



Birla Institute of Technology & Science, Pilani

Pilani Campus

Department of Electrical and Electronics Engineering

PROJECTS AVAILABLE FOR SEMESTER II (2018-2019) (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	2018SS0101	Related courses/electives done (preferably in 3 rd 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)	2018SS0101		
Prof. Navneet Gupta	1) Short Channel Effects modeling in Junctionless nanowire transistors (JNT)	2018SS0601	Knowledge of Electronic Devices	Good Quality Research paper for all topics
	2) Field Effect Mobility Model in Organic Thin Film Transistors (OTFT).	2018SS0602	Knowledge of Electronic Devices	
	3) Quantum Capacitance modeling of Carbon nanotube Field-Effect Transistors (CNFET)	2018SS0603	Knowledge of Electronic Devices	
Prof. Chandra Shekhar	1) VLSI architecture for high performance real-time applications (students can approach and discuss)	2018SS0201	Computer Architecture/ VLSI Architecture	
	2) VLSI Architecture (students can approach and discuss specific problem statement)	2018SS0202		
	3) Advance computing architectural techniques (students can approach and discuss specific problem statement)	2018SS0203		
	4) RF Microelectronics (students can approach and discuss specific problem statement)	2018SS0204		

Prof. Anu Gupta	1) Design and analysis of enhanced linearity Analog System	2018SS0301	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	2018SS0302	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	2018SS0303	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	2018SS0304	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.	2018SS0305	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 nanometer range	2018SS0306		Good quality conference, journal paper (SCOPUS , SCI Indexed)
	7) Study, analysis and design of high performance MOS switch	2018SS0307		
	8) Study, analysis and design of high performance self cascode MOSFET structure	2018SS0308		
	9) ////Analog Design//// (To Be Discussed)	2018SS0309 - 2018SS0311		
	10) Design of an IOT system for smart project management	2018SS0312		
Prof. H. D. Mathur	1) Implications of Vehicle to Grid, in microgrid scenario. IoT application in smart grid scenario.	2018SS0801	Commitment (Mandatory) and Well versed with MATLAB/Simulink, particularly Simpowersystem toolbox, Communication	Quality journal publication/ Prototype for design project
	2) Smart Integration of Renewable sources of Energy	2018SS0802	Understanding of DSP will have an added advantage (but not necessary).	

Prof. Hari Om Bansal	1) Study on Charging infrastructure for PHEVs	2018SS0701	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	2018SS0702		
	3) Design and development of Vehicle to Grid Technologies	2018SS0703		
	4) Development of Maximum power point tracking (MPPT) Algorithms for PV systems	2018SS0704		
	5) Integration and control of hybrid renewable energy system	2018SS0705		
	6) Design and Development of Bidirectional Converters for Hybrid Vehicle applications	2018SS0706		
	7) Control and balancing of Bots/Manipulators	2018SS0707		
	8).Development of a hybrid energy storage system for HEV applications	2018SS0708	Electrical Sc, Control Systems, Power Electronics	Good quality journal (SCOPUS indexed)/Conference paper).
Dr. K. K. Gupta	1) Water Quality Assessment	2018SS1001	CGPA > 8.0 Knowledge of Signal Processing; Image processing	Publication in a standard IEEE conference
	2) Smart Water Grid	2018SS1002		
	3) Bearing Health Monitoring	2018SS1003		
	4) Multimodal Biometric Techniques using thermal and visible Facial Images	2018SS1004		
	5) Compressed Domain Video Analysis	2018SS1005		
	6) Structural Health Monitoring	2018SS1006		
Dr. Rajneesh Kumar	1) Development of intellectual Energy concept for AI training	2018SS1201	CGPA > 8.5, Prior knowledge of AI Techniques	Publication in SCI index journal
	2) Development of smart power electronics systems	2018SS1202	CGPA > 8.5, prior knowledge of power electronics and control systems	Working prototype
	3) Development of optimal mesh network architecture for Internet of Photovoltaics (IoPV)	2018SS1203	CGPA > 8.5, prior knowledge of communication systems	Publication in a IEEE conference etc.
Dr. Rahul Singhal	1) Infrared Communications in Free Space	2018SS1501	CGPA \geq 7.0	Simulation Schematic & National/International Conference Paper
	2) Patch Antenna Design and Analysis	2018SS1502		
	3) Passive/Active Photonic Device Design and Analysis	2018SS1503		

Dr. Praveen Kumar A.V.	1) Microwave resonator based position sensor – development of the principle	2018SS1301	Good at RF & Microwave engineering, Use of HFSS or CST, Experimental methods CGPA > 7.5	SCI/SCOPUS indexed research publication The project is complete only when the student fulfills all the terms and conditions agreed at the time of joining the project. Issue of reference letter, project completion letter etc will depend on the above Interested and eligible students may meet with the IC to get a detailed idea on the project.
	2) Reliability studies on the waveguide based material characterization techniques	2018SS1302	Good in experimental and analytical methods, CGPA > 7.5	
	3) Frequency and time domain analysis of slot antennas	2018SS1303	Background of Antenna theory, Use of HFSS or CST CGPA > 7.5	
	4) Study on the challenges in fabrication and measurement of low profile antennas	2018SS1304	Background of Antenna theory , Use of HFSS or CST CGPA > 7.5	
	5) Computation of radiation pattern of low profile antennas	2018SS1305	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	2018SS1801	CGPA > 8.5 MATLAB Signals and Systems/DSP	Publication in signal processing conference (SCI-Indexed).
	2) Spectral features extraction of PCG signals.	2018SS1802		
Dr. Sainath Bitragunta	1) Nanosatellite optical wireless intersatellite link/constellation design and analysis	2018SS1601	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	2018SS1602	Probability, random variables, random processes, digital communication, Ability to learn new simulation tools	Journal (Scopus/SCI)/IEEE conference

			eg. MATLAB, NetSim), CGPA > 8.0 (PG)	
	3) Energy efficient cooperative optical/visible light wireless system design and performance analysis	2018SS1603	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.	2018SS1604	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	2018SS1605	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	2018SS1606	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	2018SS1607	Communication system basics, optical communication in wireless medium, simulation skills CGPA > 7.5 (UG)	Journal (Scopus/SCI)/IEEE conference
Dr. ARNAB HAZRA	1) Study on Graphene Field Effect Transistors for Gas-sensing Application	2018SS1701	CGPA>8.0	Peer Reviewed Journal Paper/Conference

			Skill: Electronic Devices	Proceedings
	2) Study on Multilayer Graphene Nanoribbon for On-Chip Interconnects	2018SS1702		
Dr. Pawan K. Ajmera	1) Biomedical signals processing.	2018SS1901	CGPA > 8.0	Journal paper (SCOPUS indexed) Prototype
	2) Application of Image processing in Biomedical.	2018SS1902	Knowledge of Matlab and Signal processing	
	3) Study of Biometric system: Face recognition	2018SS1903		
	4) Study of Biometric system: Fingerprint recognition	2018SS1904		
	5) Study of Biometric system: Voice recognition	2018SS1905		
	6) Study of Biometric system: Iris recognition	2018SS1906		
	7) Study of Biometric system: Palm print recognition	2018SS1907		
	8) Biometric system: Face recognition	2018SS1908		
	9) Biometric system: Fingerprint recognition	2018SS1909		
	10) Biometric system: Voice recognition	2018SS1910		
	11) Biometric system: Iris recognition	2018SS1911		
	12) Biometric system: Palm print recognition	2018SS1912		
	13) Design of Multimodal Biometric system	2018SS1913		
	14) Design of Unimodal Biometric system	2018SS1914		
Dr. Mahesh Angira	1) Study on RF MEMS technology based phase shifter.(STUDY PROJECT)	2018SS2201	CGPA > 8	Knowledge of a new technology Good quality journal paper (SCOPUS indexed)/ Knowledge of new technology
	2) Study of contact materials for Ohmic RF MEMS Switches. (STUDY PROJECT)	2018SS2202		
	3) Study of resonator and filters using RF- MEMS technology. (STUDY PROJECT)	2018SS2203		
	4) Study of RF MEMS Technology based shunt capacitive switches. (STUDY PROJECT)	2018SS2204	CGPA > 8	
	5) Design of Reconfigurable antenna using RF- MEMS Switches. (DESIGN PROJECT)	2018SS2205		
	6) Design of Mutli-Port switches (capacitive/ohmic) using RF	2018SS2206		

	MEMS technology. (DESIGN PROJECT)			
	7) Design of RF MEMS technology based shunt capacitive switches.(DESIGN PROJECT)	2018SS2207		
	8) RF MEMS technology based phase shifter. (RP)	2018SS2208	CGPA > 8 Knowledge of Microwave and MEMS Technology	Good quality journal paper (SCOPUS indexed)/ Knowledge of a new technology
	9) Design of Reconfigurable antenna using RF – MEMS Switches.(RP)	2018SS2209		
Mr. Kavindra Kandpal	1) Compact modelling of oxide thin film transistor for display applications.	2018SS3201	SPICE, MATLAB, Electronic devices,	SCI Journals/ SCOPUS indexed conferences.
	2). Gate dielectric material selection for SnO ₂ / In ₂ O ₃ thin film transistor./ compound semiconductors for potential application in power electronics	2018SS3202	Electronic Devices	
	3) Design and implementation of CMOS demodulators in UMC 90 nm CMOS Technology	2018SS3203	ADVD/ Cadence/ Digital Communication	
	4) Design of Low Noise amplifier	2018SS3204	ADVD/ Cadence/ Analog Design/ RF Microelectronics	
	5) CMOS Analog IC design using UMC 90 nm Technology (topics will be discussed with students), Dynamic Comparators.	2018SS3205	Cadence EDA tool, ADV D, strong motivation for analog profile	
	6) SPICE modelling of oxide TFT and design of pixel driving circuitry.	2018SS3206	Microelectronics/ interest in display electronics	
Mr. Devesh Samaiya	1) Design of display controller for LED matrix panels	2018SS3301	Experience in microcontroller programming and interfacing is a must	Working Prototype
	2) Foreground segmentation techniques in H.265/ HEVC compressed videos	2018SS3302	Basics of image and video processing	Publication
	3) Design of flash programmer shield for Arduino	2018SS3303	Hands on experience in PCB designing, Arduino and C++	
Mr. K. Babu Ravi Teja	1) FPGA based implementation of RNS based DSP systems	2018SS3401	Knowledge of HDL, Digital Design	Publication in a good Conference
	2) CMOS IC Design through artificial intelligence	2018SS3402	Good knowledge of Neural networks and CMOS IC Design	

	3) Organic Thin Film Transistors : Modeling of Threshold Voltage	2018SS3403	Good knowledge of electronic devices and MATLAB	
	4) Investigation of Design strategies for multi-gate-transistors	2018SS3403	Good understanding of Digital VLSI Design, SPICE	Publication in a good journal
Mr. Ankush Jahagirdar	1) On Model Predictive Controller (MPC) Tuning	2018SS3701	Good coding skills, exposure to MATLAB, good in Maths, Control Systems	Conference (IEEE or equivalent)
	2) On Simulation Study of Sliding Mode Control	2018SS3702	Good coding skills, exposure to MATLAB, good in Maths, Control Systems	Conference (IEEE or equivalent)
	3) On Implementation of Fourier Neural Networks/ Wavelet Neural Networks	2018SS3703	Good coding skills, exposure to MATLAB, Python	Conference (IEEE or equivalent)
Mr. Harshavardhan S	1) Real time Image processing applications.	2018SS3501	CGPA > 8.0, Prior knowledge of Image processing and Matlab and Python (Neural Networks)	Publication in a IEEE conference.
	2) Classification using deep learning neural networks for brain tumors	2018SS3502		
	3) Independent component analysis-based SSVEP detection	2018SS3503		
Mr. Ashish Patel	1) Study on control of solar PV integrated Active Power Filters	2018SS3601	CGPA>8.0, Control Systems, Power Electronics, Matlab/Simulink	Good quality journal paper (SCOPUS indexed)
	2) FPGA based control of power electronic converters	2018SS3602	CGPA>7.0, Control Systems, Power Electronics, FPGA programming	Laboratory prototype
Dr. Puneet Mishra	1) Efficient implementation of Fractional order operators.	2018SS2401	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	2018SS2402	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	2018SS2403	CGPA > 9.0, Prior knowledge of Control systems, process control and instrumentation, and proficiency in MATLAB or LabVIEW	

Dr. Sujan Yenuganti	1) Piezoelectric Energy harvesting	2018SS2501	CGPA > 8.0, Prior knowledge of piezoelectric basics, mechanical structures and vibration based energy harvesting	Publication in IEEE conference
	2) Design and development of Resonance based sensors	2018SS2502	CGPA > 8.0, Prior knowledge of piezoelectric basics and mechanical structures	Working prototype
Dr. Syed Mohammad Zafaruddin	1) Deep learning for massive MIMO channels	2018SS2701	Knowledge of MIMO and Matrix Theory	Software development/Prototype/Publications in peer reviewed journals and conferences
	2) Self-interference cancellation in full duplex communications	2018SS2702	Hardware specification of Communication Systems	
	3) Impulse noise mitigation in multi-carrier communications	2018SS2703	Exposure to measurement using Function Generators and Network Analyser	
	4) Massive MIMO channel estimation and calibrations	2018SS2704	Understanding of MIMO Systems	
Dr. Vinay Chamola	1) IoT security	2018SS2301	CGPA > 9 (or must have worked with me on the project informally for one semester)	Prototype implementation & Publication in SCI Journal
	2) Brain Computer Interface controlled humanoid	2018SS2302		
	3) V2G network implementation	2018SS2303		
	4) Unmanned drone systems	2018SS2304		
	5) Resource management for 5G cellular networks	2018SS2305		Algorithm development & Publication in SCI Journal
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)	2018SS2801	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	2018SS2802	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	2018SS2803	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)	2018SS2804	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	2018SS2805	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	2018SS2601	Keen interest in Control Systems MATLAB Proficiency	Standard Conference Publication
	2. On Type-2 Fuzzy Control Applied to Some Flight Control Problem	2018SS2602	Willingness to work hard	
Dr Rupam Goswami	1)Development of window functions and mathematical modeling of organic memristors.	2018SS2901	CGPA > 8.0, Prior knowledge of electronic devices, MATLAB	Publication in a Conference/Journal as per work output + GUI Framework using preferably MATLAB which can be applied for Copyrights under India Copyrights Act
	2) Design of an offline random number generator based on image database and manipulation	2018SS2902	CGPA>7.0, Knowledge of MATLAB, basics of 2D images	Working soft prototype for industrial demonstration Publication in a

				Clarivate Analytics indexed journal
Dr Pankaj Arora	1)Design of periodic nano-structures for optical sensor	2018SS3001	Prior knowledge of Matlab software, Basic knowledge of Electromagnetic waves theory	Publication/Conference
	2)Paper based microfluidic devices	2018SS3002	N/A	Conference proceeding
	3)Development of Perovskite based solar cells	2018SS3003	Good understanding of Electronics Devices, Good skills in Matlab software	Publication/Conference
Dr. Nitin Chaturvedi	1) Design of Nonvolatile SRAM cell for storing multiple bits for runtime context switching for IoT	2018SS2001	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 Micro-Pipelines	2018SS2002		
	3) Study/Design and analysis of high speed asynchronous write circuit for non-volatile memory and logic	2018SS2003		
	4) Study and analysis on the potentials of FinFETs for Asynchronous Circuit Design	2018SS2004		
	5) Design and analysis of reconfigurable cache architecture and cache coherence protocols	2018SS2005		
	6) Study/Design of GaN HEMT Device for biosensing applications Study/Design of GaN HEMT	2018SS2006		
	7) Device for high voltage applications	2018SS2007		