

Outcome Based Education (OBE)

BOOKLET FOR

B.Tech (Electronics) Program **2018**

ELECTRONICS ENGINEERING DEPARTMENT

Birla Vishvakarma Mahavidyalaya

(Autonomous Engineering College)

Vallabh Vidyanagar, Gujarat, India

BIRLA VISHVAKARMA MAHAVIDYALAYA (AUTONOMOUS ENGINEERING COLLEGE)

ABOUT BVM:

BVM is premier institution in the field of technical education established in 1948 and is managed by Chartuar Vidya Mandal. The motto of the institute is “Work is worship”. More than 20000 engineers have graduated from this college and around a third of them are working aboard.

VISION OF INSTITUTE:

“Produce globally employable innovative engineers with core values”

MISSION OF INSTITUTE:

- Re-engineer curricula to meet global employment requirements.
- Promote innovative practices at all levels.
- Imbibe core values.
- Reform policies, systems and processes at all levels.
- Develop faculty and staff members to meet the challenges.

AFFILIATIONS OF THE COLLEGE:

- Bombay University: June 1948 - May 1951
- Gujarat University: June 1951 - May 1957
- Sardar Vallabhbhai Vidyapeeth: June 1957 to June 2008
(Re-named as Sardar Patel University in 1966)
- Gujarat Technological University: June 2008 Onwards
- First Autonomous Institute of Gujarat since June 2015

UNDER GRADUATE PROGRAMS:

Sr. No	Branch	Seats
01	Civil Engineering	120
02	Computer Engineering	60
03	Electrical Engineering	60
04	Electronics Engineering	75
05	Mechanical Engineering	90
06	Production Engineering	30
Total		435
07	Mechanical Engineering (SF)	30

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08	Production Engineering (SF)	30
09	Information Technology (SF)	60
10	Electronics & Telecommunication (SF)	60
11	P.D.D.C (Mechanical) - Part Time	30
Total		645

POST GRADUATE PROGRAM (SF)

Sr. No.	Branch	Seats
01	M. Tech Structural Engineering	18
02	M. Tech Computer Engineering	25
03	M. Tech Construction Engineering & Management	18
04	M. Tech Environmental Engineering	18
05	M. Tech Machine Design	18
06	M.Tech Transportation System Engineering	18
07	M. Tech Power System Engineering	18
08	M. Tech Infrastructure Engineering & Technology	18
Total		151

ABOUT OUTCOME BASED EDUCATION:

Globalization has brought in a clear shift from education as transmission of expert knowledge to education as building learner competencies which includes learning to learn and lifelong learning. Preparing global engineers who will be required to shoulder unforeseen challenges. Outcome based education (OBE) is student centred instruction that focuses on measuring student performance i.e. outcomes. Outcomes include knowledge, skills, and attributes suggested by National Board of Accreditation.

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ELECTRONICS ENGINEERING DEPARTMENT

VISION

“Produce globally employable innovative electronics engineers with core values”

MISSION

1. Promote Innovative Practices to strengthen teaching and learning process in electronics engineering
2. Develop faculty and staff to meet challenges in Electronics engineering
3. Adapt Engineering curricula to meet global requirements for Electronics engineering programme
4. Reform policies, systems and processes at all levels
5. Imbibe core Values.

ABOUT ELECTRONICS ENGINEERING DEPARTMENT:

Electronics Engineering Department offers B. Tech program and senior faculty members are also guiding Ph. D. candidates registered in various universities. The department has highly qualified, well experienced and dedicated faculty members. The department is equipped with advanced instruments and equipment's for research facilities. Experts from leading industries and educational institutes are invited frequently for guest lectures on recent developments for the benefit of student and faculty. The department is organizing various training programs in thrust areas for students, faculty and industrial personnel. It has signed MoU with various industrial and research agencies under the auspices of Industry Institution Interaction initiative. The graduates of this department are well placed in national and multinational companies in the core, IT and services sectors and academic institutions.

FACULTY DETAILS:

Sr. No.	Staff Member	Present Post	Date of Joining	Qualifications	Area of Specialization / Interest
1	Prof. T. D. Pawar	Professor & Head	24-11-1997	B.E., M. Tech, Ph. D	Signal Processing and Communication Engg.
2	Prof. D. M. Patel	Professor	24-11-1997	B.E., M. Tech, Ph. D	Embedded and IoT Systems, Control and Automation
3	Prof. D. L. Vala	Asso. Professor	18-04-2006	B.E., M.E., Ph. D	Signal Processing and Microwave Commu.
4	Prof. J. M. Rathod	Asso. Professor	04-12-1997	B.E., M.E., Ph. D	RF Comm. and Antenna Design

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Sr. No.	Staff Member	Present Post	Date of Joining	Qualifications	Area of Specialization / Interest
5	Prof. A. A. Daiya	Asso. Professor	17-12-1990	B.E., M.E.	Power Electronics and Integrated Circuits
6	Prof. (Ms). M. S. Holia	Asstt. Professor	01-08-2002	B.E., M.E., Ph. D	Signal Processing and Embedded Systems
7	Prof. (Ms). K. D. Patel	Asstt. Professor	01-08-2002	B.E., M.E., Ph. D	Computer Networks, Control and Automation
8	Prof. M.M. Khambalkar	Asstt. Professor	21-06-2004	B.E., M.E.	Biomed. Signal Processing and Communication Engg.
9	Prof. (Ms) P.H. Panchal	Asstt. Professor	16-01-2006	B.E., M.E., (Ph. D Pursuing)	Biomedical and Instrumentation and Embedded Systems
10	Prof. M. M. Solanki	Asstt. Professor	19-01-2006	B.E., M.E., (Ph. D Thesis submitted)	Wireless Communication, Control and Automation
11	Prof. M. P. Prajapati	Asstt. Professor	17-03-2006	B.E., M.E.	Electronics Communication Engg.
12	Prof. C. S. Patel	Asstt. Professor	22-07-2010	B.E., M. Tech.	VLSI Technology
13	Prof. C. J. Jayaswal	Asstt. Professor	03-09-2010	B.E., M. Tech.	Electronics Communication Engg.
14	Prof. N. R. Ada	Asstt. Professor	01-10-2010	B.E., M.E.	RF Comm. and Antenna Design
15	Prof. (Ms.) A. N. Bhatt	Asstt. Professor	01-07-2014	B.E., M. Tech.	VLSI Technology
16	Mr. H. C. Patel	Lab. Asstt.	11-12-1991	D.E. (Electrical)	-
17	Mr. H. J. Sevak	Instru. Mech.	01-01-1993	I.T.I.	-

Outcome Based Education (OBE)**PROGRAM EDUCATIONAL OBJECTIVES (PEOs)**

1. Study and analysis of Electronics engineering systems.
2. Adapt state-of-art developments in Electronics engineering and eco-friendly technologies.
3. Design and develop Electronic hardware and software based applications.

PROGRAM OUTCOMES (PO)

PO	Title	Program Outcome
1	Engineering knowledge:	Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2	Problem analysis:	Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3	Design/development of solutions:	Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4	Conduct investigations of complex problems:	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5	Modern tool usage:	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6	The engineer and society:	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7	Environment and sustainability:	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO	Title	Program Outcome
8	Ethics:	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9	Individual and team work:	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10	Communication:	Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11	Project management and finance:	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12	Life-long learning:	Recognize the need for, and have the preparation and ability to engage in Independent and life-long learning in the broadest context of technological change.

LIST OF EQUIPMENT

Sr. No.	Name of Equipment	Model No.	Maker	Qty. (Units)	Source
1	RF Signal Generator: 9KHz- 3GHz	N9310A	Agilent	01	TEQIP-II
2	Spectrum Analyzer: 9KHz- 3GHz	N9000A503	Agilent	01	TEQIP-II
3	Scalar Network Analyzer: 400KHz - 2.5GHz	SNA 2550	Elad	01	TEQIP-II
4	Vector Network Analyzer (VNA), 9KHz - 15GHz	MS 2037C	Anritsu	01	TEQIP-II
5	DSO: 200MHz, 2 Channel	DSOx 2022A	Agilent/ Keysight	12	TEQIP-II
6	DSO: 50MHz, 2 Channel	1052B	Agilent/ Keysight	12	TEQIP-II

Outcome Based Education (OBE)

Sr. No.	Name of Equipment	Model No.	Maker	Qty. (Units)	Source
7	Arbitrary Function Generator, 25 MHz	AFG 1022	Tektronics	06	TEQIP-II
8	Desktop Computers	Veriton - M200	Acer - i5 OS Windows 8.1	20	TEQIP-II
9	Desktop Computers	Veriton	Acer - i5 OS Windows 10	15	CVM
10	Software Define Radio	FMCOM3	Analog Device	1	GUJCOST

LIST OF COURSE SOFTWARE

Sr. No.	Name of Software	Make	Qty. (Units)	Source
1	Proteus VSM	Lab Center Electronics	10 User	TEQIP-II
2	MATLAB-2017b	Mathworks Inc.	100 User Inst. level	TEQIP-II
3	HFSS-17	Ansys	05 User	TEQIP-II
4	Xilinx- Vivado	Xilinx	25 User	TEQIP-II

PROGRAM SPECIFIC OUTCOMES

Sr. No	Short name	Program Outcome
PSO1	Analysis and Evaluation Of electronic circuits	Analyse electronic circuits and performance evaluation of electronics system.
PSO2	Design for problems	Design analogue and digital circuits using relevant software and hardware for various applications In electronics domain.
PSO3	Design of electronics systems	Demonstrate the skills to design electronics systems.

COURSE OUTCOME

Subject Code	Subject Name	Course Outcomes
SEMESTER-1		
CC101	Calculus	Acquire knowledge of advanced differential calculus for single variable and their applications
		Get acquainted with the knowledge of functions of several variables.
		Apply knowledge of differential and integral calculus of several variables for engineering applications.
CC111	Basic Civil Engineering and Environmental Studies	Carry out linear, angular & levelling measurements using survey methods.
		Acquainted to common building materials, components & simple building drawing.
		Gain knowledge of the different transportation modes and their elements.
		Recognize importance of Natural Resources.
		Impact assessment of various pollution and remedial measures.
CC122	Computer Workshop	Understand basics of computer hardware.
		Install operating systems, drivers related to hardware and other software.
		Configure operating system for effective management of resources.
		Manage security related basic problem using anti-virus software.
		Create reports, presentation, and spread sheets.
		Work with various tools for collaboration and website creation.
CC143	Engineering Physics	Apply the Basic Laws of Physics in Quantum Mechanics, to understand the concepts of wave particle duality, black body Radiation De-Broglie's hypothesis and uncertainty Principle.
		Understand the working principle of a Laser and Optical Fibre communication, their components, working of different Laser systems and their engineering applications

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Subject Code	Subject Name	Course Outcomes
		Apprise observation, experiment and theory work together to continue to expand the frontiers of knowledge of the Engineering Physics in the field of superconductivity
		Understand the basics of Acoustics and Ultrasonic and their applications
		Understand basic concepts of Nanophysics and their various applications.
CC152	Elements of Mechanical Engineering	Use the concepts of units, systems (open, closed systems and control volumes) and its boundaries, properties, state, process, cycle, quasi-static process in context of energy conversion.
		Assess thermodynamic properties of gases and steam, and apply it to systems of relevance.
		Interpret the fundamentals of I C engine and air compressors.
		Interpret the fundamentals of pumps, refrigerators and air-conditioners.
		Identify the transmission systems and its components.
CC171	Communication Skills	Acquire Presentation skills and Group Discussion skills
		Acquire knowledge of communication and its components
		Improve language skills -LSRW
		Develop basic and intermediate competency in English language
		Overcome communication phobia in English
SEMESTER-2		
CC102	Vector Calculus and Linear Algebra	Solve system of linear equations using different tools of linear algebra for the problems
		Use Eigen values and Eigen vector in different subjects of engineering like control theory, vibration analysis, electric circuits, advanced dynamics and quantum mechanics.

Subject Code	Subject Name	Course Outcomes
		Apply vectors in higher dimensional space in experimental data, storage and warehousing,
CC121	Computer Programming	Explain different features (keywords, constructs, functions, pointers, etc...) of C programming language.
		Break-up a medium (or large) problem into smaller sub-problems to make it tractable for a possible solution through computer programming.
		Represent and communicate a conceived solution to a problem in a systematic way using the tools of algorithms and flow-charts
		Use different features of C programming language to develop a possible programming solution to a given problem in each domain
		Decipher a given C program of simple to moderate complexity and determine the output.
		Identify syntactical and semantic errors in given C program.
CC131	Basic electrical Technology	Assess the knowledge about the electric and magnetic circuits.
		Practice the fundamentals of AC supply systems and their applications.
		Interpret the working and applications of various electrical machines.
		Associate the knowledge about various measuring instruments and wiring system.
		Comprehend the advance subjects of electrical engineering.
CC141	Fundamentals of Electronics	Identify the applications and functions of electronics in Engineering.
		Acquire knowledge about semiconductor physics for intrinsic and extrinsic materials.
		Understand the basic of semiconductor diodes, BJTs and their small signal
		Analyse the performance of BJTs on the basic of their operation and working.

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Subject Code	Subject Name	Course Outcomes
CC142	Electronics workshop	Build a small electronic circuit.
		Identification and testing of basic electronics Components.
		Use of analogy and digital instruments for troubleshooting.
		Understand the operating function about basic instruments like CRO, Digital Storage Oscilloscope Power Supply, Function Generator and Digital Multi meter etc.
		Design and development of PCB and soldering of components.
CC151	Engineering Graphics	Interpret standard conventions used in engineering drawing and construction of plain and diagonal scales.
		Construct orthographic and isometric projections.
		Construct various engineering curves and identify its various applications.
		Construct projections of points and straight lines.
		Interpret different planes and solids and construct their projection.
		Create sections of solids and develop surfaces.
CC174	Value Education, Human Rights and Legislative Procedures	Inculcate the core Values of education
		Trigger their social behaviour and Personality
		Civilize in the societal settings
		Adopt moral behaviour and act accordingly.
SEMESTER-3		
MA201	Advanced Engineering Mathematics	Do expansion of functions in terms of basic trigonometric functions.
		Analyse differential equations.
		Solve differential equations by using tool like Laplace transform, Fourier series and series solution.
		Create a modelling of engineering problems.

Subject Code	Subject Name	Course Outcomes
EL201	Signals and Systems	Understand the analytical frame work, mathematical description and representation of Signals.
		Derive and examine a fundamental representation of LTI systems.
		Understand and analyse the representation of periodic signals in continuous and discrete time.
		Understand and analyse the representation of aperiodic signals in continuous and discrete time.
		Relate time-domain and frequency-domain characteristics of the LTI systems.
		Understand the concept of sampling of a signal and reconstruction of a signal from the samples.
		Understand the generalization of frequency representation of continuous time and discrete time systems.
		Understand the analytical frame work, mathematical description and representation of Signals.
EL202	Linear Circuit Analysis	Apply various circuit laws, theorems and analysis techniques.
		Analyse behaviour of passive circuits such as RC, RL and RLC.
		Apply Laplace Transform for circuit analysis.
		Analyse circuit in the S- Domain
		Study various two port networks.
EL203	Analog Electronics	Understand the basics of BJTs and MOS circuits.
		Analyse the multistage amplifiers and understand its frequency response.
		Analyse and Design the performance of negative feedback circuits and Oscillators.
		Understand the use of op-amp using MOS.
		Analyse the power amplifiers and wave shaping circuits.
EL204	Digital Electronics	Understand digital number systems and logic gates.
		Analyse logic function minimization.

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Subject Code	Subject Name	Course Outcomes
		Design combinational and sequential circuits. Design simple digital circuits using FSM. To study the functions of various digital integrated circuits and ADC, DAC. Simulate digital circuits using Hardware descriptive language.
MA202	Professional Soft Skills	Understand organizational structure. Promote professionalism. Enhance advanced level of communication with special focus on organizational structure. Enhance their presentations style and their ability to deal with the variety of organizational communication i.e. presentations, conferences, meetings, interviews and the other.
SEMESTER-4		
MA203	Engineering Economics and Management	Understand and apply the basics of economics and management to engineering areas. Understand and apply the basics of demand, demand forecasting, elasticity et al. to engineering projects. Apply the basics of project planning project evaluation break even depreciation and costing and et al to engineering. Understand product development product life cycle and its advantages to the organization. Understand quality concepts. Understand human resource development recruitment and training and its advantages to the organization.
EL205	Electromagnetic Field Theory	Understand and apply Maxwell's equations in governing electric and magnetic forces. Calculate line parameters, characteristic impedance and propagation constants for coaxial, two-wire, parallel plate and micro strip transmission lines. Apply vector calculus for solving electromagnetic problems of gradient, divergence and curl operations.

Subject Code	Subject Name	Course Outcomes
		<p>Understand Coulomb' and Gauss laws and apply them to electrostatic problems.</p> <p>Understand Biot-Savart and Ampere laws and apply them to magneto static problems.</p>
EL206	Control Systems	<p>Understanding of basic linear feedback principles and find out the transfer function using various methods.</p> <p>Able to represent Mathematical model for different physical system determine conditions that guarantee the linear system stability.</p> <p>Able to design system with controller to improve system transient and steady state response</p> <p>Able to sketch the static feedback root locus and determine the location of the closed-loop poles.</p> <p>Able to draw Nyquist plots, bode plots and find stability margins.</p> <p>Able to present and analyse linear control system using the state space technique</p>
EL207	Analog Communication	<p>Understand Basic Communication System and noise present in systems.</p> <p>Evaluate fundamental communication system factors, such as bandwidth, power and signal to quantization noise ratio.</p> <p>Able to describe classification of elementary signals and noise with different noise parameter like noise factor, noise temperature and noise bandwidth.</p> <p>Use Fourier transforms for frequency analysis of communication systems.</p> <p>Examine basic types of modulation scheme for analog communication (AM, FM, PM).</p>
EL208	Micro Controllers and Applications	<p>Explore Architecture and practice related to basic Microcontroller.</p> <p>Program the microprocessors and microcontrollers.</p> <p>Able to design Microcontrollers based systems.</p>

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Subject Code	Subject Name	Course Outcomes
		Use software tools to simulate and ability to analyse the peripherals interfacing Design of microcontroller based Systems, and use it in applications.
		Explore Architecture and practice related to basic Microcontroller.
		Program the microprocessors and microcontrollers.
EL209	Electronic Measurements and Instrumentation	Understand the terminology of instruments.
		Understand the sensors.
		Apply the transducers for various electronic applications.
		Able to apply signal conditioning for measurements.
		Explain various measurements techniques for industrial and laboratory applications of various transducers.
EL210	Electronic Design and Automated Tools	Use software tools like NGspice/LTSpice/Multisim/Orcad.
		Simulate various analog and digital circuits using NGspice/LTSpice/Multisim/Orcad.
		Design PCB for given circuit using PCB Software like EAGLE, Express PCB, OrCAD.
Subject Code	Subject Name	Course Outcomes
SEMESTER-5		
EL301	Digital Communication	Analyse different baseband modulation techniques like PCM, DM, ADM.
		Analyse the concept of ISI and reduction of ISI through Nyquist criteria.
		Compare various digital modulation-demodulation techniques
		Understand probability, random variable and various statistical analysis methods.
		Derive channel capacity for discrete memory less channel and continuous channel.
EL302	Analog Circuit Design	Understand basic characteristics of op-amp.
		Analyse the basic block diagram and datasheets for op-amp.

Subject Code	Subject Name	Course Outcomes
		<p>Design the op-amp's linear, non-linear circuits and active filters applications.</p> <p>Test and Analyse special purpose ICs and their application circuits.</p> <p>Understand basic characteristics of op-amp.</p>
EL303	Antenna and Wave Propagation	<p>Apply Antenna theory to design various antennas.</p> <p>Analyse and measure the fundamental antenna parameters.</p> <p>Design various antennas performance using Electromagnetic Simulators.</p> <p>Understand and analyse the operation of different types of antennas.</p>
EL304	Advanced Micro Controller	<p>Knowledge of Architecture and practice related to various Microcontrollers available in the market today.</p> <p>Understand and analyse the various design challenges and techniques for solution by Microcontrollers based designs.</p> <p>Use software tools to simulate and analyse the performance of Design of microcontroller based Systems, and use it in real time applications.</p> <p>Ability to identify, formulate and solve engineering problems related to Real time Electronics design solutions.</p>
EL305	Guided Research and Reading	<p>Guided research reading helps students to understand texts and to use a range of reading and thinking strategies on other texts.</p> <p>Assessment that emerges from the classroom rather than being imposed upon it is integral to guided reading.</p> <p>Guided reading requires that comprehension strategies be modelled by teachers and that students be encouraged to use them independently before, during, and after their reading of a text.</p>

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Subject Code	Subject Name	Course Outcomes
		Guided reading is much more than a set of activities to work through. An understanding of the theoretical underpinnings is essential.
EL351	Power Drivers Electronics and Drivers	Understand the power semiconductor devices.
		Design and analyse various SCR firing, commutation methods and Phase controlled rectifiers.
		Design and understand the operation of various industrial based power electronics circuits like inverters, choppers and Cycloconverters.
		Foster ability to understand the use of DC drives and AC drives in industrial applications.
EL352	Digital System Design	Understand Hardware Descriptive Language and different design methodology.
		Design Combinational and sequential circuits using HDL.
		Design synchronous circuits using FSM and analyse Asynchronous circuits and timing
SEMESTER-6		
EL306	VLSI Design	Understand VLSI design flow and different design methodology.
		Understand fabrication process of MOSFETs and CMOS.
		Understand MOS theory.
		Analyse the CMOS construction & its characteristics.
		Apply CMOS fundamentals to design CMOS based digital circuits.
EL307	Digital Signal Processing	Understands the fundamentals, implementations and application of DSP.
		Understand applications of z- transforms.
		Design the digital filters.
		Analysis of the frequency response of discrete-time signals and systems.

Subject Code	Subject Name	Course Outcomes
		<p>Develop programs using software tools for DSP algorithms.</p> <p>Understand the difference between fixed point and floating point digital signal processor and select them as per requirement of applications</p>
EL308	Microwave Engineering	<p>To understand TE, TM, TEM mode propagation, advantages and applications of microwaves.</p> <p>To understand, analyse and solve problems related microwave transmission line.</p> <p>To understand and analyse the concept of various active and passive microwave components for different applications.</p> <p>To understand the concept of various microwave tube devices.</p>
EL341	Mini Project	<p>Students will be able to practice acquired knowledge within the chosen area of technology for project development.</p> <p>Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach.</p> <p>Reproduce, improve and refine technical aspects for engineering projects.</p> <p>Work as an individual or in a team in development of technical projects.</p> <p>Communicate and report effectively project related activities and findings</p>
EL353	Digital Control System	<p>Understand the role of different types of digital PID controller and its realization in control system design.</p> <p>Understand the methodology of feedback control system and different types of stability analysis for them.</p> <p>Identify, formulate digital control system, and analyse optimal control system.</p> <p>Understand of digital control system and able to predict system behaviour.</p>

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Subject Code	Subject Name	Course Outcomes
EL354	Optical Fiber Communication	Understand the basic elements of optical fibre transmission link, fibre modes and structure configurations.
		Analyse the different kind of losses, signal distortion in optical wave guides.
		Design optical source materials, LED / Laser diodes structures and Transmission Systems.
		Analyse the fibre optical receiver operation and configuration.
EL371	Electronic Communication	Understand the basic concept Communication system.
		Analyse Digital communication systems.
		Use network fundamentals for LAN.
		Understand the Internet technologies it's security aspects.
		Analyse Cellular Technologies.
SEMESTER-7		
EL401	Wireless Communication	Understand the basics of Wireless Communication, Evolution and comparison.
		Understand the basic concepts of basic Cellular System, design requirements and basic Principles behind radio resource management techniques such as power control, channel allocation and handoffs.
		Gain insights into various mobile radio propagation models and how the diversity can be exploited to improve performance.
EL402	Embedded System Design	Knowledge of theory and practice related to Embedded System.
		Understand and analyse the Hardware techniques and Design of Software codes for Embedded Systems.
		Use software tools to simulate and analyse the performance of Embedded Systems and development of model for real time Application.

Subject Code	Subject Name	Course Outcomes
		<p>Ability to identify, formulate and solve engineering problems by using Embedded Systems.</p> <p>Ability to implement real field problem by gained knowledge of Embedded Systems</p>
EL431	Seminar	<p>Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the Electronics engineering practice.</p> <p>Understand the impact of the Electronics engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.</p> <p>Apply ethical principles and commit to professional ethics and responsibilities and norms of the Electronics engineering practice</p> <p>Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings</p>
EL451	Process Instrumentation & Control	<p>Identify, formulate and analyse complex process control system problems related to industrial automation.</p> <p>Understand the analytical frame work, description of actuators, final control elements and continuous and discrete control system.</p> <p>Design solutions for simple process problems and design small data acquisition system.</p> <p>Identify the need for the automation problems, and have the preparation and ability to engage independent and life-long learning in the broadest context of technological change.</p> <p>Identify, formulate and analyse complex process control system problems related to industrial automation.</p>

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Subject Code	Subject Name	Course Outcomes
EL452	Radar & Navigation Aids	Knowledge in the topics such as Fundamentals of Radar
		To become familiar with fundamentals of Different types of RADAR
		To gain in-depth knowledge about the different types of RADAR and their operations
		Understand signal detection in RADAR and various detection techniques
EL453	Data Communication & Networking	Apply the knowledge of communication techniques, medias and fundamentals of layer architecture to the solve computer networks' problems.
		Design solutions for different communication networks
		Analyse any system as layered architecture system.
		Able to choose appropriate protocol on each layer based on application demand.
EL454	Digital Image Processing	Understand the basic concepts of two-dimensional signal acquisition, Sampling, and quantization.
		Apply the knowledge of spatial filtering techniques and enhance image quality using image enhancement techniques.
		Understand the DFT and able to filter given image using frequency domain filtering technique.
		Apply the knowledge of Image restoration and reconstruction and select the right image restoration technique to remove degradation from given image
		Understand image segmentation, image compression and image morphological operations.
EL471	Microcontroller Based Electronics System	Understand the architecture of AVR 8-bit Microcontroller and importance and function of each pin of AVR ATmega32 Microcontroller.
		Write, debug and simulate embedded C language programs.

Subject Code	Subject Name	Course Outcomes
		<p>Understand Timer operation, Interrupt environment and Serial Communication and.</p> <p>Interface I/O peripherals like LCD, ADC, DAC devices with microcontroller</p>
SEMESTER-8		
EL441	Project	Apply the knowledge of electronics engineering to the solution of electronics engineering problems/project.
		Review research literature, and analyse complex engineering problems reaching substantiated conclusions.
		Use research-based knowledge and research methods, including design of experiments, analysis and interpretation of data to design electronic project.
		Apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to design electronics circuits using relevant software and hardware for embedded, IOT, signal processing and communication etc. based application.
		Understand the impact of the electronics engineering solutions to societal and environmental contexts, ethical principles and norms of the electronics engineering practice.
EL455	Antenna Design	Understanding basic antenna characteristics.
		Ability to select and justify an appropriate antenna for an engineering task.
		Ability to model/optimize the antenna using ANSOFT HFSS.
		Design and fabrication of antenna with optimization of results
		Understanding basic antenna characteristics.
EL456	Biomedical Instrumentation	To understand characterize anatomy and physiology of important physiological system of human body.
		To understand the Analyse and design of medical instruments (particularly electronics part) by evaluating medical parameter measurement constraint.

Outcome Based Education (OBE)

Subject Code	Subject Name	Course Outcomes
		To analyse important vital sign parameters to evaluate certain disease conditions.
		To Implementation of the electric safety of the medical instruments
EL457	Internet of Things	Knowledge of theory and practice related to IoT System.
		Understand and analyse the Hardware techniques and Design of Software codes for IoT Systems.
		Use software tools to simulate and analyse the performance of IoT Systems and development of model for real time Application.
		Ability to identify, formulate and solve engineering problems by using IoT Systems.
		Ability to implement real field problem by gained knowledge of IoT Systems.
EL458	Advance Microprocessor	Become familiar with the Intel 8086 microprocessor.
		Understand instruction set and programming of 8086.
		Learn Intel 80386, 80486, Pentium family.
		Understand Instruction Level Parallelism.
EL459	Satellite Communication	Understand principle, working and operation of various sub systems of satellite as well as the earth station.
		Apply various communication techniques for satellite applications.
		Analyse and design satellite communication link.
		Analyse Propagation Effects and their Impact on Satellite –Earth Links.
EL446	Industry Defined Project/Training	Apply the knowledge of electronics engineering to the solution of electronics engineering problems/project.
		Review research literature, and analyse complex engineering problems reaching substantiated conclusions.

Subject Code	Subject Name	Course Outcomes
		<p>Use research-based knowledge and research methods, including design of experiments, analysis and interpretation of data to design electronic project.</p> <p>Apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to design electronics circuits using relevant software and hardware for embedded, IOT, signal processing and communication etc. based application.</p> <p>Understand the impact of the electronics engineering solutions to societal and environmental contexts, ethical principles and norms of the electronics engineering practice.</p>

MAPPING OF COURSES WITH PO's

Subject Code	Subject Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
		Engineering knowledge	Problem Analysis	Design of solution	Conduct investigations of complex problems	Modern tool usage	The Engineer and Society	Environment and Stability	Ethics	Individual and Team Work	Communication	Project management and finance	Lifelong learning	Analysis and Evaluation of electronics circuits	Design for problem	Design of electronic System
SEMESTER-1																
CC101	Calculus	2.75	2.00	1.50	2.00	2.25	-	1.00	-	2.00	2.00	-	2.50	-	-	-
CC111	Basic Civil Engineering	2.33	1.83	2.16	2.33	2.00	2.00	1.67	2.00	2.33	2.16	2.00	2.16	-	-	-
CC122	Computer Workshop	1.00	1.17	1.00	1.00	2.00	1.33	1.00	2.00	1.17	2.00	1.00	2.00	-	-	-
CC143	Engineering Physics	2.17	1.50	1.40	1.00	-	1.67	1.67	-	-	-	-	1.00	-	-	-
CC152	Elements of Mechanical Engineering	3.00	1.60	1.00	-	-	-	-	-	-	-	-	-	-	-	-
CC171	Communication Skills	-	-	-	-	-	1.50	-	2.00	3.00	3.00	-	2.00	-	-	-
SEMESTER-2																
CC102	Vector Calculus and Linear Algebra	2.50	2.00	2.33	1.67	1.50	1.80	2.50	2.00	2.25	1.67	-	2.33	-	-	-
CC121	Computer Programming	2.33	2.17	2.17	1.00	1.83	-	1.50	2.00	1.50	1.33	1.17	1.13	-	-	-
CC131	Basic Electrical Technology	2.40	2.00	2.20	2.00	2.40	2.40	1.60	1.60	1.60	2.00	1.00	1.00	-	-	-
CC141	Fundamental of Electronics	3.00	2.00	-	-	1.00	-	-	-	-	-	-	-	-	-	-
CC142	Electronics Workshop	2.20	2.00	2.40	1.50	2.50	1.00	1.00	1.00	2.33	1.00	1.67	2.00	-	-	-

Subject Code	Subject Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CC151	Engineering Graphics	3.00	2.00	2.00	-	-	-	-	-	-	-	-	2.00	-	-	-
CC174	Value Education, Human Rights & Legislative Procedure	-	-	-	-	-	2.00	2.00	3.00	2.25	2.00	2.50	2.00	-	-	-
SEMESTER-3																
MA201	Advanced Engineering Mathematics	2.50	2.50	2.00	-	-	-	-	-	1.00	2.00	-	2.00	-	-	-
EL 201	Signals and Systems	3.00	2.43	2.00	1.00	2.00	-	1.00	1.00	2.00	-	-	3.00	2.33	1.14	-
EL 202	Linear Circuit Analysis	3.00	2.00	1.00	-	1.00	-	-	-	1.00	1.00	-	1.00	3.00	-	1.00
EL 203	Analog Electronics	2.60	1.60	2.00	1.60	1.00	-	-	-	1.00	-	1.00	1.60	1.00	1.00	2.00
EL204	Digital Electronics	1.67	3.00	2.17	1.00	2.00	-	-	-	-	-	-	-	1.33	2.33	2.00
MA202	Professional Soft Skills	-	-	1.00	-	-	2.00	1.33	2.25	2.75	3.00	1.67	2.25	-	-	-
SEMESTER-4																
MA203	Engineering Economics and Management	3.00	3.00	2.00	-	-	2.00	1.00	1.00	1.00	1.50	1.50	3.00	-	-	-
EL205	Electromagnetic Field Theory	1.60	3.00	3.00	2.60	2.50	-	-	-	3.00	-	-	-	-	-	-
EL206	Control Systems	2.67	1.67	2.00	1.40	2.00	1.00	1.00	3.00	3.00	3.00	1.00	3.00	1.00	1.00	1.00
EL207	Analog Communication	3.00	2.67	2.50	2.00	-	2.00	2.00	2.00	2.00	3.00	3.00	2.50	3.00	3.00	3.00
EL208	Microcontrollers and Applications	3.00	2.00	1.80	1.33	2.60	1.00	1.00	3.00	1.80	1.00	-	3.00	1.80	1.80	2.40
EL209	Electronics Measurements and Instrumentation	3.00	2.40	2.60	2.20	1.20	2.80	1.40	1.20	1.40	1.20	1.20	1.40	3.00	2.00	1.80
EL210	Electronics Design and Automation Tools	1.67	1.00	3.00	1.00	3.00	-	-	-	-	-	-	-	2.00	3.00	3.00
SEMESTER-5																
EL301	Digital Communications	3.00	1.67	1.80	1.00	2.00	-	-	1.00	1.00	-	-	3.00	1.00	1.00	-

Outcome Based Education (OBE)

Subject Code	Subject Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
EL302	Analog Circuit Design	3.00	2.75	2.75	1.00	2.00	2.00	2.00	-	1.00	1.00	-	2.00	1.00	1.00	1.00
EL303	Antennas and Wave Propagation	3.00	2.00	1.75	2.00	2.50	1.00	1.00	1.00	1.00	2.00	-	3.00	1.75	1.00	-
EL304	Advanced Microcontrollers	-	-	2.00	2.00	3.00	2.00	1.00	-	-	-	-	1.25	2.50	2.00	2.25
EL305	Guided Research and Reading	2.25	1.75	2.00	2.75	2.00	2.25	1.33	1.00	-	2.00	-	2.00	1.00	2.00	-
EL351	Power Electronics and Drives	2.00	1.75	2.25	1.33	1.67	1.00	1.00	1.00	2.00	1.00	2.00	-	1.33	2.50	1.50
EL352	Digital System Design	3.00	2.25	1.50	1.75	2.00	-	-	-	-	-	-	2.00	2.00	3.00	2.00
SEMESTER-6																
EL306	VLSI Design	3.00	2.20	1.40	1.60	2.00	-	-	-	-	-	-	2.20	2.20	1.40	1.40
EL307	Digital Signal Processing	3.00	2.17	2.00	1.00	2.17	-	-	2.00	2.00	-	-	3.00	1.00	1.50	2.00
EL308	Microwave Engineering	1.67	2.00	1.33	1.00	1.00	1.00	2.00	-	-	-	-	1.00	1.20	1.50	1.00
EL341	Mini Project	1.00	1.00	2.50	-	2.00	-	1.00	-	2.00	1.50	2.00	1.00	1.33	1.50	1.67
EL353	Digital Control Systems	3.00	1.75	2.00	1.00	2.00	2.00	1.00	1.00	-	-	-	-	-	-	-
EL354	Optical Fibre Communication	3.00	2.00	2.00	2.00	1.00	1.00	-	-	-	-	-	1.00	1.00	1.00	-
EL371	Electronics Communication	3.00	1.83	1.20	1.00	2.00	-	-	1.00	-	1.00	-	3.00	1.00	-	1.00
SEMESTER-7																
EL401	Wireless Communication	3.00	2.33	2.17	2.00	2.33	1.33	1.00	3.00	3.00	3.00	-	3.00	2.50	2.83	1.00
EL402	Embedded System Design	3.00	1.80	2.00	2.00	3.00	1.80	2.00	3.00	1.80	1.40	1.75	3.00	2.60	2.60	2.20
EL431	Seminar	1.60	2.00	2.00	2.00	1.25	2.33	2.33	2.00	2.33	2.00	1.33	2.50	1.17	1.50	1.33
EL451	Process Instrumentation and Control	2.25	2.25	2.00	2.00	2.00	2.50	1.25	1.50	1.50	1.50	1.25	1.25	2.50	2.25	2.50
EL452	Radar and Navigation Aids	2.00	1.00	1.00	1.00	1.60	2.00	1.00	1.60	1.25	1.40	1.00	1.80	1.50	1.00	1.00
EL453	Data-communication and Networking	3.00	2.80	2.00	2.60	2.20	3.00	1.20	2.00	2.00	3.00	2.00	3.00	2.80	1.60	1.40

Subject Code	Subject Name	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
EL454	Digital Image Processing	3.00	1.67	1.83	1.40	2.83	1.33	-	3.00	1.83	1.83	1.33	3.00	2.00	2.00	2.00
EL471	Microcontroller Based Electronic System	1.50	2.00	2.00	1.67	3.00	2.00	1.25	1.00	-	1.00	-	1.00	1.50	2.00	1.75
SEMESTER-8																
EL441	Project	3.00	1.50	2.00	1.50	1.40	1.67	1.20	2.00	1.33	1.33	3.00	1.00	1.80	1.00	1.60
EL455	Antenna Design	2.25	1.75	2.00	2.75	2.00	2.25	1.33	1.00	-	2.00	-	2.00	1.00	2.00	-
EL456	Biomedical Instrumentation	3.00	2.00	2.00	2.00	1.00	1.00	1.00	-	1.00	1.00	-	1.00	2.00	2.00	2.00
EL457	Internet of Things	3.00	1.80	2.00	2.00	2.80	1.80	2.00	3.00	1.80	1.40	1.75	3.00	2.60	2.60	2.20
EL458	Advance Microprocessor	2.00	2.17	1.50	1.67	1.67	3.00	3.00	3.00	2.50	3.00	2.00	2.00	2.00	2.17	1.50
EL459	Satellite Communication	3.00	1.83	2.20	2.00	2.00	2.00	2.00	2.00	1.60	1.00	2.00	1.33	1.00	1.67	1.67
EL446	Industry Defined Project/ Tanning	3.00	1.50	2.00	1.50	1.40	1.67	1.20	2.00	1.33	1.33	3.00	1.00	1.80	1.00	1.60

MAPPING OF CO's WITH PO's

Subject Code	Subject Name	Course Outcomes	SEMESTER I															
CC101	Calculus	Acquire knowledge of advanced differential calculus for single variable and their applications Get acquainted with the knowledge of functions of several variables. Learn differential and integral calculus of several variables. Apply knowledge of differential and integral calculus of several variables for engineering applications.	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03	
			Engg. knowledge	Problem analysis	Design of solutions	Conduct investigation of complex problems	Modern tool usage	The engineer and society	Environment and sustainability	Ethics	Individual and team work	Communication	Project Management and finance	Life long learning	Analysis and Evaluation of electronics circuits	Design for problems	Design of electronic System	
			3	2	1	1	3	-	1	-	2	2	-	3	-	-	-	-
			3	2	-	1	1	-	1	-	2	2	-	3	-	-	-	-
			2	2	-	3	2	-	1	-	2	2	-	1	-	-	-	-
			3	2	2	3	3	-	1	-	2	2	-	3	-	-	-	-

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03	
CC111	Basic Civil Engineering and Environmental Studies	Carry out linear, angular & levelling measurements using survey methods.	3	2	2	2	2	2	2	2	3	3	3	2	-	-	-	
		Acquainted to common building materials, components & simple building drawing.	3	2	3	2	2	1	2	1	2	3	2	2	2	-	-	-
		Gain knowledge of the different transportation modes and their elements.	2	1	2	2	2	2	2	1	1	2	2	2	2	-	-	-
		Recognize importance of Natural Resources.	2	2	2	3	1	2	2	3	2	2	2	1	3	-	-	-
		Impact assessment of various pollution and remedial measures.	2	2	2	2	2	2	2	3	2	2	2	2	2	-	-	-
		Develop ethical and social awareness about environmental degradation and control.	2	2	2	3	3	3	3	3	3	3	2	2	2	-	-	-
CC122	Computer Workshop	Understand basics of computer hardware	1	1	1	-	1	-	-	2	1	-	1	2	-	-	-	
		Install operating systems, drivers related to hardware and other software	1	1	1	-	2	-	-	-	2	1	-	1	2	-	-	-

Outcome Based Education (OBE)

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
		Configure operating system for effective management of resources	1	1	1	1	2	1	-	2	2	-	1	2	-	-	-
		Manage security related basic problem using anti-virus software	1	1	1	1	2	2	1	2	1	-	1	2	-	-	-
		Create reports, presentation, and spread sheets	1	1	1	1	2	-	-	2	1	3	1	2	-	-	-
		Work with various tools for collaboration and website creation	1	2	1	1	3	1	1	2	1	1	1	2	-	-	-
CC143	Engineering Physics	Apply the Basic Laws of Physics in Quantum Mechanics, to understand the concepts of wave particle duality, black body Radiation De-Broglie's hypothesis and uncertainty Principle. Understand the working principle of a Laser and Optical Fibre communication, their components, working of different Laser systems and their engineering applications	3	1	-	-	-	2	-	-	-	-	-	1	-	-	-
			2	2	1	1	-	-	1	-	-	-	-	1	-	-	-

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
		Apprise observation, experiment and theory work together to continue to expand the frontiers of knowledge of the Engineering Physics in the field of superconductivity	2	2	2	-	-	2	2	-	-	-	-	1	-	-	-
		Understand the basics of Acoustics and Ultrasonic and their applications	2	1	2	-	-	-	-	-	-	-	-	-	-	-	-
		Understand basic concepts of Nanophysics and their various applications.	2	1	1	1	-	1	2	-	-	-	-	-	-	-	-
		Ability to identify engineering problems related to Engineering Physics.	2	2	1	1	-	-	-	-	-	-	-	-	-	-	-
CC152	Elements of Mechanical Engineering	Use the concepts of units, systems (open, closed systems and control volumes) and its boundaries, properties, state, process, cycle, quasi-static process in context of energy conversion.	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-
		Assess thermodynamic properties of gases and steam, and apply it to systems of relevance.	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-

Outcome Based Education (OBE)

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03	
		Interpret the fundamentals of I C engine and air compressors.	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	
		Interpret the fundamentals of pumps, refrigerators and air-conditioners.	3	1	1	-	-	-	-	-	-	-	-	-	-	-	-	
		Identify the transmission systems and its components.	3	1	1	-	-	-	-	-	-	-	-	-	-	-	-	
CC171	Communi- cation Skills	Acquire Presentation skills and Group Discussion skills	-	-	-	-	-	1	-	2	3	3	-	2	-	-	-	
		Acquire knowledge of communication and its components	-	-	-	-	-	1	-	2	3	3	-	2	-	-	-	
		Improve language skills – LSRW	-	-	-	-	-	-	1	-	2	3	3	-	2	-	-	-
		Develop basic and intermediate competency in English language	-	-	-	-	-	-	2	-	2	3	3	-	2	-	-	-
		Overcome communication phobia in English	-	-	-	-	-	-	1	-	2	3	3	-	2	-	-	-
		Acquire Presentation skills and Group Discussion skills.	-	-	-	-	-	-	2	-	2	3	3	-	2	-	-	-
		Get acquainted to literature to acquire necessary life skills.	-	-	-	-	-	3	-	2	3	3	-	2	-	-	-	

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
		Feel confident to communicate in English & Receive knowledge of formal letter writing.	-	-	-	-	-	1	-	2	3	3	-	2	-	-	-
SEMESTER-2																	
CC102	Vector Calculus and Linear Algebra	Solve system of linear equations using different tools of linear algebra for the problems	3	-	1	1	2	-	-	-	-	1	-	3	-	-	-
		Use Eigen values and Eigen vector in different subjects of engineering like control theory, vibration analysis, electric circuits, advanced dynamics and quantum mechanics.	3	1	2	2	1	1	1	-	-	-	2	-	2	-	-
		Apply vectors in higher dimensional space in experimental data, storage and warehousing.	3	2	3	2	1	2	3	-	2	2	-	2	-	-	-
		Apply linear transformation in subject like computer graphics, cryptography, thermodynamics etc.	2	2	2	2	1	2	3	-	2	1	-	2	-	-	-

Outcome Based Education (OBE)

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
		Apply differential and integral vector calculus to the problems in R^3 .	2	2	3	1	1	2	1	2	2	2	-	2	-	-	-
		Use the techniques and theory of linear algebra to model various real world problems.	2	3	3	2	3	2	3	2	3	2	-	3	-	-	-
		Explain different features (keywords, constructs, functions, pointers, etc...) of programming language.	1	1	1	1	-	-	-	2	1	1	-	1	-	-	-
		Break-up a medium (or large) problem into smaller sub-problems to make it tractable for a possible solution through computer programming.	2	2	3	1	-	-	2	2	2	1	2	2	-	-	-
CC121	Computer Programming	Represent and communicate a conceived solution to a problem in a systematic way using the tools of algorithms and flow-charts	2	2	2	1	3	-	-	2	2	3	2	2	-	-	-
		Use different features of C programming language to develop a possible programming solution to a given problem in each domain	3	2	3	1	3	-	1	2	2	1	1	1	-	-	-

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03	
		Decipher a given C program of simple to moderate complexity and determine the output.	3	3	2	1	3	-	-	2	1	1	1	1	-	-	-	
		Identify syntactical and semantic errors in given C program.	3	3	2	1	2	-	-	2	1	1	1	1	-	-	-	
CC131	Basic electrical Technology	Assess the knowledge about the electric and magnetic circuits.	3	2	2	2	2	2	1	2	2	2	1	1	-	-	-	
		Practice the fundamentals of AC supply systems and their applications.	3	2	2	1	3	3	1	2	2	2	2	1	1	-	-	-
		Interpret the working and applications of various electrical machines.	2	2	3	3	3	3	2	1	1	2	2	1	1	-	-	-
		Associate the knowledge about various measuring instruments and wiring system.	2	2	2	2	2	2	2	2	1	1	2	1	1	-	-	-
		Comprehend the advance subjects of electrical engineering.	2	2	2	2	2	2	2	2	2	2	2	1	1	-	-	-

Outcome Based Education (OBE)

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03	
CC141	Fundamentals of Electronics	Identify the applications and functions of electronics in Engineering.	3	2	-	-	1	-	-	-	-	-	-	-	-	-	-	
		Acquire knowledge about semiconductor physics for intrinsic and extrinsic materials.	3	2	-	-	1	-	-	-	-	-	-	-	-	-	-	-
		Understand the basic of semiconductor diodes, BJTs and their small signal	3	2	-	-	1	-	-	-	-	-	-	-	-	-	-	-
		Analyse the performance of BJTs on the basic of them operation and working.	3	2	-	-	1	-	-	-	-	-	-	-	-	-	-	-
		Gain idea about CMOS structure and Operation of MOS transistor.	3	2	-	-	1	-	-	-	-	-	-	-	-	-	-	-
		Analyse and Design the operational amplifiers circuits.	3	2	-	-	1	-	-	-	-	-	-	-	-	-	-	-
		Build a small electronic circuit.	3	1	1	-	-	1	1	1	-	2	-	-	-	-	-	-
CC142	Electronics workshop	Identification and testing of basic electronics Components.	2	3	3	2	2	-	1	-	-	-	-	2	-	-	-	
		Use of analogy and digital instruments for troubleshooting.	2	2	2	1	3	-	-	-	-	-	-	1	-	-	-	

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03		
		Understand the operating function about basic instruments like CRO, Digital Storage Oscilloscope Power Supply, Function Generator and Digital Multi meter etc.	1	2	3	2	2	-	1	-	3	-	2	-	-	-	-		
		Design and development of PCB and soldering of components.	3	2	3	1	3	-	-	1	2	1	2	3	-	-	-		
CC151	Engineering Graphics	Interpret standard conventions used in engineering drawing and construction of plain and diagonal scales.	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-		
		Construct orthographic and isometric projections.	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	
		Construct various engineering curves and identify its various applications.	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Construct projections of points and straight lines.	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Interpret different planes and solids and construct their projection.	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Create sections of solids and develop surfaces.	3	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03	
CC174	Value Education, Human Rights and Legislative Procedures	Inculcate the core Values of education	-	-	-	-	-	2	2	3	2	2	2	2	-	-	-	
		Trigger their social behaviour and Personality	-	-	-	-	2	2	3	2	2	2	2	2	-	-	-	
		Civilize in the societal settings	-	-	-	-	2	2	3	2	2	2	2	3	2	-	-	-
		Adopt moral behaviour and act accordingly.	-	-	-	-	2	2	3	2	3	2	2	3	2	-	-	-

SEMESTER-3

MA201	Advanced Engineering Mathematics	Do expansion of functions in terms of basic trigonometric functions.	2	2	-	-	-	-	-	-	1	2	2	2	-	-	-	
		Analyse differential equations.	3	3	-	-	-	-	-	-	-	1	2	2	-	-	-	
		Solve differential equations by using tool like Laplace transform, Fourier series and series solution.	2	2	-	-	-	-	-	-	-	1	2	2	2	-	-	-
		Create a modelling of engineering problems.	3	3	-	-	-	-	-	-	-	1	2	2	2	-	-	-

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03	
EL201	Signals and Systems	Understand the analytical frame work, mathematical description and representation of Signals.	3	1	2	1	2	-	-	1	2	-	-	3	1	2	-	
		Derive and examine a fundamental representation of LTI systems.	3	1	2	1	2	-	-	-	1	2	-	-	3	-	1	-
		Understand and analyse the representation of periodic signals in continuous and discrete time.	3	3	2	1	2	-	-	-	1	2	-	-	3	-	1	-
		Understand and analyse the representation of aperiodic signals in continuous and discrete time.	3	3	2	1	2	-	-	-	1	2	-	-	3	-	1	-
		Relate time - domain and frequency - domain characteristics of the LTI systems.	3	3	2	1	2	-	1	1	2	-	-	3	-	1	-	
		Understand the concept of sampling of a signal and reconstruction of a signal from the samples.	3	3	2	1	2	-	1	1	2	-	-	3	3	1	-	
		Understand the generalization of frequency representation of continuous time and discrete time systems.	3	3	2	1	2	-	1	1	2	-	-	3	3	-	-	

Outcome Based Education (OBE)

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
EL202	Linear Circuit Analysis	Apply various circuit laws, theorems and analysis techniques.	3	2	1	-	1	-	-	-	1	1	-	1	3	-	1
		Analyse behaviour of passive circuits such as RC, RL and RLC.	3	2	1	-	1	-	-	-	-	1	1	-	3	-	1
		Apply Laplace Transform for circuit analysis.	3	2	1	-	1	-	-	-	-	1	1	-	3	-	1
		Analyse circuit in the S-Domain	3	2	1	-	1	-	-	-	-	1	1	-	3	-	1
		Study various two port networks.	3	2	1	-	1	-	-	-	-	1	1	-	3	-	1
EL203	Analog Electronics	Understand the basics of BJTs and MOS circuits.	3	2	-	-	1	-	-	-	-	-	-	-	1	1	2
		Analyse the multistage amplifiers and understand its frequency response.	3	2	-	-	1	-	-	-	-	-	-	-	1	1	2
		Analyse and Design the performance of negative feedback circuits and Oscillators.	3	2	-	-	1	-	-	-	-	-	-	-	1	1	2
		Understand the use of op-amp using MOS.	3	2	-	-	1	-	-	-	-	-	-	-	1	1	2
		Analyse the power amplifiers and wave shaping circuits.	3	2	-	-	1	-	-	-	-	-	-	-	1	1	2
EL204	Digital Electronics	Understand digital number systems and logic gates.	3	3	1	-	-	-	-	-	-	-	-	-	1	2	1
		Analyse logic function minimization.	1	3	2	-	-	-	-	-	-	-	-	-	1	2	1
		Design combinational and sequential circuits.	1	3	3	1	-	-	-	-	-	-	-	-	1	3	2

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03	
		Design simple digital circuits using FSM.	2	3	3	1	1	-	-	-	-	-	-	-	1	2	3	
		To study the functions of various digital integrated circuits and ADC, DAC.	1	3	1	1	2	-	-	-	-	-	-	-	1	3	2	
		Simulate digital circuits using Hardware descriptive language.	2	3	3	1	3	-	-	-	-	-	-	-	3	2	3	
MA202	Professional Soft Skills	Understand organizational structure.	-	-	1	-	-	-	1	2	3	3	0	2	-	-	-	
		Promote professionalism.	-	-	1	-	-	2	2	2	2	3	3	1	2	-	-	-
		Enhance advanced level of communication with special focus on organizational structure.	-	-	1	-	-	-	-	-	3	3	3	2	2	-	-	-
		Enhance their presentations style and their ability to deal with the variety of organizational communication i.e. presentations, conferences, meetings, interviews and the other.	-	-	0	-	-	-	1	2	2	3	2	3	-	-	-	
SEMESTER-4																		
MA203	Engineering Economics and Management	Understand and apply the basics of economics and management to engineering areas.	3	3	2	-	-	2	1	1	1	1	1	3	--	--	--	

Outcome Based Education (OBE)

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
		Understand and apply the basics of demand, demand forecasting, elasticity et al. to engineering projects.	3	3	2	-	-	2	1	1	1	1	1	3	--	--	--
		Apply the basics of project planning project evaluation break even depreciation and costing and et al to engineering.	3	3	2	-	-	2	1	1	1	3	3	3	--	--	--
		Understand product development product life cycle and its advantages to the organization.	3	3	2	-	-	2	1	1	1	1	1	3	--	--	--
		Understand quality concepts.	3	3	2	-	-	2	1	1	1	1	1	3	--	--	--
		Understand human resource development recruitment and training and its advantages to the organization.	3	3	2	-	-	2	1	1	1	1	1	3	--	--	--
EL205	Electro magnetic Field Theory	Understand and apply Maxwell's equations in governing electric and magnetic forces.	3	-	-	2	-	-	-	-	3	-	-	-	-	-	-
		Calculate line parameters, characteristic impedance and propagation constants for coaxial, two-wire, parallel plate and micro strip transmission lines.	1	3	3	2	3	-	-	-	3	-	-	-	-	-	-

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
		Apply vector calculus for solving electromagnetic problems of gradient, divergence and curl operations.	2	3	-	3	-	-	-	-	3	-	-	-	-	-	-
		Understand Coulomb' and Gauss laws and apply them to electrostatic problems.	1	3	3	3	2	-	-	-	3	-	-	-	-	-	-
		Understand Biot-Savart and Ampere laws and apply them to magneto static problems.	1	-	-	3	-	-	-	-	3	-	-	-	-	-	-
EL206	Control Systems	Understanding of basic linear feedback principles and find out the transfer function using various methods.	1	1	-	-	-	1	1	3	3	3	1	3	1	-	-
		Able to represent Mathematical model for different physical system determine conditions that guarantee the linear system stability.	3	1	-	1	2	-	-	-	3	3	3	1	3	-	-
		Able to design system with controller to improve system transient and steady state response	3	2	2	1	2	-	-	-	3	3	3	1	3	1	1

Outcome Based Education (OBE)

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
		Able to sketch the static feedback root locus and determine the location of the closed-loop poles.	3	2	2	1	2	-	-	3	3	3	1	3	1	1	1
		Able to draw Nyquist plots, bode plots and find stability margins.	3	2	2	2	2	-	-	3	3	3	1	3	1	1	1
		Able to present and analyse linear control system using the state space technique	3	2	2	2	2	-	-	3	3	3	1	3	1	1	1
		Understand Basic Communication System and noise present in systems.	3	-	-	-	-	-	2	2	1	-	-	-	-	-	-
		Evaluate fundamental communication system factors, such as bandwidth, power and signal to quantization noise ratio.	3	3	-	-	-	-	-	2	2	-	-	-	-	-	-
		Able to describe classification of elementary signals and noise with different noise parameter like noise factor, noise temperature and noise bandwidth.	3	3	-	-	-	-	-	2	2	-	-	-	-	-	-
		Use Fourier transforms for frequency analysis of communication systems.	3	2	-	2	-	-	-	2	2	3	-	-	-	-	-
EL207	Analog Communication																

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03	
		Examine basic types of modulation scheme for analog communication (AM, FM, PM).	3	-	2	-	-	-	-	2	2	3	-	2	-	-	-	
EL208	Micro Controllers and Applications	Explore Architecture and practice related to basic Microcontroller.	-	-	1	2	-	3	1	-	-	-	-	1	-	-	-	
		Program the microprocessors and microcontrollers.	-	-	-	-	2	3	1	-	-	-	-	-	1	-	-	-
		Able to design Microcontrollers based systems.	-	-	-	1	-	3	1	-	-	-	-	-	3	-	-	-
		Use software tools to simulate and ability to analyse the peripherals interfacing Design of microcontroller based Systems, and use it in applications.	-	-	2	3	2	1	2	1	-	-	-	-	-	3	-	2
		Ability to identify, formulate and solve engineering problems related to microprocessor and microcontroller applications.	-	-	1	2	1	2	1	-	2	-	-	3	-	2	-	
EL209	Electronic Measurements and Instrumentation	Understand the terminology of instruments.	3	2	-	-	-	3	-	-	-	-	-	-	-	-	-	
		Understand the sensors.	-	3	2	-	3	2	-	-	-	-	-	-	-	-	-	-
		Apply the transducers for various electronic applications.	-	-	3	-	-	2	1	-	-	-	-	2	-	-	-	-

Outcome Based Education (OBE)

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03	
		Able to apply signal conditioning for measurements.	-	-	-	-	-	3	1	-	-	-	-	-	-	-	-	
		Explain various measurements techniques for industrial and laboratory applications of various transducers.	-	-	-	-	-	-	-	-	-	2	3	-	3	-	2	
EL210	Electronic Design and Automated Tools	Use software tools like NGspice/LTSpice/Multisim/Orcad.	2	1	3	1	3	-	-	-	-	-	-	-	2	3	3	
		Simulate various analog and digital circuits using NGspice/LTSpice/Multisim/Orcad.	2	1	3	1	3	-	-	-	-	-	-	-	2	3	3	
		Design PCB for given circuit using PCB Software like EAGLE, Express PCB, OrcAD.	1	-	2	1	3	-	-	-	-	-	-	-	2	3	3	
SEMESTER-5																		
EL301	Digital Communication	Analyse different baseband modulation techniques like PCM, DM, ADM.	3	1	-	-	2	-	-	1	1	-	-	-	-	-	-	
		Analyse the concept of ISI and reduction of ISI through Nyquist criteria.	3	1	1	-	2	-	-	-	1	1	-	-	3	-	-	-
		Compare various digital modulation-demodulation techniques	3	2	2	1	2	-	-	-	1	1	-	-	3	1	1	-

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03	
		Understand probability, random variable and various statistical analysis methods.	3	2	2	1	2	-	-	1	1	-	-	3	-	-	-	
		Derive channel capacity for discrete memory less channel and continuous channel.	3	2	2	1	2	-	-	1	1	-	-	3	-	1	-	
EL302	Analog Circuit Design	Understand basic characteristics of op-amp.	3	3	3	1	2	2	-	-	1	1	-	2	1	1	1	
		Analyse the basic block diagram and datasheets for op-amp.	3	2	2	-	2	-	-	-	-	1	-	-	2	-	-	
		Design the op-amp's linear, non-linear circuits and active filters applications.	3	3	3	1	2	2	-	-	-	1	1	-	2	1	1	1
		Test and Analyse special purpose ICs and their application circuits.	3	3	3	1	2	2	-	-	-	1	1	-	2	1	1	1
EL303	Antenna and Wave Propagation	Apply Antenna theory to design various antennas.	3	3	1	1	-	1	-	1	1	2	-	3	1	1	-	
		Analyse and measure the fundamental antenna parameters.	3	1	1	1	-	1	1	1	1	1	2	-	3	1	1	-
		Design various antennas performance using Electromagnetic Simulators.	3	1	3	3	3	1	1	1	1	1	2	-	3	2	1	-

Outcome Based Education (OBE)

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03	
		Understand and analyse the operation of different types of antennas.	3	3	2	3	2	1	1	1	1	2	-	3	3	1	-	
EL304	Advanced Micro Controller	Knowledge of Architecture and practice related to various Microcontrollers available in the market today.	-	-	3	1	-	-	1	-	-	-	-	1	-	-	2	
		Understand and analyse the various design challenges and techniques for solution by Microcontrollers based designs.	-	-	1	3	2	1	-	1	-	-	-	-	1	2	2	2
		Use software tools to simulate and analyse the performance of Design of microcontroller based Systems, and use it in real time applications.	-	-	-	-	3	2	1	1	-	-	-	-	1	-	2	2
		Ability to identify, formulate and solve engineering problems related to Real time Electronics design solutions.	-	-	-	1	2	1	-	-	-	-	-	2	3	2	3	
EL305	Guided Research and Reading	Guided research reading helps students to understand texts and to use a range of reading and thinking strategies on other texts.	3	1	-	2	-	3	-	-	-	-	-	-	-	-	-	

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
		Assessment that emerges from the classroom rather than being imposed upon it is integral to guided reading.	2	2	2	3	2	2	1	-	-	-	-	-	1	-	-
		Guided reading requires that comprehension strategies be modelled by teachers and that students be encouraged to use them independently before, during, and after their reading of a text.	2	2	2	3	2	2	1	-	-	-	-	-	-	2	-
		Guided reading is much more than a set of activities to work through. An understanding of the theoretical underpinnings is essential.	2	2	2	3	2	2	2	1	-	2	-	2	-	-	-
		Understand the power semiconductor devices.	3	1	2	2	2	-	-	1	-	-	-	-	1	2	1
	Power Drivers and Drivers	Design and analyse various SCR firing, commutation methods and Phase controlled rectifiers.	2	1	3	1	1	-	1	-	-	1	2	-	1	3	-
EL351	Electronics and Drivers	Design and understand the operation of various industrial based power electronics circuits like inverters, choppers and Cycloconverters.	1	3	3	-	2	1	-	-	2	-	-	-	-	2	2

Outcome Based Education (OBE)

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03	
		Foster ability to understand the use of DC drives and AC drives in industrial applications.	2	2	1	1	-	-	-	1	2	-	2	-	2	3	-	
EL352	Digital System Design	Understand Hardware Descriptive Language and different design methodology.	3	3	1	1	-	-	-	-	-	-	-	2	2	3	2	
		Design Combinational and sequential circuits using HDL.	3	1	1	1	-	-	-	-	-	-	-	-	2	2	3	2
		Design synchronous circuits using FSM and analyse Asynchronous circuits and timing	3	3	2	3	2	-	-	-	-	-	-	-	2	2	3	1
			3	2	2	2	2	-	-	-	-	-	-	-	2	2	3	3
SEMESTER-6																		
EL306	VLSI Design	Understand VLSI design flow and different design methodology.	3	3	1	1	-	-	-	-	-	-	-	2	1	1	1	
		Understand fabrication process of MOSFETs and CMOS.	3	1	1	1	-	-	-	-	-	-	-	-	2	1	1	1
		Understand MOS theory.	3	3	2	3	2	-	-	-	-	-	-	-	1	3	1	1
		Analyse the CMOS construction & its characteristics.	3	2	2	2	2	-	-	-	-	-	-	-	3	3	2	2
		Apply CMOS fundamentals to design CMOS based digital circuits.	3	2	1	1	2	-	-	-	-	-	-	3	3	2	2	

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03	
EL307	Digital Signal Processing	Understands the fundamentals, implementations and application of DSP.	3	1	-	-	2	-	-	2	2	-	-	3	1	-	-	
		Understand applications of z- transforms.	3	1	-	-	2	-	-	-	2	2	-	-	3	1	-	-
		Design the digital filters.	3	2	2	1	2	-	-	-	2	2	-	-	3	1	2	2
		Analysis of the frequency response of discrete-time signals and systems.	3	3	2	1	3	-	-	-	2	2	-	-	3	1	2	2
		Develop programs using software tools for DSP algorithms.	3	3	2	1	2	-	-	-	2	2	-	-	3	1	1	2
		Understand the difference between fixed point and floating point digital signal processor and select them as per requirement of applications	3	3	2	1	2	-	-	-	2	2	-	-	3	1	1	2
EL308	Microwave Engineering	To understand TE, TM, TEM mode propagation, advantages and applications of microwaves.	1	-	-	-	-	1	1	-	-	-	-	1	1	-	-	
		To understand, analyse and solve problems related microwave transmission line.	3	3	2	1	1	-	-	-	-	-	-	-	1	1	2	1

Outcome Based Education (OBE)

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03	
		To understand and analyse the concept of various active and passive microwave components for different applications.	2	1	-	1	-	-	-	-	-	-	-	1	1	-	-	
		To understand the concept of various microwave tube devices.	1	-	-	-	-	-	-	-	-	-	-	1	1	-	-	
		Measurements of various parameters of microwave systems.	2	2	1	1	-	-	-	-	-	-	-	-	-	-	-	
		Recent trends of microwave engineering, various applications, and health hazards.	1	-	1	-	1	1	3	-	-	-	-	1	2	-	1	
EL341	Mini Project	Students will be able to practice acquired knowledge within the chosen area of technology for project development.	1	1	2	-	-	-	-	-	-	-	-	1	2	-	-	
		Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
		Reproduce, improve and refine technical aspects for engineering projects.	-	-	-	-	-	-	-	-	-	2	1	-	-	1	-	-

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
		Work as an individual or in a team in development of technical projects.	-	1	3	-	2	-	-	-	-	-	-	1	-	2	1
		Communicate and report effectively project related activities and findings	-	-	-	-	-	-	1	-	-	2	2	-	1	1	2
		Understand the role of different types of digital PID controller and its realization in control system design.	3	1	2	1	-	2	-	-	-	-	-	-	-	-	-
		Understand the methodology of feedback control system and different types of stability analysis for them.	3	1	2	1	2	-	-	-	-	-	-	-	-	-	-
		Identify, formulate digital control system, and analyse optimal control system.	3	3	2	1	-	-	1	-	-	-	-	-	-	-	-
		Understand of digital control system and able to predict system behaviour.	3	2	2	1	-	-	-	1	-	-	-	-	-	-	-
		Understand the basic elements of optical fibre transmission link, fibre modes and structure configurations.	3	2	2	2	1	1	-	-	-	-	-	1	-	-	-
EL353	Digital Control System																
EL354	Optical Fiber Communication																

Outcome Based Education (OBE)

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03	
		Analyse the different kind of losses, signal distortion in optical wave guides.	3	2	2	2	1	1	-	-	-	-	-	1	-	-	-	
		Design optical source materials, LED / Laser diodes structures and Transmission Systems.	3	2	2	2	1	1	-	-	-	-	-	1	-	-	-	
		Analyse the fibre optical receiver operation and configuration.	3	2	2	2	1	1	-	-	-	-	-	1	-	-	-	
		Analyse Optical Amplifier and networks components.	3	2	2	2	1	1	-	-	-	-	-	1	1	1	-	
EL371	Electronic Communication	Understand the basic concept Communication system.	3	1	-	-	2	-	-	1	-	1	-	3	-	-	-	
		Analyse Digital communication systems.	3	2	1	1	2	-	-	-	1	-	1	-	3	1	-	1
		Use network fundamentals for LAN.	3	2	1	1	2	-	-	-	1	-	1	-	3	-	-	1
		Understand the Internet technologies it's security aspects.	3	2	2	1	2	-	-	-	1	-	1	-	3	-	-	1
		Analyse Cellular Technologies.	3	2	1	1	2	-	-	-	1	-	1	-	3	1	-	1
		Compare various wireless technologies.	3	2	1	1	2	-	-	-	1	-	1	-	3	1	-	1

Subject Code	Subject Name	Course Outcomes	SEMESTER-7																			
			P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03					
EL401	Wireless Communication	Understand the basics of Wireless Communication, Evolution and comparison.	3	1	1	1	2	1	1	1	3	3	3	3	3	3	3	3	1	2	-	
		Understand the basic concepts of basic Cellular System, design requirements and basic Principles behind radio resource management techniques such as power control, channel allocation and handoffs.	3	2	3	3	3	2	1	1	3	3	3	3	3	3	3	3	3	3	3	-
		Gain insights into various mobile radio propagation models and how the diversity can be exploited to improve performance.	3	3	3	3	3	2	1	1	3	3	3	3	3	3	3	3	3	3	3	3
		Gain knowledge and awareness of the technologies for how to effectively share spectrum Through multiple access techniques i.e. TDMA, CDMA, FDMA etc.	3	3	2	1	2	1	1	3	3	3	3	3	3	3	3	3	2	3	3	-
		Have in-depth understanding of the design consideration and architecture for different Wireless Systems like GSM, CDMA, and GPRS etc.	3	2	2	2	2	1	1	3	3	3	3	3	3	3	3	3	3	3	3	-

Outcome Based Education (OBE)

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
		Understanding of the emerging trends in Wireless communication like WiFi, WiMAX, Software Defined Radio (SDR) and related issues and challenges.	3	3	2	2	2	1	1	3	3	3	-	3	3	3	1
		Knowledge of theory and practice related to Embedded System.	3	1	2	-	3	1	2	3	1	1	-	3	1	2	2
		Understand and analyse the Hardware techniques and Design of Software codes for Embedded Systems.	3	2	2	2	3	2	2	3	2	1	1	3	3	3	2
		Use software tools to simulate and analyse the performance of Embedded Systems and development of model for real time Application.	3	2	2	2	3	2	2	3	2	1	2	3	3	3	2
		Ability to identify, formulate and solve engineering problems by using Embedded Systems.	3	2	2	2	3	2	2	3	2	2	2	3	3	2	2
		Ability to implement real field problem by gained knowledge of Embedded Systems	3	2	2	2	3	2	2	3	2	2	2	3	3	3	3
EL402	Embedded System Design																

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03	
EL431	Seminar	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the Electronics engineering practice.	2	1	1	2	2	3	2	3	2	2	1	2	1	3	1	
		Understand the impact of the Electronics engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.	2	3	2	2	1	2	3	2	2	2	2	2	3	2	2	2
		Apply ethical principles and commit to professional ethics and responsibilities and norms of the Electronics engineering practice	1	2	2	-	-	2	2	3	2	2	1	1	3	1	1	2
		Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings	-	2	3	2	-	2	2	1	3	3	2	2	1	1	1	

Outcome Based Education (OBE)

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
		Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.	1	2	2	2	1	2	2	1	3	3	1	2	1	1	1
		Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	2	2	2	2	1	3	3	2	2	1	1	3	1	1	1
EL451	Process Instrumentation & Control	Identify, formulate and analyse complex process control system problems related to industrial automation.	3	2	2	2	2	3	2	1	2	2	2	1	3	3	3
		Understand the analytical frame work, description of actuators, final control elements and continuous and discrete control system.	2	3	2	2	2	2	2	1	1	2	2	1	2	2	2

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03	
		Design solutions for simple process problems and design small data acquisition system.	2	2	3	2	2	2	1	2	1	1	1	2	2	2	2	
		Identify the need for the automation problems, and have the preparation and ability to engage independent and life-long learning in the broadest context of technological change.	2	2	1	2	2	3	1	2	2	1	1	1	3	2	3	
EL452	Radar & Navigation Aids	Knowledge in the topics such as Fundamentals of Radar	2	-	-	-	1	2	1	1	-	1	-	1	-	-	-	
		To become familiar with fundamentals of Different types of RADAR	2	-	-	-	1	2	1	2	1	2	-	2	-	-	-	
		To gain in-depth knowledge about the different types of RADAR and their operations	2	-	1	-	2	2	2	1	2	2	2	-	2	1	-	1
		Understand signal detection in RADAR and various detection techniques	2	-	-	1	2	2	2	1	2	1	1	-	2	-	-	1
		Understand Navigational Aids and Modern Navigation	2	1	-	1	2	2	1	1	1	1	1	2	2	1	-	

Outcome Based Education (OBE)

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03	
EL453	Data communication & Networking	Apply the knowledge of communication techniques, medias and fundamentals of layer architecture to the solve computer networks' problems.	3	3	2	3	2	3	1	2	2	3	2	3	3	1	1	
		Design solutions for different communication networks	3	2	2	3	2	3	2	2	2	3	2	3	2	3	2	2
		Analyse any system as layered architecture system.	3	3	2	3	2	3	3	1	2	2	3	2	3	3	1	1
		Able to choose appropriate protocol on each layer based on application demand.	3	3	2	2	3	3	3	1	2	2	3	2	3	3	2	1
EL454	Digital Image Processing	Understand major issues and responsibilities of each layer.	3	3	2	2	2	3	1	2	2	3	2	3	3	1	2	
		Understand the basic concepts of two-dimensional signal acquisition, Sampling, and quantization.	3	2	1	-	2	1	1	-	3	1	1	1	3	2	2	2
		Apply the knowledge of spatial filtering techniques and enhance image quality using image enhancement techniques.	3	2	2	1	3	1	2	-	3	2	2	1	3	2	2	2
		Understand the DFT and able to filter given image using frequency domain filtering technique.	3	2	2	1	3	1	3	-	3	2	2	1	3	2	2	2

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
		Apply the knowledge of Image restoration and reconstruction and select the right image restoration technique to remove degradation from given image	3	2	2	1	3	1	-	3	2	2	1	3	2	2	2
		Understand image segmentation, image compression and image morphological operations.	3	1	2	1	3	1	-	3	1	1	1	3	2	2	2
		Demonstrate teamwork and communication skills through course projects.	3	1	2	3	3	3	-	3	3	3	3	3	2	2	2
EL471	Micro-controller Based Electronics System	Understand the architecture of AVR 8-bit Microcontroller and importance and function of each pin of AVR ATmega32 Microcontroller.	-	-	3	1	-	-	1	-	-	-	-	1	-	-	2
		Write, debug and simulate embedded C language programs.	2	-	1	3	3	2	1	-	-	-	-	-	1	2	2
		Understand Timer operation, Interrupt environment and Serial Communication and.	-	-	-	-	-	2	1	-	-	-	-	1	-	2	2
		Interface I/O peripherals like LCD, ADC, DAC devices with microcontroller	1	2	-	1	-	-	2	1	-	-	-	1	1	2	1

Outcome Based Education (OBE)

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03	
EL441	Project	Apply the knowledge of electronics engineering to the solution of electronics engineering problems/project.	3	1	2	1	1	1	1	-	1	1	-	1	3	1	1	
		Review research literature, and analyse complex engineering problems reaching substantiated conclusions.	-	3	2	2	1	1	1	1	2	1	1	-	1	2	1	1
		Use research-based knowledge and research methods, including design of experiments, analysis and interpretation of data to design electronic project.	-	1	3	2	1	-	1	1	2	1	1	-	1	2	1	3
		Apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to design electronics circuits using relevant software and hardware for embedded, IOT, signal processing and communication etc. based application.	-	1	2	1	3	-	1	-	1	1	-	1	1	1	2	

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03		
		Understand the impact of the electronics engineering solutions to societal and environmental contexts, ethical principles and norms of the electronics engineering practice.	-	-	1	-	1	3	2	3	1	1	-	1	1	1	1		
		Function effectively as an individual, and as a member or leader in diverse teams to manage projects, communicate effectively, write report and effective presentations of projects.	-	-	-	-	-	-	-	1	3	3	3	1	-	-	-		
EL455	Antenna Design	Understanding basic antenna characteristics.	3	1	-	2	-	3	-	-	-	-	-	-	-	-	-		
		Ability to select and justify an appropriate antenna for an engineering task.	2	2	2	3	2	2	1	1	-	-	-	-	-	1	-	-	
		Ability to model/optimize the antenna using ANSOFT HFSS.	2	2	2	3	2	2	2	1	-	-	-	-	-	-	2	-	-
		Design and fabrication of antenna with optimization of results	2	2	2	3	2	2	2	2	1	-	2	-	2	-	-	-	-

Outcome Based Education (OBE)

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03	
EL456	Biomedical Instrumentation	To understand characterize anatomy and physiology of important physiological system of human body.	3	2	2	2	1	1	1	-	1	1	-	1	2	2	2	
		To understand the Analyse and design of medical instruments (particularly electronics part) by evaluating medical parameter measurement constraint.	3	2	2	2	1	1	1	1	-	1	1	-	1	2	2	2
		To analyse important vital sign parameters to evaluate certain disease conditions.	3	2	2	2	1	1	1	1	-	1	1	-	1	2	2	2
EL457	Internet of Things	To Implementation of the electric safety of the medical instruments	3	2	2	2	1	1	1	-	1	1	-	1	2	2	2	
		Knowledge of theory and practice related to IoT System.	3	1	2	-	3	1	2	3	1	1	1	-	3	1	2	2
		Understand and analyse the Hardware techniques and Design of Software codes for IoT Systems.	3	2	2	2	2	2	2	3	2	1	1	1	3	3	3	2
		Use software tools to simulate and analyse the performance of IoT Systems and development of model for real time Application.	3	2	2	2	3	2	2	2	1	2	3	3	3	2	2	

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03	
		Ability to identify, formulate and solve engineering problems by using IoT Systems.	3	2	2	2	3	2	2	3	2	2	2	3	3	2	2	
		Ability to implement real field problem by gained knowledge of IoT Systems.	3	2	2	2	3	2	2	3	2	2	2	3	3	3	3	
EL458	Advance Micro-processor	Become familiar with the Intel 8086 microprocessor.	2	1	1	1	1	-	-	-	-	-	-	1	2	1	1	
		Understand instruction set and programming of 8086.	2	3	2	3	3	-	-	-	-	2	-	1	2	2	3	2
		Learn Intel 80386, 80486, Pentium family.	2	2	1	1	1	1	-	-	-	-	-	-	2	2	2	1
		Understand Instruction Level Parallelism.	2	2	1	1	1	1	-	-	-	-	-	-	2	2	2	1
		Learn Pentium and Multi-Core Architectures.	2	2	2	2	2	2	-	-	-	-	-	2	2	2	2	2
		Learn recent trend in microprocessors fields and prepare PPT presentation or design mini project.	2	3	2	2	2	2	2	3	3	3	3	3	3	2	3	2
EL459	Satellite Communication	Understand principle, working and operation of various sub systems of satellite as well as the earth station.	3	1	-	-	-	-	-	2	-	-	-	1	1	-	-	

Outcome Based Education (OBE)

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
		Apply various communication techniques for satellite applications.	3	2	2	2	2	-	-	-	2	1	-	1	1	1	1
		Analyse and design satellite communication link.	3	3	3	2	2	-	-	-	2	-	2	2	1	2	2
		Analyse Propagation Effects and their Impact on Satellite -Earth Links.	3	2	2	2	-	-	-	-	1	-		1	1	-	-
		Analyse Low Earth Orbit and Non-Geostationary Satellite Systems.	3	2	2	2	-	-	-	-	1	-		1	1	-	-
		evaluate role of satellite in various applications.	3	1	2	2	2	2	2	2	2	1	2	2	1	2	2
		Apply the knowledge of electronics engineering to the solution of electronics engineering problems/project.	3	1	2	1	1	1	1	1	-	1	-	1	3	1	1
		Review research literature, and analyse complex engineering problems reaching substantiated conclusions.	-	3	2	2	1	1	1	2	1	1	-	1	2	1	1
EL446	Industry Defined Project/ Training	Use research-based knowledge and research methods, including design of experiments, analysis and interpretation of data to design electronic project.	-	1	3	2	1	-	1	2	1	1	-	1	2	1	3

Subject Code	Subject Name	Course Outcomes	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P011	P012	PS01	PS02	PS03
		Apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to design electronics circuits using relevant software and hardware for embedded, IOT, signal processing and communication etc. based application.	-	1	2	1	3	-	1	-	1	1	-	1	1	1	2
		Understand the impact of the electronics engineering solutions to societal and environmental contexts, ethical principles and norms of the electronics engineering practice.	-	-	1	-	1	3	2	3	1	1	-	1	1	1	1
		Function effectively as an individual, and as a member or leader in diverse teams to manage projects, communicate effectively, write report and effective presentations of projects.	-	-	-	-	-	-	-	1	3	3	3	1	-	-	-

MAPPING OF POs AND PSOs WITH CO-CURRICULAR STUDENTS ACTIVITY

1. INDUCTION PROGRAM:

ACTIVITIES DURING INDUCTION PROGRAM:

1. Visit to the Institute
2. Visit to Industries: Elecon, Atlanta, Amul, Finecast and Rhino Industries etc.
3. Visit to Villages: Valsan, Jol, Mogar, Sarsa, Adas, Vaghasi, Navali, Sandeshar, Napadvanta and Vadod.
4. Expert Lectures By: Collector, Entrepreneur, Corporate leaders, Cyber Security Personnel, Spiritual & Motivational Leaders, Professional Trainer, Police Superintendent, and Artists.

OUTCOMES

1. It has provided students the confidence and skills to successfully transition to college.
2. Students have been familiarized with BVM College and its resources.
3. It has built positive relationships between new students and peers, faculty, and staff at BVM College.
4. It has assisted students in their personal development of life skills, ethical judgment and moral fortitude.
5. It has helped students for enhancing critical thinking skills through self-exploration and class experiences.
6. Student will able to develop strategies and resources for students to balance school, work, and personal commitments.
7. It has given exposure to college life in a structured and supportive learning community.

2. TECHNICAL VISITS:

1. Technical visits to core industries
2. Technical visits to Research Centres

OUTCOMES:

1. Industrial visits enhance student practical knowledge and challenges faced by the organization in the business world.
2. It gives greater clarity about various technical concepts for students as they can practically see how the classroom concepts are put into action.

3. It motivates students to achieve essential Program Outcomes like life-long learning, communication, engineer & society,
4. Students get exposure to the usage of modern tools
5. Students are motivated for learning beyond syllabus.
6. Report writing being part of every industrial visit, it enhance the writing and presentation skills.

3. INDUSTRIAL TRAINING/INTERNSHIP:

As mandatory part of the program structure, a student is required to undergo internship or industrial training in core industry or research institution for a period of total 6 weeks during his/her undergraduate program.

OUTCOMES:

1. Hands-on experience on the real time system which increases their knowledge and confidence. Competency in domain area increases
2. Enhancing report writing skill and ability to communication effectively.
3. Learn leadership qualities and to work as a member of diverse group.
4. Enhance design competency, understand project management, time management and financial issues.
5. Ability to understand industrial practices & modern tools; professional, ethical and legal issues.

4. MEMORANDUM OF UNDERSTANDING

The Institution or department has signed various MoU with Professional Training Agencies, Industrial units, Research Institutions to share the synergies for mutual benefits.

OUTCOMES:

1. Knowledge of state-of-the-art technologies through Extension Lectures.
2. Sensitizing the issues in society and industries.
3. Industrial visits, internship, undertaking projects etc. are the activities undertaken under this auspices.

5. STUDENTS ACTIVITIES

The college organizes various co-curricular and extra-curricular activities appropriately spaced during the academic calendar of the institution.

Outcome Based Education (OBE)

ACTIVITIES:

1. Student Training Program: In the domain subjects, pedagogies, communication skills, Personality Development Programs etc.
2. Social & Environmental issues: Blood donation camp, Tree Plantation, NSS & NCC activities, social activities under the aegis of NGO 'Bachpan' etc.
3. Annual Festival- 'Udaan': Comprising of about 50 events under the category of design, problem solving, coding, innovations, literature, dramatics, fine arts, music, etc.

OUTCOMES:

1. Enhance skills related to Project and financial management
2. Enhance design & innovation skills, creativity in subject domain, effective communication skills
3. Built team spirit as a member or leader of a diverse team. Build amicable personality
4. Sensitizes the social issues and the commitment of engineers toward society
5. Improve learning capacity and assimilate lifelong learning

Mapping of Activities Outcomes with POs/PSOs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
	Engineering knowledge	1	-	-	-	2	2	1	-	1	-	-	-	-	-
		1	1	-	1	1	1	-	-	1	1	1	1	1	1
		2	2	1	2	-	-	1	2	2	2	1	1	1	1
		-	-	-	1	-	-	1	1	-	1	1	1	1	1
		1	2	1	-	2	1	2	3	2	3	2	1	1	1
Induction Program															
Technical Visits															
Internship															
MoU															
Students Activities															

