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Course Outcomes

S.Y. B. Tech. ENTPCC-01 Network Theory Analysis Sem.-I

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
1	Apply different network theorems to simplify linear circuits.	L3: Apply
2	Summarize series resonance and Parallel resonance.	L2: Understand
3	Compute two port network parameters and draw equivalent network	L3: Apply
4	Determine transient and steady state response of linear circuits	L3: Apply
	Solve circuit problems using Fourier series, Fourier transform and Laplace transform.	L3: Apply
	Design passive filter and attenuator circuits	L3: Apply

S.Y.B.Tech ENTPCC-2 Electronics Circuit Analysis & Design Sem.-I

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
1	Determine wave-shaping circuits & voltage multipliers.	L3: Apply
2	Demonstrate filter circuits and its comparison.	L3: Apply
3	Design unregulated power supply using rectifier and filter.	L3: Apply
4	Illustrate working, characteristics, and hybrid model of BJT.	L3: Apply
5	Design negative feedback amplifiers using BJT.	L3: Apply
6	Describe the construction, working & drain characteristics of JFET and MOSFET.	L2: Understand

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S.Y. B. Tech ENTPCC-3- Analog and Digital Communication Sem.-I

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
1	Describe the fundamental concepts and various components of analog communication systems	L2: Understand
2	Explain the various techniques of generation and reception of amplitude modulation (AM), frequency modulation (FM) and phase modulation (PM) signals.	L2: Understand
3	Apply source coding techniques for the memoryless discrete sources.	L3: Apply
4	Explain pulse code modulation and binary digital modulation techniques	L2: Understand
5	Apply Linear block coding techniques for error detection & correction of block code	L3: Apply

S.Y.B.Tech ENTFP-02: PCB Design Lab Sem.-I

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
1	Explain the steps involved in schematic, layout, fabrication, and assembly process of PCB design	L2: Understand
2	Design (schematic and layout) PCB for analog circuits, and digital circuits	L4: Analyze
3	Design (schematic and layout) and fabricate PCB for simple circuits	L4: Analyze
4	Evaluate an electronic printed circuit board for a specific application	L5: Evaluate

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S.Y. B. Tech EM-01- Product Development and Entrepreneurship Sem.-I

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
1	Understand the concept of product development	L2: Understand
2	Identify the market strategies	L3: Apply
3	Frame the idea and convert it into a concept	L3: Apply
4	Identify the TRL, MRL and IRL level of product	L3: Apply
5	Demonstrate the business canvas model and lean canvas model	L3: Apply
6	Develop the strategies for launching the product in marketing	L3: Apply

S.Y. B.Tech ENTMDM- 01B- Sensor Technology Sem.-I

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
CO1	Describe the classification depends on application.	L2: Understand
CO2	Explain the applications of Industrial Sensors.	L2: Understand
CO3	Analyse the applications of Medical Sensors.	L3: Apply

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S.Y. B.Tech OE-01E:Mathematics for software and hardware applications Sem.-I

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
1	Compute higher order linear differential equations.	L3: Apply
2	Solve Laplace transforms of given functions	L3: Apply
3	Compute Z-transforms of given functions	L3: Apply
4	Determine the numerical solutions of transcendental equations, ordinary differential equations and numerical integrations.	L3: Apply
5	Compute Fourier series and half range Fourier series.	L3: Apply
6	Solve the problems of Fourier integral and Fourier transform	L3: Apply

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T.Y.B.Tech ENTPCC-07- Electromagnetic Field Theory Sem.-I

CO	**Course Outcomes:** **At the end of this course, students will be able to:**	**Cognitive Level**
1	Calculate mathematical concepts related to electromagnetic vector fields.	L3: Apply
2	Use Electrostatic laws for various parameters of the Electrostatic field	L3: Apply
3	Determine various parameters of magneto static fields using Magneto static laws.	L3: Apply
4	Examine Maxwell's equations for static, Time varying and Harmonic field.	L3: Apply
5	Solve EM waves and its propagation through different media.	L3: Apply
6	Apply knowledge of Smith chart to determine parameters of transmission line	L3: Apply

T.Y. B.Tech ENTPCC-08- Digital Signal Processing Sem.-I

CO	**Course Outcomes:** **At the end of this course, students will be able to:**	**Cognitive Level**
1	Describe the core concepts of DSP, including stability, correlation, and digital transfer functions.	L2: Understand
2	Apply DFT and FFT techniques for frequency domain analysis and filtering of signals.	L3: Apply
3	Analyze and solve problems related to long sequence filtering using overlap-save and overlap-add methods.	L4: Analyze
4	Describe FIR and IIR filters using various techniques	L2: Understand
5	Explain realization structures for FIR and IIR filters using direct, cascade, and parallel forms.	L2: Understand
6	Appy DSP applications in focusing on audio, telecommunication, and radar systems.	L3: Apply

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T.Y.B.Tech ENTPCC-08- Microcontrollers and Applications Sem.-I

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
1	Differentiate between CISC and RISC Microcontroller architectures.	L2: Understand
2	Describe the fundamental features and operation of 8051 microcontroller.	L2: Understand
3	Develop an application program for microcontroller hardware interfacing using assembly and C languages	L3: Apply
4	Describe the architecture, memory organization and features of PIC16f877A	L2: Understand
5	Explain the various core and peripheral features of PIC16f877A	L2: Understand
6	Develop programming for Arduino to interface with various sensors.	L3: Apply

T.Y.B.Tech ENTPEC- 01A- Digital Logic Design Sem.-I

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
1	Demonstrate the use of codes and k-map minimization techniques in digital circuits.	L3: Apply
2	Design combinational logic circuits using logic gates.	L3: Apply
3	Explain various characteristics of logic IC families.	L2: Understand
4	Model various flip-flops using NAND gates.	L3: Apply
5	Design asynchronous and synchronous sequential logic circuits.	L3: Apply
6	Apply concepts of state machines for designing digital applications.	L3: Apply

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T.Y.B.Tech AEC-02- Creativity and Design Thinking Sem.-I

CO	**Course Outcomes:** **At the end of this course, students will be able to:**	**Cognitive Level**
1	Describe the critical design thinking skills needed to either improve an existing product or design a new product.	L2: Understand
2	Demonstrate the ability to generate and evaluate creative ideas using ideation techniques.	L3: Apply
3	Apply Creativity and Prototyping to refine product designs effectively.	L3: Apply
4	Implement sustainable design principles to the engineering design process.	L3: Apply

T.Y.B.Tech OE-03- Interdisciplinary Mini Project Sem.-I

CO	**Course Outcomes:** **At the end of this course, students will be able to:**	**Cognitive Level**
1	Apply interdisciplinary knowledge, teamwork and collaboration skills to design and implement innovative solutions to engineering problems.	L3: Apply
2	Develop integration to emerging technologies in engineering and their applications into project design and development.	L3: Apply
3	Apply ethical principles and sustainable development goals in engineering design.	L3: Apply
4	Develop a comprehensive project report with proper documentation.	L3: Apply

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T.Y.B.Tech ENTMDM-03- IoT Networks and Security Sem.-I

CO	**Course Outcomes:** **At the end of this course, students will be able to:**	**Cognitive Level**
1	Explain the Architecture of Internet of Things.	L2: Understand
2	Use Design of IoT networks	L3: Apply
3	Describe IoT communications and Networks	L2: Understand
4	Describe different IoT security	L2: Understand
5	Describe the health monitoring of different objects.	L2: Understand

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T.Y.B.Tech HET12- Artificial Intelligence Sem.-I

CO	**Course Outcomes:** **At the end of this course, students will be able to:**	**Cognitive Level**
1	Describe fundamental aspects of Machine Learning.	L2: Understand
2	Illustrate different Machine Learning models.	L3: Apply
3	Discuss classification and regression algorithms	L2: Understand
4	Explain neural network for classification	L2: Understand
5	Distinguish between various characteristics of ML	L2: Understand
6	Interpret Machine learning techniques that enable to solve real world problems.	L2: Understand

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Final Year B. Tech ET421- Microwave Engineering Sem.-I

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
1	Formulate the wave equation in wave guide for analysis.	L2: Understand
2	Explain the working principles of all the microwave tubes and solid state devices	L2: Understand
3	Identify the use of microwave components and devices in microwave applications.	L2: Understand
4	Identify the use of microwave components and devices in microwave applications.	L2:Understand
5	Derive S matrix for given passive component.	L3:Apply
6	Choose a suitable microwave measurement instruments & carry out the required measurements	L2: Understand

Final Year B. Tech ET412- DATA COMMUNICATION Sem.-I

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
1	Explain Data Communications System and its components.	L2: Understand
2	Use of OSI and TCP/IP Models for data linking of each layer.	L1: Remember
3	Illustrate the wireless LAN standards	L3: Apply
4	Identify the different types of protocols for sub netting, routing mechanisms and transportation	L1: Remember
5	Organize the basic protocols of computer networks and their use.	L4: Analyse

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Final Year B. Tech ET413- VLSI Design Sem.-I

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
1	Explain the different syntax of Verilog HDL language.	L2: Understand
2	Design combinational circuits using Verilog HDL.	L3: Apply
3	Design sequential logic circuits using Verilog HDL.	L3: Apply
4	Describe MOS transistor theory and behavior of E-MOSFET.	L2: Understand
5	Model combinational logic circuit design using E-MOSFETs.	L3: Apply
6	Discuss the architecture and internal components of CPLD and FPGA.	L2: Understand

Final Year. B.Tech ET414.2- Mobile Communication Sem.-I

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
1	Define cellular systems, working and hand off strategies implemented in mobile communication	L1: Remember
2	Analyse various losses in mobile radio propagations and define multiple access schemes sharing radio spectrum.	L4: Analyse
3	Define GSM -architecture, frame structure, system capacity and services provided.	L1: Remember
4	Describe mobile communication evolution of 2G to 5G technologies	L1: Remember
5	Analyze emerging technologies required for fourth generation mobile systems such as Long Term Evolution(LTE) & 5G next generation technology	L4: Analyse

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Final Year B. Tech ET415-Reasearch Methodology Sem.-I

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
1	Explain research problem formulation.	L2: Understand
2	Differentiate research related information.	L2: Understand
3	Summarize the importance of Report writing.	L2: Understand
4	Discuss the research ethics.	L2: Understand
5	Interpret data analysis strategies.	L2: Understand
6	Explain different research design and sampling design.	L2: Understand

Final Year B. Tech HET16: H_AI Applications Sem.-I

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
1	Summarize fundamentals of AI & overview of AI applications	L2: Understand
2	Demonstrate computer vision techniques for image analysis, object detection, recognition, segmentation, pattern recognition and searching algorithms	L2: Understand
3	Determine real- world problems related to expert system	L3: Apply
4	Illustrate the field of NLP applications such as sentiment analysis, Chabot's, speech recognition	L3: Apply
5	Apply reinforcement learning techniques for different problems	L3: Apply
6	Examine advanced AI applications like robotics	L3: Apply

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S.Y.B.Tech ENTPCC-04 – Signals & Systems Sem.-II

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
1	Classify the different signals and systems mathematically & graphically	L3: Apply
2	Solve numerical on convolution integral, Convolution sum and Sampling theorem.	L3: Apply
3	Model LTI system equations by using different forms	L3: Apply
4	Use Fourier series for analysis of complex exponential signals.	L3: Apply
5	Determine Fourier Transform of a function	L3: Apply
6	Calculate Z Transform of a function	L3: Apply

S. Y. B. Tech ENTPCC-05 - Control System Sem.-II

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
1	Calculate transfer function using mathematical models for control system.	L3: Apply
2	Determine transfer function of systems using signal flow graph and block diagram reduction.	L3: Apply
3	Examine the stability of systems.	L3: Apply
4	Analyze control system in frequency domain and state space.	L4: Analyze

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S.Y.B.Tech ENTPCC-06– Analog Integrated Circuits Sem.-II

CO	**Course Outcomes:** **At the end of this course, students will be able to:**	**Cognitive Level**
1	Explain the fundamentals of op amp with characteristics of ideal and practical op amp.	L2: Understand
2	Illustrate frequency response of op amp.	L3: Apply
3	Develop various Linear and Nonlinear applications of op amp.	L3: Apply
4	Design first order and second order filters.	L3: Apply
5	Describe the concept of special ICs and its applications.	L2: Understand

S.Y.B.Tech ENTSEC-01– Data Structure Sem.-II

CO	**Course Outcomes:** **At the end of this course, students will be able to:**	**Cognitive Level**
1	Illustrate data organizations and data structure operations, with their time and space complexity	L3: Apply
2	Develop solutions using stacks and queues with their time and space complexity	L3: Apply
3	Build various types of linked lists based on time and space complexity.	L3: Apply
4	Develop search and traversal algorithms for trees and graphs, with their computational complexity	L3: Apply
5	Apply various Sorting and Searching algorithms in terms of time and space complexity.	L3: Apply

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S.Y.B.Tech EM-02– Project Management & Economics Sem.-II

CO	**Course Outcomes:** **At the end of this course, students will be able to:**	**Cognitive Level**
1	Demonstrate decision making and communication as a member of a team as well as Lead a team for effective management of construction projects.	L2: Understand
2	Apply the Optimization techniques for decision making in construction industry	L3: Apply
3	Describe ABC analysis, Break even analysis and calculate EOQ and Inventory costs for construction project	L2: Understand
4	Explain the decision making abilities based on economics in projects and to appraise alternative projects	L2: Understand

S.Y.B.Tech OE-02– Measurement, Instrumentation and Sensors Sem.-II

CO	**Course Outcomes:** **At the end of this course, students will be able to:**	**Cognitive Level**
1	Explain the basics concepts of Measurements	L2: Understand
2	Describe the operation of analog instruments and bridges.	L2: Understand
3	Illustrate the operation of Instrument Transformer & Digital Instruments	L3: Apply
4	Explain the basics of various sensors and working principles of different types of sensors	L2: Understand
5	Interface different sensor technology to Arduino	L3: Apply

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S.Y.B.Tech ENTMDM-02B– Fundamentals of IoT Sem.-II

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
1	Explain the fundamentals of Internet of Things.	L2: Understand
2	Use sensors/actuators in the IoT based system	L3: Apply
3	Describe different communication protocols in IoT	L2: Understand
4	Design IoT based system.	L3: Apply

S.Y.B.Tech VEC-02- Professional Ethics Sem.-II

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
1	Describe the human values in their behaviour	L2: Understand
2	Demonstrate the Engineering ethics in their professional practice.	L2: Understand
3	Explain the safety and responsibility and professional rights in their professional practice	L2: Understand
4	Outline the code of ethics of Global organizations such as ASME, ASCE, and IEEE	L4: Analyze

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T.Y.B.Tech ENTPCC-10- Advanced Mobile Communication Sem.-II

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
1	Explain cellular systems, working and hand off strategies implemented in mobile communication	L2: Understand
2	Analyze various losses in mobile radio propagations and define multiple access schemes sharing radio spectrum	L4: Analyze
3	Explain OFDM & MIMO techniques used in mobile communication.	L2: Understand
4	Demonstrate GSM - architecture, frame structure, system capacity and services provided	L3: Apply
5	Explain CDMA digital cellular standard & IMT–2020 technologies.	L2: Understand
6	Describe mobile communication evolution of 2G to 5G technologies	L2: Understand

T.Y.B.Tech ENTPCC-11- Electronics System Design Sem.-II

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
1	Describe construction, working characteristics of thyristors.	L2: Understand
2	Analyse AC and DC power control circuits using thyristors.	L4:Analyse
3	Design timers, frequency counters, digital voltmeters and frequency synthesizers.	L3:Apply
4	Develop Communication system components for system design.	L3:Apply
5	Design and analyze controllers for industrial applications.	L3:Apply

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T.Y.B.Tech ENTPCC-12- Optical Communication Sem.-II

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
1	Discuss various elements of optical fiber	L2:Understand
2	Describe transmission characteristics of optical fibers & discuss concept of optical joints.	L2: Understand
3	Illustrate different optical sources and evaluate the various parameters.	L3: Apply
4	Illustrate different optical detectors and evaluate the various parameters.	L3: Apply
5	Identify the different types of optical networks.	L1: Remember
6	Design functional blocks in optical communication system.	L3: Apply

T.Y.B.Tech ENTPEC-02- VLSI Design Sem.-II

CO	Course Outcomes: At the end of this course, students will be able to:	Cognitive Level
1	Explain the different syntax of Verilog HDL language	L2: Understand
2	Design combinational circuits using Verilog HDL	L3: Apply
3	Design sequential logic circuits using Verilog HDL	L3: Apply
4	Describe MOS transistor theory and behavior of E-MOSFET	L2: Understand
5	Implement combinational logic circuit using E-MOSFETs.	L3: Apply
6	Describe the architecture and internal components of CPLD and FPGA	L2: Understand

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T.Y.B.Tech ENTPEC- 03A- Embedded Systems Sem.-II

CO	**Course Outcomes:** **At the end of this course, students will be able to:**	**Cognitive Level**
1	Describe hardware and software architecture of embedded system	L2: Understand
2	Explain ARM7TDMI core architecture and controller based on this architecture	L2: Understand
3	Apply C program for different applications for LPC2148 microcontroller	L3: Apply
4	Illustrate different peripherals with LPC2148 microcontroller	L3: Apply
5	Use microcontroller based real time systems for different applications	L3: Apply

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T.Y.B.Tech ENTSEC-02- Hardware Mini Project Sem.-II

CO	**Course Outcomes:** **At the end of this course, students will be able to:**	**Cognitive Level**
1	Produce PCB artwork using an appropriate EDA tool	L6: Create
2	Practice good soldering, testing, fault detection and effective trouble-shooting.	L6: Create
3	Design and implement application-based hardware project.	L3: Apply
4	Present technical seminar and display the project	L2: Understand

T.Y.B.Tech ENTMDM-04- Industrial IoT Sem.-II

CO	**Course Outcomes:** **At the end of this course, students will be able to:**	**Cognitive Level**
1	Explain the theory and practical aspects of Industrial IoT Systems	L2: Understand
2	Identify, formulate and solve engineering problems by using Industrial IoT.	L3: Apply

T.Y.B.Tech HET14 - Honors-Machine Learning Sem.-II

CO	**Course Outcomes:** **At the end of this course, students will be able to:**	**Cognitive Level**
1	Describe fundamental aspects of Machine Learning	L2: Understand
2	Illustrate different Machine Learning models.	L3: Apply
3	Discuss classification and regression algorithms	L2: Understand
4	Explain neural network for classification	L2: Understand
5	Distinguish between various characteristics of ML	L2: Understand
6	Interpret Machine learning techniques that enable to solve real world problems.	L2: Understand