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COURSE OUTCOMES OF HPTU EVEN SEMESTER SUBJECTS OF ECE BRANCH

Semester 2 EE-101 Principles of Electrical Engineering Sh. Manik Dogra	
Course Outcome No.	Detail
C114.1	Appreciate and analyze DC, AC circuits using KCL and KVL.
C114.2	Understand basics of R, L, C circuit elements and voltage and current sources.
C114.3	Understand working principles of various analogue electrical measuring instruments.
C114.4	To Gain knowledge about the fundamentals of wiring and earthing.
C114.5	Comprehend the working of DC machines , transformers and induction motors.

Semester 2 EC-101 Fundamentals of Electronics Engineering Sh. Vicky Kumar/ Er. Pooja Sharma	
Course Outcome No.	Detail
C115.1	Memorize schematic symbol and Recognize basic concepts of electronic components and circuits.
C115.2	Explain the functionality of various devices including several types of Diode,BJT ,FET etc.
C115.3	Develop the ability to analyze electronic circuits using discrete components.
C115.4	Identify functions of electronic devices such as digital multimeter, cathode ray oscilloscope etc. in the measurement of physical variables.
C115.5	Recognize basic logic functions and logic gates and can solve problems related to number systems and Boolean algebra.

Semester 2 EE-111 Electrical Engineering Lab Sh. Manik Dogra	
Course Outcome No.	Detail
C118.1	Appreciate and analyze DC, AC circuits using KCL and KVL.
C118.2	Understand basics of R, L, C circuit elements and voltage and current sources.
C118.3	Understand working principles of various analogue electrical measuring instruments.
C118.4	To Gain knowledge about the fundamentals of wiring and earthing.
C118.5	Comprehend the working of DC machines, transformers and induction motors.

Semester 2 EC-111 Electronics Engineering Lab Er. Ankush Kapoor/Er. Vivek Mankotia	
Course Outcome No.	Detail
C120.1	To study experimentally the characteristics of diodes, BJT's and FET's.
C120.2	To verify practically the response of various special purpose electron devices.
C120.3	To construct various semiconductor devices using tools

Semester 4 HS-409 Human Values and Professional Ethics		Sh. Sandeep Chaudhary
Course Outcome No.	Detail	
C212.1	Analyze the importance of human values and skills for sustained happiness	
C212.2	Explore a balance between professional and personal happiness / goals.	
C212.3	Realize a significance of trust mutually satisfying human behaviors and enriching interactions with nature.	
C212.4	Develop appropriate technology and management patterns to create harmony in professional and personal life.	
C212.5	Use creative ideas for clarifying about human values in a simple manner.	
C212.6	Evaluate a holistic vision about existence and in the light of understanding they are able to place various educational inputs appropriately.	

Semester 4 EC-401 Analog Communication		Sh. Manjeet Singh
Course Outcome No.	Detail	
C213.1	Analyze energy and power spectral density of the signal.	
C213.2	Describe different types of noise and predicts effect on various analog communication systems.	
C213.3	Express the basic concepts of analog modulation schemes.	
C213.4	Evaluate analog modulated waveform in time/frequency domain and also find modulation index	
C213.5	Analyse different characteristics of receiver.	

Semester 4 EC-402 Microprocessor and Peripherals		Er. Nitasha Bisht
Course Outcome No.	Detail	
C214.1	Explain the architecture and pin diagram of microprocessor 8085 & 8086	
C214.2	Impart the knowledge about the instruction set of 8085 & 8086	
C214.3	Develop and demonstrate how to accomplish a given task using assembly and C language on a microprocessor 8085	
C214.4	Demonstrate necessary steps and methods used to interface various peripheral devices with 8085	
C214.5	Understand the basic functioning of multiprocessor systems	

Semester 4 EC-403 Linear Integrated Circuits		Sh. Ankit Sharma
Course Outcome No.	Detail	
C215.1	Discuss basic op-amp configuration and explain various parameters operational amplifier.	
C215.2	2 Understand the various linear and non linear applications of operational amplifier.	
C215.3	3 Implement various active filters like Butterworth, Chebyshev filters etc. using opamps.	
C215.4	4 Explain the basics of various oscillators, comparators and converters.	
C215.5	5 Analyze the designing of frequency divider, PLL, AGC AVC using amp.	

Semester 4 EC-404 Pulse Shaping and Wave Generation		Sh. Vicky Kumar
Course Outcome No.	Detail	
C216.1	Generation of various linear waveforms and also understand the functioning of various time base generators	
C216.2	Generation of various non-linear waveforms using clipper and clampers.	
C216.3	Develop and demonstrate sampling gates, UJT & 555 timers	

C216.4	Conceptualize the basic of Non-sinusoidal oscillators and data conversion circuits
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Semester 4 HS-410 Law for Engineers Sh. Munish Bhardwaj	
Course Outcome No.	Detail
C217.1	Understand and apply the legal concepts, fundamental rights of the constitution.
C217.2	Examine the Law of contract.
C217.3	Examine and apply the right to information and administrative law and environmental law.
C217.4	Understand and apply nature, water, air laws for environment.
C217.5	Apply the human, civil, political, prisoner rights.

Semester 4 EC-405 Microprocessor and Peripherals Lab Er. Nitasha Bisht	
Course Outcome No.	Detail
C218.1	Develop, implement, and debug 8085 & 8086 assembly language programs that meet stated specifications.
C218.2	Understand and implement delay generation using 8085 & 8086 instructions
C218.3	Implement programming module of Stepper motor, Seven Segment Display, ADC, DAC and PC to PC Communication to work with 8085 processor
C218.4	Understand techniques for faster execution of instructions and improve speed of operation and performance of microprocessors.
C218.5	Understand multicore processor and its advantages.

Semester 4 EC-406 Pulse Shaping, Wave Generation & LIC Lab Sh. Vicky Kumar	
Course Outcome No.	Detail
C219.1	Generation of various linear waveforms and also understand the functioning of various time base generators
C219.2	Generation of various non- linear waveforms using clipper and clampers.
C219.3	Develop and demonstrate sampling gates ,UJT & 555timers
C219.4	Conceptualize the basic of Non-sinusoidal oscillators and data conversion circuits

Semester 4 EC-407 Electronic Workshop and Analog Communication Lab Sh. Manjeet Singh	
Course Outcome No.	Detail
C220.1	Understand issues related to transmission of signals through communication channels
C220.2	Students will understand analog communication systems using amplitude/angle modulation and demodulation.
C220.3	Students are familiar with analog radio transmitters and receivers.

Semester 6 EC-601 Advanced Microcontrollers for Embedded systems Sh. Ankit Sharma	
Course Outcome No.	Detail
C311.1	Understand the basics of Arm architecture, cortex-M and Tiva microcontrollers.
C311.2	Impart the knowledge of addressing modes, instruction sets, address space and on-chip peripherals.
C311.3	Understand the fundamentals of basic programming using different

	I/O peripherals of Tiva.
C311.4	Describe various communication protocols and implement these interfaces using Tiva.
C311.5	Explain various Embedded networking fundamentals and its applications.
C311.6	Introduce the concept of IOT and discuss its applications using CC3100 module.

Semester 6 EC-602 Antenna & Wave Propagation Sh. Ankush Kapoor	
Course Outcome No.	Detail
C312.1	Analyse various parameters that define antenna technically.
C312.2	Design array antenna systems from specifications depending upon type of sources.
C312.3	Categorize various shapes and types of antennas such as microwave antennas, smart antennas, VHF & UHF antennas etc.
C312.4	Identify the path of radiation by analysing different ways of wave propagation.

Semester 6 EC-603 Control Systems Sh. Vivek Mankotia	
Course Outcome No.	Detail
C313.1	To Provide the students in getting a basic idea of different control systems.
C313.2	To Analyse system stability both in time domain
C313.3	To Analyse system stability both in frequency domain
C313.4	To Train the students to have the solid foundation in mathematical and engineering fundamentals required to solve engineering problems.
C313.5	To Prepare the students to excel in post graduate programs or to succeed in industry.

Semester 6 EC-604 Digital Signal Processing Sh. Munish Bhardwaj	
Course Outcome No.	Detail
C314.1	Examine all Discrete time signals and system also write Matlab Programming for generation of signals.
C314.2	Distinguish the difference between Discrete Fourier transform (DFT) and FFT with an ability to analyse the Fast Fourier Transform (FFT) algorithms for faster realization of signals and systems.
C314.3	Interpret the impact of finite word length in digital filters and design Digital IIR filters using various techniques.
C314.4	Categorise Digital filter structures for FIR and IIR filters for Direct I & II.
C314.5	Predict the digital filters design using window technique and also write MATLAB programming for their generation.

Semester 6 EC-605 Microelectronics Technology Sh. Vicky Kumar	
Course Outcome No.	Detail
C315.1	Understand the czochralski and float zone method for the single crystal growth.
C315.2	Understand the role of Epitaxial, oxidation and diffusion in the microelectronics.
C315.3	Explain ion implantation, Lithography and Etching processes with their properties.
C315.4	Explain the metallization applications, multilayer metallization and VLSI process integration.

Semester 6 EC-606 Wireless & Mobile Communication Sh. Manjeet Singh	
Course Outcome No.	Detail
C316.1	Define fundamentals of wireless communication systems.

C316.2	Explain mobile radio propagation and wireless channel characteristics.
C316.3	Define mobile adhoc networks (MANETS), wireless sensor network, vehicular ad hoc networks (VANETS), and the basic operation of GSM.
C316.4	Describe CDMA, MC-CDMA, and OFDM.
C316.5	Describe the evolution and history of Wireless Technology.

Semester 6 EC-609 Principles of Soft Computing Er. Pooja Sharma	
Course Outcome No.	Detail
C317.1	Identify and describe soft computing techniques and their roles in building intelligent machines.
C317.2	Recognize the feasibility of applying a soft computing methodology for a particular problem.
C317.3	Explain training algorithm for pattern association and autoassociative memory network.
C317.4	Compute neural networks to pattern classification and regression problems.
C317.5	Apply genetic algorithms and artificial neural networks as computation tools to solve various optimization problems.

Semester 6 EC-611 Advanced Microcontrollers for Embedded systems Lab Sh. Ankit Sharma	
Course Outcome No.	Detail
C318.1	Understand the basics of Arm architecture, cortex-M and Tiva microcontrollers.
C318.2	Impart the knowledge of addressing modes, instruction sets, address space and on-chip peripherals.
C318.3	Understand the fundamentals of basic programming using different I/O peripherals of Tiva.
C318.4	Describe various communication protocols and implement these interfaces using Tiva.
C318.5	Explain various Embedded networking fundamentals and its applications.
C318.6	Introduce the concept of IOT and discuss its applications using CC3100 module.

Semester 6 EC-612 Digital Signal Processing Lab Sh. Munish Bhardwaj	
Course Outcome No.	Detail
C319.1	Develop various DSP Algorithms using MATLAB Software package.
C319.2	Analyze and Observe Magnitude and phase characteristics (Frequency response Characteristics) of digital IIR- Butterworth, Chebyshev filters.
C319.3	Analyze and Observe Magnitude and phase characteristics (Frequency response Characteristics) of digital FIR filters using window techniques.

Semester 6 EC-613 Seminar Sh. Ankush Kapoor/Sh. Munish Bhardwaj	
Course Outcome No.	Detail
C320.1	To expose students to the 'real' working environment and get acquainted with the organization structure, business operations and administrative functions
C320.2	To promote and develop presentation skills and import a

	knowledgeable society
C320.3	To set the stage for future recruitment by potential employers

Semester 8 EC-421(d) Satellite Communication Sh. Ankush Kapoor	
Course Outcome No.	Detail
C411.1	Explain the principles, concepts and operation of satellite communication systems
C411.2	Describe the concepts of signal propagation affects, link design, rain fading and link availability and perform interference calculations.
C411.3	Understand modulation techniques and error correction codes for satellite communication.
C411.4	Use software tools to simulate and analyse the performance of satellite communication systems, and use real satellite up/down links (subject to the availability of satellite links) to conduct link experiments.

Semester 8 EC-422 Information Theory and Coding Sh. Vivek Mankotia	
Course Outcome No.	Detail
C412.1	To Provide the students in getting a basic idea of different Information Theory and Coding.
C412.2	Explain various methods of generating and detecting different types of error correcting codes
C412.3	Design a digital communication system by selecting an appropriate error correcting codes for a particular application.
C412.4	Apply convolution codes for performance analysis & cyclic codes for error detection and correction.
C412.5	To Prepare the students to excel in post graduate programs or to succeed in industry.

Semester 8 EC-423 Principle of Soft Computing Er. Pooja Sharma	
Course Outcome No.	Detail
C413.1	Identify and describe soft computing techniques and their roles in building intelligent machines.
C413.2	Recognize the feasibility of applying a soft computing methodology for a particular problem.
C413.3	Explain training algorithm for pattern association and auto associative memory network.
C413.4	Compute neural networks to pattern classification and regression problems.
C413.5	Apply genetic algorithms and artificial neural networks as computation tools to solve various optimization problems.

Semester 8 EC-424 Computer Networks & Data communication Er. Nitasha Bisht	
Course Outcome No.	Detail
C414.1	Understand the basic principles of network design
C414.2	Explain the concept of packet and circuit switching, and identify and analyze the different types of packet delay in packet-switched networks
C414.3	Understand the terminology and concepts of the OSI reference model and the TCP-IP reference model.
C414.4	Understand the conflicting issues and resolution techniques in data transmission.
C414.5	Describe the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks
C414.6	Understand the concept data communication within the network environment

Semester 8 EC-423(P) Soft computing Lab Er. Pooja Sharma/Sh. Munish Bhardwaj	
Course Outcome No.	Detail
C415.1	Formalize a given problem in the language of different Soft Computing methods.
C415.2	Identify and select a suitable Soft Computing technology to solve the problem and construct a solution.
C415.3	Solve real life problems using Fuzzy Logics
C415.4	Compute neural networks to pattern classification and regression problems.
C415.5	Analyse different Artificial Neural Network models for solving real life problems.

Semester 8 EC-424(P) Data Communication Lab Sh. Vivek Mankotia	
Course Outcome No.	Detail
C416.1	Understand and be able to explain the principles of a layered protocol architecture; be able to identify and describe the system functions in the correct protocol layer and further describe how the layers interact.
C416.2	Understand, explain and calculate digital transmission over different types of communication media.
C416.3	Describe the principles of access control to shared media and perform performance calculations.

Semester 8 EC-499 PROJECT-II All Faculty Members	
Course Outcome No.	Detail
C417.1	Apply relevant knowledge and skills, within the main area, to a given problem
C417.2	Reflect on, evaluate and critically assess one's own and others' scientific results
C417.3	identify one's need for further knowledge and continuously develop one's own knowledge