Course Outcomes of Electronics Engineering UG Program

CO	Statement
Physics BPH-101/ IPH- 101	1. To understand and to apply principle of conservation of momentum. e.g. in rocket propulsion and in many other space applications. 2. To understand the basics of quantum mechanics, and to apply its principles to learn the phenomena that occur at subatomic dimensions. 3. To understand and to apply Maxwell's equations this forms the basis of electromagnetic theory. 4. To study the fundamentals of material science especially dielectric materials, semiconducting materials and nano material and to apply the knowledge to use how dielectrics are used for the storage of charge. 5. To understand the statistical behaviour of the constituent particles which give rise to form a material, and to apply the principles of statistical mechanics and to understand the basics of Laser.
Maths-I BMA-101/ IMA-101	1. The Study of partial differentiation and its applications be needful to solve such engineering problems improving quantity (functions) depends on more than one parametric (variable). 2. Multiple integrals have been calculated to be basic application in engineering such as to find areas and volume of various bodies 3. The Vector calculus extends the basic concepts of (ordinary) differential calculus to vector function, by introducing derivative of a vector function and the new concepts of gradient, divergence and curl. 4. Vector integral calculus extends the concepts of (ordinary) integral calculus to vector functions. 5. Optimization theory and methods have been applied in many fields to handle various practical problems
Electrical Engineering EEE-101/ IEE-101	1. To understand the basic concepts of DC and AC circuits. 2. To understand the basic concepts of 3-phase AC circuits. 3. To understand the basic concepts of transformer and its application. 4. To understand the basic concepts of rotating machines. 5. To understand the basic concepts of measuring instruments.
Engg. Mechanics EME-101/IME-101	1. Apply basic principal of mechanics and its application in engineering problems. 2. Determine resultants and apply conditions of static equilibrium to plane force systems 3. Identify and quantify all forces associated with a static framework 4. Generate and sketch shear force and bending moment diagrams 5. Derive and apply stress and strain relationships in single and compound members subject to axial force, bending moment and torsion. 6. Stress analysis for two dimensional stress systems.
Professional Communication HHS-103/ IHU-101	1. Effectively communicate their ideas in the contemporary global competitive environment. 2. Convey their messages through constructive writing. 3. Draft potent E-Mails, letters, proposals and reports. 4. Present their presentations along with using all nuances of delivery with clarity and thoroughness. 5. Solve problems based on real time situations and articulate them eventually.
Eng. Lang. & Composition HHS-	1. Write professional statements & organizational communications. 2. Develop writing skills by applying different strategies on organisation system.

101/ IHU-102Remedial Eng.	3. Develop the project reports, their relevance and significance.
Engg. Chemistry BCY-102/ ICY-201	1. Interpret UV-Visible and IR-Spectra 2. Describe reaction rates for reactions of various orders 3. Understand different aspects of corrosion and thermodynamic view of electrochemical processes, reversible and irreversible cells 4. Understand the stereochemistry of molecules and identify organic reactions on the basis of their mechanism 5. Distinguish between different polymeric structures, classify polymers, and analyse the polymerization mechanism and use of polymers in different walks of life. Knowledge of conductivity of polymer, biodegradable polymers and fibre reinforced plastics. Acquire knowledge about water and treatment of municipal water
Mathematics-II, BMA-102/ IMA-201	1. The solutions of many differential equations arises from physical problems and important differential equations such as Bessel's equation and Legendre equation. 2. Laplace transform is a very powerful technique it replaces operations of calculus by operations of algebra. 3. Fourier series is the simple representation of a complicated periodic functions associated as the periodic phenomenon which occur frequently in many physical and engineering problems. 4. The Fourier Transform and series and their analytic properties are very commonly used in telecommunications, digital signal processing, electronic design
Electronics & Instrumentation Engg. EET-102/IET-201	1. To understand the basic concept of diodes, transistor, and Operational Amplifier. 2. To apply the knowledge in the calculation of the parameters of the diode, transistor, and Operational Amplifier. 3. To design the simple digital circuits. 4. Having the basic knowledge of measurement and applying it in the transducer. 5. To apply the knowledge of measurement with the help of electronic instruments and displaying it on electronic devices.
Engg. Graphics ECE-102/ ICE-201	1. To follow basic drawing standards and conventions. 2. To develop skills in three-dimensional visualization of engineering components. 3. To prepare sectional views of solids. 4. To draw the development of surfaces and estimate the sheet metal requirement. 5. To develop an understanding of solid modelling using CAD software.
CCC, ECS-102/ ICS-201	1. Identify the parts of the computer system and explain the functioning of its components along with the process of problem solving. (Remember, Understand) 2. Design an algorithmic solution for a given problem and translate it into a program. (Design) 3. Understand different operating systems, related concepts and their functions. (Understand)

	4. Use the appropriate control statements to solve the given problem. (Apply) 5. Implement different Operations on arrays and use functions to solve the given problem. (Apply)
Workshop Practice EWS-102/ IWS-251	1. Acquire skills in basic engineering practice 2. Identify the hand tools and instruments. 3. Obtain practical skills in the trades. 4. Gain measuring skills.
Environment and Ecology ECE-104	1. To make students understand and appreciate the unity of life in all its forms, the implications of the life style on the environment. 2. To understand the various causes for environmental degradation. 3. To understand individual contribution in the environmental pollution. 4. To understand the impact of pollution at the global level and also in the local environment. 5. To understand the concept of sustainable development.
Maths-III, BMA-201	1. Solve boundary value problems using Laplace transform and Fourier transform methods and solve difference equations and BVP_S using z transform 2. Construct conformal mapping between many kinds of domains 3. Evaluate complex integrals, improper real integrals using various formulae/theorems. Find Taylor and Laurents series expansion of complex functions 4. Estimate relationship between two variable using curve fitting, regression and its strength using correlation 5. Various parametric and nonparametric tests parameter estimation, hypothesis testing and ANOVA
Electric Circuit Analysis EEE-203/ IEE-303	1. Demonstrate the ability to apply graph theory for the analysis of electrical circuits 2. Apply network theorems for the analysis of electrical circuits 3. Understand and obtain transient and steady-state response of electrical circuits. 4. Analyse two port circuit behaviour. 5. Synthesize electrical circuits and design passive filters.
Solid State Devices And Circuits EET-201/ IET-301	1. Understand the basic concept of band formation in semiconductor and working principle of diode, Transistor and MOSFET. 2. Solve the numerical on working of Diode, BJT, MOSFET and broader aspect of the devices. 3. Analyse the concept of feedback and different amplifiers in mid-band and high frequency region. 4. Analyse the principle of regulated DC power supply and oscillator. 5. Implement and test the simple circuits related with characteristics, biasing, amplifiers and oscillators.
Digital Electronics EET-203/ IET-302	1. Analyse different methods used for simplification of Boolean expressions. 2. Design and implement Combinational circuits 3. Design and implement synchronous and asynchronous sequential circuits

	4. Programing and simulation of logic gates using HDL. 5. Design of circuits using logic families and its interfacing with real world.
Engg. Economics & Management HHS-201/ IHU-501	1. Understand essential economic principles for solving economic problems with suitable policy alternatives. 2. Understand and evaluate the production system with different type of cost. 3. Study and analyse the market, structure, types and characteristics 4. Understand fundamentals of management principles and functions 5. Know various forms of business ownership, formation and their relevance.
Indian Constitution HHS-205	1. Understand fundamentals of Indian constitution with preambles & fundamental rights. 2. Actuate the governance & functioning of constitutional functionaries. 3. Describe the function of legislative bodies. 4. Decipher the judiciary system & its role in governance. 5. Develop a democratic process through electoral mechanism into system.
Computer Oriented Numerical and Statistical Techniques BMA-206/IMA-302	1. Find roots of nonlinear equations and solve systems of algebraic equations. 2. Use interpolation techniques and to find numerical differentiation/ integration of data, function. 3. Use numerical methods for finding solutions of ordinary differential equations, simultaneous and higher order equations. 4. Learn numerical methods for finding solution of initial and boundary value problems, partial differential equations. 5. Learn basic concepts of some Finite element methods.
DSUC ECS- 201/ ICS 407	1. Analyse the algorithms to determine the time and computation complexity and justify the correctness. (Analyse). 2. Implement Arrays, Stacks, Queues and linked list based problems and analyse the algorithm to determine the time complexity. (Apply, Analyse). 3. Implement search and traversal algorithms on Trees and Graphs and determine the time complexity. (Apply, Analyse). 4. Algorithms for Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of space and time complexity. (Apply, Analyse, Evaluate). 5. Understand file structures and file handling. (Understand)
Electromagnetic Field Theory EET-202/ IET-401	1. Analyse field potentials due to static changes and static magnetic fields 2. Explain how materials affect electric and magnetic fields 3. Analyse Maxwell's equation in different forms (differential and integral) and apply them to diverse engineering problems. 4. Examine the phenomena of wave propagation in different media and its interfaces 5. Have knowledge about different parameters and properties of transmission line.

Signals & Systems EET-204/ IET 402	1. Analyse the properties of signals & systems. 2. Apply Laplace transform, Fourier transform, Z transform and DTFT in signal analysis. 3. Analyse continuous time LTI systems using Fourier and Laplace Transforms. 4. Modellingof sampling process and analysis of discrete systems using z-transforms. 5. Analyse discrete time LTI systems using DTFT.
Organizational Behaviors HHS-204	1. Understand organisation, features, key elements, components, types and OB Models. 2. Demonstrate individual behavioural dimensions, learning theories, perceptual process, values & ethics with motivational techniques in stressed situations. 3. Identify mechanism for conducive survival of individual in an organization with interpersonal understanding. 4. Ascertain group, group behaviour, team building with its key role in organization. 5. Demonstrate organisational structure, organisational change, organisational development for achieving higher productivity and accomplishing goals of organisation
EWPCB Lab EET-206/ IET-451	1. Recognize and identify electronic components. 2. Familiarization of PCB circuit technology and able to design a circuit and create the schematic capture. 3. Become proficient with computer skills for drawing schematic and PCB layout. 4. Create the PCB artwork like drilling, Etching, soldering and mounting the components. 5. To create new part and to fabricate a prototype PCB.
CYBER SECURITY ECS-206	1. Understand information, information systems, information security, Cyber Security and Security Risk Analysis. (Understand). 2. Understand and apply application security, data security, security technology, security threats from malicious software. (Understand, Apply). 3. Understand the concepts of security threats to e-commerce applications such as electronic payment system, e-Cash, Credit/Debit Cards etc. (Understand). 4. Understand and apply Information Security Governance & Risk Management, Security of IT Assets and Intrusion Detection Systems. (Understand, Apply). 5. Understand various types of Security Policies, Cyber Ethics, IT Act, IPR and Cyber Laws in India. (Understand).
Control System EEE-/ IEE-503	1. Apply state space techniques to model dynamic systems. 2. Understand the fundamental concepts of open-loop and closed-loop control systems. 3. Determine the time response of first and second order systems 4. Understand and Determine the stability using Routh-Hurwitz and Root

	Locus Techniques. Analyse the system behaviour in frequency domain. ii. Determine the absolute and relative stability using Nyquist stability criterion. 5. Understand the concept of compensations and realization of basic compensators.
Analog Communication EET-301/ IET 501	1. Understand the basics of communication systems, basic resources and their trade off, frequency domain analysis and need and types of modulation. 2. Do comparative study of various schemes for Amplitude modulation and demodulation for different applications. 3. Do comparative study of different types of Angle modulation and various schemes of modulation and demodulationthereof. 4. Do the probabilistic analysis of random processes and their frequency domain behaviour and to understand the various noise types and noise models. 5. Analyse the comparative noise behaviour of AM-FM-PM systems and to understand the noise compensation schemes.
Antenna and Microwaves EET-303/ IET 502	1. Understand the properties and various types of antennas. 2. Analyse the properties of different types of antennas and their design. 3. Operate antenna design software tools and come up with the design of the antenna of required specifications. 4. Apply the concepts for understanding different antenna arrays. 5. Have the knowledge of different modes of radio wave propagation and various effecting parameters.
Microprocessors EET-305/ IET 503	1. Understand 16 bit and32 bit microprocessor. 2. Can apply those concepts on advance processor. 3. Formulate a real world problem in assembly language programming. 4. Do interfacing design of peripherals like, I/O, A/D, D/A, timer etc. 5. Have the basic knowledge of memory designing.
Operation research BMA-341	1. Understand and solve linear programming problems. 2. Formulate and solve Transportations models, Assignment models and integer linear programming problems. 3. Formulate and solve sequencing and scheduling models. 4. Formulate and solve Replacement and inventory models. 5. Learn and use Dynamic programming and Genetic Algorithms.
Analog Integrated Circuits EET-302/ IET 601	1. Understand the characteristics of differential amplifier, Filters 2. Design sinusoidal and non-sinusoidal oscillators 3. Understand the functioning of OP-AMP and design OP-AMP based circuits 4. To apply the knowledge of ADC and DAC in different systems. 5. Design simple wave shaping circuits.
Digital Communication EET-304/ IET 602	1. Analyse and compare different digital modulation schemes for their efficiency and bandwidth 2. Investigate pulsed modulation system and analyse their system performance.

	3. Understand different multiple access schemes
	4. Analyse different digital modulation schemes and can compute the bit error performance
	5. To learn about different digital multiplexing and error control coding schemes
Advanced Instrumentation EET-306/ IET 603	1. Define the need of measurement and list characteristics and types of basic measuring instruments used for electrical and non-electrical quantities
	2. Identify & classify the construction and working principle of various transducers
	3. Apply the knowledge of measuring instruments in transmitting data
	4. Analyse basic measuring instruments to implement advance measuring instruments
	5. Differentiate between various transducers and measuring instruments
VLSI Design EET-308/ IET 604	1. Demonstrate a clear understanding of CMOS fabrication flow and technology scaling.
	2. Design Complementary MOSFET based logic circuit.
	3. Synthesis of digital VLSI systems from register-transfer or higher level descriptions in hardware design languages. Realize logic circuits with different design styles.
	4. Get the basic detail for designing of Sequential circuits.
	5. To learn about the designing of different arithmetic building blocks.
Enterpreneurship Development (HHS 342)	1. Describe what it takes an Entrepreneur; describe multiple ways to become an entrepreneur; including, entrepreneur, and manager, woman entrepreneur rural & urban: highlights motives to become entrepreneur.
	2. Apply the beginner concept, ownership and various forms with focus on small scale enterprises.
	3. Identify opportunities using identification; project conceptualisation, formulation & evaluation.
	4. Identify potential contribution of human resources, marketing, financial and strategic management with fund, opportunities.
	5. Decipher the role of Institution support and policy framework of Government for enterprises in India.
Digital Signal Processing EET-401/ IET 701	1. Do a time-frequency analysis of a signal
	2. Learn the basic forms of FIR and IIR filters, and how to design filters with desired frequency responses using MATLAB.
	3. Master the representation of discrete-time signals in the frequency domain, using z-transform, discrete Fourier transform (DFT), and analysis of LTI Systems
	4. Understand the implementation of the DFT in terms of the FFT, as well as some of its applications (computation of convolution sums, spectral analysis).
	5. Become aware with the concepts for Implementation of DSP algorithm using DSP Processers
BMP EET 453/ IET 835	1. To understand about basic biomedical signals and data analysis.
	2. To get the information about different measuring instrument for

	biomedical. 3. To apply these concepts on ECG and EEG and different algorithm. 4. To analyse EEG Analysis and spectral estimation. 5. Have the knowledge on EP estimation.
Satellite Communication EET-455/ IET- 711	1. Understand the basic components of orbital mechanism, launching and satellite. 2. Solve the satellite link design numerical problems. 3. Analyse this knowledge on different multiple access technique like FDMA, TDMA, DAMA, FDMA-SCPC-DA. 4. understand the mechanism used for broadcasting and navigation. 5. Have the knowledge of GPS.
DSD EET 457/ IET 822	1. Understand the basic syntax of VHDL and IEEE libraries formodelling of combinational and sequential circuits. 2. Design different networks for arithmetic operation and onfloating point arithmetic. 3. Design SM chart for real world problems. 4. Understand the different families of Xilinx FPGA and bus model. 5. Apply these concepts to understand UART andmicrocontroller.
Computer Network EET-459/ ICS-604	1. Identify the components required to build different types of networks. 2. Have the knowledge of different protocols and IEEE standards and ISO model. 3. Choose the required functionality at each layer for given applications. 4. Identify the solutions for functionality at each layer. 5. Trace the flow of information from one node to another node in the network.
Wireless Communications EET-477/ IET 702	1. An understanding of the requirements of modern wireless communication systems. 2. An understanding of key enabling technologies including Spread Spectrum, CDMA, Equalization, Diversity etc. and infrastructure for developing mobile Communication System Cellular Theory. 3. Ability to understand the new trends in Mobile/wireless communication radio propagation over wireless channel and various limitations. 4. Ability to understand the implementation of the key enabling techniques in commercial wireless systems such as UMTS, HSPA and LTE. 5. An appreciation of evolving trends leading to a vision of future heterogeneous wireless communication systems.
VLSI T EET 479/ IET 712	1. Understand the basic process of crystal growth and different steps for fabrication of ICs 2. Understand the concept of crystal growth, epitaxy and on film deposition 3. Understand basic steps for formation of ICs like lithography, Etching, Ion implantation, Metallization. 4. Apply these concepts to understand CMOS topology. 5. Apply these concepts on different types of MOSFETs.
Radar & Microwave Engg.	1. Understand various microwave system components their properties. 2. To study microwave systems for different practical application.

EET 481/ IET 714	3. Understand the basic concept and working of Radar 4. Apply these concepts on MTI and Doppler Radar 5. Study different navigation systems VOR, DECCA, DME, TACAN
Opto Electronics EET 475/ IET 713	1. Understand the concept of waveguide, optical fiber. 2. Know the photo sources and photo detectors. 3. Apply the concept of wave guide on electro optic fibers. 4. Analyse the application of sensors. 5. Know different types of display.
Mobile Communication EET 431/ IET-741	1. To understand the techniques involved in mobile communication 2. To review MAC, satellite and broadcast system 3. Analyse architecture of mobile associated systems 4. Have the in depth knowledge of network and transport layer. 5. To understand various systems that support for mobility.
Biomedical Electronics EET 433	1. To understand about basic biomedical signals and data analysis. 2. To get the information about different measuring instrument for biomedical. 3. To apply these concepts on ECG and EEG and different algorithm. 4. To analyse EEG Analysis and spectral estimation. 5. Have the knowledge on EP estimation.
Industrial / Practical Training and Report Presentation EET-461/ IET 754	1. Get exposure to the real working environment and make them conversant with the organization's hierarchical structure, business time-bound operations and administrative functions. 2. Get hands-on experience in his field of interest where they can relate and reinforce what has been taught in the courses. 3. Be able to promote Industry-academia interaction by presenting himself / herself as University representative in order to meet present challenges in the society and possibly setting stage for future recruitment. 4. Develop an ability to use technical resources available in the industry. 5. Develop an ability to document the requirements, procedure and result obtained out of the project done and to present it before industry persons and in formal academic setting.
Seminar EET 471/ IET 851	1. Analyse current literature at an advanced level from an interdisciplinary perspective. 2. Analyse and critique methods and practices prevalent for the proposed topic in the course of conducting literature search and by way of interactions both with faculty and batch mates. 3. Recognizing new paradigmatic and epistemological approaches for the proposed topic of study and use these approaches to find novel and interesting new solutions to address present societal problems. 4. Disseminate ideas effectively, both orally and in writing, in formal academic settings before faculty, batch mates, seniors and juniors etc. and enhancing interpersonal and communications skills. 5. Use relevant software tools for possible simulation to verify existing results and for documentation .
Project EET 498/ IET 853	1. Apply the knowledge of Engineering Fundamentals and Basic Sciences in formulation of relevant mathematical modelling and implementation

	of prototype or simulator after due literature survey (IEEE, Elsevier, Wiley, Taylor and Francis, etc.). 2. Implement the projects based on research-based knowledge, research methodologies, catering social needs (e.g. fulfil the need of differently-abled persons, security, energy conservation etc.) 3. Innovate the concept of Engineering Projects preferably in interdisciplinary areas 4. Understand the impact of Professional Engineering Solutions to Environment and Society 5. Design the cost-effective projects considering social and environmental factors. 6. Use relevant software and hardware tools for implementation of Projects and its documentation.
Architecture and Application of Digital Signal processors EET-452/ IET 833	1. Understand about different Digital Signal Processors hardware and circuits. 2. Know the architecture and instruction set for various digital signal processors. 3. To apply these concepts on programming & downloader. 4. Apply the concepts in synchronization filtering voice /speech processer. 5. Apply these concepts in applications e.g. telecomm., Image, military & other apps.
Information Theory and Coding EET-454/ IET 831	1. To understand about different source coding and channel capacity. 2. To apply these concepts on different type of codes and also get knowledge about error corrections. 3. To analyse to apply these concepts for analysis of video abstraction, secure data transmission and speech coding. 4. To apply coding concepts for analysis of different coder and decoder. 5. Learn about different modulation schemes and evaluate the performance on AWGN channel.
Advanced Semiconductor Devices EET-456/ IET 825	1. Understand the basic concept for formation of energy band, charge carriers and excess charge carriers. 2. Apply these concepts to understand the operation of different electronic devices like diode, BJT, JFET and MOSFET. 3. Analyse the working of these devices and solve mathematical problems of Diode, BJT, MOSFET and Diode. 4. To design a circuit using transistor at a desired operating point. 5. Apply these concepts on to understand the operation of heterojunction devices and have the basic knowledge of optically active devices.
RF System EET-458	1. Understand the importance of microwave concepts and itsapplications. 2. Apply smith chart on different applications. 3. Know about different single and multiport networks and their stability considerations. 4. Use of RF filters, amplifiers and oscillators. 5. Design different amplifiers and transistor oscillator
Digital Image Processing EET	1. To understand the digitization, segmentation shape representation of images.

476/ IET 824	2. Have the basic knowledge of data structure for image processing. 3. To apply these concepts on image transforms and image enhancement. 4. Also analyse image data compression on different image representation techniques. 5. To apply the concepts on 3D vision, geometry and radiometry.
Embedded Systems EET 480/ IET 832	1. Understand the basic of hardware fundamentals about embedded systems. 2. Learn about microprocessor and microcontroller. 3. Have the knowledge of interfacing from microprocessors using different techniques. 4. Apply these concepts to understand different advance processor. 5. Apply the concepts to solve real world problems.
Data Analytics EET 482	1. Understand algorithms by employing Map Reduce technique for solving Big Data problems. 2. Implement algorithms for Big Data by deciding on the apt Features set. 3. Design algorithms for Big Data by optimizing main memory consumption. 4. Design for Big Data by suggesting appropriate clustering techniques. 5. Know about supervised and unsupervised learning techniques for data analytics.
Optical Fiber Communication EET-478/ IET 801	1. Understand the Basic Principles of Wave Propagation through Optical Fiber, Characteristics of Optical Fibers and Signal Degradation in Optical Fibers, Optical Emission, Optical Source Materials. 2. Compare Structure and Operation of LED and Laser diodes. 3. Understand and compare Principles of Optical Detection, Structure, Operation and characteristics of PIN, APD and its Noise Performance. 4. Understand Principles of Operation of Optical Receiver and analyse different types of Noise and its effect on BER, and SNR. 5. Design and analyse Complete Optical Communication Link.
Image Processing EET442	1. To understand the digitization, segmentation shape representation of images. 2. Have the basic knowledge of data structure for image processing. 3. To apply these concepts on image transforms and image enhancement. 4. Also analyse image data compression on different image representation techniques. 5. To apply the concepts on 3D vision, geometry and radiometry.
Fuzzy Logic EET 444/ IET 715	1. To understand uncertainty if information and different sets of fuzzy sets and their properties. 2. To understand and apply different DSW algorithm. 3. To apply these concepts on Fuzzification and defuzzification. 4. To analyse different models of fuzzy on digital components. 5. To apply fuzzy logic on real time applications.