COURSE OUTCOMES (COs):

Course Outcomes (COs) describe what students can able to do after completion of the course.

Program : B.Tech-Electronics and Communication Engineering	**Academic Year :** 2020-21	**Semester :** I & II

S.No	Year/ Sem	Course Code	Course Name	Course Outcomes (After completion of the course student can able to :)
1	II/I	EC301PC	Electronic Devices & Circuits	**CO1:** Describe the applications of diode as rectifier, clippers, and clamper circuits.
				CO2: Design various switching devices such as transistor, transistor biasing.
				CO3: Analyse the operation of FET, special devices like Zener, Tunnel, Varactor diode, UJT and SCR.
				CO4: Define explain transistor hybrid model.
				CO5: Draw the operation of small signal model FET operation.
				CO6: Explain the operation of diodes, BJT, FET, Transistor amplifiers.
2	II/I	EC302PC	Network Analysis and Transmission Lines	**CO1:** Gain the knowledge on basic network elements and magnetic circuits.
				CO2: Analyze the RLC circuits in detail.
				CO3: Gain the knowledge in characteristics of two port network parameters (Z, Y, ABCD, H & G).
				CO4: Gain the knowledge in network function driving point in transfer function using s variables, poles and zeros.
				CO5: Analyze the transmission line parameters and configurations.
				CO6: Analyze smith chart configuration & applications.
3	II/I	EC303PC	Digital System Design	**CO1:** State the Boolean algebra, different number systems and codes. Change one number system into another number system.
				CO2: Design the different combinational logic circuits. Modify and transform one form of Boolean equation to another form and simplify the Boolean equation in K-Map.
				CO3: Design the different Sequential circuits. Analyze and compare the flipflops and transform one flipflop to another flipflop.

PRINCIPAL
Sri Indu Institute of Engineering & Technology
Sheriguda(V), Ibrahimpatnam(M),
R.R Dist. Telangana -501 510

				CO4: Design synchronous and asynchronous counters. Analyze and differentiate the sequential machine.
				CO5: Define, Differentiate between logic families and realization of logic gates using diodes and transistors
				CO6: Design the digital system.
4	II/I	EC304PC	Signals and Systems	**CO1:** Explain any arbitrary signals in terms of complete sets of orthogonal functions and understands the principles of impulse functions, step function and signum function.
				CO2: Express periodic signals in terms of Fourier series and express the spectrum and express the arbitrary signal (discrete) as Fourier transform to draw the spectrum.
				CO3: Analyze the characteristics of linear time invariant systems.
				CO4: Explain response can be obtained using Laplace transform and Z- Transform, properties and ROC of L.T and Z- Transform.
				CO5: Analyze the Sampling theorem, reconstruction, aliasing, and Nyquist's theorem to represent continuous time signals in discrete time.
				CO6: Compare auto Correlation and cross correlation and concept of power density spectrum.
5	II/I	EC305ES	Probability Theory and Stochastic Processes	**CO1:** Attain the knowledge of Probability theory and random variables.
				CO2: Explain the Vector Random variables and joint distribution function.
				CO3: Understand the response of linear time Invariant system for a Random Processes.
				CO4: Analyze the random variable and random process, its properties.
				CO5: Determine the Spectral and temporal characteristics of Random Signals.
				CO6: Analyze the concepts of Noise in Communication systems.
6	II/I	EC306PC	Electronic Devices & Circuits Lab	**CO1:** Describe the applications of diode as rectifier, clippers and clamper circuit.
				CO2: Design various switching devices such as transistor, transistor biasing.
				CO3: Analyze the operation of FET, Special devices like Zener, Tunnel. Varactor diode, UJT, SCR.
				CO4: Define explain transistor hybrid model.
				CO5: Draw the operation of small signal model FET operation.
				CO6: Examine the operation of diodes, BJT, FET, Transistor amplifiers.

PRINCIPAL
Sri Indu Institute of Engineering & Technology
Sheriguda(V), Ibrahimpatnam(M),
R.R. Dist. Telangana -501 510

7	II/I	EC307PC	Digital System Design Lab	**CO1:** Identify the IC configurations of digital circuits.
				CO2: Verify and compare different types of gates and comparators.
				CO3: Develop the clock using universal gates.
				CO4: Design and realization of sequential circuits.
				CO5: Analyze and implementation of sequential circuits.
				CO6: Compare combinational and sequential circuits.
8	II/I	EC308ES	Basic Simulation Lab	**CO1:** Identify the basic operations on matrices.
				CO2: Identify and Analyze the various signals and sequences.
				CO3: Point out even and odd signals and real and imaginary parts of signals.
				CO4: Construct the convolution for signals and sequence, Linear-Non linear and time variant-Invariant of sequences.
				CO5: Compare the auto correlation, cross correlation.
				CO6: Describe sampling.
				CO6: Express the Fourier transform and Laplace transform.
9	II/I	MC309	Constitution of India	**CO1:** Understand meaning, features, characteristics of constitution law and constitutionalism.
				CO2: Describe fundamental rights, fundamental duties and its legal status.
				CO3: Describe The constitution powers and status of the President of India.
				CO4: Understand Emergency Provisions: National Emergency, President Rule, And Financial Emergency.
				CO5: Understand Fundamental Right to Equality, Fundamental Right to certain Freedom under Article 19.
				CO6: Describe the Scope of the Right to Life and Personal Liberty under Article 21.
10	II/II	MA401BS	Laplace Transforms, Numerical Methods & Complex Variables	**CO1**: Describe the use of Laplace Transform techniques when solving ordinary differential equations.
				CO2: Solve the polynomial and transcendental equations.
				CO3: Determine the Numerical solutions for given ordinary differential equations.
				CO4: Identify the Differential Numerical Methods.
				CO5: Describe the Complex function with their analyticity, integration using Cauchy's Integral and Residue theorems.
				CO6: Discuss the Taylor's and Laurent series expansions.

Sri Indu Institute of Engineering & Technology, Sheriguda(V), Ibrahimpatnam(M), R.R Dist. Telangana -501 510

11	II/II	EC402PC	Electromagnetic Fields and Waves	**CO1:** Apply the basic laws to derive the Maxwell's Equation in Differential and Integral form for solving the engineering problems in Electrostatics.
				CO2: Describe the knowledge of Magnetic Scalar and Vector Potentials. Forces due to Magnetic Fields. Ampere's Force Law.
				CO3: Distinguish between static and Time varying fields, apply these concepts to derive the Maxwell's Equation in Differential, Integral form and boundary conditions for solving the engineering problems.
				CO4: Analyze the wave equation for good conductors and good dielectrics, criticize and apply the characteristics of uniform plane wave for practical problems.
				CO5: To analyze the characteristics of Uniform Plane Waves (UPW), determine their propagation parameters and estimate the same for dielectric and dissipative media.
				CO6: Analyze the rectangular waveguides, their mode characteristics, and design waveguides for solving practical problems.
12	II/II	EC403PC	Analog and Digital Communications	**CO1:** Design various continuous wave modulation and demodulation techniques.
				CO2: Analyze Frequency Modulation (FM) Techniques.
				CO3: Analyze Phase Modulation (PM) Techniques.
				CO4: Design various AM and FM transmitters.
				CO5: Describe various Pulse Modulation Techniques.
				CO6: Analyze various digital modulation techniques and baseband transmission.
13	II/II	EC404PC	Linear IC Applications	**CO1:** Describe the characteristics of Operational Amplifier with linear integrated circuits.
				CO2: Analyze the different applications of Operational Amplifier.
				CO3: Produce the different wave forms of filters and oscillators.
				CO4: Describe the functional diagrams and applications of IC 555 & IC 565.
				CO5: Explain various techniques to design analog to digital converters and digital to analog converters.
				CO6: Design the linear integrated circuits using operational Amplifier.
14	II/II	EC405PC	Electronic Circuit Analysis	**CO1:** Design the multistage amplifiers and develop& analyze transistor amplifier circuits using Hybrid π model at high frequencies.
				CO2: Design of Feedback amplifiers and their frequency response.

PRINCIPAL
Sri Indu Institute of Engineering & Tech.
Sheriguda(V), Ibrahimpatnam(M),
R.R Dist. Telangana -501 510

				CO3: Understand the design of various oscillators such as RC Phase Shift Oscillator, Wein Bridge Oscillator, Crystal, LC oscillator.
				CO4: Design and compare various Power amplifiers such as Class A, Class B, Class AB amplifiers, Analysis of various tuned amplifiers etc.
				CO5: Design Multivibrators.
				CO6: Understand sweep circuits for various applications.
15	II/II	EC406PC	Analog and Digital Communications Lab	**CO1:** Identify the basics of analog and digital communication systems.
				CO2: Design and Implement different modulation and demodulation techniques.
				CO3: Analyze and implement analog to digital, digital to analogy converters.
				CO4: Describe practical implementation of baseband modulation techniques.
				CO5: Design and implement different pulse modulation techniques like PAM, PWM and PPM.
				CO6: Compare analog and digital modulation techniques.
16	II/II	EC407PC	IC Applications Lab	**CO1:** Design inverting and non inverting, adder and subtractor or amplifier using op-amp.
				CO2: Verify a comparator, Integrator and Differentiator using op-amp and voltage regulator using IC723.
				CO3: Design active filters, PLL.
				CO4: Analysis of IC741 waveform generator sine, square, triangular waves.
				CO5: Design a Monostable, Astable Multivibrator and Schmitt trigger.
				CO6: Identify and verify the functionalities of the linear integrated circuits.
17	II/II	EC408PC	Electronic Circuit Analysis Lab	**CO1:** Design and simulate different BJT amplifiers: CE amplifier, Two stage RC coupled amplifier, Cascode, Darlington pair.
				CO2: Design and simulate feedback amplifiers: Current shunt feedback amplifier, Voltage series feedback amplifiers.
				CO3: Design and simulate different oscillators: RC phase shift oscillator, Hartley and colpitt's oscillators.
				CO4: Design and simulate power amplifiers: Class A power amplifier, Class B complementary symmetry amplifier.
				CO5: Design Monostable Multivibrator.
				CO6: Design Miller sweep circuit.

PRINCIPAL
Sri Indu Institute of Engineering & Technology
Sheriguda(V), Ibrahimpatnam(M),
R.R Dist. Telangana -501 510

18	II/II	EC408PC	Gender Sensitization Lab	**CO1:** Develop sensibility with regard to issues of gender in contemporary India.
				CO2: Provide a critical perspective on the socialization of men and women.
				CO3: Determine information about some key biological aspects of genders.
				CO4: Debate on the politics and economics of work.
				CO5: Reflect critically on gender violence.
				CO6: Expose more egalitarian interactions between men and women.
19	III/I	EC501PC	Microprocessors & Microcontrollers	**CO1**: Basic understanding of 8086 microprocessors architectures and its functionalities.
				CO2: Design and develop 8086 Microprocessor based systems for real time applications using low level language like ALP.
				CO3: Basic understanding of 8051 microcontroller's architectures and its functionalities.
				CO4: Discuss the input /output memory interface Serial Communication and Bus Interface device.
				CO5: Analyze the internal architecture of ARM.
				CO6: Classify the internal architecture of CORTEX ARM Processor and MAP ARM Processor.
20	III/I	EC502PC	Data Communications and Networks	**CO1:** Explain conceptual foundation for study of data communication using layered architecture.
				CO2: Analyze network Interface protocol and Design Performance issues in MAC in DLL.
				CO3: Evaluate the functioning of routing algorithm and internetworking.
				CO4: Analyze reliable transmission and analyze the performance of TCP protocols.
				CO5: Demonstrate the significance of various flow control and congestion control mechanisms.
				CO6: Analyze the features and operation of various application layer protocols such as Http, DNS &STMP.
21	III/I	EC503PC	Control Systems	**CO1:** Create mathematical model using Laplace Transform and define the Transfer Function of an LTI system in various ways.
				CO2: Analyze the response of First and second order systems in time domain using characteristic Equations for feedback control systems, and also evaluate the stability of a system in Time Domain using RH Criterion and Root Locus.
				CO3: Examine Frequency response analysis of a Control System and Solve the stability of the system using BODE Plots.
				CO4: Analyze the stability of System in Frequency

PRINCIPAL
Sri Indu Institute of Engineering & Technology
Sheriguda(V), Ibrahimpatnam(M),
R.R Dist. Telangana -501 510

				domain using polar and Nyquist's plots.
				CO5: Design and implementation of Compensators and Controllers to improve stability.
				CO6: Design state model of a system and determine the transfer function for Linear Time Variant Systems.
22	III/I	SM504MS	Business Economics & Financial Analysis	**CO1:** The students will understand various forms of Business and the impact of economic variables on the business.
				CO2: Understand the significance of elasticity of demand and its forecasting, law of demand and its exceptions and supply analysis.
				CO3: Understand production analysis function with different variables and cost analysis functions.
				CO4: To adopt the principles of accounting to record, classify and summarize various transactions in books of accounts for preparation of final accounts.
				CO5: Understand the Ratio analysis to give an idea about financial forecasting, financial planning, controlling and decision making.
				CO6: Understand the implementation of different structures of markets covering how price-output is determined under different market structures.
23	III/I	EC511PE	Computer Organization and Operation Systems (Professional Elective-I)	**CO1:** Visualize the organization of different blocks in a computer.
				CO2: Understand micro programmed control and the memory system.
				CO3: Analyze input and output organization of a computer.
				CO4: Describe different serial communication protocols.
				CO5: Analyze the overview of a operating system.
				CO6: Understand file system interface.
28	III/II	EC601PC	Antennas and Propagation	**CO1:** Characterize the antennas based on frequency.
				CO2: Identify the antenna array patterns.
				CO3: Understand the concept of antenna measurements.
				CO4: Design VHF, UHF and microwave antennas.
				CO5: Analyze micro strip antennas.
				CO6: Characterize different wave propagations.
29	III/II	EC602PC	Digital Signal Processing	**CO1:** Understand the LTI system characteristics and Multi rate signal processing.
				CO2: Understand the inter-relationship between DFT and various transforms.
				CO3: Design IIR digital filters for a given specification.
				CO4: Design FIR digital filters for a given specification.
				CO5: Express Z -transform analysis of signals and

PRINCIPAL
Sri Indu Institute of Engineering & Technology
Sheriguda(V), Ibrahimpatnam(M),
R.R. Dist. Telangana -501 510

				systems.
				CO6: Understand the significance of various filter structures and effects of round off errors.
30	III/II	EC603PC	VLSI Design	**CO1:** Acquire knowledge of the Fabrication of IC using various MOS circuits and can be able to compute electrical properties of MOS circuits.
				CO2: Understand vlsi design flow and design rules for layout of IC.
				CO3: Design various gates, adders, Multipliers and Memories using stick diagrams, layouts.
				CO4: Design various forms of memories.
				CO5: Demonstrate semiconductor IC design such as PLA's, PAL, FPGA, CPLDs.
				CO6: Understand differential strategies for testing of IC's and CMOS.
31	III/II	EC613PE	Embedded System Design (Professional Elective – II)	**CO1:** Describe the basics of an embedded system.
				CO2: Interpret the types of memory and interfacing to external world.
				CO3: Analyze the embedded firmware design approaches.
				CO4: Design the RTOS based embedded system for multitasking.
				CO5: Express the task communication/synchronization issues.
				CO6: Assess the method of designing an embedded system for any type of application.
32	III/II	EI711OE	Basics of Sensors Technology (Open Elective – I)	**CO1:** Define Measurement system and types of passive sensors.
				CO2: Identify suitable Active sensors and transducers for real time applications.
				CO3: Solve the different type of velocities.
				CO4: Transform theoretical concepts of consistency and viscosity into working Models.
				CO5: Describe calibration and calibration using different types of sensor.
				CO6: Prepare the skill base summary to further explore advance the topics of Basics of sensor Technology.
33	IV/I	EC701PC	Microwave Engineering	**CO1:** Recognize the microwave bands, applications and rectangular waveguides.
				CO2: Analyze the waveguide components and cavity resonators.
				CO3: Classify O type and M type microwave tubes.
				CO4: Explain the microwave solid state devices and applications.
				CO5: Illustrate microwave measurements by using microwave bench.
				CO6: Describe the significance of microwave transmission lines and wave guides.

PRINCIPAL
Sri Indu Institute of Engineering & Tech
Sheriguda(V), Ibrahimpatnam(M),
R.R Dist. Telangana -501 510

34	IV/I	EC721PE	Computer Networks	**CO1:** Compare the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
				CO2: Identify different MAC mechanism (Aloha, slotted Aloha, and FDMA).
				CO3: Analyze & Building the skills of sub netting and routing.
				CO4: Describe the different types of network devices and their functions within a network.
				CO5: Design and implement a peer to peer file sharing application utilizing application layer protocol & such as HTTP, DNS and Transportation layer protocol.
				CO6: Distinguish the ethical, legal, security and social issues related to computer networks.
35	IV/I	EC731PE	Wireless Communications And Networks	**CO1:** Understand cellular system design concepts.
				CO2: Analyze large scale path loss.
				CO3: Analyze small scale fading.
				CO4: Describe multipath propagation.
				CO5: Explain Equalization and Diversity.
				CO6: Compare different wireless networks.
36	IV/I	EC743PE	Electronic Measurements And Instrumentation	**CO1:** Analyze the various electronic instruments based on their specifications for carrying out a particular task of measurements.
				CO2: Explain the various types of signal generators, signal analyzers for generating and analyzing various real time signals.
				CO3: Define the different types of oscilloscopes and the characteristics of the signals.
				CO4: Compare different types of transducer like piezoelectric and magnetro strictive Transducers.
				CO5: Define and distinguish the types of bridges and measuring the physical parameters like Humidity, moisture, velocity and force.
				CO6: Relate the use of measuring instruments in real time applications.
37	IV/I	EC702PC	VLSI Design	**CO1:** Acquire knowledge of the Fabrication of IC using various MOS circuits and can be able to compute electrical properties of MOS circuits.
				CO2: Understand vlsi design flow and design rules for layout of IC.
				CO3: Design various gates, adders, Multipliers and Memories using stick diagrams, layouts.
				CO4: Design various forms of memories.
				CO5: Demonstrate semiconductor IC design such as PLA's, PAL, FPGA, CPLDs.
				CO6: Understand differential strategies for testing of IC's and CMOS.

PRINCIPAL
Sri Indu Institute of Engineering & Tech
Sheriguda(V), Ibrahimpatnam(M)
R. Dist. Telangana -501 510

38	IV/I	EC705PC	Industry Oriented Mini Project	**CO1:** Analyze new problems, identify and define the appropriate requirements for their solutions.
				CO2: Understand team work to complete to reach the target.
				CO3: Learn new technologies in the engineering fields.
39	IV/I	EC706PC	Seminar	**CO1:** Express public speaking during presentations.
				CO2: Analyze new technologies in all engineering fields.
				CO3: Effectively communicate by making an oral presentation.
40	IV/II	EI744OE	Sensors and Transducers (Open Elective – III)	**CO1:** Describe various measurement standards and various errors and perform erroranalysis.
				CO2: Obtain and analyze of static and dynamic characteristics of transducer.
				CO3: Describe construction, working principle, characteristics and applications of various resistance transducers.
				CO4: State the working principle of various inductance and capacitance transducers.
				CO5: Examine the operation and applications of modern industrial transducers.
41	IV/II	EC853PE	Optical Communications (Professional Elective – V)	**CO1:** To identify the basic elements of optical fiber transmission link, fiber modes configurations and Structures.
				CO2: To analyze the different kind of losses, signal distortion, SM fibers.
				CO3: To classify the various optical sources, materials and fiber splicing.
				CO4: Illustrate the behaviour of optical transmitters & receivers for analog & digital mode of operation.
				CO5: To distinguish the fiber optical receivers and noise performance in photo detector.
				CO6: To Illustrate link budget, WDM, solutions and SONET/SDH network.
42	IV/II	EC863PE	Global Positioning System(Professional Elective – VI)	**CO1:** Identify the basic components of GPS .
				CO2: Analyze the signal characteristics and the user position calculations.
				CO3: Identify error sources in GPS observations and apply the corrections for accurate position.
				CO4: Compare the types of GPS and their architectures.
				CO5: Classify the military applications and usage of GPS
				CO6: Distinguish and understand the basic GPS signals and calculate the receiver PVT.

Sri Indu Institute of Engineering & Technology
Sheriguda(V), Ibrahimpatnam(M),
R.R Dist. Telangana -501 510

43	IV/II	EC801PC	Major Project	**CO1:** Analyze new problems, identify and define the appropriate requirements for its solutions.
				CO2: Understand of the impact of engineering solutions.
				CO3: Understand team work to complete a common goal.

HOD/ECE

Head of the Department
Electronics and Communication Engg. Dept.
SRI INDU INSTITUTE OF ENGG & TECH.
Sheriguda(V), Ibrahimpatnam(M), R.R.Dist-501 510.

PRINCIPAL

PRINCIPAL
Sri Indu Institute of Engineering & Tech.
Sheriguda(V), Ibrahimpatnam(M).
R.R. Dist. Telangana -501 510