COURSE STRUCTURE AND SYLLABUS

For

ELECTRONICS AND COMMUNICATION ENGINEERING

(Applicable for batches admitted from 2019-2020)

R19

VISHNU
UNIVERSAL LEARNING

VISHNU INSTITUTE OF TECHNOLOGY (AUTONOMOUS):: BHIMAVARAM

Approved by AICTE, Accredited by NAAC-A^{++}, NBA & Affiliated to JNTUK

I B.Tech I Sem (Semester - I)

S.No	Category (Course Code)	Course Title	Hours Per week			Credits	Examinations			Category
			L	T	P	C	I	E	T	
1	19BS1T01	COMMUNICATIVE ENGLISH	2	0	0	2	40	60	100	HS
2	19BS1T02	MATHEMATICS-I (LINEAR ALGEBRA & CALCULUS)	2	1	0	3	40	60	100	BS
3	19BS1T03	APPLIED PHYSICS	3	0	0	3	40	60	100	BS
4	19CS1T01	PROBLEM SOLVING AND PROGRAMMING USING PYTHON	3	0	0	3	40	60	100	ES
5	19ME1P01	ENGINEERING GRAPHICS AND DESIGN	1	0	3	2.5	40	60	100	ES
6	19BS1P01	LAB I: ENGLISH COMMUNICATION SKILLS LAB	0	0	3	1.5	40	60	100	HS
7	19BS1P02	LAB II: APPLIED PHYSICS LAB	0	0	3	1.5	40	60	100	BS
8	19CS1P01	LAB III: PROBLEM SOLVING AND PROGRAMMING LAB	0	0	3	1.5	40	60	100	ES
9	19BS1A01	CONSTITUTION OF INDIA	3	0	0	0	-	-	-	MC
Total			**14**	**1**	**12**	**18**	**320**	**480**	**800**	

I B.Tech II Sem (Semester - II)

S.No	Category (Course Code)	Course Title	Hours Per week			Credits	Examinations			Category
			L	T	P	C	I	E	T	
1	19BS2T02	MATHEMATICS-II (PDE & VECTOR CALCULUS)	2	1	0	3	40	60	100	BS
2	19BS2T07	MATHEMATICS-III (TRANSFORM CALCULUS & COMPLEX VARIABLES)	2	1	0	3	40	60	100	BS
3	19BS2T05	APPLIED CHEMISTRY	3	0	0	3	40	60	100	BS
4	19EE2T01	NETWORK ANALYSIS	2	1	0	3	40	60	100	ES
5	19CS2T01	AI TOOLS, TECHNIQUES& APPLICATIONS	2	1	0	3	40	60	100	ES
6	19BS2P04	LAB I: APPLIED CHEMISTRY LAB	0	0	3	1.5	40	60	100	BS
7	19CS2P01	LAB II: AI TOOLS, TECHNIQUES & APPLICATIONS LAB	0	0	3	1.5	40	60	100	ES
8	19CS2P04	LAB III: COMPUTER PROGRAMMING LAB	0	0	2	1	40	60	100	ES
9	19CS2P03	ENGINEERING WORKSHOP & IT WORKSHOP	0	0	3	1.5	40	60	100	ES
10	19BS2A02	ENVIRONMENTAL SCIENCE	3	0	0	0	-	-	-	MC
Total			**14**	**4**	**11**	**20.5**	**360**	**540**	**900**	

II B.Tech I Sem (Semester - III)

S.No	Category (Course Code)	Course Title	Hours Per week			Credits	Examinations			Category
			L	T	P	C	I	E	T	
1	19EC3T01	ELECTRONIC DEVICES AND CIRCUITS	3	0	0	3	40	60	100	PC
2	19EC3T02	SIGNALS AND SYSTEMS	3	0	0	3	40	60	100	PC
3	19EC3T03	SWITCHING THEORY AND LOGIC DESIGN	3	0	0	3	40	60	100	PC
4	19EC3T04	RANDOM VARIABLES AND STOCHASTIC PROCESS	2	0	0	2	40	60	100	BS/PC
5	19EE3T04	ELECTRICAL TECHNOLOGY	3	0	0	3	40	60	100	ES
6	19EC3T05	INTERNET OF THINGS	2	0	0	2	40	60	100	ES
7	19EC3P01	LAB I: ELECTRONIC DEVICES AND CIRCUITS LAB	0	0	3	1.5	40	60	100	PC
8	19EE3P01	LAB II: NETWORK ANALYSIS & ELECTRICAL TECHNOLOGY	0	0	3	1.5	40	60	100	ES
9	19CS3P01	LAB III: IOT LAB	0	0	3	1.5	40	60	100	ES
10	19BS3P01	LAB IV: BUSINESS ENGLISH COMMUNICATION LAB	0	0	3	1.5	40	60	100	ES
11	19BS3A01	QUANTITATIVE APTITUDE -I	0	0	2	0	-	-	-	BS
Total			**16**	**0**	**14**	**22**	**400**	**600**	**1000**	

II B.Tech II Sem (Semester - IV)

S.No	Category (Course Code)	Course Title	Hours Per week			Credits	Examinations			Category
			L	T	P	C	I	E	T	
1	19EC4T01	ELECTRONIC CIRCUITS AND ANALYSIS	3	0	0	3	40	60	100	PC
2	19EC4T02	PULSE AND DIGITAL CIRCUITS	3	0	0	3	40	60	100	PC
3	19EC4T03	EM WAVES AND TRANSMISSION LINES	2	0	0	2	40	60	100	PC
4	19EC4T04	ANALOG COMMUNICATIONS	3	0	0	3	40	60	100	PC
5	19ME4T07	ELEMENTS OF CIVIL AND MECHANICAL ENGINEERING	3	0	0	3	40	60	100	ES
6	19EC4P01	LAB I: EC & PDC LAB	0	0	3	1.5	40	60	100	PC
7	19EC4P02	LAB II: ANALOG COMMUNICATIONS LAB	0	0	3	1.5	40	60	100	PC
8	19ME4P05	LAB III: CIVIL AND MECHANICAL ENGINEERING LAB	0	0	3	1.5	40	60	100	ES
9	19EC4J01	MINI PROJECT-I	0	0	3	1	20	30	50	PR
10	19BS4T01	LOGICAL REASONING	0	0	2	1	40	60	100	BS
Total			**14**	**0**	**14**	**20.5**	**380**	**570**	**950**	

III B.Tech I Sem (Semester - V)

S. No	Category (Course Code)	Subjects	Hours Per week			Credits	Examinations			Category
			L	T	P	C	I	E	T	
1	19EC5T01	INTEGRATED CIRCUITS AND APPLICATIONS	3	0	0	3	40	60	100	PC
2	19EC5T02	ANTENNA AND WAVE PROPAGATION	3	0	0	3	40	60	100	PC
3	19EC5T03	DIGITAL COMMUNICATIONS	3	0	0	3	40	60	100	PC
4	19EE5T04	CONTROL SYSTEMS	3	0	0	3	40	60	100	ES
5	**PROFESSIONAL ELECTIVE I**									
	19EC5T04	1) OPTICAL COMMUNICATIONS	3	0	0	3	40	60	100	PE
	19EC5T05	2) CELLULAR AND MOBILE COMMUNICATIONS								
	19EC5T06	3) EMI/EMC								
6	**OPEN ELECTIVE I**									
	19OE5T08	1) OOPS THROUGH JAVA	3	0	0	3	40	60	100	OE
	19OE5T01	2) FUZZY AND NEURAL NETWORKS								
	19OE5T11	3) DATA STRUCTURES								
	19OE5T10	4**) SOFTCOMPUTING TECHENIQUES**								
7	19EC5P01	LAB I: DIGITAL COMMUNICATIONS LAB	0	0	2	1	40	60	100	PC
8	19EC5P02	LAB II: LINEAR & DIGITAL IC LAB	0	0	2	1	40	60	100	PC
9	19BS5T03	LOGICAL REASONING II	0	0	2	1	40	60	100	BS
10	19EC5J01	MINI PROJECT-II	0	0	0	1	20	30	50	PR
Total			**18**	**0**	**6**	**22**	**380**	**570**	**950**	

III B.Tech II Sem (Semester - VI)

S. No	Category (Course Code)	Subjects	Hours Per week			Credits	Examinations			Category
			L	T	P	C	I	E	T	
1	19EC6T01	MICROPROCESSOR AND MICROCONTROLLERS	3	0	0	3	40	60	100	PC
2	19EC6T02	DIGITAL SIGNAL PROCESSING	3	0	0	3	40	60	100	PC
3	19EC6T03	MICROWAVE ENGINEERING	3	0	0	3	40	60	100	PC
4		**OPEN ELECTIVE II**								
	19OE6T11	1) COMPUTER ARCHITECTURE AND ORGANIZATION	3	0	0	3	40	60	100	OE
	19OE6T12	2) RELIABILITY ENGINEERING								
	19OE6T07	3) OPERATIONS RESEARCH								
5		**PROFESSIONAL ELECTIVE II**								
	19EC6T04	1) RADAR SYSTEMS	3	0	0	3	40	60	100	PC
	19EC6T05	2) DIGITAL TV ENGINEERING								
	19EC6T06	3) DIGITAL SYSTEM DESIGN								

6		**HUMANITIES ELECTIVE I**								
	19HE6T01	1) MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS	3	0	0	3	40	60	100	HS
	19HE6T04	2) LIFE SCIENCES FOR ENGINEERING								
	19HE6T05	**3) FOREIGN LANGUAGE**								
7	19EC6P01	LAB I: MICROPROCESSOR AND MICROCONTROLLERS LAB	0	0	2	1	40	60	100	PC
8	19EC6P02	LAB II: DIGITAL SIGNAL PROCESSING LAB	0	0	2	1	40	60	100	PC
9	19BS6P01	ADVANCED ENGLISH COMMUNICATION SKILLS LAB	0	0	3	1.5	40	60	100	HS
10	19EC6I01	INDUSTRIAL TRAININGS/INTERNSHIPS/ CERTIFICATION COURSES	0	0	1	0.5	50	-	50	PR
Total			**18**	**0**	**8**	**22**	**410**	**540**	**950**	

IV B.Tech I Sem (Semester - VII)

S. No	Category (Course Code)	Subjects	Hours Per week			Credits	Examinations			Category
			L	T	P	C	I	E	T	
1	19EC7T01	VLSI	3	0	0	3	40	60	100	PC
2	19EC7T02	DIGITAL IMAGE PROCESSING	2	0	0	2	40	60	100	PC
3		**PROFESSIONAL ELECTIVE III**								
	19EC7T03	1) 5G TECHNOLOGIES	3	0	0	3	40	60	100	PE
	19EC7T04	2) DIGITAL IC DESIGN								
	19EC7T05	3) RF ENGINEERING & SYSTEM DESIGN								
	19EC7T06	4) COMPUTER NETWORKS								
4		**PROFESSIONAL ELECTIVE IV**								
	19EC7T07	1)ELECTRONIC MEASUREMENTS AND INSTRUMENTATION	3	0	0	3	40	60	100	PE
	19EC7T08	2) EMBEDDED SYSTEMS								
	19EC7T09	3) COGNITIVE RADIO								
5		**OPEN ELECTIVE III**								
	19OE7T08	1**) NETWORK SECURITY AND CRYPTOGRAPHY**	3	0	0	3	40	60	100	OE
	19OE7T09	2)ROBOTICS								
	19OE7T10	3) DIGITAL CONTROL SYSTEMS								
	19OE7T11	4) RAPID MANUFACTURING PROCESS								
6		**HUMANITIES ELECTIVE II**								
	19HS7T01	1) MANAGEMENT SCIENCE	3	0	0	3	40	60	100	HS
	19HS7T02	2) INTELLECTUAL PROPERTY RIGHTS AND PATENTS								
	19HS7T04	3) EDUCATION ,TECHNOLOGY AND SOCIETY								
7	19EC7P01	LAB I: VLSI LAB	0	0	3	1.5	40	60	100	PC
8	19EC7P02	LAB II:MICROWAVE AND OPTICAL COMMUNICATION LAB	0	0	2	1	40	60	100	PC
9	19EC7P03	**LAB III: SOFT COMPUTING TECHNIQUES LAB**	0	0	2	1	40	60	100	PC
10	19EC7J01	MINI PROJECT-III	0	0	2	1	20	30	50	PR

11	19EC7I01	TRAINING/CERTIFICATION/RESEARCH PROJECT	0	0	0	0.5	50	-	50	PR
Total			**`17**	**0**	**9**	**22**	**430**	**570**	**1000**	

IV B.Tech II Sem (Semester - VIII)

S. No	Category (Course Code)	Subjects	Hours Per week			Credits	Examinations			Category
			L	T	P	C	I	E	T	
1	**OPEN ELECTIVE IV**									
	19OE8T07	1) BIOMEDICAL ENGINEERING	3	0	0	3	40	60	100	OE
	19OE8T10	**2)** WEB TECHNOLOGIES								
	19OE8T11	3) NANOTECHNOLOGY AND APPLICATIONS								
	19OE8T19	**4)**FUNDAMENTALS OF POWER ELECTRONICS								
2	**PROFESSIONAL ELECTIVE V**									
	19EC8T01	1) WIRELESS SENSOR NETWORKS	3	0	0	3	40	60	100	PE
	19EC8T02	2) DIGITAL SPEECH PROCESSING								
	19EC8T03	3) CELLULAR MOBILE COMMUNICATION								
	19EC8T04	4) DSP &ARCHITECTURE								
3	19EC8J01	PROJECT	0	0	14	7	80	120	200	PR
Total			**6**	**0**	**14**	**13**	**160**	**240**	**400**	

DEPT OF ECE PROGRAM OUTCOMES (POs)

Program Outcomes are the statements that describe what learners will know and be able to do when they graduate from a program.

PO1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2. 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.

PO3. 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.

PO4. 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.

PO5. 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.

PO6. 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.

PO7. 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.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10.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.

PO11.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.

PO12.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.

DEPT OF ECE PROGRAM SPECIFIC OUTCOMES

PSO 1: Will be equipped with knowledge of innovative, dynamic complete design flow specialized in implementation of projects pertaining to communication system, signal processing, digital and analog IC design, embedded systems and will integrate all areas to illustrate the goal of DIGITAL INDIA.

PSO 2: Will have the ability to analyze, design electronics and communication applications using software tools like, pSPICE, XILINX, MATLAB, Mentor Graphics and other related software.

PSO 3: Can demonstrate the principles of semiconductor devices, digital system, Microprocessor and microcontrollers, signal processing, antenna design in fields of consumer electronics, medical, defense and spacecraft electronics industry.

PSO 4: Will have strong ethical moral values and sound fundamental foundation of technical knowledge in all core subjects which help them to explore scientific theories, ideas, methods and technologies that help in solving current and future universal societal problems through Assistive Technology Laboratory as a platform.

I Year - I Semester

COMMUNICATIVE ENGLISH

Course Outcomes

At the end of the course, the learners will be able to

- Identify the context, topic, and pieces of specific information from social or transactional dialogues spoken by native speakers of English.
- Formulate sentences using proper grammatical structures and correct word forms.
- Speak clearly on a specific topic using suitable discourse markers in informal discussions.
- Write summaries based on global comprehension of reading/listening texts.
- Produce a coherent paragraph interpreting a figure/graph/chart/table.
- Take notes while listening to a talk/lecture to answer questions.

MATHEMATICS-I (LINEAR ALGEBRA & CALCULUS)

Course Outcomes:

After completing this course, the students will be able to

- Solve linear system of equations in engineering problems.
- Find Eigenvalues and Eigenvectors of a matrix in engineering studies.
- Model engineering problems as differential equations and solve analytically. .
- Model engineering problems as a differential equations and solve analytically the higher order differential equations.
- Find out local /global optimum of functions of several variables.
- Compute areas, surface areas and volumes.

APPLIED PHYSICS

Course Outcomes:

Upon the completion of the course the students will be able to:

CO1: Explain the need of coherent sources and the conditions for sustained interference. Identify the applications of interference in engineering. Analyse the differences between interference and diffraction with applications. Illustrate the concept of polarization of light and its applications.

CO2 Explain various types of emission of radiation. Identify the role of laser in engineering applications. Describe the construction and working principles of various types of lasers. Explain the working principle of optical fibers. Classify optical fibers based on refractive index profile and mode of propagation. Identify the applications of optical.

CO3: Explain the concept of dielectric constant and polarization in dielectric materials. Summarize various types of polarization of dielectrics. Classify the magnetic materials based on susceptibility and their temperature dependence. Explain the applications of dielectric and magnetic materials. Apply the concept of magnetism to magnetic devices.

CO4: Describe the dual nature of matter. Explain the significance of wave function. Identify the role of Schrodinger's time independent wave equation in studying particle in one-dimensional infinite potential well. Identify the role of classical free electron theory in the study of electrical conductivity.

CO5: Explain the concept of quantum free electron theory in the study of electrical conductivity. Classify the energy bands of solids. Outline the properties of charge carriers in semiconductors. Identify the type of semiconductor using Hall effect. Identify applications of semiconductors in electronic devices.

PROBLEM SOLVING AND PROGRAMMING USING PYTHON

Course Outcomes:

After completing this course, the students will be able to

- Visually describe programming logic using flowcharts.
- Develop Python programs for numerical and text based problems.
- Express and evaluate logic of simple programs.
- Choose relevant python data structure to solve problems.
- Develop simple static pages in html, css and serve them through flask.

ENGINEERING GRAPHICS & DESIGN

Course Outcomes:

After completing this course, the students will be able to

- Understand and construct the polygons and curves in engineering applications.
- Visualize objects in 3D space and draw Orthographic Projections.
- Interpret Orthographic and Isometric views of objects.

ENGLISH COMMUNICATION SKILLS LAB

Course Outcomes:

CO1: Understand Non Verbal Communication and identify the topic, the context, specific questions and overall idea by listening to short audio texts and answering a series of questions and will also be able to introducing themselves and others

CO2: Articulate Vowels and Consonants properly and answer a series of questions about main idea and supporting ideas after listening to audio texts and will be able to use expressions for Greetings and Leave takings, Complaining and Apologizing.

CO3: Understand stress and listen for global comprehension and summarize what is listened to and will be able to use expressions for Permissions, Requesting, and Inviting.

CO4: Apply the rules of stress and intonation while reading a text; will be able to speak on short topics and will also be able to use expressions for Asking for and giving Information/Directions; Suggesting/Opinion giving.

CO5: Write and enact Dialogues/Role Plays and practice topics from Science and Technology - using PPT slides and neutralize accent

CONSTITUTION OF INDIA

Course Outcomes:

After completing this course, the students will be able to

- Examine salient features of Indian Constitution and live accordingly in society.
- Interpret the meaning of Fundamental Rights and Directive Principles of State Policy and,
- Develop an attitude which paves the way for better living conditions.
- Discover various aspects of Union Government legislation and live up to the expectations of the rules.
- Critically examine State Government legislation and improve your living standards by following the rules strictly.
- Examine powers and functions of local bodies such as Municipalities and Panchayats and take advantage of available resources for better living
- Analyse the powers and functions of Election Commission and The Union Public Service Commission and decide upon it for safe and secured life.

I Year - II Semester

MATHEMATICS-II (PDE & VECTOR CALCULUS)

Course Outcomes:

After completing this course, the students will be able to

- Model first order linear and non-linear partial differential equations and solve analytically.
- Model higher order homogeneous & non homogeneous linear partial differential equations and solve analytically.
- Model physical problems of engineering like steady and unsteady heat conduction,vibration of string.
- Use of Laplace transforms in solving the differential equations with the initial and boundary conditions.
- Understand electric and magnetic fields and their physical significance.
- Compute line, surface and volume integrals and evaluate the work done, flux, potential functions.

MATHEMATICS-III (TRANSFORM CALCULUS & COMPLEX VARIABLES)

Course Outcomes:

After undergoing this course, students will be able to

- Compute Fourier series of periodic functions.
- Identify and solve problems related to engineering application using integral transform techniques.
- Identify and solve problems related to engineering applications using Z- transform techniques.
- Understand differentiability and analyticity for complex variable functions and learn sufficient conditions for analyticity.
- Evaluate integration of complex valued functions.
- Classify the singularities of complex function of one variable.

APPLIED CHEMISTRY

Course Outcomes:

After completing this course, the students will be able to

- The advantages and limitations of plastic materials and their use in design would be understood.
- Fuels which are used commonly and their economics, advantages and limitations are discussed.
- Reasons for corrosion and some methods of corrosion control would be understood.

- The students would be now aware of materials like nano-materials and fullerenes and their uses. Similarly liquid crystals and superconductors are understood. The importance of green synthesis is well understood and how they are different from conventional methods is also explained.
- Conductance phenomenon is better understood.
- The students are exposed to some of the alternative fuels and their advantages and limitations.

NETWORK ANALYSIS

Course Outcomes:

After completing this course, the students will be able to

- Articulate in working of various components of a circuit.
- Familiar with ac and dc circuits solving.
- Ready with the most important concepts like mesh and nodal analysis.
- Analyze various coupled circuits and resonance
- Solve the given circuit with various theorems and methods.
- Solve Circuits using Tree, Node, Branch, Cut set, Tie Set Methods.

ARTIFICIAL INTELLIGENCE TOOLS, TECHNIQUES AND APPLICATIONS

Course Outcomes:

After completing this course, the students will be able to

- Understand the importance of AI.
- Understand concepts of Machine Learning algorithms and their limitations.
- Develop Chatbots based on the requirements.
- Analyze complex problems involving image processing, such as quality control, visual surveillance, multimodal human-machine interfaces, and image compression.
- Understand the application of Reinforcement Learning.
- Understand smart solutions for various domains.

APPLIED CHEMISTRY LAB

- The students entering into the professional course have practically very little exposure to lab classes.
- The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis.
- Thus, at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments.
- They thus acquire some experimental skills.

ENGINEERING WORKSHOP & IT WORKSHOP

COURSE OUT COMES:

The student will be able to:

1. Know the importance of general safety precautions on different• shop floors.
2. Identify the basics of tools and equipments used in fitting,• carpentry, sheet metal, machine, welding and smithy.
3. Fabrication of wooden joints and understand joining of metals.
4. Make metal joints and sheet metal work.
5. Understand the basics of removal of material from work piece surface to attain specific shape.
6. Familiarize with the production of simple models in fitting, carpentry, sheet metal, machine, welding and smithy trades.

ENVIRONMENTAL SCIENCE

Course Outcomes:

After completing this course, the students will be able to

- Articulate the basic structure, functions, and processes of key social systems affecting the environment.
- Explain how Natural resources should be used.
- Identify the threats to biodiversity.
- Understand Causes, effects and control measures of environmental pollution.
- Gain knowledge about watershed management and environmental ethics.
- Gain a rigorous foundation in various scientific disciplines as they apply to environmental science, such as ecology, evolutionary biology, hydrology, and human behaviour.

II Year - I Semester

ELECTRONIC DEVICES AND CIRCUITS

Course Outcomes:

At the end of this course the student can able to:

- Understand the basic concepts of semiconductor physics.
- Understand the formation of p-n junction and how it can be used as a p-n junction as diode in different modes of operation.
- Know the construction, working principle of rectifiers with and without filters with relevant expressions and necessary comparisons.
- Understand the construction, principle of operation of transistors, BJT and FET with their V-I characteristics in different configurations.
- Know the need of transistor biasing, various biasing techniques for BJT and FET and stabilization concepts with necessary expressions.
- Perform the analysis of small signal low frequency transistor amplifier circuits using BJT and FET in different configurations.

SIGNALS & SYSTEMS

Course Outcomes:

At the end of this course the student will able to

- Understand and differentiate among various classes of signals and Systems.
- Analyze the continuous-time signals and continuous-time systems using Fourier series, Fourier transform and Laplace transform.
- Understand the relationships among the various representations of LTI systems.
- Apply sampling theorem to convert continuous-time signals to discrete-time signal and reconstruct back.
- Apply z-transform to analyze discrete-time signals and systems.

SWITCHING THEORY AND LOGIC DESIGN

Course Outcomes:

- Classify different number systems and apply to generate various codes.
- Use the concept of Boolean algebra in minimization of switching functions
- Design different types of combinational logic circuits.
- Apply knowledge of flip-flops in designing of Registers and counters.

- The operation and design methodology for synchronous sequential circuits and algorithmic state machines.
- Produce innovative designs by modifying the traditional design techniques.

RANDOM VARIABLES AND STOCHASTIC PROCESS

Course Outcomes:

After completion of the course, the student will be able to

- Mathematically model the random phenomena and solve simple probabilistic problems.
- Identify different types of random variables and compute statistical averages of these random variables.
- Characterize the random processes in the time and frequency domains.
- Analyze the LTI systems with random inputs.
- Apply these techniques to analyze the systems in the presence of different types.

ELECTRICAL TECHNOLOGY

Course Outcomes:

- Able to estimate the parameters of two port networks.
- Able to describe the performance of dc shunt machine.
- Able to investigate the performance of Single-phase transformer.
- Able to perform tests on 3-phase induction motor and alternator to determine their performance characteristic.

INTERNET OF THINGS

Course Outcomes:

- Interpret the impact and challenges posed by IOT networks leading to new architecturalmodels.
- Compare and contrast the deployment of smart objects and the technologies to connect them tonetwork.
- Appraise the role of IOT protocols for efficient networkcommunication.
- Elaborate the need for Data Analytics and Security inIOT.
- Illustrate different sensor technologies for sensing real world entities and identify the applications of IOTinIndustry.

QUANTITATIVE APTITUDE –I

Course Outcomes:

After completing this course, the students will be able to

- Find number of factors, LCM and HCF of numbers and fractions, least and greatest number divisible by given numbers and leaving some remainder(s).
- Evaluate average of numbers, Proportions of given ratio, ratio or average price of two quantities of different prices when mixed to get new mix, use relation between fractions and percentages in calculation.
- Identify the profit or loss incurred in a transaction and how cheating is possible by an unfair trader.
- Calculate the simple and compound interests ,difference between them and the EMI repayment for a loan.
- Evaluate the time taken by a train/car for crossing a static object or a moving object and time taken by a person to a row a boat in a river.
- Calculate the time required for individual or combined work, shares of amount for their work and time taken for a tank/cistern to get filled by inlets and outlet.

II Year - II Semester

ELECTRONIC CIRCUITS AND ANALYSIS

Course Outcomes:

After going through this course the student will be able to

- Design and analysis of small signal high frequency transistor amplifier using BJT and FET.
- Design and analysis of multi stage amplifiers using BJT and FET and Differential amplifier using BJT.
- Derive the expressions for frequency of oscillation and condition for oscillation of RC and LC oscillators and their amplitude and frequency stability concept.
- Know the classification of the power and tuned amplifiers and their analysis with performance comparison.

PULSE AND DIGITAL CIRCUITS

Course Outcomes:

After going through this course the student will be able to

- Design linear and non-linear wave shaping circuits.
- Apply the fundamental concepts of wave shaping for various switching and signal generating circuits.
- Design different multi vibrators and time base generators.
- Utilize the non-sinusoidal signals in many experimental research areas.

EM WAVES AND TRANSMISSION LINES

Course Outcomes:

After going through this course the student will be able to

- Determine E and H using various laws and applications of electric & magnetic fields.
- Apply the Maxwell equations to analyze the time varying behavior of EM waves.
- Gain the knowledge in uniform plane wave concept and characteristics of uniform plane wave in various media.
- Calculate Brewster angle, critical angle and total internal reflection.
- Derive the expressions for input impedance of transmission lines.
- Calculate reflection coefficient, VSWR etc. using smith chart.

ANALOG COMMUNICATIONS

Course Outcomes:

After going through this course the student will be able to

- Differentiate various Analog modulation and demodulation schemes and their spectral characteristics.
- Analyze noise characteristics of various analog modulation methods.
- Analyze various functional blocks of radio transmitters and receivers.
- Design simple analog systems for various modulation techniques.

ELEMENTS OF CIVIL AND MECHANICAL ENGINEERING

Course Outcomes:

After going through this course the student will be able to

- To impart basic knowledge on civil engineering and the students will be able to analyze the material on the basis of their properties and thus assigning different weightage to their use for technical purposes
- To provide exposure on the fundamental elements of civil engineering structures
- Identify engineering materials, their properties, manufacturing methods encountered in engineering practice.
- Understand the basics of internal combustion engines, heat transfer and mechanism of power transfer through belt, rope, chain and gear drives.
- Understand the working of hybrid electric vehicles, basics of robotics and automation.

LOGICAL REASONING

Course Outcomes:

After completing this course, the students will be able to

- Identify the relation between given persons, find the direction and distance from starting point, find angle between hands at given time and vice-versa, find day of given date and vice-versa.
- Find the position and rank of a person/object in an arrangement, arranging in order using given data.
- Decode the given code pattern and code given word in terms of alphabet, numbers, symbols and mixed, identify missing term in the pattern/series.
- Draw a valid conclusion from the statements, consistency of inference drawn, valid reason from given assertions.
- Identify the cause for the assumed effect, take decision logically from the given data.

- Identify the odd one in the given series/group, number opposite any face of dice, figure completion from a folded figure.

III Year - I Semester

INTEGRATED CIRCUITS AND APPLICATIONS

Course Outcomes:

- Design circuits using operational amplifiers for various applications.
- Analyse and design amplifiers and active filters using Op-amp.
- Diagnose and trouble-shoot line are electronic circuits.
- Understand the gain-bandwidth concept and frequency response of the amplifier configurations.
- Understand thoroughly the operational amplifiers with linear integrated circuits.

ANTENNA AND WAVE PROPAGATION

Course Outcomes:

After going through this course the student will be able to

- Identify basic antenna parameters.
- Design and analyze wire antennas, loop antennas, reflector antennas, lens antennas, horn antennas and micro strip antennas.
- Quantify the fields radiated by various types of antennas.
- Design and analyse antenna arrays.
- Analyze antenna measurements to assess antenna's performance.
- Identify the characteristics of radio wave propagation.

DIGITAL COMMUNICATIONS

Course Outcomes:

At the end of this course the student can able to:

- Analyze various pulse digital modulation techniques and Apply different sampling and quantization techniques for A/D conversions.
- Analyze various digital modulation techniques.
- Evaluate the probability of error for digital modulation techniques.
- Compute and analyze Block codes, cyclic codes and convolution codes.
- Design a coded communication system.

CONTROL SYSTEMS

Course Outcomes:

- This course introduces the concepts of feedback and its advantages to various controlsystems.
- The performance metrics to design the control system in time-domain and frequency domain are introduced.
- Control systems for various applications can be designed using time-domain and frequency domain analysis.
- In addition to the conventional approach, the state space approach for the analysis of control systems is also introduced.

OPTICAL COMMUNICATIONS

Course Outcomes:

On successful completion of the course, students will be ableto:

- Apply knowledge to understand· Mode theory of optical communication.

· Losses in optical fibers.· Optical sources and detectors.· Power Launching and coupling techniques.· Optical links.· WDM concepts.· Optical Networks.

- Analyze Problems in analog and Digital Links.
- Design and Develop Optical Sources, Detectors and Links.
- Provide valid solutions to overcome losses in optical fibers.
- Select appropriate optical components to suit advanced optical communications and Networks.
- Assess and propose cost effective solutions to minimize the radiation hazards caused by wireless links.

CELLULAR AND MOBILE COMMUNICATIONS

Course Outcomes:

At the end of this course the student can able to:

- Understand the basic concept and limitations/advancements of conventional mobile telephone systems, cellular mobile systems and advanced generations of cellular wireless systems.
- Identify and understand the effect of interference in cellular mobile communication.
- Explore the frequency management, channel assignment strategies and antennas in cellular systems.
- Understand the concept of handoff and architectures of various cellular systems.
- Familiarized with the concept of cell coverage for signal and traffic, diversity techniques and mobile antennas

EMI/EMC

Course Outcomes:

At the end of this course the student can able to

- Students shall be able to distinguish effects of EMI and counter measures by EMC-techniques.
- Students shall apply the knowledge gained in selecting proper gadget/device/appliance/system, as per EMC- norms specified byregulating authorities.
- Students shall choose career in the fields of EMI/EMC as anEngineer/Researcher/Entrepreneur in India/abroad.

OOPS THROUGH JAVA

Course Outcomes:

- Write, compile, execute and troubleshoot Java programming for networking concepts.
- Build Java Application for distributed environment.
- Design and Develop multi-tier applications.
- Identify and Analyse Enterprise applications.

DATA STRUCTURES

Course Outcomes:

By the end of the course, the students should be able to:

- Understand basic concepts of data structures and apply algorithm analysis for various searching and soring techniques.
- Understand the concept of linked lists and be use it in various applications.
- Be able to use Stacks and Queues in various applications.
- Understand the concept of Trees & Graphs and perform various operations on it.
- Understand the concept of Hashing & different types of Hashing Techniques.

LOGICAL REASONING II

Course Outcomes:

After completing this course, the students will be able to

- Analyze the given chart / table and interpret the results from the given data.
- Identify the logic the given objects follow and identify the missing or similar one and the different one.
- Understand the pattern and select the figure which completes the series and form a new object.

- Apply the logic to find the figure that can be inserted, group the similar objects and count number of objects in the given figure.
- Estimate the number of persons/objects belonging to a specified category using the concept of Venn diagram.
- Deduce the ratios/ equations corresponding to ages of persons of a family and calculate the corresponding ages.

III Year - II Semester

MICROPROCESSOR AND MICROCONTROLLERS

Course Outcomes:

At the end of the course, the students should be able to

- Understand and execute programs based on 8086microprocessor.
- Design Memory Interfacing circuits.
- Design and interface I/O circuits.
- Design and implement 8051 microcontroller based systems
-

DIGITAL SIGNAL PROCESSING

Course Outcomes:

At the end of this course the student can able to:

- Apply the difference equations concept in the anayziation of discrete time systems.
- Use the FFT algorithm for solving the DFT of a given signal.
- Design a Digital filter (FIR&IIR) from the given specifications.
- Realize the FIR and IIR structures from the designed digital filter.
- Use the Multirate Processing concepts in various applications (eg: Design of phase shifters, interfacing of digital systems…).
- Apply the signal processing concepts on DSP Processor.

COMPUTER ARCHITECTURE AND ORGANIZATION

Course Outcomes:

At the end of this course the student can able to:

- Students can understand the architecture of modern computer.
- They can analyze the Performance of a computer using performance equation.
- Understanding of different instruction types.
- Students can calculate the effective address of an operand by addressing modes.
- They can understand how computer stores positive and negative numbers.
- Understand the concepts of I/O Organization and Memory systems.

RELIABILITY ENGINEERING

Course Outcomes:

- Design circuits using operational amplifiers for various applications.
- Analyze and design amplifiers and active filters using Op-amp.
- Diagnose and trouble-shoot linear electronic circuits.
- Understand the gain-bandwidth concept and frequency response of the amplifier configurations.
- Understand thoroughly the operational amplifiers with linear integrated circuits.

OPERATIONS RESEARCH

Course Outcomes:

After completion of the course, the students will be able to:

- Modal and solve the LP problems.
- Solve the transportation and assignment problems.
- Make right decisions in operations management using replacement theory.
- Make right decisions in operations management using game theory.
- Make use sequence models.
- Formulate a real time situation in a mathematical model using queuing theory.

RADAR SYSTEMS

Course outcomes:

After going through this course the student will be able to:

- Derive the radar range equation and to solve some analytical problems.
- Understand the different types of radars and its applications.
- Understand the concept of tracking and different tracking techniques.
- Understand the various components of radar receiver and its performance.

DIGITAL TV ENGINEERING

Course Outcomes

Upon completion of the course, the students will be able to:

- Understand TV standards and picture tubes for monochrome TV.
- Distinguish between monochrome and color Television transmitters and receivers.
- Analyze and Evaluate the NTSC and PAL color systems.

MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS

Course Outcomes:

- To adopt the Managerial Economic concepts for decision making and forward, planning.
- To outline the different types of business organizations and provide a framework for analyzing money in its functions as a medium of exchange.
- To implement various techniques for assessing the financial position of the business.

LIFE SCIENCES FOR ENGINEERING

Course Outcomes;

After studying the course, the student will be able to:

- Explain catalytic properties of enzymes.
- Summarize application of enzymes and fermentation in industry.
- Identify DNA as a genetic material in the molecular basis of information transfer.
- Apply thermodynamic principles to biological systems.
- Analyze biological processes at the reductionist level.

MICROPROCESSOR AND MICROCONTROLLERS LAB

Course Outcomes:

- Demonstrate ability to handle arithmetic operations using assembly language programming in TASM and training boards.
- Demonstrate ability to handle logical operations using assembly language programming in TASM.
- Demonstrate ability to handle string instructions using assembly language programming in TASM.
- Demonstrate ability to handle sorting operations and using assembly language programming in TASM.

DIGITAL SIGNAL PROCESSING LAB

Course Outcomes:

At the end of this course the student can able to:

- Generate the discrete time signals
- Plot the frequency response of analog LP/HP filters
- Analyze the stability of the system
- Compute Linear and Circular Convolution

- Design FIR and IIR filters
- Find the FFT of 1-D signal and power density spectrum

ADVANCED ENGLISH COMMUNICATION SKILLS LAB

Course Outcomes:

Upon the completion of the course, the student will be able to:

- Choose vocabulary contextually.
- Comprehend, analyse and interpret the text in a definite time frame.
- Write resumes cohesively and coherently.
- Construct and elaborate on a given topic.
- Comprehend and practice the dynamics of group discussion.
- Comprehend the concept and process of interview; answering through mock interviews.

IV Year - I Semester

VLSI

Course Outcomes:

At the end of this course the student can able to:

- Explain the operation of MOSFET and the fabrication of various MOSFETS.
- Understand the basic electrical properties of MOS circuits.
- Analyze the CMOS circuit design processes and scaling of MOS circuits.
- Design the logic circuits using VHDL, test and understand the Implementation strategies.

DIGITAL IMAGE PROCESSING

Course Outcomes:

After undergoing the course students will be able to

- Perform image manipulations and different digital image processing techniques
- Perform basic operations like – Enhancement, Image transforms and restoration techniques on image.
- Apply wavelets in image processing techniques.
- Apply various morphological operators on images.
- Analyze pseudo and fullcolor image processing techniques.

5G TECHNOLOGIES

Course Outcomes:

At the end of this course the student can:

1. Understand and explain the channel models of 5G and the use cases for 5G.
2. Analyse use of MIMO in 5G and its techniques.
3. Draw and explain 5G architecture, its components and functional criteria.
4. Understand device to device (D2D) communication and standardization.
5. Understand interference management, mobility management and security issues in 5G.

DIGITAL IC DESIGN

Course Outcomes:

After going through this course the student will be able to

1. Understand the concepts of MOS Design.
2. Design and analysis of Combinational MOS Circuits.

3. Design and analysis of Sequential MOS Circuits.
4. Extend the Digital IC Design to Different Applications.
5. •Understand the Interconnect Techniques.
6. •Understand the Concepts of Semiconductor Memories, RAM array organization.

RF ENGINEERING & SYSTEM DESIGN

Course Outcomes:

At the end of this course the student can able to:

- Design impedance matching networks and passive RF filters.
- Design and appraise RF amplifiers and oscillators.
- Analyze EMI and EMC in RF circuits.

COMPUTER NETWORKS

Course Outcomes:

At the end of this course the student can:

- Understand OSI and TCP/IP models.
- Analyze MAC layer protocols and LAN technologies.
- Design applications using internet protocols.
- Understand routing and congestion control algorithms.
- Understand how internet works.

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Course Outcomes:

After completion of the course the student will be

- Able to understand operation of different instruments.
- Able to describe different terminology related to measurements
- Understand and analyse different signal generators and analysers.
- Understand the design of oscilloscopes for different applications.

EMBEDDED SYSTEMS

Course Outcomes:

After undergoing the course students will be able to

- Understand the basic concepts of an embedded system and able to know an embedded system

- Design approach to perform a specific function.
- The hardware components required for an embedded system and the design approach of an embedded hardware.
- The various embedded firmware design approaches on embedded environment.
- Understand how to integrate hardware and firmware of an embedded system using real time operating system.

COGNITIVE RADIO

Course Outcomes:

After undergoing the course students will be able to

- Understand the fundamental concepts of cognitive radio networks.
- Develop the cognitive radio, as well as techniques for spectrum holes detection that cognitive radio takes advantages in order to exploit it.
- Understand technologies to allow an efficient use of TVWS for radio communications based on two spectrum sharing business models/policies.
- Understand fundamental issues regarding dynamic spectrum access, the radio- resource management and trading, as well as a number of optimization techniques for better Spectrum exploitation
- Design the network, transport and cross layers based on the challenges and issues

NETWORK SECURITY AND CRYPTOGRAPHY

ROBOTICS

Course Outcomes:

Upon successful completion of this course you should be able to:

1. To learn about knowledge for the design of robotics.
2. Identify various robot configuration and components.
3. Carry out kinematic and dynamic analysis for simple serial kinematic chains
4. Calculate the Jacobian for serial and parallel robot.
5. Perform trajectory planning for a manipulator by avoiding obstacles and develop programming principles, languages for a robot control system
6. Select appropriate actuators and sensors for a robot based on specific application

DIGITAL CONTROL SYSTEMS

Course Outcomes:

1. Student will able to understand the advantages of digital systems over analog systems.
2. Student will able to understand the mathematical models of linear discrete-time control systems using pulse transfer functions and state-space models.
3. Student will able to analyze the digital systems using different stability methods.
4. Student will able to design digital controllers for physical systems.
5. Student will able to gain knowledge on controller design using state space analysis

RAPID MANUFACTURING PROCESS

Course Outcomes:

Students will be able to

- Differentiate Additive Manufacturing with other manufacturing processes.
- Select a suitable AM technique to produce multiple material and colored objects.
- Understand different solid, liquid and powder-based RP systems and their applications.
- Use various Software's and data formats in Additive Manufacturing to fabricate a component.
- Identify various Rapid tooling methods for a given application.
- Apply the concept of Reverse Engineering for complex geometries to develop products using AM.

MANAGEMENT SCIENCE

Course Outcomes:

After undergoing the course students will be able to

- After completion of the Course the student will acquire the knowledge on management functions, global leadership and organizational behaviour.
- Will familiarize with the concepts of functional management project management and strategic management

INTELLECTUAL PROPERTY RIGHTS AND PATENTS

Course Outcomes:

After undergoing the course students will be able to

- Identify different types of Intellectual Properties (IPs), the right of ownership, scope of protection as well as the ways to create and to extract value from IP.

- Recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development.
- Understood the core values that shape the ethical behaviour of an engineer.
- Exposed awareness on professional ethics and human values.

EDUCATION TECHNOLOGY AND SOCIETY

Course Outcomes:

After undergoing the course students will be able to

- Lead a good human life with necessary education.
- Learn the digital technologies in changing educational and psychological contexts
- Integrate their technical education for betterment of society
- Enable the digital technologies for learning in changing educational contexts
- Develop themselves with ethics and values of education and technology

Understand the social debates which impact on the use of technology in education.

MICROWAVE AND OPTICAL COMMUNICATION LAB

Course Outcomes

- Understand the Characteristics of ReflexKlystron and Gunn Diode
- Obtain the Scattering Matrix of Circulator, Directional coupler and Magic Tee
- Understand theCharacteristics of LED/LASER
- Obtain the data rate for a digital optic link

Measure the losses and Numerical Aperture of an Optical Fibre

IV Year - II Semester

BIOMEDICAL ENGINEERING

Course Outcomes:

At the end of this course the student can able to:

- Learn about fundamental concepts of bio medical instrumentation system, bio electric potentials and problems encountered in measuring a living system.
- Gain knowledge on electrodes, transducers,Respiratory system and instruments for breathing
- Be able to understand the physiology of heart and ECG
- Understanding the patient monitoring,pacemaker,Defibrillator,audiometer,
- An ability to explain about x-ray and MRI and ultrasonic diagnosis,
- Gain knowledge on Recorders, Bio telemetry and shock hazards.

NANO TECHNOLOGY AND APPLICATIONS

Course Outcomes:

Upon successful completion of this course, the students will be able to:

- Understand the concepts of Nano science and nanotechnology.
- Acquire knowledge about the classification of nanostructures.
- Understand the physical methods of synthesis of nanomaterials.
- Identify various chemical methods of synthesis of nanomaterials.
- Understand the tools for characterization of nanomaterials.
- Explore the applications of nanomaterials in automotive and aerospace sectors.

WIRELESS SENSOR NETWORKS

Course Outcomes:

After undergoing the course students will be able to

- Describe and explain radio standards and communication protocols on the link and networking layers for wireless personal area networks, and inter-working with wireless local area networks and cellular networks
- Describe and explain the function and use of sensors especially for medical and sports application.
- Describe and explain operating systems and programming languages for wireless sensor node.
- Be familiar with architectures, functions and performance of wireless sensor networks systems and platforms

- Describe and analyse the specific requirements for applications in wireless sensor networks regarding energy supply, memory, processing and transmission capacity

DIGITAL SPEECH PROCESSING

Course Outcomes:

After undergoing the course students will be able to

- Create new algorithms with speech processing
- Derive new speech models
- Perform various language phonetic analysis
- Create a new speech identification system

Generate a new speech recognition system

REAL TIME OPERATING SYSTEMS

Course Outcomes:

After undergoing the course students will be able to

- After completing the course students will understand the fundamental concepts of RTOS.
- They will have an in depth knowledge about the real time operating systems applications. Real-time operating systems.
- Able to understand the process communication in RTOS
- Able to understand various Real time operating systems.

DSP & ARCHITECTURE

Course Outcomes:

After undergoing the course students will be able to

- Understand the basic concepts, number representation and errors of Digital Signal Processing
- Differentiate the architectural features of General purpose processors and DSP processors
- Understand the architectures of TMS320C54xx devices and ADSP 2100 DSP devices
- Write the simple assembly language programs by using instruction set of TMS320C54xx
- Interface the various devices to DSP Processors.