Birla Institute of Technology & Science, Pilani
Pilani Campus
Department of Electrical and Electronics Engineering

PROJECTS AVAILABLE
(Study Project/ Laboratory Project/ Design Project)

Name of Faculty	Title of Project	Serial no. of Project	Skill Set required	Expected Outcome
Prof. V K Chaubey	1) Study, design, and simulation analysis of optical/wireless link/systems	FS0101	Related courses/electives done (preferably in 3rd year) (students should discuss the area/problem to ensure his interest)	Understanding the problem and steps to find the solutions. In case of sufficient findings attempt for publication.
	2) Device modeling (Electronic /Optoelectronic/ nano-electronic/photonic and related areas)	FS0102		
Prof. Navneet Gupta	1) Short Channel Effects modeling in Junctionless nanowire transistors (JNT)	FS0601	Knowledge of Electronic Devices	Good Quality Research paper for all topics
	2) Performance Analysis of flexible and stretchable (FSE) TFTs based on high-k dielectrics.	FS0602	Knowledge of Electronic Devices	
	3) Modeling and Simulation of Metamaterial based Antennas.	FS0603	Knowledge of EMT/ Antennas	
Prof. Chandra Shekhar	1) VLSI architecture for high performance real-time applications (students can approach and discuss)	FS0201	Computer Architecture/ VLSI Architecture	
	2) VLSI Architecture (students can approach and discuss specific problem statement)	FS0202		
	3) Advance computing architectural techniques (students can approach and discuss specific problem statement)	FS0203		
	4) RF Microelectronics (students can approach and discuss specific problem statement)	FS0204		

Prof. Anu Gupta	1) Design and analysis of enhanced linearity Analog System	FS0301	Concepts of course Microelectronic Circuits & Analog & digital VLSI Design	Good quality conference, journal paper (SCOPUS, SCI Indexed)
	2) Design and analysis of Nanometer SRAM in subthreshold region	FS0302	Concepts of course Microelectronic Circuits & Analog & digital VLSI Design	Good quality conference, journal paper (SCOPUS, SCI Indexed)
	3) A novel CMOS operational transconductance amplifier based on a mobility compensation technique	FS0303	Concepts of course Microelectronic Circuits & Analog & digital VLSI Design	Good quality conference, journal paper (SCOPUS, SCI Indexed)
	4) Design Of Low Voltage Low Power Self Biased Cmos Current Reference	FS0304	Concepts of course Microelectronic Circuits & Analog & digital VLSI Design	Good quality conference, journal paper (SCOPUS, SCI Indexed)
	5) Design of Differential Power Attack immune Circuits for robust data encryption.	FS0305	Concepts of course Microelectronic Circuits & Analog & digital VLSI Design	Good quality conference, journal paper (SCOPUS, SCI Indexed)
	6) Design of FINFET circuits for high performance in the nanometer range	FS0306		Good quality conference, journal paper (SCOPUS, SCI Indexed)
	7) Study, analysis, and design of high-performance MOS switch	FS0307		
	8) Study, analysis and design of high performance self cascode MOSFET structure	FS0308		
	9) ////Analog Design///// (To Be Discussed)	FS0309-FS0311		
	10) Design of an IOT system for smart project management	FS0312		
Prof. H. D. Mathur	1) Implications of Vehicle to Grid, in the microgrid scenario. IoT application in smart grid scenario.	FS0801	Commitment (Mandatory) and Well versed with MATLAB/Simulink, particularly Simpowersystem toolbox,	Quality journal publication/ Prototype for design project

	2) Smart Integration of Renewable sources of Energy	FS0802	Communication toolbox. Understanding of DSP will have an added advantage (but not necessary).	
Prof. Hari Om Bansal	1) Study on Charging infrastructure for PHEVs	FS0701	Electrical Sc, Control Systems, Power Electronics	Good quality journal (SCOPUS indexed)/Conference paper).
	2) Design of Energy Optimization strategies for Plug in Hybrid Electric Vehicles	FS0702		
	3) Design and development of Vehicle to Grid Technologies	FS0703		
	4) Development of Maximum power point tracking (MPPT) Algorithms for PV systems	FS0704		
	5) Integration and control of hybrid renewable energy system	FS0705		
	6) Design and Development of Bidirectional Converters for Hybrid Vehicle applications	FS0706		
	7) Control and balancing of Bots/Manipulators	FS0707		
	8).Development of a hybrid energy storage system for HEV applications	FS0708	Electrical Sc, Control Systems, Power Electronics	Good quality journal (SCOPUS indexed)/Conference paper).
Dr. K. K. Gupta	1) Water Quality Assessment	FS1001	CGPA > 8.0 Signal Knowledge of Image Processing; processing	Publication in a standard IEEE conference
	2) Smart Water Grid	FS1002		
	3) Bearing Health Monitoring	FS1003		
	4) Multimodal Biometric Techniques using thermal and visible Facial Images	FS1004		
	5) Compressed Domain Video Analysis	FS1005		
	6) Structural Health Monitoring	FS1006		
Dr. Rajneesh Kumar	1) Development of intellectual Energy concept for AI training	FS1201	CGPA > 8.5, Prior knowledge of AI Techniques	Publication in SCI index journal

	2) Development of smart power electronics systems	FS1202	CGPA > 8.5, prior knowledge of power electronics and control systems	Working prototype
	3) Development of optimal mesh network architecture for Internet of Photovoltaic (IoPV)	FS1203	CGPA > 8.5, prior knowledge of communication systems	Publication in a IEEE conference etc.
Dr. Rahul Singhal	1) Infrared Communications in Free Space	FS1501	CGPA ≥ 7.0	Simulation Schematic & National/International Conference Paper
	2) Patch Antenna Design and Analysis	FS1502		
	3) Passive/Active Photonic Device Design and Analysis	FS1503		
Dr. Praveen Kumar A.V.	1) Studies on Circular slot antennas	FS1301	CGPA ≥ 8, Prior knowledge of antenna theory, HFSS/CST, etc	SCOPUS/SCI publication
	2) Studies on high gain dielectric resonator antenna	FS1302	CGPA ≥ 8, Prior knowledge of antenna theory, HFSS/CST etc	
	3) Studies on RF resonator based sensors	FS1303	Studies on RF resonator based sensors	
	4) Computational Electromagnetics (coding and code conversion)	FS1304	CGPA ≥ 7.5, Good coding skills, Prior knowledge of MATLAB, and C++	
	5) Computation of radiation pattern of low profile antennas	FS1305	Background of Electromagnetic theory, Mathematics and MATLAB (or similar) CGPA > 7.5	
Dr. Anantha Krishna Chintanpalli	1) Implementation of DSP algorithm using TMS320C6748. (co-supervisor) - Mr. Harshavardhan	FS1801	CGPA > 8.5 MATLAB Signals and	Publication in signal processing conference (SCI- Indexed).

	2) Spectral features extraction of PCG signals.	FS1802	Systems/DSP	
Dr. Sainath Bitragunta	1)Nanosatellite optical wireless Intersatellite link/constellation design and analysis	FS1601	Basics of communication, networks, Ability to learn new simulation tools (eg. MATLAB, STK) CGPA > 7.5 (UG)	Journal (Scopus/SCI)/IEEE conference
	2) Energy harvesting(EH)/non- EH millimeter-wave cooperative communication system design and performance analysis	FS1602	Probability, random variables, random processes, digital communication, Ability to learn new simulation	Journal (Scopus/SCI)/IEEE conference
			tools eg. MATLAB, NetSim), CGPA > 8.0 (PG)	
	3) Energy-efficient cooperative optical/visible light wireless system design and performance analysis	FS1603	Probability, random variables, random Processes, digital communication, Ability to learn new simulation tools eg. MATLAB, NetSim), CGPA > 8.0 (PG)	Journal (Scopus/SCI)
	4) Simultaneous power and data transfer in energy harvesting cooperative system: novel protocol design and analysis.	FS1604	Probability, random variables, random processes, digital communication, information theory, Ability to learn new simulation tools eg. MATLAB, NetSim), CGPA > 8.0 (PG)	Journal (Scopus/SCI)/IEEE conference
	5) Optimal Full-Duplex relaying: protocol design and analysis	FS1605	Probability, random variables, random processes, digital communication, information theory, Ability to learn new simulation tools e.g., MATLAB, NetSim), CGPA > 8.0 (PG)	Journal (Scopus/SCI)/IEEE conference

	6) Energy efficient, interference-aware, Non-orthogonal multiple access protocol design and analysis	FS1606	Probability, random variables, random processes, digital communication, information theory, Ability to learn new simulation tools eg. MATLAB, NetSim), CGPA > 8.0 (PG)	Journal (Scopus/SCI)/IEEE conference
	7) Li-Fi design, application, and its implementation	FS1607	Communication system basics, optical communication in the wireless medium, simulation skills CGPA & gt; 7.5 (UG)	Journal (Scopus/SCI)/IEEE conference
Dr. Arnab Hazra	1) Study on Graphene Field Effect Transistors for Gas-sensing Application	FS1701	CGPA>8.0 Skill: Electronic Devices	Peer-Reviewed Journal Paper/ Conference Proceedings
	2) Study on Multilayer Graphene Nanoribbon for On-Chip Interconnects	FS1702		
Dr. Pawan K. Ajmera	1) Biomedical signals processing.	FS1901	CGPA > 8.0 Knowledge of Matlab and Signal processing	Journal paper (SCOPUS indexed) Prototype
	2) Application of Image processing in Biomedical.	FS1902		
	3) Study of Biometric system: Face recognition	FS1903		
	4) Study of Biometric system: Fingerprint recognition	FS1904		
	5) Study of Biometric system: Voice recognition	FS1905		
	6) Study of Biometric system: Iris recognition	FS1906		
	7) Study of Biometric system: Palm print recognition	FS1907		
	8) Biometric system: Face recognition	FS1908		
	9) Biometric system: Fingerprint recognition	FS1909		
	10) Biometric system: Voice recognition	FS1910		

	11) Biometric system: Iris recognition	FS1911		
	12) Biometric system: Palm print recognition	FS1912		
	13) Design of Multimodal Biometric system	FS1913		
	14) Design of Unimodal Biometric system	FS1914		
Mr. Devesh Samaiya	1) Design of display controller for LED matrix panels	FS3301	Experience in microcontroller programming and interfacing is a must	Working Prototype
	2) Foreground segmentation techniques in H.265/ HEVC compressed videos	FS3302	Basics of image and video processing	Publication
	3) Design of flash programmer shield for Arduino	FS3303	Hands on experience in PCB designing, Arduino and C++	
Mr. Ravi Babu Teja	1) CMOS IC Design through artificial intelligence	FS3401	Good knowledge of Neural networks and CMOS IC Design	Publication in a good Conference
	2) FPGA based implementation of RNS based DSP systems	FS3402	Knowledge of HDL, Digital Design	
	3) Organic Thin Film Transistors : Modeling of Threshold Voltage	FS3403	Good knowledge of electronic devices and MATLAB	
	4) Investigation of Design strategies for multi-gatetransistors	FS3403	Good understanding of Digital VLSI Design, SPICE	Publication in a good journal
Mr. Ankush Jahagirdar	1) On Model Predictive Controller (MPC) Tuning	FS3701	Good coding skills, exposure to MATLAB, good in Maths, Control Systems	Conference (IEEE or equivalent)
	2) On Simulation Study of Sliding Mode Control	FS3702	Good coding skills, exposure to MATLAB,	Conference (IEEE or equivalent)

			good in Maths, Control Systems	
	3) On Implementation of Fourier Neural Networks/ Wavelet Neural Networks	FS3703	Good coding skills, exposure to MATLAB, Python	Conference (IEEE or equivalent)
Mr. Harshavardhan S	1)Detecting ECG Heartbeat Abnormalities using Artificial Neural Networks	FS3501	CGPA > 8.0, Prior knowledge of Image processing and Matlab and Python (Neural Networks).	Publication in a IEEE conference.
	2) Efficient pedestrian detection in far IR night vision	FS3502	CGPA > 8.0, Prior knowledge of Image processing and Matlab and Python (Neural Networks).	Publication in a IEEE conference.
Dr. Ashish Patel	1) Study on control of solar PV integrated Active Power Filters	FS3601	CGPA>8.0, Control Systems, Power Electronics, Matlab/SimulinK	Good quality journal paper (SCOPUS indexed)
	2) FPGA based control of power electronic coverters	FS3602	CGPA>7.0, Control Systems, Power Electronics, FPGA programming	Laboratory prototype
Dr. Puneet Mishra	1) Efficient implementation of Fractional order operators.	FS2401	CGPA > 8.5, Prior knowledge of digital signal processing, proficiency in MATLAB or LabVIEW, good in data acquisition basics	Quality Publication in an SCI or / SCOPUS index journal
	2) Design of bio-mimicry based global optimization algorithms	FS2402	CGPA > 8.0, Prior knowledge of MATLAB or LabVIEW	Publication in a reputed conference etc or in a SCOPUS indexed journal
	3) Development of adaptive intelligent control scheme/s for control applications	FS2403	CGPA > 9.0, Prior knowledge of Control systems, process control and instrumentation, and proficiency in MATLAB or LabVIEW	

Dr. Sujan Yenuganti	1) Acquisition of biomedical signals (ECG, BP etc)	FS2501	CGPA > 7.0, Prior knowledge of electronic circuits	Working prototype
	2) Design and simulation of a micro piezoelectric glucose sensor	FS2502	CGPA > 7.0, Prior knowledge of MEMS	Publication in a IEEE conference etc.
Dr. Syed Mohammad Zafaruddin	1) Deep learning for massive MIMO channels	FS2701	Knowledge of MIMO and Matrix Theory	Software development/Prototype/Publications in peer reviewed journals and conferences
	2) Self-interference cancellation in full duplex communications	FS2702	Hardware specification of Communication Systems	
	3) Impulse noise mitigation in multi-carrier communications	FS2703	Exposure to measurement using Function Generators and Network Analyser	
	4) Massive MIMO channel estimation and calibrations	FS2704	Understanding of MIMO Systems	
Dr. Vinay Chamola	1) IoT security	FS2301	Must had informally worked under me for a semester	Publication (journal / conference)
	2) ML based BCI controlled humanoid design	FS2302	Must had informally worked under me for a semester (/ having strong prior background knowledge in areas of ML, humanoid control and BCI)	Hardware implemenation / publication in journal / conference
	3) Resource planning & management for 5G cellular networks	FS2303	Must have informally worked under me for a semester	Publication (journal / conference)
Dr. Meetha. V. Shenoy	1) Model-based approach for prototyping of embedded system (Apply the technique for prototyping a given embedded system on GPU or microcontroller, application- to be finalized after discussion)	FS2801	MATLAB Programming. Familiarity with the programming of microcontrollers	Working Prototype for a given application, Publication if substantial results are achieved

	2) Sensor fusion based positioning for robotic applications	FS2802	Experience in C/C++. Familiarity with the programming of microcontrollers & sensor interfacing, Preference for students who have experience in 3d-printing	Hands on experience in sensor fusion. Proof of concept via simulation and partial Prototyping. Publication if substantial results are achieved
	3) Image fusion based on Machine learning for robotic applications	FS2803	Experience in C/C++ or Python Programming. Preference for students who have worked on image processing	Hands on experience in computer vision problems. Proof of concept via simulation or Prototyping. Publication if substantial results are achieved
	4) Development of an IoT system for a given application (application will be finalized after discussion- Focus on Edge Vs cloud computing & real-time performance analysis)	FS2804	Experience in C/C++ or Python Programming. Familiarity with the programming of microcontrollers & sensor interfacing	Proof of concept via simulation and partial Prototyping, Publication if substantial results are achieved
	5) Implementation of an Artificial neural network on Zynq 7000-SoC	FS2805	Experience in either C/C++ or Verilog/VHDL programming	Prototype. Publication if substantial results are achieved
Dr. B.K. Mukherjee	1) Nonlinear Control for Autonomous Maneuvering of Fighter Aircraft	FS2601	Keen interest in Control Systems MATLAB Proficiency Willingness to work hard	Standard Conference Publication
	2. On Type-2 Fuzzy Control Applied to Some Flight Control Problem	FS2602		
Dr. Pankaj Arora	1)Design of periodic nano-structures for optical sensor	FS3001	Prior knowledge of Matlab software, Basic knowledge of Electromagnetic waves theory	Publication/Conference
	2)Paper based microfluidic devices	FS3002	N/A	Conference proceeding

	3)Development of Perovskite based solar cells	FS3003	Good understanding of Electronics Devices, Good skills in Matlab software	Publication/Confere nce
Dr. Nitin Chaturvedi	1) Design of Nonvolatile SRAM cell for storing multiple bits for runtime context switching for IoT	FS2001	Good Knowledge of Digital VLSI Design, SPICE, CGPA > 7.5	Good quality conference/journal paper(SCOPUS indexed)
	2) Design of Self-Resetting Latches for Asynchronous MicroPipelines	FS2002		
	3) Study/Design and analysis of high speed asynchronous write circuit for non-volatile memory and logic	FS2003		
	4) Study and analysis on the potentials of FinFETs for Asynchronous Circuit Design	FS2004		
	5) Design and analysis of reconfigurable cache architecture and cache coherence protocols	FS2005		
	6) Study/Design of GaN HEMT Device for biosensing applications Study/Design of GaN HEMT	FS2006		
	7) Device for high voltage applications	FS2007		