are uploaded in the learning management system which can be accessed by all students via internet.
- Partnered with the MIT & Harvard's massive open online course (MOOC) platform edX to offer MOOCs to its own on-campus and off-campus students as well as students outside BITS. Now offering two courses using edX platform in all 4 campuses (Computer Programming; Microprocessor & Interfacing)
- Our own customized and enhanced version of the Open edX^{TM} based MOOC / SPOC Platform, 'Any-Learn' is now ready to create, host and offer courses, depending upon our convenience and schedule. This is already connected to the National Knowledge Network.

4.4 Maintenance of Campus Facilities

4.4. 1 Does the university have an estate office / designated officer for overseeing the maintenance of buildings, class-rooms and laboratories? If yes, mention a few campus specific initiatives undertaken to improve the physical ambience.

All four campuses have Estate Management/Facilities Department and are headed by the Estate Manager/Facilities Manager who takes care of all facilities of the premises. A strong contingent including facilities manager, maintenance manager, maintenance superintendent and maintenance engineer and support staff with specialization in electrical, civil, air conditioning, horticulture works, etc. are part of this team. They oversee the maintenance of buildings, class rooms, laboratories, hostels, etc. Regular renovations in civil works, painting, air conditioning and electrical works are carried out as per site condition either to accommodate the new equipments or to facilitate academic as well as research projects requirements. The campus electricity normalcy is maintained with backup generator at specific areas. The specialized equipments are usually under annual maintenance contract with the supplier or service provides to avoid the break downs. The individual campuses are under renovation & expansion and new facilities are being added every year

Infrastructure details and initiatives: All the campus buildings are well lit with modern amenities. There are dedicated substations for air conditioning plants and other lighting purposes which avoid fluctuations and disturbances in administrative blocks. Additional substations having transformers with adequate capacities ensure power supply to hostels, main building, residences, student activity centre, sewage plant, medical centre, pump house, etc. An arrangement of looping is carried out as a backup supply power connection in case of failure of any one transformer.

Children parks are developed to cater to the needs of campus children with outdoor playing equipments like slides, swings, merry go round, sea-saw, etc. The Campus Child Care Center has been functioning in individual campuses. It provides a safe and creative environment where the children of faculty and staff can spend quality time.

Adequate Food courts and cafeteria cater to the needs of academic buildings, dining halls on either side cater to the hostel residents with other general eateries spread across the campus for students and residents. Beyond regular dining hours there are adequate food courts to take care of immediate needs of residents on campus. Auditoriums with seating capacity between 1200- 2500 in various campuses are being used for various Institute functions, academic events and student's technical and cultural festival etc.

For Pilani campus, Institute had in the past made addition to the existing physical infrastructure whenever there was a need, especially with the addition of new programmes/curricular or when there was increase in no. of students and subsequently faculty members. Institute has recently added approx. 5,25,000 sq. ft. of infrastructure to the existing facility and is about to add approximately 4,25,000 sq. ft. of new facility in next 3-4 years. In Pilani, new faculty housing has been constructed with state of art facilities.

In Goa Campus, the barren land of Campus has been transformed in to a green campus with an attractive central lawn. Institute has playgrounds like cricket ground which is maintained at international level in association with Goa cricket association. Whereas football ground is also developed and is maintained in association with Salgaoncars. The other play grounds like two volley ball courts, two basket ball courts, foot sole and two lawn tennis courts are developed. The indoor games housed in student activity center are squash court, multipurpose hall badminton court, table tennis, carom, chess board, etc. In addition to the above, facilities like gym equipment's, tread machines etc, art and deco room, dance classes, etc., are also part of student activity centre.

A state of art library and 2500 capacity auditorium has been added to the campus With respect to Hyderabad campus, to cater to proposed increase in student and faculty strength over next 5 years, student and faculty housing has been planned along with sports facilities and other required infrastructure. Having completed the design stage and having obtained required clearances from the authorities, the construction activity will start soon.

The university has earmarked adequate budget for up keep of the infrastructure including annual maintenance, special repairs and improvement of special facilities. The Times of India dated 6th May 2015 has rated our Goa campus as India's 7th best campus among the beautiful campuses in India.

4.4. 2 How are the infrastructure facilities, services and equipments maintained? Give details.

A strong contingent of personnel associated with the estate management unit has been appointed on permanent basis for the maintenance of the premises. The entire team takes care of operations & maintenance and upkeep of the facilities in the premises. For specialized maintenance of heavy equipments/machineries, sophisticated instruments, Annual Maintenance Contracts are usually signed for proper preventive maintenance.

The electrical arm of Estate Management Unit takes care of all electrical needs and repair of the same. Electricians are available round the clock to address the issue of untimely power breakdown. They also take care of timely replacement and repair of lights in academic blocks, hostels, street lights etc. The maintenance arm of Estate Management Unit takes care of all of the remaining functions like plumbing, water supply, cleaning, garbage collection, proper disposal of waste, maintenance of lawns etc.

Some facilities like House Keeping, Cooking, Gardening, Laundry, have been outsourced to professional agencies. Mechanized cleaning of roads, spraying of Mosquito repeller etc. is done in each building on the campus, including classrooms, labs, seminar halls playgrounds etc., and is attended/ supervised by an external or internal supervisor.

Adequate security measures are at place at all the campuses to ensure safety and security of residents. Security has been outsourced to professional agencies. The Institute is well barricaded with boundary wall with security guards guarding the campus placed at all important locations. The surveillance of main gate provided. The security of the campus is outsourced with monitoring by BITS representative. Every hostel has security guard etc. With this arrangement the campus is safe & secure.

The infrastructure facilities like back up diesel generator electricity in case of Government power failure is available for academic building and other critical areas. We are progressively outsourcing most of these activities to professional agencies.

5 CRITERION V: STUDENT SUPPORT AND PROGRESSION

5.1 Student Mentoring and Support

Every campus has a Student Welfare Division that takes care of student mentoring, progress and support related activities. It is headed by an Associate Dean in each campus and assisted by the Chief Warden, Wardens, Hostel Superintendents, Nucleus members, Student members and administrative staff etc. The division is involved in all students' related activities and policies.

5.1.1 Does the university have a system for student support and mentoring? If yes, what are its structural and functional characteristics?

Academic Advising

ARCD, Academic Registration and Counselling Division, serves as the central node for all the academic and registration activities of BITS. Students get guidance and information regarding their academic performance through the Division. Apart from providing counseling to students, maintenance of students' academic history is also done by the Division. ARC facilitates the usage of various academic flexibilities available to the students.

A committee, Academic Counselling Board (ACB) , monitors the performance of academically weaker students and gives guidance to help them improve their performance. The committee meets the students regularly and monitors their performance in various tests, quizzes etc., and also interacts with the different course instructors to get feedback regarding the student's performance.

In addition, the Academic Counselling Cell (ACC), comprising faculty members and students, is also involved in mentoring students. The institute has also recently evolved a mechanism in which all students of the first year are divided into small groups and each group is assigned a faculty member as advisor to provide academic and personal guidance.

Academic Advising is carried out through the faculty members of respective departments as academic advisors to students. A student mentoring committee is made for every semester. This consists of faculty and students who mentor academically weak students on a one-on-one basis. Mentors interact with all people who deal with all aspects of student life on campus. This includes teachers, wardens, friends, parents.

The academic advisors interact with their advisees on a regular basis and discuss their performance and progress. Students are advised to contact the academic advisors periodically. The goal is to help the students reduce their programme-related stress and maximize opportunities for academic performance improvements leading to a high quality professional life.

Student Counselling

Academic counselling of students is done by the Academic Counselling Board (ACB). It monitors their programmes and gives guidance to help them improve their performance. Students are advised to interact with assigned faculty mentor from time to time and get guidance for further improvement. Also the Academic Counselling cell (ACC) assigns faculty and senior students for academic mentoring.

Each campus has a professional Counselor to students who need some solution to their psychological problems , to foster well-being on campus and to help students actualize both personal and career goals. The sessions are individual and confidential. The counselor interacts with students, discusses all issues which affect their academic performance and helps the students in resolving their psychological issues, if any. Students are advised to contact the counselor directly. The goal is to help students reduce their stress, maximize academic and personal success, enhance personal development and improve the quality of life. Students are also free to meet the faculty for counseling services and many students approach the faculty for the same. A Stanford-BITS initiative, The Manamali program has been started with a view to reduce stress and anxiety among students.

5.1.2 Apart from classroom interaction, what are the provisions available for academic mentoring?

All BITS campuses being residential provide ample opportunities for interaction between faculty and students. This facilitates continuous interaction outside the classroom teaching and helps in student mentoring by the faculty. All instructors have assigned chamber consultation hours to their respective students for one to one communication relating to academic matters.

There are structured project type courses in the curriculum where students can work with a faculty as a guide to pursue study in their research fields. This provides for additional opportunities outside the classroom interaction. The Academic Counselling Cell (ACC) assigns faculty and students for academic mentoring.

During the Practice School program, students spend seven and a half months as interns in the industries. The academic inputs are given to the students regularly by the mentoring BITS faculty and expert from the industry at the location of the work.
Students actively participate as project fellows in the research activities of the sponsored research projects of faculty members. This enables them to develop research based skills.

The Institute has several centers of learning. These help in mentoring students in various aspects within and outside their curriculum to enhance their learning experience.

5.1.3 Does the university have any personal enhancement and development schemes such as career counselling, soft skill development, career-path-identification, and orientation to well-being its students? Give details of such schemes.

A separate unit deals with these important activities. About 450 companies visit the institute every year to interview students who are about to graduate. The number of such interviews has actually grown considerably over the years.

The Institute also tries to arrange interviews for practice school students in and around their own practice school centers. The impressions given by the representatives of industries about students are continuously fed back to the concerned divisions and departments. Some of the organizations that have been conducting campus interviews are shown in Annexure II.

- **Soft skill development**:

Identification of students with weak soft skills in English proficiency, both spoken and written and enhancing the same by way of a comprehensive 1 week training program by the placement unit in the 4th year of study of the student.

A new initiative has been embarked upon to identify students with weak communication skills through their performance in the course Technical Report Writing offered in first year and to put them through a battery of tests/study material/group discussions/mock interviews , etc., in order to enhance their skills.

Alumni interactions at regular intervals (one per month) stresses upon the need to polish the soft skills and enhance the same for a better and more career-centric options. These interactions make positive impact and enhance BITSians' professional and personal life.

Project Embryo aims to help BITS Pilani students become leaders, innovators and entrepreneurs of tomorrow. It is a project to foster strong collaboration of BITS students and BITS faculty with the alumni and friends of BITS Pilani. Through lecture series and collaborative projects, the students can get exposure to the cutting edge research areas that complement BITS courses. They also get an opportunity to network with the alumni and friends of BITS, who are reputed academicians and industry leaders.

***Career-path-identification:**

Student counselling at the respective department level is done on a periodic basis to provide guidance to students to choose from different career options that exist. Guest speakers/ Alumnus are invited regularly to provide students a platform to air their concerns around choosing their career options. The students interact and get a fair idea of various options and then weigh the pros and cons and take an informed decision to pursue a career of their choice across higher studies and employment.
An outside experienced career counsellor is invited twice a month for the Dubai campus to interact with students. It's purely voluntary on the part of the student to either avail or not this facility depending upon his interest, keenness and the need. The students are informed during the regular interactions about the calendar and availability of the career counsellor. Students then block the slot and appear in person and discuss with the career counsellor about the advice they want to seek.

Students are also trained in latest technology based courses such as:

- Website Design & Development
- Introduction to Programming in Java
- Automotive Surface Designing using CATIA
- Introduction to Electronics in Robotics
- Advanced Image Processing
- Android App Development
- Computational Fluid Dynamics with COMSOL Multiphysics

- Introduction to electronics and robotics
- Introduction to Python
- Introduction to Java programming
- Quantitative Finance and Investing
- 3D modelling and Kinematics using CATIA
- ANSYS with an Introduction to COMSOL
- Vehicle Design and Dynamics

All these courses have been open to students of all disciplines, which help in the development of the software skills of every individual student on campus.

5.1.4 Does the university provide assistance to students for obtaining educational loans from banks and other financial institutions?

Yes. Every year, at the beginning of the academic year, the Institute enables different banks to explain the salient features of the education loan schemes to enable students to select the right bank for their educational loan.

5.1.5 Does the university publish its updated prospectus and handbook annually? If yes, what are the main issues / activities / information included / provided to students through these documents? Is there a provision for online access?

The Institute makes available the following documents to the students either in hard copy or through web access.

1. Bulletin: The university publishes its updated bulletin in the beginning of every academic year that contains general information such as facilities, students life, students services, placements and campus interviews and infrastructure etc., related to different campuses of the university. It describes the educational process and programmes of studies which includes information about programs offered in different campuses, teaching-learning process, evaluation, flexibilities such as admissions in both semesters, admission with marginal deficiency, admission with advanced standing, dual degree scheme, transfer, audit and other flexibilities and academic regulations. Also, it provides information about university-industry linkage, details of practice school (PS), research at BITS including research areas, research linkages and the research components of various academic programmes.
2. Time table: The year wise academic calendar is planned in advance. Before the start of each semester, the Instruction Division prepares the Time-Table which contains academic calendar, courses on offer and other details that include Instructors, class hours, classrooms, mid-semester examination date and comprehensive examination dates. The time-table also contains details of humanities electives, list of equivalent courses, pre-requisite details, audit type course details, textbook details etc. The BITS educational programmes allows several flexibilities to the students and teachers. Students have flexibilities like course wise passing, choice to accelerate or decelerate his program according to his capability and a wide choice of electives which cuts across year, level and disciplines.

3. Guidelines to students: This booklet is given to every newly admitted student which facilitates students to conduct themselves during their stay on campus.
4. Academic Regulations: The Academic Regulations document lists the rules governing various programmes.
5. Annual reports and Research at BITS gives an yearly account of activities at the Institute and is available through the BITS website.

5.1.6 Specify the type and number of university scholarships /freeships given to the students during the last four years. Was financial aid given to them on time? Give details (in a tabular form) for the following categories: UG/PG/M.Phil/Ph.D./Diploma/others (please specify).

A large number of scholarships, fellowships and other forms of financial assistance are available to the students of the university. For continuance of scholarships, high academic performance and good conduct are essential.

Institute Merit and Merit-cum-Need Scholarships: Students admitted to the Integrated First Degree Programmes are eligible to receive these awards. The merit awards cover reimbursement of full semester fees and admission fees for top ten students of each batch, and 50% or 25% semester and admission fees for those selected for Merit-Cum-Need awards. For the merit awards, students are automatically considered, and students desirous of being considered for the merit-cum-need awards need to apply each semester in response to a specific notice. On an average, these awards benefit a little over 20% of the students. All awards are made for one semester only, and their continuance in the subsequent semester depends upon the candidate's performance in the Institute.

Student Aid Fund: Some financial assistance may also be obtained from this fund. These awards are made normally in the second semester only. Students have to apply for this assistance in response to a notice.

Other Scholarships & Aids: Student Welfare Division also forwards applications from students for scholarship/ financial aid to external agencies. The Division, in case of special need, tries its best to help the students, by all possible means.

Professional Assistantship: Some students are selected as Professional Assistants each semester for laboratory work, office assistance, etc. The selection and operation of the assistantship is done through the Instruction Division.

The table below provides information about Institute scholarships since 2011-12:

Type of Scholarship	Students receiving Institute scholarships since 2011-12	Tuition fees reimbursed
Merit scholarships	1% of Students admitted that academic year	80%
	2% of Students admitted that academic year	40%
Merit-cum-need scholarships	3% of Students admitted that academic year	80%
	6% of Students admitted that academic year	40%
	12% of Students admitted that academic year	25%

All awards are made for one semester only and their continuance in the subsequent semester(s) will depend on the candidate's performance in the Institute and his/her needs. Second, a student is not permitted to avail Institute scholarship in case s/he receives any external scholarship of an equal amount and if the external scholarship is of less than the Institute scholarship amount, the difference of amount as institute scholarship is paid.

The fee-waiver is merit based for Higher Degree (HD) and Ph.D. students. 50% ME/M. Pharm/M.Phil students receive 40% fee waiver; 25% MBA students receive 40% fee waiver and 50% Ph.D. students receive 90% fee waiver. HD and Ph.D. students may also get a monthly stipend which is again merit based and is in the form of assistantship for which they are required to devote six to eight hours every week to assist in teaching/research/educational administration. 50% ME/M. Pharm/M.Phil and 25% MBA students may get a monthly stipend of Rs. 9600/- while 50% Ph.D. students may receive a monthly stipend of Rs. 12000/- or Rs. 18200/- based on their qualification.

Pilani Campus: FD Scholarships

First Degree - Scholarships			
Pilani Campus	**Merit**	**Merit Cum Need**	**Total**
2011-12	117	1239	1356
2012-13	150	1314	1464
2013-14	175	1417	1592
2014-15	201	1398	1599
Goa Campus			
2011-12	114	866	980
2012-13	124	754	878
2013-14	157	717	874

2014-15	77	319	
Hyderabad Campus			
2011-12	206	1087	1293
2012-13	157	1334	1491
2013-14	159	1249	1408
2014-15	78	602	681
Dubai campus	**Merit**	**Others**	
2011-12	295	94	389
2012-13	348	152	500
2013-14	562	232	794
2014-15	608	259	867

Higher Degree - Fee Waiver/Stipend

Years	**Pilani**	**Goa**	**Hyderabad**	**Dubai**
2011-12	210	38		49
2012-13	395	85	102	31
2013-14	499	85	131	25
2014-15	569	66	124	33

Ph.D. Fee Waiver/Stipend

Academic Year	**Pilani Campus**		**Goa Campus**		**Hyderabad Campus**		**Dubai Campus**	
	Full time	Part Time	Full time	Part Time	Full Time	Part time	Full Time	Part time
2011-12	293	66	61	0	79	0	0	0
2012-13	341	74	71	0	117	0	4	0
2013-14	442	67	95	14	146	36	12	0
2014-15	463	71	96	26	174	36	12	3

5.1.7 What percentage of students receive financial assistance from state government, central government and other national agencies (Kishore Vaigyanik Protsahan Yojana (KVPY), SN Bose Fellow, etc.)?

A good number of students receive assistance in the form of Inspire, KVPY, Pratibha etc., but the exact percentage is not available. The University is not able to maintain any records of state and central government scholarships because the funding agencies are directly transferring scholarship amounts to the students accounts. The University authorities intimate the students through notice boards whenever the scholarship notices are received from State/Central Government. Students apply on their own after fulfilling formalities through the University.

5.1.8 Does the university have an International Student Cell to attract foreign students and cater to their needs?

Yes, the Institute has an International Program and Collaborative Division headed by a University level Dean and campus level Associate Deans which acts as an interface for all international activities of the Institute.

In the last few years BITS felt the need for internationalization of education and as part of its Mission 2015 – an imperative team was created to work out the logistics of international admissions. To introduce transnational diversity and to embark upon making BITS Pilani a global university, an alternate merit based mode was introduced for admitting international students to the integrated first degree programmes.

Any student who is not a citizen of India is eligible to apply through this scheme for which the admission will be based on performance in Scholastic Assessment Test (SAT) conducted by the College Board (USA) in Mathematics, Physics, and Chemistry. In the academic year 2015-16, 27 international students have been admitted to the Hyderabad campus. An office of international students has been established in the Hyderabad campus which works collaboratively with the Admission Officer of the institute. Efforts are on to admit international students in the other Indian campuses in the coming years.

Dubai Campus: The Admissions Office at Dubai Campus handles the International admissions. Presentations are made in different countries. Existing international students also help by joining the team as volunteers. Dubai Campus has UAE nationals as well as international students from other countries. Mentors are assigned and accommodation is provided. International students are provided separate scholarship.

5.1.9 Does the university provide assistance to students for obtaining educational loans from banks and other financial institutions?

Same as 5.1.4.

5.1.10 What types of support services are available for

* **Overseas students**

Institute provides Guesthouse/Hostel facilities for the stay of students coming under exchange program to BITS Pilani.

* **Physically challenged / differently-abled students**

Access to some of the classrooms and labs can be done in a wheelchair and ramps/lifts.

* **SC/ST, OBC and economically weaker sections**
  For all economically weaker students, the University provides two types of scholarships: i) Merit cum need scholarship (from the Institute funds) ii) Need based scholarship (from Student Aid Fund)

* **Students participating in various competitions/conferences in India and abroad**
  A good number of students attend competitions/conferences in India and abroad. The University provides financial help for travel from its own funds or through BITS Alumni Association (BITSAA) and provides all required documents for their visa for participating in competitions/conferences abroad. It also supports them to get assistance from Government agencies.

* **Health centre, health insurance etc.**
  The Institute has Health/Medical centre and has medical insurance (Rs. 50000-100000) to all residential students. This medical insurance covers the fee paying parents/guardians. In the case of the fee paying person's death, medical insurance covers the fee of student in the range of 3-5 lakhs.

* **Skill development (spoken English, computer literacy, etc.);**
  Courses are run by the Department of Humanities and Social Sciences and efforts are made towards developing the language and communication skills of students. A compulsory course, Technical Report Writing, is offered to all the students in their first year. Elective courses are offered in Effective Public Speaking, Linguistics, Business Communication, etc.

* **Performance enhancement for slow learners**
  Academic Counselling Board (ACB), monitors the performance of academically weaker students and gives guidance to help them improve their performance. The committee meets the students regularly and monitors their performance in various tests, quizzes etc. and also interacts with the different course instructors to get feedback regarding the student's performance. In addition, the Academic Counselling Cell (ACC), comprising faculty members and students, is also involved in mentoring students. The Institute has also recently evolved a mechanism in which all students of the first year are divided into small groups and each group is assigned a faculty member as advisor to provide academic and personal guidance.

* **exposure of students to other institutions of higher learning/ corporates/business houses, etc.**

  BITS Pilani has a unique course called Practice School, where every student goes to Industry for i) two months in summer, to study how corporate and business houses work, ii) six months, where they work on live projects in the Industry, iii) students also avail the option of one semester off campus thesis in India and aboard in reputed universities.

* **publication of student magazines**

  Financial support is provided by the University for printing of student magazine. Wherever it is in online form, website space is made available.

5.1.11 Does the university provide guidance and/or conduct coaching classes for students appearing for Civil Services, Defence Services, NET/SET and any other competitive examinations? If yes, what is the outcome?

Yes, the Institute enables external experts to coach for GATE, GMAT, and CAT examinations, etc. After regular university classes students are free to attend these classes. Career guidance on how to prepare for and what to expect while pursuing Civil Services is also given.

Talks by eminent administrative heads, and high performers in public arena, business leaders, scientists, distinguished alumni etc., are arranged regularly to motivate the students and offer career guidance in competitive examinations.

Many students are getting good results in these competitive exams.

5.1.12 Mention the policies of the University for enhancing student participation in sports and extracurricular activities through strategies / schemes such as

* **Additional academic support and academic flexibility in examinations**
  - The University gives permission to participate in sports and extracurricular activities and students are given makeup for examinations, when they are participating in State/National/International level games.
  - The Institute invites eminent sportsmen/ women to deliver talks for motivation.

* **special dietary requirements, sports uniform and materials**

  Yes, the Institute provides sports kit to all students who represent the Institute. High protein and mineral rich foods are served and special care is taken for re-hydration of players for better performance

* **any other (please specify)**

The Institute has various sports programs to increase participation rates and enhance health status of students. The major programs are listed below.

- The Institute conducts coaching camps and invites Sports Authority of India coaches from various sports disciplines to teach students sports skills.
- The students sports committee of the Institute is encouraged to organize intra/ inter Institute sports events which will be attended by a large number of students..
- Various recreational sports activities and indigenous sports are conducted to attract those students who do not participate in sports.

- The Institute also conducts regular martial arts classes to teach students particularly women students, self -defensive skills by qualified coach.
- Regular fitness classes are conducted to enhance health related fitness of the students.
- A fitness test is also conducted every semester focusing on cardio, strength and flexibility.

5.1.13 Does the university have an institutionalized mechanism for students' placement? What are the services provided to help students identify job opportunities, prepare themselves for interview, and develop entrepreneurship skills?

Placement at BITS is professionally managed by a team of people headed by the Chief Placement officer under the guidance of the Vice Chancellor and respective campus Directors. Every campus has a Faculty In-charge for placements and a Placement Manger who coordinate the campus level placements with help of the departmental placement coordinators and the administrative staff. The placement process is centralized and done with the help of advanced technology (eg. Tele-presence facility as and when required). The data capturing and the statistics are all centralized using placement automation system for all the campuses. The process is centralized from the time the company shares the requirement to all the 4 campuses and the time where the feedback is captured online and is shared with all the campuses.

Apart from Campus placements, we help students to apply online for off campus placements and summer internships where the students might get pre-placement offers. There are instances where we communicate and give opportunity to students to participate in coding and other technology competitions where the students are given pre placement offers and sometimes directly job offers.

Interview Preparation : Every campus, depending on the feedback received from the companies in the past and training need analysis, will offer training workshop for more than 6 weeks in a year (as appropriate) which will include Technical as well as other soft skills which are required.
In some instances the training is on-going through online platforms like Hacker Rank and Hacker Earth for Coding and other workshops for CORE specific branches. The trainers could be both internal and external industry experts.

Entrepreneur Skills: Students get the opportunity to leverage on the Technology Business Incubator to enhance their entrepreneur skills. Special care is taken for those students starting from ideation to formation of a company through TBI.

5.1.14 Give the number of students selected during campus interviews by different employers (list the employers and the number of companies who visited the campus during the last four years).

YEAR OF PLACEMENT	NO OF COMPANIES VISITED
2011-12	230
2012-13	243
2013-14	309
2014-15	357

Detailed information about the companies year wise is provided in Annexure 2

5.1.15 Does the university have a registered Alumni Association? If yes, what are its activities and contributions to the development of the university?

Yes. The University has a registered Alumni association; BITSAA International Inc. The website for the same is http://www.bitsaa.org/. The BITS Alumni Association (BITSAA) has been functioning since 1989 as a nodal agency for maintaining liaison with Alumni all over the world and to involve them with the development of the Institute. Since 1989 the Institute has grown manifold. An overseas campus at Dubai is functioning since 2000, and the K K Birla Goa and Hyderabad campuses are in operation since 2004 and 2008 respectively.
A new division, BITS Alumni Affairs (BITSAA) Division, was created in 2010 to give distinct thrust to the activities related to Alumni and to connect and engage students, alumni, friends and well-wishers for a long time relationship with BITS Pilani.

It focuses on the development of alumni support to the continuing development of the Institute's academic, research, and off-campus programs, expansion and renewal of its facilities, and providing scholarships and financial aid to students through annual fundraising campaigns. It manages various events – Silver Jubilee Meet, Golden Jubilee Meet, farewell to graduating students etc. and brings the news about Alumni. It coordinates its efforts with BITSAA International and BITSAA chapters in various cities in India and abroad.

The role of BITS Alumni Affairs Division includes the following: to plan, implement and promote alumni programs that support the BITS Pilani strategic initiatives; to establish and build relationships with a wide range of alumni as well as local, regional, national and international alumni chapters; serve as the single point of contact for alumni & Institute for all matters related to alumni affairs, and to maintain regular communication with alumni; Educate graduating students about alumni benefits and engage them in various programs.

Partner with various offices of the institute to spearhead the introduction of alumni involvement in the growth and continued leadership of the University. Collaborate closely with BITSAA Chapters throughout the world and enable increased support from alumni, and provide platforms and programs for such support. Raise funds for select special projects and events. Seek alumni involvement for placements of graduating students and for promotion of entrepreneurship amongst students.

The launch of BITS connect 2.0 with support from alumni ushered a landmark achievement. It marks the start of a new era in the world of education, making BITS the first university of its kind to implement Tele-presence on such a large scale.

Gurudakshina is the signature program by the BITS Charitable Trust (of the 1970-75 batch) and is held every year to offer gurudakshina to professors who taught in their times. During this program, the batch members felicitate their gurus and award cash prizes while recalling their contributions in students' lives.

Mantra Award: Mantra Awards are instituted by BITS alumni, to recognize and reward outstanding students who have demonstrated extraordinary leadership potential and/or entrepreneurial initiative. They are awarded in the following four categories : 1) Award for Outstanding Leadership; 2) Entrepreneur of the Year Award; 3) Award for Social Leadership; 4) Innovator of the Year Award

Teaching Excellence Award are instituted by BITS Alumnus in the name **Prof. S Venkateswaran and Kris Ramachandran** , to encourage, honor retain, and develop faculty who are the key part of student development.

Also department specific student award are instituted by the alumni in honour of their favourite professor. Awards like Prof. R. P. Vaid from Chemical Engineering, Prof. K. E. Raman, for EEE etc. are awarded to a deserving student studying in BITS campuses. Alumni also contribute towards infrastructural development of the university by creating sports facilities for the students. They encourage research initiatives of the undergraduate students by supporting travel grants for conferences and scholarships. Alumni also encourage entrepreneurial activities on the BITS campuses by acting as Mentors and Angel Investors for student start ups.

5.1.16 Does the university have a student grievance redressal cell? Give details of the nature of grievances reported. How were they redressed?

Yes, the Institute has student grievance redressal mechanisms. Institute addresses student grievances, if any, and in general works to maintain the well-being of the student community. It also addresses the issues, investigates and recommends feasible solutions for resolving issues for the mutual benefit of the students and the Institution.

The student council and the student welfare division, jointly take up the issue of student grievances. The students approach the council with their problems which are then taken up with the administration as and when required.

Examples of student grievances include issues such as

- Academic grievances like grading, time schedule etc are taken up and students are guided to the concerned authorities for resolution.
- related to facilities (redressed by bringing to the notice of facilities department and making sure it was done)
- Complaints about unacceptable behaviour amongst the members of community
- Faculty behaviour and teaching (redressed by bringing to the notice of Dean ID and Director)
- Complaints related to ragging
- Complaints related to sexual harassment

5.1.17 Does the university promote a gender-sensitive environment by (i) conducting gender related programmes (ii) establishing cell and mechanism to deal with issues related to sexual harassment? Give details.

BITS Pilani takes pride in its commitment to maintain a working and learning environment that is free of intimidation, fear, bullying, revenge, retaliation in which students, faculty, and staff can develop intellectually, professionally, personally, and socially. There is a Committee for Combating Sexual Harassment (CCSH) at each campus, which works with an aim to provide for the effective enforcement of the basic human right of gender equality and guarantee against sexual harassment and abuse. Complaints Committee for Combating Sexual Harassment is functioning with a Chairperson, Convenor, representatives from faculty & students and an external member.

Complaints can be made verbally, through email, phone, or in a letter to any member of Committee for Combating Sexual Harassment (CCSH). Complaints should be lodged by the concerned person directly with any member of CCSH. Third party complaints shall not be entertained except in cases where the complainant has been forcibly prevented from making a complaint; in such cases a complaint can be made on her/his behalf until she/he can approach CCSH. Complaints must be filed within three months of the incident.

Committee ensures the confidentiality of the complaint. Students have expressed the view that there are no sexual harassment cases in our campus. Department of Humanities and Social Sciences offers an elective course Introduction to Gender Studies by a guest faculty who is an expert in the subject.

5.1.18 Is there an anti-ragging committee? How many instances, if any, have been reported during the last four years and what action has been taken in these cases?

Yes. BITS, Pilani in compliance with the anti ragging guidelines, has issued an order on June 26, 2007, regarding the formation of Institute Level Anti-ragging Committee and Anti-ragging Squads, which is strictly being implemented every year. Due to the measures taken up by this committee, we did not have any incidence of ragging reported during the last 4 years.

5.1.19 How does the university elicit the cooperation of all its stakeholders to ensure the overall development of its students?

The university elicits the support of all stakeholders namely parents, alumni, faculty and staff to ensure the overall development of its students through discussions, meetings, formation of various committees and associations.

5.1.20 How does the university ensure the participation of women students in intra- and inter-institutional sports competitions and cultural activities? Provide details of sports and cultural activities where such efforts were made.

University provides the equal opportunities to women students along with men. Women students are encouraged to participate in all academic, cultural and sports festivals held within and outside the campus. Apart from these, sports events are conducted regularly in women's hostel. It encourages girls' participation in sports, every year inter-Hostel Girls Tournaments. Women students also are active members in conducting and participation inter college cultural fest in all the three competitions. Our students have won prizes in dance, fashion shows and music competitions regularly. In many sports competitions, our women students have participated and brought laurels to the institute.

5.2 Student Progression

5.2.1 What is the student strength of the university for the current academic year?

Campus	FD (BE, B. Pharm and MSc.)	HD (M.E. M.Pharm, M.BA).	Ph.D.	Total
Pilani	3714	560	410	4684
Goa	2666	72	171	2909
Hyderabad	2981	145	193	3319
Dubai	1665	85	37	1787

***Analyse the Programme-wise data and provide the trends for the last four years.**

Student Progression	%		
UG to PG	We do not maintain this data. However, a large number of students pursue higher studies. Data for departments that maintain this data has been provided in individual departmental evaluative report.		
PG to M.Phil.			
PG to Ph.D.			
Ph.D. to Post-Doctoral			
Employed	**FY15**	**FY14**	**FY13**
% placed (Indian Campuses)	87.36%	80%	70.00%
% placed (Dubai)	56.04%	39.61%	41.10%

5.2.2 What is the programme-wise completion rate during the time span stipulated by the university?

All students complete their degree. Less than 1% take more than the time span stipulated. These include students with poor academic performance and students who have medical conditions.

5.2.3 What is the number and percentage of students who appeared/ qualified in examinations like UGC-CSIR-NET, UGC-NET, SLET, ATE / CAT / GRE / TOFEL / GMAT / Central / State services, Defense, Civil Services, etc.?

We do not collect this data.

5.2.4 Provide category-wise details regarding the number of Ph.D./ D.Litt./D.Sc. theses submitted/ accepted/ resubmitted/ rejected in the last four years.

Ph.D. thesis data Campus	Pilani	Goa	Hyderabad	Dubai	Total
Submitted	206	37	38	8	289
Accepted	186	29	28	3	246
Resubmitted	1	2	0	1	4
Rejected	1	0	0	0	1
under evaluation	18	7	10	4	39

*Note: Institute does not offer D.Litt./D.Sc.

5.3 Student Participation and Activities

5.3.1 List the range of sports, cultural and extracurricular activities available to students. Furnish the programme calendar and provide details of students' participation.

Every campus provides space, material and equipment for sports, cultural and extracurricular activities available to students. Annual festivals are held in each of the campuses and are very popular with huge participation from students from colleges spread across the country

Pilani Campus • BOSM - Annual Sports Festival • OASIS - Annual Cultural Festival • APOGEE - Annual Academic festival • Interface • Conquest	**Hyderabad campus** • ARENA - Annual Sports Festival • PEARL - Annual Cultural Festival • ATMOS – Annual Academic festival
Goa campus • SPREE - A Sports Festival • WAVES - A Cultural Festival • QUARK – Annual Academic festival	**Dubai campus** • BSF - Annual Sports Festival • JASHN - Annual Cultural Festival • Tech Fest

*Apart from these events several other events are organized by departments and clubs.

Campus Events and Activity Calendar

S no.	Event	Period
1	Freshers Icebreakers	Beginning of academic Year
2	Techno Fest	Annual event held in first or second semester. (varies with campus)
3	BITS Sports Festival	Annual event held in first or second semester. (varies with campus)
4	Hostel Day	Annual Event
5	Inter Hostel sports competition	Annual Event
6	Classical Music competitions	Annual Event
7	Cultural fest	Annual event held in first or second semester. (varies with campus)
8	Annual Day	May
9	Graduants farewell Tea Party	May
10	BITS Sports Festival	Annual event held in first or second semester. (varies with campus)
11	Inter departmental Sports festival	Annual Event

Cultural and extra curricular activities: Some examples of student participation in all four campuses of BITS are given below

- Students have various clubs – aerodynamics, robotics, photography, music, foreign languages, movie, painting, dance, drama, solving Rubik's cube to enrich the quality of campus life.
- Students participate actively in cultural functions of various festivals of major Indian festivals such as Ganesh Chaturthi, Ugadi, Gudi Padwa, Onam, Durga Puja, Diwali, Holi and Christmas with enthusiasm.

- Teachers Day – As is the tradition, the first years were given the responsibility of conducting the Teachers Day celebrations. Amidst a lot of exciting and amazing events the teachers were delighted with the performances.
- Fresher's Day – The most hyped event for the freshers. After several rounds of competitions for Mr. Fresher and Ms. Fresher, the finals were conducted grandly in the campus. The event gave the freshers the first insight into the campus culture of BPHC.
- BITS-MUN– The Annual Mock-United Nations was conducting from October 3rd to 5th. With participation of over 450 students, BITS-MUN was a huge success
- Inter-Bhawan Cultural competitions were conducted. Started with the motive to provide talented youngsters a platform to showcase their talent, the first edition was a huge success with participation over 950 students In 30+ events. This increases the interaction between the students living together and also gives them a break from the regular routine in academics.
  Three cultural nights were conducted for three consecutive days : Music night, Dramatics night and Dance night. This made sure that the semester ended with a plethora of cultural activities.
- Ignite – Nirmaan had organized the Ignite festival on January 25th and 26th. Around 200 children from various parts of the city had participated in this social festival. They gained hands-on-experience with practical science experiments, vedic maths, and other engaging educational activities. The event ended with a dance workshop where kids and volunteers alike danced with joy
- Verba Maximus – The Annual literary festival
- Sanskriti –It was a feast for all Regional Associations of the college. With multiple dance, singing and dramatics performances mixed with fashion shows, the entire program was a delight to watch.

Students have shown great enthusiasm in making use of the sports facilities provided in the campus. Each hostel has facilities for indoor games like table-tennis, chess and caroms. There are shuttle badminton courts and grounds for volley-ball, foot-ball and cricket. Physical Education Department of SWD has been conducting friendly matches among Bhavans and inter-discipline teams in all four campuses. Also student participate in the inter collegiate and invitational competitions with other institutions. A representative Annual sports calendar giving details of games conducted for BITS campus where selections for new talent and tournaments are held through out the year.

SL N0	Event
1	Preliminary Cricket (Boys)
2	Badminton Selection and tournaments
3	Football Selections for BITS OPEN SPORTS MEET/Pilani
4	Cricket (Boys & Girls)
5	Volleyball Selections(Boys & Girls)

6	Chess Selections
7	Throw ball Selections(Girls)
8	Basketball Selections (Boys)
9	Cricket Coaching Camp
10	Volleyball Coaching Camp
11	Basketball Coaching Camp
12	Football Coaching Camp and Selections
13	Table-Tennis Selections
14	Badminton Selections(Boys)
15	Carom Interclass Tournament
16	Badminton Interclass Tournament
17	Athletics Interclass Tournament and Selections(Boys & Girls)
18	Chess Interclass Tournament
19	BITS Sports Festival
20	Football Interclass Tournament
21	Basketball Interclass Tournament
22	Cricket Interclass Tournament
23	Volleyball Interclass Tournament
24	Throw Ball Interclass Tournament
25	Table Tennis Interclass Tournament
26	Boxing Coaching Camp
27	Boxing Interclass Tournament

5.3.2 Give details of the achievements of students in co-curricular, extracurricular and cultural activities at different levels: University / State / Zonal / National / International, etc. during the last four years.

A variety of extracurricular activities such as drama, public speaking, debate, poetry and story writing, painting, sketching, singing, dancing, quizzing, gaming, digital art, face painting, rangoli, henna, photography, fashion show, flower arrangement , graffiti etc. have become a regular feature of the Campus Calendar. Students also participate and win several laurels in various other inter university events organized by other colleges. The Sports Club is committed to health and well being of student community and encourages students and faculty to be involved in recreational sports through intramural, extramural competitions and tournaments.

- Saurabh Ahuja [Captain (2008B4A2704P)], Abhinav Mahajan (2008C6TS554P), Harshdeep Singh (2010A4PS300P), Vineet Agarwal (2007B1A8209P), Ayush Agarwal, Hemant Kumar Singh (2010B5A1580P),

Pawan Kunchey (2009A4PS306P) and Anjal Khan (2010B2A4364P) of BITS Pilani won the Overall 2nd position in Efficycle 2011, organized by Society of Automotive Engineers Northern India Section [SAE NIS], held from 14 October 2011 to 16 October 2011, at UIET Chandigarh. The 8 member team designed a 3 tyred multi rider hybrid vehicle that runs both on human effort and batteries.

- Dishank Upadhyay (2008A8TS270P) has been appointed by the DAAD (German Academic Exchange Service) as the Young Ambassador to Germany for the academic year 2011-2012. On 4 August, Christiane Schlottmann, Director of the DAAD, New Delhi handed over the letters of appointment to the second batch of fourteen 'Young Ambassadors'.
- Saurabh Ahuja (2008B4A2704P), Ankit Khandelwal (2007B3A4655P) and Abhinav participated in a B-Plan competition held at IIM Kozhikode. They were overall winners in the Whiteknight- Backwaters event held during 18-20 November 2011. Apart from this, they won consolation prize at CONQUEST, Annual International B-Plan Competition of BITS Pilani.
- Rohit Pathak (2011A7PS004P) and Aqsa Inayat (2011A7PS017P) received the prestigious Aditya Vikram Birla Scholarship 2011.
- Ajay Singhvi (2011A3PS029P), Nayan M Goyal (2010A7PS308P) and Lokesh Jindal (2008A3PS073P) received the prestigious OP Jindal Engineering & Management Scholarship, 2011.
- Nilanjana Sadhu (2008A5TS862P), Karkhanis Aneesh Vidyadhar (2008A5PS432P), Jyothirmai Sirugudi (2008A5PS370P), Ankit Tankala (2008A5PS802P), Deepa Deepta Acharya (2009A5PS776P), Sanjeev Agarwal (2009A5PS882P), Vankadari Koushik Kumar (2009A5AB680P), Mohit Agarwal (2009A5PS499P), Shaurya Chanana (2010A5PS854P), Saloni Kapil (2010A5PS849P), Riddhiman Pal (2010A5PS776P) and Bandi Sai Sharan Reddy (2010A5PS840P) received the prestigious Sir Ratan Tata Trust Scholarship, 2011
- Bhargav Golla (2009A7PS140P) got the Runners Up in the All India Web of Knowledge Quiz held during October – November 2011. Thomson Reuters, the parent company of Web of Knowledge sent a gift of Canon Power Shot A 3200 IS camera to the Institute which was handed over to him by Prof Arya Kumar, Dean, Student Welfare Division.
- Aditya Shankar Raghuvanshi (2007B5A4661) and Aaksh Mohan Singhal (2007A3TS168P) participated in finals of Intel India Embedded Challenge and won First Prize in Smart Solution Category, a sum of Rs. 50,000 for the Robot Shaurya, an autonomous ground vehicle designed by them.

- They also participated in DRDO Student Robot Competition 2010 held on 25-31 October 2010 at Chennai, Shaurya was shortlisted among the 14 finalists out of 240 teams from different parts of the country. Shaurya received prize money of Rs 1 lakh.
- Nishank Varshney (2009B4A8698P) and G Bhargav (2009A7PS140P) were selected for the Design and Innovation Workshop organized by MIT Media Lab, USA at Pune during 24-28 January 2011. Only 120 Students were selected out of more than 1500 applicants from all over the globe.
- Gautam Bothra (2010B3A3636P) stood first in the APOGEE event: Stock Market Simulation, an online event organised by Eco Finance Association.
- A new Startup company by Nikhil P Bhandare (2008C6PS298P) and Siddharth Seth (2009B4A3713P) was selected amongst India's Top 30 Student Startups in the event NEN First dot at Chennai during 10-11 January 2011.
- Siddharth Seth (2009B4A3713P) and Shayoni Seth (2009A7PS659P) were the only student invitees for Pravasi Bharatiya Divas (NRI Conference), organized by Ministry of Overseas Indian Affairs and Confederation of Indian Industries at Vigyan Bhavan, Delhi during 7 - 9 January 2011.
- Siddharth Seth (2009B4A3713P) got first Prize in CYBERFIESTA (International software designing contest) and second Prize in Project Presentation in Category – Infrastructure in APOGEE 2011.
- Shivam Pratap Singh (2010A2PS417P) won first position for the project titled The Omniscient Bot (Communication and Network Systems) in APOGEE 2011.
- Nikhil Gakkhar (2010H106431P) presented a research paper titled Experimental and Numerical Based approach for Fibre Reinforcement in Rotomolding in an International Conference on Advances in Mechanical Engineering, held at Surat (India) during 6-8 June 2011. He also presented a research paper titled Experimental Reliability Analysis of Linear Low Density Poly-Ethylene in an International Conference on Advances in Materials and Manufacturing Technology, held at Chitkara University (Punjab) on 20 July 2011.
- Ravi Aswani (2010C7PS510P), Anjal Khan (2010B2PS364P) and Hemant Kumar Singh (2010B5PS580P) got second position in an event called Peace Patra, a paper presentation (They presented on "Fortunes at the bottom of the pyramid") at SOIL India Conference, organised by School of Inspired Leadership (SOIL), Gurgaon India on 18 March 2011.
- Mayank Gupta (2010A7PS022P) won second prize in Projects (Category-Transportation) for the project on “Automatic Vehicle Accident Report System” in APOGEE 2011.

- Ankita Sarda (2010A7PS020P), Vaibhav Grewal (2010A3PS024P), Prakash Singh (2010A3PS017P) and Shuja Shabir Naik (2010A7PS002P) received prestigious Aditya Birla Scholarship at ITC Grand Central, Mumbai in September 2010.
- Divyashish Sharma (2008A5PS426P) and Vineet Mohapatra (2008A2PS217P) won fourth prize in Wiz-o-Biz, Drishti 2011, Symbiosis Institute of Operations Management (SIOM), Nasik (January 2011), third prize in B-Plan, Kshitij 2011, IIT Kharagpur (January 2011) second prize in Ignite, Elevator Pitch Competition, TATAVA 2011, Lal Bahadur Shastri Institute of Management (February 2011) and first prize in DHITI, APOGEE 2011, BITS Pilani (March 2011) for their B-Plan "AMRIT" which seeks to solve water quality issues in Rural India by deploying low cost water filter "Boondh", which is based on biosand filtration and natural coagulation and is environment friendly as well.
- Akash Saxena (2010A7PS168P) won second prize for the project on Use of Swarm Intelligence for designing an architectural plan for emergency evacuation, avoiding stampede (Infrastructure field) and first prize in the event Cyberfiesta in Apogee 2011.
- Agrawal Chirag Shivprakash (2009A3PS058P) (Group Leader), Modi Krupal Chandresh (2009A3PS150P), Gogri Saumil Pankaj (2009B4A3539P) and Khambati Aziz Hozefa (2010A3PS101P) stood second in Avalanche, a competition involving robot building, image processing and data communication at IIT Bombay Techfest held during 7-9 January 2011.
- Rishikesan Parthiban (2009A3PS191P) presented a paper on 'Write Tutor' at IITM 'International IEEE conference on Technology for Education' held during 14-16 July 2011.
- Rishabh Mehrotra (2008B4A7533P) presented a paper in the field of Artificial Intelligence, which got accepted at a Workshop on Computational Approaches to Subjectivity and Sentiment Analysis to be held in conjunction with 49th Annual Meeting of the Association of Computational Linguistics: Human Language Technologies (ACL-HLT) 2011 in Portland, Oregon on 24 June 2011. It was the only paper by an undergraduate author which was selected for publication at the workshop.
- Ayush Kanwar (2008A1PS474P) received Prof. R P Vaid Award by BITSAA and Chemical Engineering Association, BITS, Pilani on 24 April 2011.

5.3.3 Does the university conduct special drives / campaigns for students to promote heritage consciousness?

Pilani Campus: The student clubs and associations, music club, dance club and SPICMACAY organises programmes to promote Indian heritage. Apart from this Havelis in Shekhavati region is a major source of attraction for students of BITS, Pilani. The students are encouraged to get exposure of sites of Shekhavati region which is a readily available rich source of Indian heritage. 'LokRang'- an evening of Rajasthani Traditional Music and Dance- was organized in the campus. The event included performances staged by the globally popular Rajasthani folk groups: Manganiyar and Kalbelia from Jaisalmer and Barmer, Sapera from Gogamedi and Badarpur, and Dhamaal from the heartland of Shekhawati region.

Goa Campus: Cultural programmes organized under the head of various student clubs such as Music Club, dance club and Kala promote heritage consciousness. In addition, two major programmes were organized by SPICMACAY, especially VIRASAT 2012 and Goa state Convention in August 2012.Virasat brings in conscious effort from the students to make people experience the best of the Indian classical art forms.

Hyderabad Campus: BITS Pilani Hyderabad Campus & SPIC MACAY joined hands to create a 3-day spectacle, a pure celebration of rich Indian heritage through various art forms with Virasat . Spanning over three days, this festival witnessed divine Carnatic music performances, where eminent artistes like Lalgudi GJR Krishnan mesmerized the audience with his soothing music and Dr. K.N. Ranganatha Sharma with his ensemble troupe touched many hearts with his lovely vocal recital. Every week devotees from ISKON come to the campus to speak about Bhagavad-Gita and Hindu related divinity speeches. Swami Bodhamayananda Maharaj of Vivekananda Institute for Human Excellence, Hyderabad gave a discourse to the students. Yoga classes are conducted in Hyderabad campus twice a week. 25-30 students are attending the classes.

5.3.4 How does the university involve and encourage its students to publish materials like catalogues, wall magazines, college magazine, and other material? List the major publications/ materials brought out by the students during the last four academic sessions.

The Institute has lot of literature and journalism enthusiasts. There is a Department of Journalism managed by the students, which includes Hindi and English Press Club that regularly publish materials for the students, both in print as well as through blogs

Campus	Material Published by Students	Languages	Details
Pilani	CACTUS FLOWER	English	Annual Magazine
	VAANI	Hindi	Annual
	BITS Herald	English	Regular Issues

Goa Campus	Sizzling Sands	English	Annual Magazine
	DoJMA	English	Monthly
	BITSAM	English	Annual
	BITS Gazette	English	Weekly newsletter
Hyderabad	ON THE ROCKS	English	Annual Magazine
	Journal Club	English	During Fest
Dubai Campus	Perspectives	English	
Graduating students Annual year book is also published in all the campuses.			

5.3.5 Does the university have a Student Council or any other similar body? Give details on its constitution, activities and funding.

All the four campuses of the Institute has a student council or Student's Union. It is composed of a President, Vice President, General Secretary, Treasurer and other members. The powers and functions of each is guided by a constitution. The council is responsible for looking into most of the student activities on campus, including clubs and festivals. It looks after the various student initiatives, technical /academic programs as well as student grievances that may come up. The council is partly funded by Institute. It handles all major festivals and events and looks into most of the student activities. It also negotiates and communicates between the student community and the institution.

5.3.6 Give details of various academic and administrative bodies that have student representatives on them. Also provide details of their activities.

List of academic and administrative bodies

S.No.	Committee	Functionality
1.	SENATE	Academic body of the Institute with student representation from all four campuses
2.	ACADEMIC COUNSELING COMMITTEE	To recommend measures for monitoring progression of students under purview of ACB; To provide for mentoring of academically weak students, in a Semester. To implement recommendations of the committee.
3.	CAMPUS DEVELOPMENT COMMITTEE	To consider proposals for development of Campus, for improvement of waste management, water services, electricity supply and lighting, plantation, safety and security, roads, local conveyance & transport, Shops and Community services, etc.

4.	CONTRACTS EVALUATION COMMITTEE	To receive and evaluate proposals from essential service contractors/providers; To negotiate contract deals with contractors/ service providers; To recommend execution of legal contract with service contractor/provider; To monitor services of the contractors through the contract period and advise for improvement; To review and recommend extension or termination of contractual agreements.
5.	STANDING COMMITTEE FOR STUDENTS DISCIPLINE	To receive, investigate and resolve complaints involving indiscipline among students. To advise appropriate actions for approval of the Director
6.	STUDENT FACULTY COUNCIL	Active engagement of students and faculties in teaching and learning process so that it is fruitful for all the stakeholders of the university. Provide a platform where students and faculty can interact informally and understand the respective needs. Make the academic environment of the university more conductive and lively.
7.	ANTI RAGGING COMMITTEE	To ensure compliances with the provisions of UGC Regulations as well as the provisions of any law for the time being in force concerning ragging; and also to monitor and oversee the performance of Anti Ragging Squad in prevention of ragging in the institution.
8	MESS COMMITTEE	Selection of branded items, quality of raw material, menu preparation (biweekly). Contingency plans in case of emergency(like strikes trade unions, Non availability of regular menu items)

6 CRITERION VI: GOVERNANCE, LEADERSHIP AND MANAGEMENT

6.1 Institutional Vision and Leadership

6.1.1 State the vision and the mission of the university.

Vision: BITS' lasting vision is to cultivate a scientific mind in young men and women, and provide them with a value-based education that fosters creativity, innovation and leadership, and prepare them to serve humanity. Our commitment to transparency and stress on equal opportunity has been a key contributing factor behind our emergence as an institution of national repute; our rigorous intake process rewards only merit and ensures that only truly motivated students join us. Our curriculum is continuously being innovated and updated to reflect the latest developments in technology and trends within industry. Pure academics are supplemented by pervasive industry engagement and every student is exposed to practical applications of classroom knowledge under a structured semester-long engagement programme.

Mission: BITS' mission is to advance knowledge and educate students in science, technology, and other areas of scholarship that will best serve the nation and the world in the 21st century. The Institute is committed to generating, disseminating, and preserving knowledge, and to working with others to bring this knowledge to bear on the world's great challenges. BITS is dedicated to providing its students an education that combines rigorous academic study and the excitement of discovery with the support and intellectual stimulation of a diverse campus community. BITS seeks to develop in each member of its community the ability and passion to work wisely, creatively, and effectively for the betterment of humankind.

The Institution has embarked on yet another transformative phase of this journey, as embodied in the Vision 2020 document, a journey that seeks to transform BITS into a research focused University continuing to offer educational programmes of the highest levels of excellence, with deep and pervasive industry engagement.

The Vision 2020 journey has been broken up into three year milestones or 'Mission Programmes'. Mission 2012, completed in that year, focused on, and achieved significant results in six thrust areas – Academic Programmes and Pedagogy, People, Research and Consultancy, Campus Life, Infrastructure and Facilities, and University Administration. Mission 2015, moving towards completion has seven imperative themes – Faculty and Staff Development, Industry Engagement, Innovation and Entrepreneurship, Interdisciplinary Research, Internationalization, Quality Assessment and Assurance, and Technology Enablement.

6.1.2 Does the mission statement define the institution's distinctive characteristics in terms of addressing the needs of the society, the students it seeks to serve, the institution's tradition and value orientations, its vision for the future, etc.?

Mission: BITS mission is to advance knowledge and educate students in science, technology, and other areas of scholarship that will best serve the nation and the world in the 21st century. The Institute is committed to generating, disseminating, and preserving knowledge, and to working with others to bring this knowledge to bear on the world's great challenges. BITS is dedicated to providing its students an education that combines rigorous academic study and the excitement of discovery with the support and intellectual stimulation of a diverse campus community. BITS Seeks to develop in each member of its community the ability and passion to work wisely, creatively, and effectively for the betterment of humankind.

Meritocracy and transparency have been core values; industry engagement a core ingredient of the educational philosophy; technology adoption, innovation and entrepreneurship the life blood; primacy of the interests of its students and staff members integral to the culture; and service to society the lasting objective, of the Institute, remain the guiding principles in its present journey to achieving Vision 2020.

6.1.3 How is the leadership involved

∗in ensuring the organization's management system development, implementation and continuous improvement?

Management at BITS Pilani involves faculty and staff members contributing to educational administration at various levels based on their nomination for a particular role. Apart from the leadership team of BITS which includes Vice Chancellor and Directors of individual campuses, all functional divisions are headed by University level Deans who are in turn assisted by Campus level Associate Deans. The departmental Heads are responsible for the functional activities of the individual disciplines and departments. Individual faculty members can contribute in the capacity of nucleus members of these divisions. All functional units are adequately supported by non teaching staff for its various activities. In addition, administrative professionals are also employed for domains where special functions like placements, IT, Finance, HR, etc.. require specific domain knowledge. Review of these governance structures is done periodically and changes are made to ensure smooth working of BITS Pilani, a multi campus university.

∗in interacting with its stakeholders?

BITS leadership has very strong interaction with all its stakeholders. Being a residential campus, students have ample opportunities to interact with director and other faculty members. Interaction with students is regularly arranged through student faculty committee meetings, through interactions with student union members, through hostel wardens and through participation in all student events of the campus.

Director of each campus interacts with the parents of freshers during the orientation programme and several other occasions. A formal gathering of graduating students is arranged every semester which gives an opportunity to understand their perspectives of campus life during their 4-5 year stay. The leadership continuously engages with the faculty members through the HODs, as well as department wise face to face meetings. The functional division heads interact regularly with faculty regarding policy matters and ensure transparency. The community welfare unit and other similar functional units of each campus acts as a strong link between the campus leadership and the faculty community.

BITSAA has an active presence in campus and through the office of Alumni Affairs, constant interaction with alumni is ensured. BITS leadership also encourages and participates in the BITSAA Global Meets. At least 3-5 meetings with alumni are scheduled in a year at various locations across the globe. On campus, a student organization like SCIO (SCIO BENEVOLENT FOUNDATION) brings prospective BITS students from various schools and orients them about the BITSIAN way of life. This helps establishing early links with BITS aspirants.

∗in reinforcing a culture of excellence?

BITS has a history of excellence in higher education focusing on the areas of teaching, research, industry engagement and societal service. The leadership at BITS reinforces a culture of excellence by practicing a transparent, merit based system at all levels of operation.

The admission process at BITS is absolutely merit based. Faculty members are recruited through a rigorous six step recruitment process that ensures quality faculty are taken into the system. Investments in infrastructure have ensured the best teaching learning environment with modern laboratories and equipment. BITS provides the students and faculty an enriching experience through innovative initiatives like Practice School, Entrepreneurial Leadership etc., which help in sustaining and enhancing the learning outcomes of the stakeholders.

∗in identifying organizational needs and striving to fulfil them?

The Institute has always had mechanisms in place to: (i) collect, synthesize, and analyze Institutional data for mandatory reporting requirements; (ii) offer accurate and timely research results with the goal of evidence based decision-making within and outside the University. Faculty members who excel in these capacities are then inducted in senior administrative positions. The University has been working on building the processes for talent pipeline development and leadership succession into the performance management system. Additionally, to move forward in a dedicated and purposeful way, the Institute has taken up (three year) projects in Mission mode - 2012, and 2015, led by faculty teams. Recommendations made by teams engaged in Mission 2012 and Mission 2015 have been successfully executed. Recently, Institutional Knowledge and Analysis Cell has been established to formally oversee this activity.

6.1.4 Were any of the top leadership positions of the university vacant for more than a year? If so, state the reasons.

No.

6.1.5 Does the university ensure that all positions in its various statutory bodies are filled and meetings conducted regularly?

Yes. The various statutory bodies of the Institute are filled regularly. Regular meetings are conducted.

6.1.6 Does the university promote a culture of participative management? If yes, indicate the levels of participative management.

Yes. Students, faculty and staff are encouraged to participate in the management processes of the Institute. Faculty members contribute in administrative roles and manage responsibilities in different roles like Heads of the Department, Divisional Heads, Wardens and Chief Wardens, Faculty In charges, etc., on a rotational basis. They also participate through the various committees such as Senate, Examination Committee, Research Board, Doctoral Counselling Committee, etc., Faculty members have active involvement in driving change through the Mission programmes of the University where university goals are identified and future roadmaps are designed and executed.

Student members are nominated to various important university bodies such as Senate, standing committee for student discipline, academic counselling board, academic counselling cell, etc. The Student Faculty Council contributes in all student related policy changes by actively mobilizing opinions and providing feedback.
Student faculty committees at various levels ensure active participation from both faculty and students in all decisions. Heads of Department engage faculty and staff members regularly through periodic meetings and convey their expectations and views to the leadership. To understand the level of engagement, BITS is the only university in the country to conduct the Survey by Gallup in 2010 as part of Mission 2012 on a large scale with the involvement of all faculty, students and staff of all campuses.

6.1.7 Give details of the academic and administrative leadership provided by the university to its affiliated colleges and the support and encouragement given to them to become autonomous.

Not Applicable

6.1.8 Have any provisions been incorporated / introduced in the University Act and Statutes to provide for conferment of degrees by autonomous colleges?

Not Applicable

6.1.9 How does the university groom leadership at various levels? Give details.

The University requires all faculty members to direct a part of their efforts towards Institutional Development activities. Faculty members with a high level of performance in this area are given the opportunity to contribute as Nucleus Members, Faculty-in-charges, and as Associate Deans. Heads of Department are appointed on rotation basis.

Faculty members who excel in these capacities are then groomed as Deans, and for other senior administrative positions. The University is currently working on building the processes for talent pipeline development and leadership succession into the performance management system.

6.1.10 Has the university evolved a knowledge management strategy? If yes, give details.

The Institute has established the Institutional Knowledge and Analysis Cell (IKA) to: (i) Collect, synthesize, and analyze Institutional data for mandatory reporting requirements; (ii) Offer accurate and timely research results with the goal of evidence based decision-making within and outside the University; (iii) Lead and facilitate initiatives such as benchmarking, accreditation and ranking; and (iv) Provide authentic and accurate information to stakeholders, researchers, government and private agencies, media, and the public at large. The cell will be drawing heavily on the power and capability of the full ERP system that is being implemented. A dashboard of key indicators is prepared every quarter and is used for tracking the performance indicators of the University in various respects.

6.1.11 How are the following values reflected in the functioning of the university?

∗Contributing to national development

BITS produces professionals of high quality to take care of human resource needs of the country and contributes to national development. An important aspect of BITS curriculum is the Practice School Programme which provides the industries with trained student manpower to work on live projects. It is clearly evident from the diversity of industries participating in the Practice School programme that BITS students make substantial contribution to various fields. Entrepreneurship is actively encouraged at BITS and many student, faculty and alumni start ups have helped in the country's growth over the years.

BITS faculty members are actively involved in basic and applied research and contribute towards the scientific development of the country. Their research outputs in the form of publications and patents add to the global knowledge creation and technological improvements. Low cost point of care devices have been developed by BITS faculty aiming to make available affordable health care at low cost to the Indian population.

The Institute has a National Service Scheme (NSS) where about 200 students every year participate in nation building through social work. NSS volunteers of the Institute work in the surrounding villages and involve the villagers in activities like awareness camps, health camps. Other activities like Blood Donation Camps and seminars on RTE are organized successfully.

Nirmaan is a social organization founded on 12th February, 2005 by a student group from BITS Pilani. It is now spread over all the BITS campuses Pilani, Hyderabad and Goa and also with full time chapters in Bengaluru and Hyderabad. It is an organization that aims at constructive citizen movement for an empowered India. Nirmaan has been phenomenal in creating great impact in areas of educational initiatives, livelihood opportunities and socio-technological sectors. Currently, the Nirmaan workforce stands at 1200 across India and corporate chapters at US, UK and Singapore. In addition there are several other social organizations that are run by students (Nirmaan, Udaan and Abhigyaan) that proactively work in order to instill a sense of social fulfillment among students.

∗Fostering global competencies among students

BITS curriculum is continuously benchmarked with comparable programs offered by reputed Universities. Feedback and suggestions are also invited from experts from other academic institutions and the industry who are invited to the University to present their views. Any emerging pedagogy (such as MOOC) is immediately adopted by BITS. Modern teaching technologies and pedagogy have given our students a comparable learning environment and enabled them to compete with global peers.
International exposure is available to students through the overseas Practice School stations as well as the research opportunities available through the off campus thesis programme of the University. In addition, students are encouraged to participate in International conferences, seminars and competitions to foster global competencies.

Admissions of International students toour campuses have further enhanced the opportunities of achieving a global outlook for our students through peer learning.

∗Inculcating a sound value system among students:

As part of the structured curriculum at BITS, students are required to take at least three Humanities electives. These help the students to obtain a social and ethical perspective to issues. These courses have captured the interest of students and show high registration.

Moreover, BITS has a culture of good student faculty interaction and faculty members regularly advise and counsel students to develop a sound value system. BITS has zero tolerance for students deviating from the right values and they are specifically identified and reformed. Several motivational talks by eminent people from the spiritual and leadership realms on topics aiming at inculcating certain values are organized throughout the semester.

*** Promoting use of technology**

BITS is one of the educational institutions that has harnessed the potential of technology in education. BITS is the first university for having successfully conducted an all India entrance exam online at multiple centers for more than 1.5 lakh students. This pioneering effort showcased the use of technology at a large scale in education.

One Tele-presence (TP) classroom (capacity 160 students) is established in each campus of the University for organizing tele-presence lectures and courses. 12 to 15 courses are offered every semester by faculty members of different departments and different campuses. BITS Connect 2.0 Immersive Tele presence Eco-System is the University-wide, Integrated immersive Tele presence Infrastructure with seamless support for very high-quality eye-to-eye contact based meetings facilitating interaction between students and faculty members across the campuses. This also contributes to research collaborations between faculty members across the four campuses. Tele presence facility through EX90 enables constant dialogue among the directors and leadership on administrative matters. Video conferencing facilities through Polycom are also available in all campuses.

Administrative work is automated and centralized and the core university data is maintained using ERP on the PeopleSoft Platform which ensures uniformity of procedures and policies in HR, Leave, Payroll, etc., across multiple campuses of the University. Students life cycle data (Admission to Graduation), Employee life cycle data and Institute purchases are also maintained and facilitated through ERP.

The student placement process is centralized and done in collaboration with the help of advanced technology (e.g. Tele presence facility as and when required). The data capturing and the statistics is all centralized using placement automation system for all the campuses.

Faculty recruitment is also done using technology. Every faculty is given a personal laptop/ desktop and other computing equipments at the time of joining. The institute provides latest softwares to its faculty to help in creating learning material. All the classrooms are equipped with audio visual systems to enable a faculty in delivering and testing these learning materials. The institute has specialized studio rooms to video record their lecture sessions with necessary IT support. Talks by eminent experts are arranged with help of our Alumni network over skype/telepresence from across the globe for the benefit of students and faculty by a separate body called "Embryo".

*** Quest for excellence**

BITS has a history of excellence in higher education focusing on the areas of teaching, research, industry engagement and societal service. The leadership at BITS reinforces a culture of excellence by practicing a transparent, merit based system at all levels of operation. The admission process at BITS is absolutely merit based. Faculty members are recruited through a rigorous process that ensures the quality of faculty recruited.

Investments in infrastructure have ensured the best teaching learning environment with modern labs and equipments. . Each campus of BITS provides the students and faculty an enriching experience. Innovative initiatives of BITS like Practice School, Entrepreneurial Leadership, etc., are steps towards sustaining and enhancing the learning outcomes of the stakeholders.

BITS has an Internal Quality Assurance Cell (IQAC) operating in all campuses as well as at the University level. It works in a participative and facilitative manner and ensures the university is in the path of excellence. It promotes quality sustenance and enhancements in academic improvement, curriculum development, student learning outcomes, industry collaborations, research outputs, governance and infrastructural improvements. All these evidences prove that the leadership at BITS is committed to excellence at all levels and leaves no stone unturned to achieve the same.

6.2 Strategy Development and Deployment

6.2.1 Does the university have a perspective plan for development? If yes, what aspects are considered in the development of policies and strategies?

- **Vision and mission**
- **Teaching and learning**
- **Research and development**
- **Community engagement**
- **Human resource planning and development**
- **Industry interaction**
- **Internationalisation**

Yes, all the aspects are taken care as mentioned below.
A growth and development plan has been crafted for the Institute, and is under implementation. In line with its vision, the growth plan envisages transforming the University into one that is significantly research focused, even if there is a consolidation in its position of eminence in the offering of First and Higher Degree Programmes of the highest quality.

The Vision journey has been broken down into three year milestones or 'Mission Programmes'. Mission 2012, completed in that year, focused on, and achieved significant results in six thrust areas – Academic Programmes and Pedagogy, People, Research and Consultancy, Campus Life, Infrastructure and Facilities, and University Administration. Mission 2015, moving toward completion has seven imperative themes – Faculty and Staff Development, Industry Engagement, Innovation and Entrepreneurship, Interdisciplinary Research, Internationalization, Quality Assessment and Assurance, and Technology Enablement

Accordingly, along with the increase in student numbers in the campuses, with increased emphasis on the Higher Degree and Doctoral Programmes, the plan also projects the annual growth required in the number of faculty members, staff members, and the physical and laboratory infrastructure. Thus there is a clear sight of the extent of resources necessary and to be provided for.

The growth plan has a strategic dimension to it that lays down the directions to be set in various respects to ensure successful attainment of the objectives

These then cascade into strategic initiatives at the Departmental and functional (teaching and learning, research, Institutional growth, and community development) levels, which then serve as the context in which individuals set their goals, ensuring complete alignment.

Industry engagement has been one of the important elements at the core of the educational philosophy of the Institution from its inception. Deepening this engagement to define the distinctive character of the Institution, and to achieve the objectives, is an important aspect of the plan for growth and development.

BITS Pilani was one of the first Indian Universities to establish an international presence by starting a campus in Dubai in 2000. Recognizing the emergence of the new global environment, the Institute has put in place policies and processes to increase the enrolment of students from other countries in its campuses, as well as to attract international faculty.

There is a separate growth plan that has been developed, and is being implemented, for the growth and diversification of the off-campus programmes for working professionals. The growth plan is reviewed annually after assessment of the extent of attainment of objectives, and fine-tuned as necessary.

6.2.2 Describe the university's internal organizational structure and decision making processes and their effectiveness.

The executive Head of the University is the Vice Chancellor, who is supported by a team of Directors (one heading each campus and one responsible for the off-campus programmes and industry engagement), Registrar (heading general administration), and Chief Financial Officer. Functions of academic administration that require a great deal of cross-campus synergy in conceptualization, policy formulation, and implementation are carried out by Divisions headed by University-wide Deans, who are supported by Associate Deans in each campus or off-campus. Deans or Associate Deans head other Divisions catering to functions of a more campus-specific nature. Professionals with vast previous experience are recruited to independently handle certain functionalities of the university. For example Chief Financial Officer, Chief placement Officer, Chief Research and Development Officer etc.

In each campus, Departments, which are the fundamental academic building blocks of the University are led by their respective Heads who work in a highly collaborative manner with one another and the Divisions, to ensure uniform excellence of instruction, high quality of research, and student experience. Certain functions are led independently by officers or faculty-in-charges. A large number of faculty members participate in activities of academic administration, supporting the various offices of administration. Decision-making is aided by extensive consultation with all stakeholders including students, staff, and faculty members. The discussion is carried out at multiple levels, culminating in decision driven by consensus being taken by the concerned apex body. Typically, when a new plan is implemented, a process for assessment of the success of implementation is also laid out.

ADMINISTRATIVE STRUCTURE OF BITS, PILANI

1. **Vice Chancellor, BITS, Pilani.**
2. **Registrar, BITS Pilani.**
3. **Directors:**
   - Director, Pilani Campus.
   - Director, Goa Campus.
   - Director, Hyderabad Campus.
   - Director, Dubai Campus.
   - Director, Off Campus Programmes and Industry Engagement.

4. **Chief Financial Officer CFO.**

5. **University Level Deans:**
   - Dean, Academic Research Division.
   - Dean, Sponsored Research and Consultancy Division.
   - Dean, Academic Resource and Planning Division.
   - Dean, Admissions.
   - Dean, Faculty Affairs.
   - Dean, Practice School Division.
   - Dean, Work Integrated Learning Programmes.
   - Dean, International Programmes and Collaboration Division.

6. **University Level Professor In-charge:**
   - Center for Innovation, Incubation and Enterpreneurship
   - Teaching Learning Center
7. **Campus level Deans:**
   - Dean Administration, Pilani Campus
   - Dean, Administration, Goa Campus
   - Dean, Administration, Hyderabad Campus.

8. **Campus Level Associate Deans at Pilani, Goa, Hyderabad and Dubai campuses:**
   - Associate Dean : Faculty Affairs
   - Associate Dean : Academic Research
   - Associate Dean : Sponsored Research and Consulting
   - Associate Dean : Academicand Resource Planning
   - Associate Dean : International Programmes and Collaboration
   - Associate Dean : Admissions
   - Associate Dean : Practice School
   - Associate Dean : WILP (Pilani, Goa and Hyderabad)
   - Associate Dean : Instruction
   - Associate Dean : Academic Registration and Counselling
   - Associate Dean : Student Welfare Division

9. Associate Deans: Off campus

- Practice School (Bangalore)
- WILP (Chennai)

10. Campus level Unit Chiefs and Faculty In-charges:

- Unit Chief, Computer Assisted Housekeeping
- Unit Chief, General Administration
- Unit Chief/Faculty In-charge, Information Processing Centre
- Unit Chief, Instrumentation
- Unit Chief/Faculty Incharge, Publications & Media Relations
- Unit Chief, Software Development & Educational Technology
- Unit Chief/Faculty In Charge, Centralised Purchases
- Unit Chief/Faculty In charge, Estate Management/Maintenance and Engineering Services
- Unit Chief/Faculty In Charge, Placement
- Faculty Incharge – Center for Innovation, Incubation and Entrepreneurship.
- Faculty Incharge – Teaching Learning Center

11. Heads of Departments for individual departments

- Biological Sciences – Pilani, Goa and Hyderabad
- Biotechnology – Dubai campus
- Chemical Engineering – All four campuses
- Chemistry – Pilani, Goa and Hyderabad.
- Civil Engineering – Pilani and Hyderabad Campus
- Computer Science & Information Systems – All four campuses
- Economics & Finance – Pilani, Goa and Hyderabad.
- Electrical & Electronics – All four campuses
- Electronics and Instrumentation – Pilani, Goa and Hyderabad.
- Electronics and Communication Engineering – Hyderabad Campus.
- Humanities and Social Sciences – All four campuses
- Management – Pilani campus
- Mathematics – Pilani, Goa and Hyderabad.
- Mechanical Engineering – All four campuses
- Pharmacy - Pilani and Hyderabad campuses
- Physics – Pilani, Goa and Hyderabad.
- General Science – Dubai Campus.

12. Non Academic Professionals for Specialized Functional Roles:

- University level Chief Placement Officer (CPO)
- University level Chief ERP Implementation Officer (CIO)
- University level Chief Research and Development Officer (CRDO)
- University Level Chief Operating Officer (COO) for WILP

6.2.3 Does the university have a formal policy to ensure quality? How is it designed, driven, deployed and reviewed?

The University has always emphasized the need to ensure quality in its activities by devising suitable measures for the same, and holding concerned offices as accountable for delivery of the requisite quality. A dashboard of key indicators is monitored at the apex level to track the performance of the University in various respects. Each of these, in turn cascades into a number of indicators of finer levels of detail at various layers of academic delivery, monitored by those accountable for quality.

Robust design of process elements, and measures of effectiveness, is ensured by internal and external (industry and academia) surveys and consultation. Independent corroboration of the quality of delivery is obtained by feedback from concerned stakeholders, the results of which are factored into relevant indices in the dashboard. This also happens by ensuring adequate external participation in execution, and/or review.

Quality assessment and assurance is the theme of one of the imperatives in the current three-year mission of implementation of the Institute's vision. This team has reviewed existing measures to ensure quality, and to recommend necessary modifications as well as new initiatives. Among the outcomes of this effort are the establishment of a teaching-learning center, and the framing of guidelines to ensure quality of publications.

The Institute has an IQAC that works towards quality sustenance and enhancement of teaching research and administration. The IQAC is functional at the individual campus levels as well as at the University level. There is a standing review council, which carries out a quarterly review of progress on various initiatives at university level, and tri-annually at the campus level.

6.2.4 Does the university encourage its academic departments to function independently and autonomously and how does it ensure accountability?

Yes, the Departments have complete freedom to function independently and autonomously, and take appropriate decisions in respect of the various academic programmes and courses that they offer, and in respect of the directions of research. Committees such as the Departmental Committee for Academics, and the Departmental Research Committee, take these decisions. In doing so, they collaborate extensively across campuses, and there are cross-campus committees, which facilitate such discussion. Divisions responsible for specific academic functions such as academic programme and course design, instruction, research, and industry engagement ensure adoption of common processes and standards, and adherence to these.

All decisions of a fundamental nature are taken after extensive cross-campus discussion, by the concerned apex body such as the Senate or the Research Board. An assessment of the extent of contribution made by each Department in each of the

campuses is made, and shared to ensure that the Departments remain focused on quality of performance and improvement. While preparing Annual expenditure plan, inputs are taken from Department and budget is allocated as per the need of Departments ensuring financial autonomy.

6.2.5 During the last four years, have there been any instances of court cases filed by and against the institute? What were the critical issues and verdicts of the courts on these issues?

Total 29 cases were filed by/against BITS during the period. These were mainly related to service matters like payment of over time, payment of gratuity, scholarship, etc. Total 20 cases were decided during the period and all were in favour of BITS.

6.2.6 How does the university ensure that grievances / complaints are promptly attended to and resolved effectively? Is there a mechanism to analyse the nature of grievances for promoting better stakeholder-relationship?

Grievance Redressal Mechanism is given high priority and steps are taken to ensure that grievances of all stakeholders are addressed. There are multiple levels at which grievances are taken care of. Students can approach the Wardens, Chief Warden and Student Welfare division for any grievance related to their academic and non academic needs. The Student Welfare division has a students grievance redressal committee and proper guidelines and mechanisms in place to ensure that all grievances of students are addressed. In case of grievances related to evaluation and grading, students can ask the teacher for a re-view review of evaluation. If still not satisfied, there is a provision for appeal to the Examination Committee which monitors results, analyses trends of students' performance and checks the disparity between the entry point performance and the performance in a particular course. Cases of negligence, if any, are brought to the notice of the Examination Committee which ultimately decides the administrative actions needed in the matter.

Faculty and Staff related grievances are handled by the Controlling officers at the department or division level and by the General Administration Division at the Institute level. The community welfare unit of the campus also invests time and effort in ensuring all grievances of the campus inhabitants are well taken care of. The mechanism of exit interviews of faculty leaving the institute is also in place which identifies probable action items based on the inputs received.

6.2.7 Does the university have a mechanism for analyzing student feedback on institutional performance? If yes, what was the institutional response?

Yes. BITS is the only Institute in the country to conduct an engagement survey by Gallup in 2010, where students participated in large numbers and provided structured feedback on all facets of the educational and administrative processes of the University. Apart from this, feedback from students is also collected through various other channels.

Student feedback is continuously collected on the pedagogy and instruction. The information is shared with faculty to enable them to improve the teaching and learning process. In case of any assistance, they can also take the assistance of the faculty team from Teaching Learning Centre.

Students are also part of various academic and administrative bodies like Senate, Academic Counseling Committee, Student Faculty Council, Students Disciplinary Committee, Campus development committee, etc., through which feedback on various institutional performance are collected.

The feedback obtained through all these means are presented before the BITS leadership and steps are taken to address issues if any.

6.2.8 Does the university conduct performance audit of the various departments?

Yes. The departmental reviews, in terms of academic and administrative structures, curriculum, infrastructure and facilities etc., is done periodically through visiting committees comprising of eminent academicians and researchers from Institutions across the country. The feedback and outcomes are shared with the departments and remedial measures are initiated.

Key performance indicator matrices have also been developed by the leadership team for internal assessment to assess and account for the departmental performance. This ensures that best practices are percolated across departments.

6.2.9 What mechanisms have been evolved by the university to identify the developmental needs of its affiliated institutions?

Not Applicable

6.2.10 Does the university have a vibrant College Development Council (CDC) / Board of College and University Development (BCUD)? If yes, detail its structure, functions and achievements.

BITS does not have affiliated colleges.
However, BITS has a strong emphasis on development and there are different functional divisions which are responsible for monitoring and bringing out the necessary change in different spheres of university functions.

- For the curriculum and programme design, the Academic & Resource Planning (ARP) Division is the functional authority which in consultation with various departments follows a systematic process for designing, developing and making changes in the curriculum. Changes in the curriculum as well as new programs are proposed by individual departments after a thorough discussion with all faculty members in the department across all the campuses of BITS Pilani. Senate of BITS Pilani meets frequently (two to four times a year) to discuss all such proposals and approve them. Such routine changes happen every semester. The Senate can also appoint a separate committee for implementing major structural

changes in the curriculum which cut across many departments. The curriculum of BITS is also benchmarked against the curriculum followed in reputed Universities in each discipline and changes in the curriculum are recommended based on this exercise, discussed, and then decided. Periodic curriculum reviews are also done with feedback from various stakeholders and also through visiting teams. Operational aspects of curriculum are taken care by the Instruction Division of the Institute along with the departments.

- Promotion of research: Academic Research Division (ARD) looks after the overall PhD programme of the Institute. This includes Ph.D Admission, monitoring Pre-PhD course work, conducting PhD qualifying exam till the PhD thesis submission along with the Departmental Research Committees of Individual departments. Policy matters pertaining to academic research are taken by the Research Board of the Institute. In addition, Sponsored Research & Consultancy Division (SRCD) looks after all issues related to the Institute's sponsored projects and consultancy..

- An International Programmes and Collaboration Division (IPCD) has been set up with representation from all the four campuses of BITS Pilani, to promote relations with renowned Institutions abroad. It provides an opportunity to students of BITS Pilani to complete a part of their first degree, higher degree, Ph.D, Research and Development projects at various partner Universities abroad; and a platform for faculty members to collaborate with peers at foreign Universities for active research work.

- Industry Linkages are taken care of by the Off Campus Programmes Division. The Practice School Division and the Work Integrated learning Programmes Division are parts of the off campus programmes division and together they monitor the Industry linkages of the Institute.

- All the functional divisions of the Institute are headed by University level Deans and are assisted by Campus level Associate Deans. Individual faculty members participate in these divisional activities as nucleus members.

Additionally, to move forward in a dedicated and purposeful way, the Institute takes up (three year) projects in mission mode - 2012, and 2015, led by faculty teams. Mission 2012 and Mission 2015 have been completed in the recent past with profound success.

To bring all the university initiatives together, there are quarterly reviews at the University level by the senior-most leadership. Additionally, there are half-yearly campus-level reviews. IQAC of the University also has a participative and facilitative role in ushering the quality enhancement measures.

6.3 Faculty Empowerment Strategies

Faculty Affairs Division (FAD), with a University wide Dean and campus specific Associate Deans is responsible for implementation of all Institutional policies related to faculty across all BITS campuses at Pilani, Goa, Hyderabad and Dubai. Apart from attracting and selecting talented and competent people, it is also intensely focused on empowering and retaining the talent.

6.3.1 What efforts have been made to enhance the professional development of teaching and non-teaching staff?

BITS emphasizes Professional development as one of the important attributes for Teaching and Non-Teaching staff and frames polices to enhance the same.

Professional Development of Faculty: Some of the policies in place for faculty development are listed below.

1. The Seed Grant Scheme: The Seed Grant scheme of Birla Institute of Technology and Science, Pilani 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. An interim review of the policy will be performed. The objectives are
    - To aid a faculty to start a research program that has the potential to sustain by attracting funds from external agencies.
    - To test a novel idea and to generate preliminary results before submitting proposals to external agencies.
    - To promote inter-faculty collaboration in emerging areas.
    - To promote generation of IPR and product/process development.
    - To attract and retain talent.

2. Research initiation grant scheme: The Research Initiation Grant is designed to attract faculty to BITS to perform quality research. Grants are awarded soon after joining BITS for upto Rs. 2 Lakhs and the amount should be spent within 24 months of appointment. (Based on requirement and progress an additional amount of Rs. 2 Lakhs may be considered after a year. This is to initiate research activities at BITS).

3. Competitive Research Grant Scheme: This scheme is over and above the research initiation grant and the seed grant. This scheme will provide upto Rs. 10 Lakhs to a new faculty to initiate research by procuring equipment, etc., to establish facility necessary for his/her research. This additional research grant will be awarded to new faculty on a competitive basis and based on a well-documented research plan in the form of a proposal. The scheme will support on an average one-third of new faculty in each campus.

4. OPERA Award (Outstanding Potential for Excellence in Research and Academics): The OPERA awards are established (75 awards over 3 years) 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. While the funds to establish these 75 awards will come from BITS, we will establish more such awards from donations sought from alumni & well-wishers, in future. The award consists of 3.00 Lakhs Rs./year for a 5 year period of which up to 1.8 lakhs/per year can be taken as an additional incentive to salary while the remaining amount is to be used for academic activities defined in guidelines.

5. Reimbursable Professional Allowances: To cover expenses related to one's profession, including books, supplies, travel, etc. Allowance shall be Rs. 1 Lakh per year for Assistant Professor and above and Rs 25000/- per year for Lecturers and Visiting Faculty. Also for Lecturers a pool of Rs. 75,000 is made available for every 5 Lecturers (or equivalently once in a Lecturer's tenure of approx. 5 years) specifically for travel to present paper at a Tier 1 or 2 conference in India/abroad. Unspent funds may be carried forward to next year. The university also provides Special Casual Leave to attend and present papers in International Conferences held abroad and India. The university provides leave and funding for National Conferences as well.

6. Exposure to Universities abroad and immersion in Industries within India: A faculty member at the level of Assistant Professor and above, after the completion of three years of service, becomes eligible for exposure to Universities abroad / immersion for a defined period in an Industry in his /her area of interest, within the country through immersion program, wherein he/she could spend up to two months (during summer vacation period).

7. Besides personal development these two policies also promote international / national collaboration on interdisciplinary cutting edge areas with different Academic institutes and industries. BITS Pilani provides the financial support to all faculty, identified through separate processes. Through these programmes it is expected that faculty members will experience / gain:
   (i) first-hand exposure to current/latest advances in research
   (ii) an understanding of lab resources required to initiate research or to use (or to program) equipment
   (iii) an understanding on how class room or lab-based instruction is organized or imparted
   (iv) an understanding of research methodology, cross-disciplinary collaboration, or collaboration across institutions /industries
   (v) first-hand exposure to processes undertaken by companies for design, manufacturing, marketing, logistics, etc., and to
   (vi) further, gain an understanding of how the theory learnt in classrooms is translated into practice on the job floor.

8. Chair Professorship: Chair Professorship helps recognize and reward excellence in teaching and research by a faculty member of the BITS Pilani at either of its campuses or to induct a professor from outside BITS Pilani. Such a person would be re-designated as Chair Professor.

9. Sabbatical Leave: The University also has a policy for sabbatical leave for the faculty. Under this scheme, a faculty member is eligible for one-year Sabbatical Leave after the completion of six years of continuous service at Assistant Professor Level or higher with satisfactory record of performance in the most recent annual performance review. The faculty receives 50% of the salary during the Sabbatical Leave, while the balance will be paid in 4 equal installments over the next two years together with interest calculated @ 6% per annum.

10. Extraordinary leave (EOL) without pay: A faculty may avail "extraordinary leave" (EOL) without pay for up to 2 years at a time after three year service at BITS. The total of such EOL (together with sabbatical leave) is limited to 20% of time spent at BITS.

11. Practice school and industry engagement: What sets BITS apart from its peers is its unique practice school programme. Practice school I (PS 1), a programme of 2 months duration is offered during the summer term, once students have completed two years of course work. The students going to various industries and research organizations are accompanied by faculty members. Thus, the programme runs under the supervision of faculty members. It provides an opportunity for faculty to update their knowledge on latest developments in technological advances. It is also an exposure for them and gives them a unique opportunity to bring back the knowledge so gained and update their class room teaching, update existing laboratory experiments and or design/re-design laboratories.

12. Meet the expert: BITS Pilani encourages invited talks by field experts in all the departments that immensely benefit faculty and students. Such visits of experts encourage faculty members to enter into front line research areas by establishing collaborations.

Professional Development for Non-Teaching, Technical, Support Staff:

1. The Institute organizes 2 weeks to 6 months of training programmes on a periodic basis for upgradation of skills and technical expertise. Major training areas have been Soft skill training, public relations, retraining of staff for ERP, workshop equipments, common laboratory, classroom equipments, instruments in various laboratories, office, security personnel, etc.
2. Opportunities are given to some category of staff members for pursuing Higher Degree and Ph.D. by providing fee waiver and other facilities.
3. Staff members are given recognition in the form of excellency awards for their contribution to institutional building.

6.3.2 What is the outcome of the review of various appraisal methods used by the university? List the important decisions.

Faculty appraisal process at BITS has been a critical exercise for ensuring faculty satisfaction and a means of retaining talent. Periodic reviews of the various appraisal processes are done by the leadership and proactive measures have been taken to upgrade and bring in positive changes to the appraisal process.

In the past, BITS had a practice of contractual appointments that was reviewed and extended every five years. Since 2009, this has been changed and all contractual faculty members will be regularized till the superannuation age of Sixty.

Under the Mission 2012 initiative, the new performance management system (PMS) for faculty was introduced wherein weighted average effort against performance was clearly indicated through the performance expectations set for teaching, research and Institutional contribution. A probation period of 3 years was also set for new recruits and they are regularized after a comprehensive review of their performance and contributions. The frequency of the review process was brought down to two years from the earlier five years.

The faculty appraisals happen every year. The assessments are made with respect to the outcome of the goals set by each faculty member in terms of teaching, research and institutional contribution. The goals are set in consultation with the department head/controlling officer and are aligned with growth map of the Institute and the department, in particular. Appropriate measures are taken to normalize the assessments of faculty across departments and across campuses.

Important decisions include intimating all faculty on the outcomes of appraisals that identify the strengths of a faculty, areas to improve, besides also giving an indication of assessment of their performance in comparison with other colleagues in the Institute. In addition, the appraisal also includes sharing of information on quality of teaching, student feedback and peer feedback that helps faculty in enhancing their skills and focus on improvising on weaknesses, if any.

Similar appraisal process is also followed for non-teaching staff of the institute with different assessment criteria that best fit their job profiles and descriptions. The Non-teaching staff review cycle is also set for every two years.

All these appraisals are taken into consideration during faculty and staff promotions, assigning new job responsibilities, and delegation of authority.

6.3.3 What are the welfare schemes available for teaching and non- teaching staff? What percentage of staff have benefitted from these schemes in the last four years? Give details?

- **Education Fee Reimbursement Policy:** Employee, children, spouse are eligible for support for education where significant amount of tuition fees, etc. are reimbursed by the institute up to 90 %.

- **Medical expense reimbursement Policy:** Medical attendance and treatment including reimbursement of medical expenses (up to 90 %) incurred by the members of the staff on themselves and their families are covered under a separate medical reimbursement policy for in-patients /out-patients. In addition, all campuses have an in-house medical centre with competent physicians, para-medical staff to attend to immediate needs and small emergencies. The institute also has tie-ups with specialty and major hospitals nearby campuses for priority treatment of BITS staff and students whenever they are referred to higher centres. State of the art ambulance(s) are also available in –house or on call.

- **Subsidized Accommodation on campus:** All faculty and staff are provided accommodation on campus as per availability. All campuses (except Dubai) provide accommodation for all employees within the campuses they are fully residential.. In cases where it is not possible for the Institute to provide accommodation within campuses, temporary arrangements are made to house them in identified housing outside campus with arrangement for their transport to campus and back. Future expansion plans to accommodate faculty and staff within campuses as per growth plans are in the pipeline. In case of Dubai campus, where it is not possible to own land for construction of housing complex by the Institute, HRA is extended as per rules.

- **Loans (housing, computer, furniture [interest free], vehicle)**
  All employees are eligible for aforementioned facilities as per defined guidelines.

- In addition to the above, all employees are also eligible for PF, Gratuity, Casual/special/ vacation leave, leave travel concessions, TA/DA, as per Institutional norms defined elsewhere.

All the faculty and staff utilize most of these facilities on an annual basis as per eligibility and guidelines of the Institute.

6.3.4 What are the measures taken by the University for attracting and retaining eminent faculty?

Following schemes have been framed for attracting and retaining eminent faculty

a) Seed Grant Scheme
b) Research Initiation Grant Scheme
c) Competitive research grant for faculty
d) OPERA (Outstanding Potential for Excellence in Research and Academics) Award
e) Chair Professorships
f) Sabbatical Leave
g) Extraordinary leave

These schemes have been explained in detail in the earlier section 6.3.1 and are intended to attract and retain research faculty. In addition, for eminent faculty based on the profile, several other measures are initiated as given below:

- Enabling Avenues to start companies within the institute as part of entrepreneurship and TBI
- Promoting Interdisciplinary Collaborative Research
- Additional infrastructure grant specific to their research needs for setting up laboratories
- Procurement of High end equipments in their research area
- Enabling them to carry out their research/ consultancy work at other organization for limited period of time.

  These initiatives have culminated in recruitment of eminent experienced faculty over the last 5 years.

6.3.5 Has the university conducted a gender audit during the last four years? If yes, mention a few salient findings.

No audits have been performed in the earlier years. All appointments are made through a rigourous assessment and evaluation process involving external members with equal opportunity to all. Data on gender ratio is provided below (as on June 30, 2015).

Faculty Gender Ratio:

Campus	F	M	Grand Total	% F:M
Pilani	73	233	306	23.9
Goa	45	110	155	29.0
Hyd	42	123	165	25.5
Dubai	23	38	61	37.7
Grand Total	183	504	687	26.6

Non Teaching Staff Gender ratio:

Campus	F	M	Grand Total	% F:M
Pilani	44	576	620	7.1
Goa	40	120	160	25.0
Hyd	31	136	167	18.6
Dubai	7	92	99	7.1
Grand Total	122	924	1046	11.7

6.3.6 Does the university conduct any gender sensitization programmes for its faculty?

Institute does not per se have such programmes. However, due weightage is given to individual and personal issues during and after appointment of faculty and staff at all levels. In addition, Institute also committees for combating sexual harassment and

redressal committees, at all campuses to immediately address concerns, if any. The Institute addresses any act of indiscipline, at all levels, seriously, and necessary corrective measures /actions are taken at the earliest.

6.3.7 What is the impact of the University's Academic Staff College Programmes in enhancing the competencies of the university faculty?

We don't have Academic Staff College by name. However, the functions of Academic Staff College are taken care by

Intensive Teaching Workshop (ITW):
Instruction being a core competency at all tiers of teaching, the Institute has in – house, well structured and well defined ITW process, organized by the Instruction Division of each campus, every semester, where new faculty members participate and get an opportunity to understand how classroom teaching could be made innovative and more effective. It is generally conducted by a panel of senior faculty members of the Institute, on a routine manner. The feedback from the cell is seriously considered for continuing a faculty in the Institute as a teacher. This helps the Institute maintain set standards / expectations from a new recruit. This is also extended to existing faculty. In addition, Humanities and Social Sciences Department also houses a Languages laboratory that helps a faculty in enhancing English Proficiency if necessary.

Teaching Learning Centre (TLC):

The mandate for the TLC is to improve the overall teaching learning practice in BITS. TLC has been formed for the professional development of BITS faculty as well as non teaching academic staff associated with teaching activities (laboratory technicians, demonstrators). The TLC also aims to engage research in various aspects of teaching and learning. Further, to bring the best practices in teaching and learning across the globe, and share their experiences through direct or indirect modes are some objectives of this centre. These processes facilitate teaching staff to enhance their instruction capabilities and also provide a platform for them to assess their communication skills in an effective manner. This also reflects on their teaching quality which in turn indirectly reflects on student and peer feedback obtained during annual appraisal of their performance.

In extreme situations, where the feedback of a faculty is observed to be poor or does not meet expectations over a period of time, the faculty is provided enough opportunity and guidance (with or without a mentor) to improve his/her teaching and communication skills as per expectations and if there are no improvements observed during the defined period, he/she is given an indication of his/her unsuitability for the teaching profession. However, due to the stringent recruitment process and performance management guidelines, most faculty meet the minimum standards of effective teaching.

6.4 Financial Management and Resource Mobilization

6.4.1 What is the institutional mechanism available to monitor the effective and efficient use of financial resources?

The Institute has a strong annual planning and budgeting process. Detailed process is in placefor preparing annual budgets and tracking actual to budgets. All the investment is measured for cost benefit analysis and return on investment and financial practices are benchmarked against best practices. The Institute has a strong Financial MIS system and a strong qualified finance team headed by CFO (Chief Finance Officer).

6.4.2 Does the university have a mechanism for internal and external audit? Give details.

Yes, the university has a mechanism for internal and external audit.

1. Statutory audit is done by one of the reputed audit agencies S R Batliboi (Member firm of EY in India)
2. Internal Audit is conducted by M/S Aneja Associates; a firm specializes in internal audit.

6.4.3 Are the institution's accounts audited regularly? Have there been any major audit objections, if so, how were they addressed?

Yes. External Audit is conducted every year. Internal Audit is conducted twice a year. There were no major audit objections.

6.4.4 Provide the audited income and expenditure statement of academic and administrative activities of the last four years.

Please refer to Annexure IV.

6.4.5 Narrate the efforts taken by the University for Resource Mobilization.

The Institute is financially self sustained. Due to its strong financial practices and strong balance sheet, funds are mobilized through bank loans as and when required.

6.4.6 Is there any provision for the university to create a corpus fund? If yes, give details

Yes. Please refer to Annexure IV

6.5 Internal Quality System

6.5.1 Does the university conduct an academic audit of its departments? If yes, give details.

The departmental reviews, in terms of academic and administrative structures, curriculum, infrastructure and facilities etc. are done periodically through visiting committees comprising of eminent academicians and researchers from Institutes across the country. The programme structures, relative relevance of various programmes, the intensity of courses, the pedagogy methods, level of practical hands on exposure, quality of faculty, student teacher ratios, infrastructure resources, assessment of graduate and Ph. D programmes, quality of research outputs like publications, patents, etc. are analysed in detail during these academic audits. The last set of visits to each Department happened in 2013 and we expect to sustain these visits every three years. In addition, BITS has also initiated a curriculum review for each discipline/program by external experts from academia and industry in India. These reviews have been started in July 2015 and are expected to be completed by March 2016. The feedback and outcomes of all these measures are shared with the departments and remedial measures are initiated as per the requirement.

In the year 2011-12, based on an internal academic audit, a benchmarking exercise was undertaken for all the programmes of the Institute. Nearly 30 programmes (both first degree and higher degree) across 13 departments of the Institute were benchmarked against curriculum of leading universities worldwide. The programme wise list of the benchmarked universities is given in the table below.

Cross campus teams from all four campuses were involved in this rigorous exercise and the BITS curriculum was compared for its program structure, sequencing and mix of courses, Electives and project based courses, pedagogical differences in terms of content and learning modes etc. The computed scores obtained after benchmarking were used for redesigning the curriculum, with the result that our programs are now comparable to the best in the world.

Programme wise list of benchmarked universities:

S. No.	**University**	**Program**
	BITS	**M.Sc. (Hons.) Biology**
U1	Princeton University	B.S. Biology
U2	Stanford University	B.S. Biology
U3	Yale University	B.S. Biology
U4	University Of Texas	B.S. Biology
	BITS	**M.E. Biotechnology**
U1	Georgetown University, Washington DC	M.S. Biotechnology
U2	IIT, Mumbai	M.Sc. Biotechnology
U3	JNU, New Delhi	M.Sc. Biotechnology

	BITS	Bachelor of Engineering (Hons.) in Biotechnology
U1	Stanford University, California	Bachelor of Science Degree in Engineering
U2	Massachusetts *I*nstitute of Technology, Cambridge, Massachusetts	Bachelor of Science in Biological Engineering
U3	Indian Institute of Technology, Delhi	Bachelor of Technology and Master of Technology (dual degree) in Biochemical Engineering and Biotechnology
	BITS	**B.E. (Hons.) in Chemical Engineering**
U1	IITB	B Tech. (Hons) in Chemical Engineering
U2	MIT	B.S. (Chemical engineering)
U3	CALTECH	B.S. (Chemical engineering)
	BITS	**M.Sc. (Hons) Chemistry**
U1	MIT	SB Major in Chemistry
U2	Harvard	Concentration in chemistry
U3	UCLA	BS major in chemistry
	BITS	**M.E. Civil with Specilization in Infrastructure Systems**
U1	Joint degree by IIT Bombay and Nanyang Technological University	Master in Infrastructure Engineering and management
U2	Texas A&M University	M.Eng. in Civil Engineering with a focus on Infrastructure Management and Security.
U3	Technological Leadership Institute, University of Minnesota	Master of Science in Infrastructure Systems Engineering (ISE)
	BITS	**M.E. in Civil with Specialization in Structural Engineering**
U1	IIT Kanpur	M. Tech. in Structural Engineering
U2	M.I.T.	M.S. in Materials and Structure
U3	University of Illinois-Urbana-Champaign	M.S. in Structural Engineering
	BITS	**M.E. Civil , specialization in Transportation Engg.**
U1	IIT Madras	M.Tech. Transportaion Engineering
U2	MIT	M.S. in Transportaion Engineering
U3	University of Illinois-Urbana-Champaign	M.S. in Transportaion Engineering
	BITS	**B.E (Hons.) Civil Engineering**
U1	IIT Kanpur	B.Tech in Civil Engineering
U2	MIT	B.S. in Civil and Environmental Engineering
U3	UIUC	B.S. in Civil and Environmental Engineering
	BITS	**B.E. (Hons) Computer Science**
U1	MIT	SB in Compter Sc. and Engg. (6-3)
U2	UCB	BS In CSE
U3	IITB	BTech CSE
	BITS	**M.E. in Computer Science**
U1	MIT	S.M in Computer Science
U2	UCB	M.S. in Computer Science
U3	NUS	Master of Computing in Computer Science

	BITS	**M.E. in Software Systems**
U1	George Mason	MS in Software Engineering
U2	RIT	MS in Software Engineering
U3	(Reference - ACM)	Software Engineering
	BITS	**M.Sc. Tech in Information Systems**
U1	National University of Singapore	Bachelor of Computing in Information Systems
U2	Cornell University	B.S. in Information Sciences
U3	(Reference - ACM)	Software Engineering
	BITS	**M.Sc Economics**
U1	MSE	MSc Economics
U2	MIT	M.S Economics
U3	LSE	M.Sc Economics
	BITS	**M. Sc. Tech Finance**
U1	University of Delhi	MFC
U2	George Washington Univ.	MS Finance
U3	University of Illinois UC	MS Finance
	BITS	**BE ECE**
U1	MIT	BS EE
U2	UCB	BS EE
U3	Stanford	BS EE
	BITS	**ME(Microelectronics)**
U1	IIT BOMBAY	Mtech (Microelectronics)
U2	STANFORD	MS (ELECTRICAL ENGINEERING)
U3	UNIV. of MASSACHUSETTES	
	BITS	
U1	Purdue	ME in Communications Engineering
U2	IOWA State University	ME in Communications Engineering
U3	IITM	ME in Communications Engineering
	BITS	**B.E.(Hons) EEE**
U1	MIT	S.B EE
U2	UCB	S.B EE
U3	Stanford	S.B EE
	BITS	**ME Embedded Systems**
U1	MIT	SM EE(Computer Electronics Systems)
U2	UCB	SM EE (Computer Archi & h/w)
U3	University of Texas at Austin	SM EE (Computer Engg)
	BITS	**(courses in Languages)**
U1	Stanford	B.E (EE) and B.E(ME) and M.E
U2	NUS	The courses discussed are offered in all diciplines in the school of engg
U3	MIT	The courses discussed are offered in all diciplines in the school of engg
	BITS	**MSc(Hons) Mathematics**
U1	MIT	S.B Mathematics

U2	Princeton University (PU)	B.S Mathematics
U3	IIT Kanpur (IITK)	MSc Mathematics
	BITS	**B.E.(Hons) Manufacturing Engineering**
U1	PURDUE UNIVERSITY	B.S. Manufacturing Engineering
U2	CAMBRIDGE	Manufacturing Engineering Tripos
U3	IIT KGP	B.Tech Manufacturing Science & Engineering
	BITS	**BE (Hons.) Mechanical Engineering**
U1	M.I.T.	B.S. Mechanical Engineering
U2	IMPERIAL COLLEGE	M.Eng Mechanical Engineering
U3	IIT KHARAGPUR	B. Tech Mechanical Engineering
	BITS	**M.E. Manufacturing Systems Engineering**
U1	M.I.T.	M.E. Manufacturing Engineering
U2	UW-Madison	M.S. Manufacturing Systems Engineering
U3	Lehigh University	M.S. Manufacturing Engineering
	BITS	**M.E, Mechanical Engineering**
U1	M.I.T.	M.E. Mechanical Engineering
U2	Georgia Tech	M.S. Mechanical Engineering
U3	Imperial College, London	M.E. Mechanical Engineering
	BITS	**M.E, Design Engineering**
U1	Stanford	M.S. Product Design
U2	Imperial College, London	M.Sc. /M.A. in Innovation Design Engineering
U3	IIT Bombay	M. Tech. Design Engineering
	BITS	**B.Pharm (Hon)**
U1	University of Michigan	BS in Pharmaceutical Sciences
U2	Manipal college of pharmacy	B.Pharm
U3	Purdue University	BSPS
	BITS	**M Pharm, Medicinal chemistry**
U1	University of Kentucky	M.S .Drug discovery
U2	NIPER, Chandigarh	M.S. Pharm
U3	University of Washington, Seattle	M.S, Medicinal Chemistry
	BITS	M.Pharm Pharmaceutics
U1	University of Kentucky	M.S -Pharmacetics/Drug delivery
U2	Niper, Chandigarh	M.S Pharmaceutics
U3	University of Washington, seattle	M.S-Pharmaceutics
	BITS	**M.Sc. (Physics)**
U1	IIT Kanpur	Int.M.Sc (5 year)
U2	IIT Kharagpur	Int.M.Sc (5 year)
U3	MIT	B.S (4 year) Physics
	BITS	**M.B.A.**
U1	MIT	M.B.A
U2	IIT Mumbai	M.B.A.
U3	HBS	M.B.A

6.5.2 Based on the recommendations of the academic audit, what specific measures have been taken by the university to improve teaching, learning and evaluation?

Based upon an internal academic audit, a benchmarking exercise was undertaken wherein all the programmes of Institute were benchmarked against curriculum of leading universities worldwide and curriculum for all the programmes was updated based upon the results of this benchmarking exercise. BITS invites Visiting Committees (of experts from other academic institutions in India) to assess the strengths and weaknesses of Departments in terms of research, teaching, and institutional practices. The last set of visits to each Department happened in 2013 and we expect to sustain these visits every three years. In general the comments of review committee were good.

In addition, BITS has also initiated a curriculum review for each discipline/program by external experts from academia and industry in India. These reviews have been started in July 2015 and are expected to be completed by March 2016. Departments have put forward proposals for upgrading or making changes in the curriculum. These proposals are discussed and approved by the Senate of BITS Pilani during its meetings that are held three to four times in a year. Several such routine changes are incorporated into the curriculum every semester based on feed back received.

Other measures taken include recruitment of faculty in specialized areas, changes in Ph.D monitoring and evaluations and increasing the library infrastructure with a greater focus on research. Infrastructure budget to the tune of Rs. 15 crores (5 crores for each campus) has been allotted for procurement and upgradation of high end equipments.

6.5.3 Is there a central body within the university to continuously review the teaching learning process? Give details of its structure, methodologies of operations and outcome?

The Instruction Division is the functional unit of BITS that majorly takes care of the teaching learning activities. The main activity is to ensure that teaching across the Institute is carried out in an efficient and effective manner and meets the learning objectives of the programme. It works closely with the Academic Resource Planning division and the Academic Registration and Counselling Division as well as individual departments to ensure operational flexibilities are implemented. All these functional divisions are headed by University level Deans, who are assisted by Campus level Associate Deans located in each campus. The activities include planning for and designing flexible time table, monitoring of classes, tests, evaluation of answer books, timely processing of results and periodic feedback collection for the various operations.

In addition, all policy changes and structure related changes are approved by the Senate of the Institute after taking cognizance of all stakeholder needs. Recently, The Teaching Learning Centre has been established with senior faculty members to improve the overall teaching learning practice and engage in research on various aspects in teaching and learning and to share best practices for enhancing instruction capabilities.

6.5.4 How has IQAC contributed to institutionalizing quality assurance strategies and processes?

BITS has an Internal Quality Assurance Cell (IQAC) operating in all campuses as well as at the University level. It works in a participative and facilitative manner towards ensuring quality sustenance measures. It contributes to the holistic academic excellence of the University by validating the quality sustenance and enhancement strategies of the Institute especially those focusing on academic improvement, curriculum development, student learning outcomes, industry collaborations, research outputs, governance and infrastructural improvements.

6.5.5 How many decisions of the IQAC have been placed before the statutory authorities of the university for implementation?

Many academic curriculum related changes in policies and pedagogy have been implemented by the university. Few representative examples of these include curriculum review and expert committee visits to assess all discipline programmes across departments, increase in assignment based and open book components in curriculum and fine grained grading of students, strengthening of faculty and course feedback systems, establishment of teaching learning center, etc.

To transform BITS into a research led university and to enhance the research outputs of the university, several measures have been implemented: include recruitment of research focused faculty, introduction of research initiation grant , competitive research initiation grants, seed grants, OPERA awards for new faculty and Chair Professorships to senior faculty, increase of Professional allowance for faculty to the tune of 1 lakh/annum, introduction of Part Time Ph.D programme, revamping of Ph.D course structure , introduction of provision of co-supervisorships, giving letter grades to thesis/Dissertation to encourage undergraduate/graduate research activities, etc.

Student centric learning has been strengthened by measures like creation of sand box facility to encourage innovative and applied research, ICT enabled classrooms, smaller tutorials for better interaction and guidance, more discipline oriented project courses, etc.

6.5.6 Does the IQAC have external members on its committees? If so, mention any significant contribution made by such members.

Yes, IQAC has external members with highly accomplished backgrounds. The external members made various suggestions, recommendations on the following matters.

- Academic improvement and curricular development
- Enhancing research activities, suggestions were provided on receiving external funding from different agencies
- Industry collaborations
- Student placements
- Learning outcomes

6.5.7 Has the IQAC conducted any study on the incremental academic growth of students from disadvantaged sections of society?

Not really. But, meritorious students from economically weaker sections of the society are taken care of and supported by various scholarships (Merit cum Need scholarship). Academically weaker students are provided extra academic support by way of special guidance from faculty and counselling.

6.5.8 What policies are in place for the periodic review of administrative and academic departments, subject areas, research centres, etc.?

Departments and Divisions which are the functional units of the university have systems in place that ensure periodic review and improvements.

The departmental reviews, in terms of academic and administrative structures, curriculum, infrastructure and facilities, etc. is done periodically through visiting committees comprising of eminent academicians and researchers from Institutions across the country. The programme structures, relative relevance of various programmes, the intensity of courses, the pedagogy methods, level of practical hands on exposure, quality of faculty, student teacher ratios, infrastructure and quality of equipments and resources, assessment of graduate and Ph. D programmes, quality of research outputs like publications, patents, etc., are analysed in detail during these academic audits. The last set of visits to each Department happened in 2013 and we expect to sustain these visits every three years. In addition, BITS has also initiated a curriculum review for each discipline/program by external experts from academia and industry in India. These reviews have been started in July 2015 and are expected to be completed by March 2016. The feedback and outcomes are shared with the departments and remedial measures are initiated.

Based upon an internal academic audit, a benchmarking exercise was undertaken in 2011 wherein all the programmes of Institute were benchmarked against curriculum of leading universities worldwide and curriculum for all the programmes was updated based upon the results of this benchmarking exercise.

Internally, within the departments, appropriate decisions are taken on academic matters like programmes and courses as well as directions of research, thrust areas, etc. through committees such as Departmental Committee for Academics, and the Departmental Research Committee etc. These committees collaborate extensively across campuses through the cross-campus committees, which facilitate such discussion. An assessment of the extent of contribution made by each Department in each of the campuses is made, and shared to ensure that the Departments remain focused on quality of performance and improvement.

Administrative Review:

Periodic review of administrative departments is conducted at the Institutional level by the leadership. Various such administrative changes have been put in place in the last few years to ensure smooth operations in the multi campus university. For example, to enhance the focus of the Institute towards specialized thrust areas, new functional divisions have been commissioned. For eg. The Academic Resource Planning Division (ARPD) aims at improving academic curriculum and pedagogy. Splitting of the Research and Consultancy portfolio to Academic Research Division and Sponsored Research and Consultancy Division, ensures equal thrust to internal and external research interactions. Appointment of University level Deans in functional divisions and campus specific Associate Deans is another step towards ensuring uniformity and operational efficiency across the four campuses.

Existing divisions responsible for specific academic functions such as academic programme and course design, instruction, research, and industry engagement ensure adoption of common processes and standards, and adherence to these. To move forward in a dedicated and purposeful way, the Institute has taken up (three year) projects in mission mode - 2012, and 2015, led by faculty teams. There are quarterly reviews at the university level by senior leadership as well as half yearly reviews at the campus levels to bring all initiatives together and progress with a collective vision.

7 CRITERIA VII: INNOVATIONS AND BEST PRACTICES

7.1 Environment Consciousness

7.1.1 Does the university conduct a Green Audit of its campus?

Green audit was conducted recently in Hyderabad campus and other campuses have initiated measures to implement the same.

- Solar systems for water heating and street lights
- Institute has implemented PeopleSoft ERP system for the academic, purchase and stores, finance, and other activities, with which the paper waste is limited.
- Environmental clearance from the respective state pollution boards is taken.
- Independent sewage treatment plant to treat the sewage generated from campus and the treated water is used for gardening.
- The garbage generated from Campus is segregated within our area and sent to the designated areas through outsourced parties as per the directions of pollution board.
- The wet garbage generated from campus especially through the both the dining halls is fed into a bio gas plant to generate gas which in turn is used for Institute cafeteria.
- Tree plantation is carried out during monsoon period every year to plant new or to replace the deceased plants.
- Phasing out CFL and replacement with LED lights.

7.1.2 What are the initiatives taken by the university to make the campus eco-friendly?

Pilani:

1. Energy conservation
    - Use of Energy Efficient Equipment
    - Insulation of Hot Water Pipes
    - Dual Layered Glass to prevent Green House Effect
    - Use of CFL/LED and Energy Rated equipment's and fixtures
    - Master Switches for each Room to shut down power of entire room when not in use
    - CRT monitors being replaced with LCD/LED Monitors
    - Thermostat controlled cooling system

2. Use of renewable energy: Solar Powered Street Lighting; Solar Powered Water Heating System

3. Water harvesting-
    - New Academic Block is equipped with Rain Water Management System with Channelized Drain & Pipe Network, Rain Water Holding Tank, Pumps and Ground Water Recharge Pits.
    - Approx. 2km of Storm Water Drain Line is also provided with four rain water recharge pits
    - Rain Water Harvesting & Recharge Pits are provided at numerous locations of the campus.

4. Check dam construction – Not Applicable

5. Efforts for Carbon neutrality- Tree plantation is carried out to achieve carbon neutrality to cover the most open areas. Institute residents are encouraged to use cycle as a transport medium within the campus. All the wastes generated in the campus are taken care of as per norms. Decrease in electrical usage by substitution with renewable sources of energy.

6. Plantation – Entire campus has approx. 12,000 trees and various types of plantation. About 150 acres of land in the campus is under landscape and natural plants.

7. Hazardous waste management – This factor has been taken care of in an adequate manner to provide an eco-friendly environment within the campus

8. e-waste management - e-waste generated is collected and sent either to an e-waste dealer or to the collection point prescribed by pollution board.

Goa:

1. Energy conservation: The campus street lights are operating on sensors without human intervention i.e. switching off and on of lights is operated by sensing the day light. The CFL fittings with higher rating wattage are replaced with LED fittings with lower wattage with the same lux and luminous level in street lights and other possible areas of Campus.

2. Renewable energy: The hostels are provided with solar water heaters to harness the solar energy. The power control centres are provided with capacitor bank to maintain the power factor unity to reduce the losses. The portion of Campus street light and medical centre are connected with three hybrid power system of 5 kW each i.e. power generated by wind and solar. The hostels are provided with solar water heaters. Some standalone street lights are powered with solar panels in specific junctions.

3. Water harvesting : Even though the strata is of lateritic, measures are taken to harvest the water through maintaining natural nallha along the side of secondary roads to increase the percolation of water to increase the water table. The plantation pits which are excavated to a depth of 4 feet to 5 feet are also acting as a water retainer.

4. Check dam construction: The natural nallhas are maintained with the available gradient to avoid the immediate rain water runoff, so as to percolate the ground to increase the water table.
5. Efforts for Carbon neutrality: Tree plantation is carried out to achieve carbon neutrality to cover most open areas. Institute residents are encouraged to use cycle as a transport medium within the campus. All the wastes generated in the campus are taken care of as per norms. This has been factored in all future constructions in the expansion plan by design to make them green buildings. Reduction of electrical usage is achieved by substitution with renewable sources of energy.

6. Plantation: Every year we have plantation drives to increase the greenery with the replacement of deceased plants. We have self-sufficient staff in house as well as through external housekeeping contractors for maintenance of landscape.

7. Hazardous management: This factor has been taken care of in an adequate manner to provide an eco-friendly environment within the campus.

8. E-waste management: e-waste generated is collected and sent either to e-waste dealer or to the collection point prescribed by pollution board.

9. Any other: The Times of India dated 6th May 2015 has rated our campus as India's 7th best campus among the beautiful campuses in India.

Hyderabad:

1. Energy conservation: Recently energy audit was done. Efforts are taken and measures are being implemented to reduce the power consumption like going to LED lights etc.

2. Renewable energy: All hostels are equipped with solar water heaters. Street lights are also planned to connect to solar panels.

3. Water harvesting: The roof water harvesting was recently done with both recharging and also collecting the filtered rain water to use for flushing etc. Water harvesting tanks were dug in the campus to collect and recharge the rain water.

4. Check dam construction: Not Applicable

5. Efforts for Carbon neutrality: Tree plantation is carried out to achieve carbon neutrality to cover the most open areas. Institute residents are encouraged to use cycle as a transport medium within the campus. All the wastes generated in the campus are taken care of as per norms. Reduction of electrical usage by substitution with renewable sources of energy.

6. Plantation: A lot of greenery has been developed in and around the campus beyond the local authorities' norms.

7. Hazardous waste management: This factor has been taken care of in an adequate manner to provide an eco-friendly environment within the campus.
8. E-waste management: e-waste generated is collected and sent either to e-waste dealer or to the collection point prescribed by pollution board.

9. Any other: Sewage water is being treated and the treated water is pumped back to maintain the avenues, horticulture and flushing the toilets.

7.2 Innovations

7.2.1 Give details of innovations introduced during the last four years which have created a positive impact on the functioning of the university.

Name of the Innovation: Project BITS-Connect 2.0 as an Innovation in Educational Technology

Back in 2012, the Institute embarked on an innovative initiative that would allow multiple benefits from a resilient service infrastructure across its campuses by the way of providing a high-quality, interactive collaborative facility in keeping with the times. Termed as the BITS-Connect 2.0, this initiative has, probably, become a deserving candidate to be considered as an innovation in the university eco-system.
Keywords/ Key Phrases: Multi-site Collaboration, Immersive Telepresence

Objective of this initiative: was to create an Integrated Scalable Multi-Location Immersive Tele-Presence environment across four campuses of the University.

Need for such an innovation: The Institute had a few major challenges that led to the design and implementation of the current architecture of the BITS-Connect 2.0 Immersive Telepresence Eco-System. These were as follows:

- Being a four-campus university often meant far too frequent travel by the Institute's Leadership costing significant loss of money, time and productivity. Since, some of the people involved had multiple responsibilities like those of teaching and research in addition of some form of administration, such frequent travels often used to require rescheduling of certain lectures, deliberations or meetings and did potentially eat up significant amount of time that belonged rightfully to their families and scholars.
- Like all the other major higher education institutes in the country, the issue of faculty availability (skewed demand to supply ratio) did potentially reduce the choice of offering new electives with the same number of faculty since faculty used the traditional model of teaching at their respective campuses only. Also, in some cases, it did lead to higher teaching load than what may be ideal to allow them adequate time to work towards research and consulting (as also for outreach activities).

How was it achieved?

- A team comprising of select alumni and faculty, in consultation with the leadership, identified certain technology solutions which if combined and duly adapted, could be deployed in a way across all four campuses as well as the Chancellor's Office at Mumbai.
- Once the architecture got in place, engineers from Cisco and the A/V Integration Team from Godrej Boyce worked closely with the team of faculty at BITS Pilani to select and integrate products (most of them from Cisco but a few from other vendors as well) and enable pilot services of meeting, teaching and recording etc.

- Limited mobility support along with provision of QoS-enabled IP-MPLS, SIP and Restful Services, the new applications gradually evolved like those related to Seminars, Recruitments and Placement etc.
- In the first stage Pilani, Goa and Hyderabad campus got access to this unified multi-service eco-system, in addition to Mumbai ABG Headquarters. In the second phase, Dubai campus too got connected seamlessly to this facility.

How has it benefitted the Institute?

- Multi-campus meetings with eye-to-eye contact and collaboration capability, leading to huge savings in terms of travel time and associated costs while allowing class-schedules and family lives of the faculty and leadership largely unaffected.
- Permits efficient use of faculty, particularly in the areas of specializations which would otherwise have required each campus to have dedicated experts in even those areas wherein there may be hardly double digit student registration in a given campus.
- Allowed expert alumni and external experts visiting a given campus (or even from their offices / homes anywhere in the world) to share their experience and expertise to students and faculty across campuses.
- Permits multi-campus Faculty Recruitment committees to interact simultaneously with a given aspirant.
- Permits placement agencies to visit any one campus and yet to be able to address and interview students across all relevant campuses.
- Conducting multi-campus seminars, mass addresses, workshops and training programmes became possible due this innovative enterprise.

Evidence of Success:

- Effective multi-campus teaching with due high-quality interaction is now readily possible since a teacher from any given campus can easily interact with up to 720 students (if all four campuses join) or up to 540 students (if only three Indian campuses join) across different locations.
- It helps in faculty recruitments as well. The travel cost has hugely reduced as now faculty and staff don't have to travel for meetings or classes as now they as well as external experts can interact with people and panellists various locations with eye-to-eye based Full HD-quality experience.
- It has also enhanced the seamless University-wide collaboration between leadership, faculty groups and students.
- Being integrated with HDVC as well as IP-Telephony, MPLS Cloud and traditional Web-conferencing apart for NBR, the unified architecture of the BITS-Connect 2.0 Eco-system facilitated highly interactive multi-site teaching as well as Full-HD Multi-site Meetings with eye-to-eye contact feature.

Problems encountered and resources required:

Being a multi-site project and that too first of its kind in the Indian University System, had quite a few difficulties and problems which needed to be taken care of, including the following:

- Bringing people across campuses together to be able to see the value and significance of the proposed initiative, more so since it was a high-cost proposition.

- Bringing down the costs and time without compromising onto the effective quality of the outcome by the way of careful design and implementation choices.
- Coordinating amongst multiple high-level (involving the Institute Leadership and Alumni Leadership) and on-ground teams (faculty colleagues, technical staff, civil and electrical work staff, system integrator teams and vendors) was a time-consuming effort that also warranted due follow-up until the project passed cross-site performance testing and went live.

INNOVATION	The Unified Multi-Modal Collaboration Architecture for the Multi-Campus University
BUSINESS IMPACT	Reduced cost of travel and increased interaction between leadership, faculty and students, Saving faculty resources, Making Expertise Available across Campuses, Faculty Recruitment Interviews became flexible, Unified Placement interactions are now feasible.
FUTURE POTENTIAL	Scaling it up may help multiplying benefits referred above and help save not only travel costs etc. but also faculty time in a significant way which could be used for academic purposes including research, counselling and outreach. In a way, this can also help solve a part of faculty scarcity problem to a certain extent in select areas of specialization.
MINIMIZE RISK	The technology involved allows network based recording and archival facilities which could allow reuse of the created content that could help student revisit select content if the regular session had a few moments wherein attention was low. Making such content available via VoD, LMS and CDN platforms may further reduce of risk of exclusion of those students who may have missed some lectures due to being unwell or other reasons.

7.3 Best Practices

7.3.1 Give details of any two best practices which have contributed to better academic and administrative functioning of the university.

Format of Best Practice: 1. *Curriculum Redesign*

1. **Title of the Practice: Curriculum Redesign**

2. **Objectives of the Practice Process:** One aspect of the philosophy of BITS is that a curriculum should be dynamic (i.e. adaptive to external changes), flexible (offer enough options for students), and customizable (i.e. teachers can bring in their expertise and adapt it to a context). With this in mind, BITS enables continual assessment and frequent revision of the curriculum without losing its rigor. Feedback from students, teachers, employers, and external experts from academia / industry is incorporated into the curriculum at different levels of granularity at different intervals of time ensuring the curriculum is robust and nimble.

3. **The Context:** BITS is a student-centric University, enabling immediate employability of students while ensuring that they acquire life-long learning and adaptation skills makes it challenging to decide on content and pedagogy. Despite these constraints and the challenges BITS has managed to ensure that curricular changes are carried out in a timely and rigorous manner.

4. **The Practice:** In 2010, BITS Pilani evaluated the curriculum of each of its first degree programs in B.E. (Hons)., B.Pharm., M.Sc.(Hons.), and M.Sc.(Tech.) and higher degree programs in M.E., M.Pharm., and M.B.A. programs. The evaluation included a benchmarking exercise for each program against three top Universities in India and abroad in that discipline. Twelve different specializations in first degree and more than thirty different specializations in higher degree were benchmarked using a set of forty eight parameters under Program Structure, Course Content, and Pedagogy.

   The benchmark results were used to synthesize an integrated curriculum for all first degree programs and a generic structure for higher degree programs. Subsequently, the details of the benchmark were used by the Departments to strengthen the curriculum in terms of its courses and contents. Pedagogic aspects were also improved across the board. The curriculum was rolled out from 2011-12 onwards and the first batch of first degree students graduated with the new curriculum in 2015.

   The highlight of the process of redesign was the consultative exercise wherein about 120 faculty members across the four campuses were directly engaged in multiple rounds of workshops in benchmarking, analyzing, and deciding the general structure and pedagogic elements of the curriculum. Subsequently, about 200 faculty members designed the discipline specific courses and content across multiple departments and programs offered.

   The impact of the curriculum has resulted in increased depth of specialization / discipline specific courses in the first degree curriculum without compromising the integrated nature and cross-disciplinary philosophy of education at BITS Pilani.

Specific highlights of the new curriculum include increased Humanities requirements for all first degree students, more elective choices for students, increased emphasis on practical / hands-on learning, increased emphasis on open assessment practices such as take-home assignments, seminars, literature survey, team work and other aspects.

A more systematic process of feedback and review is carried out over a longer period of time. Every few years, visiting committees (per Department) of experts from other academic institutions visits and assess the Department (across the campuses of BITS) for its faculty strength, research, teaching, and institutional processes. This was carried out in August to October 2013.

Besides the above we have also started a process of external review of curriculum by experts from academia and industry for each Department. This is currently going on since August 2015.

BITS has also been engaging consultants to interact with and elicit views from potential / current employers of our on-campus / off-campus students regarding their expectations from our students, their assessment of qualities of our students such as preparedness, domain-specific skills, and intellectual / professional adaptability.

The above feedback mechanisms are importantly supported by student feedback per course in each semester and instructor experience. Feedback is then distilled and curated into structural, content, and pedagogic requirements for the curriculum.

5. **Evidence of Success** The impact of the curriculum redesign processes has been validated by student feedback as well as external feedback through different channels. It is found that:

- Employer feedback and responsiveness has been improving.
- Sustained and high-quality employment opportunities and offers for our students that withstand market fluctuation.
- Feedback from external reviewers has been strongly positive.

6. **Problems Encountered and Resources Required**

- The process is highly man-power (i.e. faculty time) intensive.
- Engaging external agencies introduces noise that is not always easy to filter.
- While the curriculum is robust and nimble, it is not easy to forecast success of such revisions.

Format of Best Practice: ***2. Industry Engagement as a curricular aspect***

1. **Title of the Practice: Industry Engagement as a curricular aspect:**

2. **Objective of the practice**
   BITS has an educational philosophy that establishes a dialectical link between theory and practice. The university curriculum is continuously being innovated upon and refreshed to reflect the latest developments in technology and trends within industry. Pure academics are supplemented by pervasive industry engagement through the Practice School.

3. **The Context**
   BITS is an Institution of national repute with a mission to advance knowledge and educate students in science, technology, and other areas of scholarship that will best serve the nation and the world in the 21st century. It is one of the few universities that has created an institutionalized framework for achieving a vibrant environment that successfully inculcates an ambience for experiential and cooperative learning and education.

4. **The Practice**
   BITS has introduced industry internship as integral part of its curriculum. Each student has to do an industry internship of seven and half months before he graduates. The PS programme in the BITS curriculum has two components, namely PS-I of two months duration implemented during the summer following the 2nd year and PS-II of five and a half months duration implemented during either of the semesters of the final year. The academic curriculum of BITS takes the classroom for a specified period to a professional location where the students and the faculty along with the industry experts get involved in real life problems.

   Practice School Programme of BITS has been successfully implemented for the last three decades. The planning process for Practice School begins almost one year in advance. The various steps include (i) deciding the list of eligible students (ii) carrying out a demographic analysis to establish region wise targets for the number of stations and seats, (iii) identifying list of assignments through Problem banks (iv) confirming the continuation of existing stations and initiating new stations. This ensures that an adequate number of suitable projects are available from the various organizations (existing and new) to comfortably accommodate all the students. Based on this information, the students submit their preferences for the various projects and organizations. The allotment of students is done on the basis of the CGPA of the students, by matching the project requirements with students' profiles, keeping the preferences and the merit of the students in view along with any particular requirements specified by the organizations. Practice School stations are spread throughout India and abroad covering various sectors.

5. **Evidence of Success**
   BITS, Pilani model of education has a structured method for integrating education with practical work experience and accommodates an enriched environment of multiple learning levels and schedules for all its partners.

   - Started in 1973; expanded exponentially from 4 students to 2500 students;
   - More than 400 organizations participate in Practice School Programme
   - Continuing successfully from last four decades;
   - Covers all disciplines;
   - Practice school stations across the country and abroad;
   - 100% students participate in PS;
   - Average stipend paid by industries to students is around 20K.
   - Replicated in other universities

   Through the PS initiative, nearly 10000 students per annum are likely to gain industry exposure in more than 1000 industries and be employment ready by 2030.

6. **Problems Encountered and Resources Required:**
   For continued success with increasing number of campuses and students it is important to have:
   a) Participation of adequate number of organizations: BITS has forged strategic partnerships that focus on one or straddle multiple areas through focused efforts on sustained industry engagement over the years. This has ensured mutually beneficial relationship from committed organizations spread across the country and abroad.
   b) Participation and sustained commitment and dedication of faculty members
   c) Active Student Participation
   d) Monetory Resources

Any other information regarding Innovations and Best Practices which the university would like to include.

1. **Continuous and Transparent Evaluation:** BITS Pilani since its inception has been following a continuous evaluation system. All evaluation components are internal – conducted and evaluated by the faculty who is/are teaching the course. The components of evaluation (tests, quizzes, take-home assignments, laboratory exercises, seminars, reports etc.) are specified with weightages, duration, and time in the handout issued by the teacher in the beginning of the semester. For each component, the teacher evaluates and returns the answer sheets to the students within a week of completion of that component. The model answers and marking scheme are published before this. The student has the right to seek a clarification or re-evaluation. The teacher considers all such requests, clarifies, and/or re-evaluates the answers, and returns it to the student. Further redress mechanisms are available to the student in the form of an examination committee in each campus. But the process is robust enough that one in a thousand student or less has had ever to approach the examination committee.

2. **Teaching Learning Centre:** Quality teaching cannot be defined in any one way. It must necessarily be understood differently across contexts, institutions, and disciplines. Towards encouraging faculty members to excel in teaching in BITS, the university decided to set up a dedicated center which can help the faculty to develop innovative methods to teach, incorporate contemporary best practices from some of the top educational institutions of the world. In an age of internet and resultant information overload , it is important for faculty to inspire and engage students using new methods both in and outside the classroom. The Institute set up the Teaching Learning Centre (TLC) in 2015. It is involved in improving the overall teaching – learning environment at BITS Pilani , across all 4 campuses. The Centre carries-out research on innovative teaching pedagogy, collection of good practices of teaching learning from all over the world and disseminates the same among the faculty. The center also engages in conduct of intensive teaching workshops for newly joined faculty . Resource persons for such workshops are invited experts from India and abroad , as well as some distinguished in house faculty. The Center will also be preparing a newsletter to document diverse innovative methods and experiments carried out during the semester by faculty.

3. **Gallup engagement survey:** To achieve the goals set in Vision 2020 - Mission 2012, the need for engagement survey for BITS Pilani across all the campuses has been identified as one of the action items of Task Force on Campus Life dealing with Engagement & Extension. To execute this survey, BITS Pilani has commissioned the services of Gallup - a management research organization. Gallup is recognized as the world leader in the measurement and analysis of people's attitudes, opinions and behavior. With operations across Globe, Gallup specializes in engagement survey. BITS Pilani is the first Indian University in the country to take 'Engagement Survey' for its students, faculty and staff. Engagement measures the level of emotional bonding and psychological commitment of its stakeholders with the institute. To measure the level of engagement, a survey is conducted and the analysis of this survey helps in identifying the gaps. Based on the identified gaps an action plan is drawn to strengthen the emotional connect of the stakeholders with the institute and among all the stakeholders

APPENDIX

Appendix – 1

Appendix 2

Appendix 3

ANNEXURES