ACE EngineeringCollege

Ankushapur(V), Ghatkesar(M), Medchal.Dist - 501 301

(An Autonomous Institutions)

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

II B.TECH. COURSE STRUCTURE & SYLLABUS

II Year				I Semester				
S. No.	Course Type	Course Code	Course Title	% of Deviation	Periods Per Week			Credits
					L	T	P	
1	PCC	EC301PC	Electronic Devices and Circuits	0	3	1	0	4
2	PCC	EC302PC	Network Analysis and Transmission Lines	3	3	0	0	3
3	PCC	EC303PC	Switching Theory and Logic Design	5	3	1	0	4
4	PCC	EC304PC	Signals and Systems	0	3	1	0	4
5	ESC	EC305ES	Probability Theory and Stochastic Processes	0	3	0	0	3
6	PCC	EC306PC	Electronic Devices and Circuits Lab	0	0	0	2	1
7	PCC	EC307PC	Digital Logic Design Lab	10	0	0	2	1
8	PCC	EC308PC	Basic Simulation Lab	0	0	0	2	1
9	MC	MC309HS	Constitution of India	0	3	0	0	0
10	MC	MC310EC	Fundamentals of Data Structures	-	2	0	0	0
11	MC	MC311	Advanced Python Programming	-	0	0	2	0
Total					**20**	**3**	**8**	**21**

II Year				II Semester				
S. No.	Course Type	Course Code	Course Title	% of Deviation	Periods Per Week			Credits
					L	T	P	
1	BSC	MA402BS	Numerical Methods, Complex Variables & Statistical Inference	20	3	1	0	4
2	PCC	EC402PC	Electromagnetic Fields and Waves	0	3	0	0	3
3	PCC	EC403PC	Analog and Digital Communications	1	3	1	0	4
4	PCC	EC404PC	Analog and Pulse Circuits	0	3	0	0	3
5	PCC	EC405PC	Linear and Digital Integrated Circuits	10	3	0	0	3
6	PCC	EC406PC	Analog and Digital Communications Lab	0	0	0	3	1.5
7	PCC	EC407PC	Analog and Pulse Circuits Lab	20	0	0	3	1.5
8	PCC	EC408PC	Linear and Digital Integrated Circuits Lab	10	0	0	2	1
9	MC	MC409HS	Gender Sensitization Lab	0	0	0	2	0
10	MC	MC410EC	Electronic Circuit Design Lab	-	0	0	2	0
Total					**15**	**2**	**12**	**21**

EC301PC: ELECTRONIC DEVICES AND CIRCUITS

B.TECH II YEAR I SEMESTER								
COURSE CODE	CATEGORY	HOURS/WEEK			CREDITS	MAXIMUM MARKS		
EC301PC	CORE	L	T	P	C	CIA	SEE	TOTAL
		3	1	0	4	30	70	100
CONTACT CLASSES:45	TUTORIAL CLASSES:15	PRACTICAL CLASSES:NIL				TOTAL CLASSES :60		

PREREQUISITES: APPLIED PHYSICS

COURSE OBJECTIVE:

1. To introduce components such as diodes, BJTs andFETs.
2. To know the applications ofcomponents.
3. To know the switching characteristics ofcomponents.
4. To give understanding of various types of amplifiercircuits.

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

1. Know the characteristics of various components.
2. Understand the utilization ofcomponents.
3. Understand the biasingtechniques.
4. Design and analyze small signal amplifiercircuits.

Unit-1 Diodes and Applications

Diode and Applications: Diode - Static and Dynamic resistances, Equivalent circuit, Load line analysis, Diffusion and Transition Capacitances, Diode Applications: Switch-Switching times.

Rectifier - Half Wave Rectifier, Full Wave Rectifier, Bridge Rectifier, Rectifiers With Capacitive Filter, Clippers-Clipping at two independent levels, Clampers-Clamping Operation, types, Clamping Circuit Theorem,Comparators.

Unit-2 Bipolar Junction Transistor (BJT):

Bipolar Junction Transistor (BJT): Principle of Operation and characteristics - Common Emitter, Common Base, Common Collector Configurations, Operating point, DC & AC load lines, Transistor Hybrid parametermodel,Determinationofh-parametersfromtransistorcharacteristics,Conversionofh-parameters.

Unit-3 Analysis and Design of BJT Amplifiers

Transistor Biasing and Stabilization : Bias Stability, Fixed Bias, Collector to Base bias, Self Bias, Bias Compensation using Diodes and Transistors.

Analysis and Design of Small Signal Low Frequency BJT Amplifiers: Analysis of CE, CC, CB Amplifiers and CE Amplifier with emitter resistance, low frequency response of BJT Amplifiers, effect of coupling and bypass capacitors on CE Amplifier.

Unit-4 Junction Field Effect Transistor (JFET)

Junction Field Effect Transistor: Construction, Principle of Operation, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and FET, Biasing of FET, FET as Voltage Variable Resistor, Analysis of CS, CD, CG JFET Configurations

Unit-5 Metal Oxide Semiconductor Field Effect Transistor (MOSFET)&Special Purpose Devices

MOSFET: MOSFET Construction and its Characteristics in Enhancement and Depletion modes. Basic Concepts of MOSFET Amplifiers.

Special Purpose Devices: Zener Diode - Characteristics, Voltage Regulator; Principle of Operation - SCR, Tunnel diode, UJT, Varactor Diode.

TEXT BOOKS:

1. Integrated Electronic - Jacob Millman, Christos C. Halkias. McGraw HillEducation.
2. Electronic Devices and Circuits theory– Robert L. Boylestead, Louis Nashelsky, 11th Edition, 2009,Pearson.

REFERENCE BOOKS:

1. The Art of Electronics, Horowitz, 3rd Edition Cambridge UniversityPress
2. Electronic Devices and Circuits, David A. Bell – 5th Edition,Oxford.
3. Pulse, Digital and Switching Waveforms –J. Millman, H. Taub and Mothiki S. Prakash Rao, 2Ed., 2008, McGrawHill.
4. Electronic Devices and Circuits- Jacob Millman, McGraw Hill Education

WEB REFERENCES:

1. https://www.youtube.com/watch?v=S76CnEJMl5E
2. https://www.physics-and-radio-electronics.com/electronic-devices-and-circuits/rectifier/clampercircuits.html
3. https://www.youtube.com/watch?v=MZPeRlst8rQ
4. https://www.elprocus.com/bridge-rectifier-circuit-theory-with-working-operation/
5. https://www.youtube.com/watch?v=-VwPSDQmdjM
6. https://www.electronics-tutorials.ws/amplifier/transistor-biasing.html
7. https://www.youtube.com/watch?v=i2t9GTAd2I0
8. https://www.electronics-tutorials.ws/transistor/tran_5.html
9. https://www.youtube.com/watch?v=XqGBNyhImV4

E TEXT BOOKS:

1. https://www.e-booksdirectory.com/details.php?ebook=8466
2. https://www.e-booksdirectory.com/details.php?ebook=1109
3. https://www.e-booksdirectory.com/details.php?ebook=5302

EC302PC : NETWORK ANALYSIS AND TRANSMISSION LINES

B.Tech II year I semester

Course Code	Category	Hours/Week			Credits	Max Marks		
		L	T	P	C	CIA	SEE	Total
EC302PC	Core	3	0	0	3	30	70	100
Contact Classes : 45	Tutorial Classes : Nil	Practical Classes : Nil				Total Classes : 45		

Prerequisite : Basic Circuit elements & Basic Electrical Circuits

Course Objectives :

1. To understand the basic concepts on RLCcircuits.
2. To know the behavior of the steady states and transients states in RLCcircuits.
3. To understand the two port networkparameters.
4. To study the propagation, reflection and transmission of plane waves in boundedand unboundedmedia.

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

1. Gain the knowledge on basic RLC circuitsbehavior.
2. Analyze the Steady state and transient analysis of RLCCircuits.
3. Know the characteristics of two port network parameters.
4. Analyze the transmission line parameters andconfigurations.

Unit-1 Network Graphs & Magnetic Coupled Circuits

Network Topology, Basic cutset and tie set matrices for planar networks, Magnetic Circuits, Self and Mutual inductances, dot convention, impedance, reactance concept, Impedance transformation and coupled circuits, co-efficient of coupling, equivalent T for Magnetically coupled circuits, Ideal Transformer.

Unit-2 RLC Analysis & Theorems

Transient and Steady state analysis of RC, RL and RLC Circuits, Sinusoidal, Step and Square responses. RC Circuits as integrator and differentiators. 2nd order series and parallel RLC Circuits, Root locus, damping factor, over damped, under damped, critically damped cases, quality factor and bandwidth for series and parallel resonance, resonance curves. Maximum Power Transfer Theorem and Reciprocity Theorem

Unit-3 Two Port Networks

Two port network parameters, Z, Y, ABCD, h and g parameters, Characteristic impedance, Image transfer constant, image and iterative impedance, network function, driving point and transfer functions – using transformed (S) variables, Poles and Zeros. Standard T,π,L Sections, Characteristic impedance, image transfer constants, Design of Attenuators, impedance matching network.

Unit-4 Transmission Lines - I

Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Equivalent Circuit, Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Lossless / Low Loss Characterization, Types of Distortion, Condition for Distortion less line, Minimum Attenuation, Loading - Types of Loading.

Unit-5 Transmission Lines - II

Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR. λ/4, λ/2, λ/8 Lines – Impedance Transformations, Smith Chart – Configuration and Applications, Single Stub Matching.

Text Books :

1. Engineering Circuit Analysis – William Hayt and Jack E Kemmerly, MGH, 8th Edition,1993.
2. Networks, Lines and Fields - JD Ryder, PHI, 2nd Edition,1999.

Reference Books :

1. Network Analysis – Van Valkenburg, 3rd Ed., Pearson,2016.
2. Electric Circuits – J. Edminister and M. Nahvi – Schaum's Outlines, Mc Graw HillsEducation, 1999.
3. Fundamentals of Electric Circuits – Charles K. Alexander and Matthew N. O. Sadiku, 6thEd
4. Electromagnetics with Applications – JD. Kraus, 5th Ed., TMH
5. Network Analysis & Synthesis – S P Ghosh and A K Chakraborty, McGraw Hill,2009
6. Transmission Lines and Networks – Umesh Sinha, Satya Prakashan, 2001, (Tech.India Publications), NewDelhi.

Web References :

1. https://www.electrical4u.com/transmission-line-in-power-system/
2. http://www.antenna-theory.com/tutorial/txline/
3. https://www.electrical4u.com/network-analysis/

E-text Books :

1. http://dl.konkur.in/post/Book/Bargh/Fundamentals-of-Electric-Circuits-6th-Edition-%5Bkonkur.in%5D.pdf
2. http://eng.harran.edu.tr/~msuzer/files/edt/edt.pdf
3. https://archive.org/details/Electromagnetics_559

EC303PC: Switching Theory and Logic Design

B.Tech. II Year I Semester								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
EC303PC	**Core**	3	1	-	4	30	70	100
Contact Classes: 45	**Tutorial Classes: 15**	**Practical Classes: Nil**				**Total Classes: 60**		

Prerequisite: Nil

Course Objectives:

- To understand common forms of number representation in logiccircuits
- To learn basic techniques for design of digital circuits and fundamental concepts used in the designof digitalsystems
- To understand the concepts of combinational logic circuits and sequentialcircuits.
- To understand the Realization of Logic Gates Using Diodes &Transistors.

Course Outcomes: Upon completing this course, the student will be able to

- Understand the numerical information in different forms and Boolean Algebratheorems
- Postulates of Boolean algebra and to minimize combinationalfunctions
- Design and analyze combinational and sequentialcircuits
- Known about the logic families and realization of logicgates.

Unit-1 NUMBER SYSTEMS & BOOLEAN ALGEBRA

Number Systems: Number systems, Complements of Numbers, Codes- Weighted and Non-weighted codes and its Properties, Parity check code and Hamming code.
Boolean Algebra: Basic Theorems and Properties, Switching Functions- Canonical and Standard Form, Algebraic Simplification, Digital Logic Gates, EX-OR gates, Universal Gates, Multilevel NAND/NOR realizations.

Unit-2 MINIMIZATION OF BOOLEAN FUNCTIONS

Minimization of Boolean functions: Karnaugh Map Method - Up to five Variables, Don't Care Map Entries, Tabular Method
Combinational Logic Circuits: Adders, Subtractors, Comparators, Multiplexers, Demultiplexers, Encoders, Decoders and Code converters, Hazards and Hazard Free Realizations.

Unit-3 SEQUENTIAL CIRCUITS FUNDAMENTALS

Sequential Circuits Fundamentals: Basic Architectural Distinctions between Combinational and Sequential circuits, SR Latch, Flip Flops: SR, JK, JK Master Slave, D and T Type Flip Flops, Excitation Table of all Flip Flops, Timing and Triggering Consideration, Conversion from one type of Flip-Flop to another.
Registers and Counters: Shift Registers – Left, Right and Bidirectional Shift Registers, Applications of Shift Registers - Design and Operation of Ring and Twisted Ring Counter, Operation of Asynchronous and Synchronous Counters.

Unit-4 SEQUENTIAL MACHINES

Sequential Machines: Finite State Machines, Synthesis of Synchronous Sequential Circuits- Serial Binary Adder, Sequence Detector, Parity-bit Generator, Synchronous Modulo N –Counters. Finite State Machine- capabilities and limitations, Mealy and Moore models.

Unit-5	REALIZATION OF LOGIC GATES USING DIODES & TRANSISTORS

Realization of Logic Gates Using Diodes & Transistors: AND, OR and NOT Gates using Diodes and Transistors, TTL, CML and CMOS Logic Families and its Comparison, Classification of Integrated circuits, standard TTL NAND Gate- Analysis & characteristics, TTL open collector Cofiguration, Tristate TTL, MOS & CMOS open drain and tri state outputs, CMOS transmission gate, IC interfacing- TTL driving CMOS &
CMOS driving TTL.

Text Books:

1. Digital Design- Morris Mano, PHI, 4th Edition,2006
2. Modern Digital Electronics – R. P. Jain, 3rd Edition, 2007- TataMcGraw-Hill

ReferenceBooks:

1. Introduction to Switching Theory and Logic Design – Fredriac J. Hill, Gerald R. Peterson, 3rd Ed, John Wiley & SonsInc.
2. Fundamentals of Logic Design- Charles H. Roth, Cengage Learning, 5th, Edition,2004.
3. Switching Theory and Logic Design – A.Anand Kumar, PHI,2013

Web References:

1. https://nptel.ac.in/courses/117/105/117105080/
2. https://nptel.ac.in/courses/106/105/106105185/
3. https://nptel.ac.in/courses/117/106/117106086/

E-Text Books:

1. https://www.pdfdrive.com/foundation-of-switching-theory-and-logic-design-as-per-jntu-syllabus-d159787713.html
2. https://neurophysics.ucsd.edu/courses/physics_120/Agarwal%20and%20Lang%20(2005)%20Foundations%20of%20Analog%20and%20Digital.pdf
3. http://dl.booktolearn.com/ebooks2/engineering/electrical/9789814364584_foundation_of_digital_electronics_and_logic_design_0516.pdf

EC304PC: SIGNALS AND SYSTEMS

B.Tech. II Year I Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
EC304PC	Core	3	1	-	4	30	70	100
Contact Classes: 45	Tutorial Classes: 15	Practical Classes: Nil				Total Classes: 60		

Prerequisite: Mathematics

Course Objectives:

- This gives the basics of Signals and Systems required for all Electrical Engineeringrelated courses.
- To understand the behavior of signal in time and frequencydomain
- To understand the characteristics of LTIsystems
- This gives concepts of Signals and Systems and its analysis using different transformtechniques.

Course Outcomes: Upon completing this course, the student will be able to

- Differentiate various signalfunctions.
- Represent any arbitrary signal in time and frequencydomain.
- Understand the characteristics of linear time invariantsystems.
- Analyze the signals with different transformtechnique

Unit-1 Signal Analysis

Analogy between Vectors and Signals, Orthogonal Signal Space, Signal approximation using Orthogonal functions, Mean Square Error, Closed or complete set of Orthogonal functions, Orthogonality in Complex functions, Classification of Signals and systems, Exponential and Sinusoidal signals, Concepts of Impulse
function, Unit Step function, Signum function.

Unit-2 Fourier series & Fourier Transforms

Fourier series: Representation of Fourier series, Continuous time periodic signals, Properties of Fourier Series, Dirichlet's conditions, Trigonometric Fourier Series and Exponential Fourier Series, Complex Fourier spectrum.

Fourier Transforms: Deriving Fourier Transform from Fourier series, Fourier Transform of arbitrary signal, Fourier Transform of standard signals, Fourier Transform of Periodic Signals, Properties of Fourier Transform, Fourier Transforms involving Impulse function and Signum function, Introduction to Hilbert Transform.

Unit-3 Signal Transmission through Linear Systems

Linear System, Impulse response, Response of a Linear System, Linear Time Invariant(LTI) System, Linear Time Variant (LTV) System, Transfer function of a LTI System, Filter characteristic of Linear System, Distortion less transmission through a system, Signal bandwidth, System Bandwidth, Ideal LPF, HPF, and BPF characteristics, Causality and Paley-Wiener criterion for physical realization, Relationship between Bandwidth and rise time, Convolution and Correlation of Signals, Concept of convolution in Time domain and Frequency domain, Graphical representation of Convolution.

Unit-4	Laplace Transforms & Z–Transforms

Laplace Transforms: Laplace Transforms (L.T), Inverse Laplace Transform, Concept of Region of Convergence (ROC) for Laplace Transforms, Properties of L.T, Relation between L.T and F.T of a signal, Laplace Transform of certain signals using waveform synthesis.

Z–Transforms: Concept of Z- Transform of a Discrete Sequence, Distinction between Laplace, Fourier and Z Transforms, Region of Convergence in Z-Transform, Constraints on ROC for various classes of signals, Inverse Z-transform, Properties of Z-transforms.

Unit-5	Sampling theorem& Correlation

Sampling theorem: Graphical and analytical proof for Band Limited Signals, Impulse Sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, Effect of under sampling – Aliasing, Introduction to Band PassSampling.

Correlation: Cross Correlation and Auto Correlation of Functions, Properties of Correlation Functions, Energy Density Spectrum, Parsevals Theorem, Power Density Spectrum, Relation between Autocorrelation Function and Energy/Power Spectral Density Function, Relation between Convolution and Correlation, Detection of Periodic Signals in the presence of Noise by Correlation, Extraction of Signal from Noise by Filtering.

Text Books:

1. Signals, Systems & Communications - B.P. Lathi, 2013,BSP.
2. Signals and Systems - A.V. Oppenheim, A.S. Willskyand S.H. Nawabi, 2Ed.
3. Signals and Systems – Simon Haykin and Van Veen, Wiley 2Ed.,

Reference Books:

1. Signals and Systems – A. Rama Krishna Rao, 2008,TMH
2. Fundamentals of Signals and Systems - Michel J. Robert, 2008, MGH InternationalEdition.
3. Signals, Systems and Transforms - C. L. Philips, J.M.Parr and Eve A.Riskin, 3 Ed., 2004,PE.
4. Signals and Systems – K. Deergha Rao, Birkhauser,2018.

Web References:

1. https://www.edx.org/course/discrete-time-signal-processing-mitx-6-341x-1
2. https://www.mooc-list.com/course/digital-signal-processing-coursera

E-Text Books:

1. http://onlinevideolecture.com/ebooks
2. http://www.freebookcentre.net/SpecialCat/Free-Signal-Processing-Boo

EC305PC: PROBABILITY THEORY AND STOCHASTIC PROCESSES

B.Tech. II Year I Semester								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
EC305ES	**ESC**	3	-	-	3	40	60	100
Contact Classes: 45	**Tutorial Classes: Nil**	**Practical Classes: Nil**				**Total Classes: 45**		

Prerequisite: Nil

Course Objectives:

1. This gives basic understanding of random signals and processessing
2. Utilization of Random signals and systems in Communications and Signal Processing areas.
3. To known the Spectral and temporal characteristics of RandomProcess.
4. To Learn the Basic concepts of Noisesources
5. To Learn the Basics of Information Theory and Source coding techniques of achannel.

Course Outcomes:

Upon completing this course, the student will be able to

1. Understand the concepts of Random Process and itsCharacteristics.
2. Understand the response of linear time Invariant system for a RandomProcesses.
3. Determine the Spectral and temporal characteristics of RandomSignals.
4. Understand the concepts of Noise in Communicationsystems.
5. Understand the concepts of Entropy, Channel capacity and different source coding techniques to evaluate coding efficiency of achannel.

Unit - 1 PROBABILITY & RANDOM VARIABLE

Probability :Probability introduced through Sets and Relative Frequency: Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Joint Probability, Conditional Probability, Total Probability, Baye's Theorem, IndependentEvents

Random Variable: Definition, Conditions for a Function to be a Random Variable, Discrete, Continuous and Mixed Random Variable, Distribution and Density functions, Properties, Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh, Methods of defining Conditioning Event, Conditional Distribution, Conditional Density and their Properties.

Operations On Single Random Variable: Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Chebychev's Inequality, Characteristic Function, Moment Generating

Function, Transformations of a Random Variable: Monotonic and Non-monotonic TransformationsofContinuousRandomVariable,TransformationofaDiscreteRandom Variable.

Unit - 2 MULTIPLE RANDOM VARIABLES

Multiple Random Variables: Vector Random Variables, Joint Distribution Function and its Properties, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Conditional Distribution and Density – Interval conditioning, Statistical Independence. Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem, (Proof not expected). Unequal Distribution, Equal Distributions.

Operations On Multiple Random Variables: Expected Value of a Function of Random Variables: Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case, Properties, Transformations of Multiple Random Variables, Linear
Transformations of Gaussian Random Variables.

Unit - 3	**RANDOM PROCESSES – TEMPORAL CHARACTERISTICS**

Random Processes – Temporal Characteristics: The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, concept of Stationarity and Statistical Independence. First-Order Stationary Processes, Second- Order and Wide-Sense Stationarity, (N-Order) and Strict- Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation- Ergodic Processes, Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, Covariance Functions, Gaussian Random Processes, Poisson Random Process. Random Signal Response of Linear Systems: System Response – Convolution, Mean and Mean-squared Value of System Response, autocorrelation
Function of Response, Cross-Correlation Functions of Input and Output.

Unit - 4	**RANDOM PROCESSES – SPECTRAL CHARACTERISTICS**

Random Processes – Spectral Characteristics: The Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, The Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross- Correlation Function. Spectral Characteristics of System Response: Power Density
Spectrum of Response, Cross-Power Density Spectrums of Input and Output.

Unit - 5	**NOISE SOURCES & INFORMATION THEORY**

Noise Sources: Resistive/Thermal Noise Source, Arbitrary Noise Sources, Effective Noise Temperature, Noise equivalent bandwidth, Average Noise Figures, Average Noise Figure of cascaded networks, Narrow Band noise, Quadrature representation of narrow band noise & its properties.

Information Theory: Entropy, Information rate, Source coding: Huffman coding, Shannon Fano coding, Mutual information, Channel capacity of discrete channel, Shannon-Hartley law; Trade -off between bandwidth and SNR.

Text Books:

1. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, TMH, 4th Edition, 2001.
2. Principles of Communication systems by Taub and Schilling,TMH

Reference Books:

1. Probability, Random Variables and Stochastic Processes – Athanasios Papoulisand
   S. Unnikrishna Pillai, PHI, 4th Edition
2. Communication Systems – Analog and Digital - R.P.Singh&S.D.Sapre,TMH
3. Probability, Statistics & Random Processes-K. Murugesan, P. Guruswamy, Anuradha Agencies, 3rdEdition
4. Probability Theory and Stochastic Processses - Y.Mallikarjun Reddy, University Press.
5. Statistical Theory of Communication – S.P Eugene Xavier, New AgePublications

Web References:

1. www.britannica.com/topic/probability-theory
2. www.math.uiuc.edu/~r-ash/BPT.html
3. www.nptel.ac.in/courses/111102014/
4. https://en.wikipedia.org/wiki/Information_theory#:~:text=It%20can%20be%20subdivided%20into,information%20entropy%20of%20the%20source.

E-Text Books:

1. http://freecomputerbooks.com/mathProbabilityBooks.html
2. http://www.springer.com/in/book/9780387878584
3. http://www.e-booksdirectory.com/listing.php?category=15

EC306PC: ELECTRONIC DEVICES AND CIRCUITS LAB

B.Tech. II Year I Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
EC306PC	Core	-	-	2	1	40	60	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 30				Total Classes: 30		

Prerequisite: Semi-Conductor Physics

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

1. Understand the characteristics of PNDiode.
2. Understand the characteristics of ZenerDiode
3. Understand the operation of Rectifiers, Clippers &Clampers.
4. Understand the input & output characteristics of BJT &JFET
5. Understand the frequency response of BJT& JFETamplifiers.
6. Understand the characteristics ofSCR.

List of Experiments: Verify any twelve experiments in H/W Laboratory

1. PN Junction diode characteristics A) Forward bias B) Reversebias.
2. Zener diode characteristics and Zener as voltageRegulator
3. Full Wave Rectifier with & withoutfilters
4. Input and output characteristics of BJT in CEConfiguration
5. Input and output characteristics of FET in CSConfiguration
6. Frequency response of Common Emitteramplifier.
7. Frequency response of Common Baseamplifier.
8. Frequency response of Common Sourceamplifier.
9. Measurement of h-parameters of transistor in CB, CE, CCconfigurations
10. Switching characteristics of atransistor
11. SCRCharacteristics.
12. Types of Clippers at different referencevoltages
13. Types of Clampers at different referencevoltages
14. The steady state output waveform of clampers for a square waveinput

List of Equipment/Software(with Specifications or Range) Required:

1. Regulated PowerSuppliers,0-30V
2. 20 MHz, Dual Channel Cathode RayOscilloscopes.
3. Functions Generators-Sine and Square wavesignals
4. Multimeters
5. ElectronicComponents

EC307PC: DIGITAL LOIC DESIGN LAB

B.Tech. II Year I Semester								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
EC307PC	**Core**	-	-	2	1	30	70	100
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 30**				**Total Classes: 30**		

Prerequisite: Nil

Course Objectives:

1. To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
2. To understand the concepts of combinational logic circuits and sequentialcircuits.
3. To Know about the logic families and realization of logicgates

List of Experiments:

1. Realization of Boolean Expressions usingGates
2. Design and realization logic gates using universalgates
3. Generation of clock using NAND / NORgates
4. Design a 4 – bit Adder /Subtractor
5. Design a Full Adder using 3x8decoder
6. Design and realization of a 4 – bit gray to Binary and Binary to GrayConverter
7. Design and realization of an 8 bit parallel load and serial out shift register usingflip-flops.
8. Design and realization of a Synchronous counter usingflip-flops
9. Design and realization of Asynchronous counters usingflip-flops
10. Design and realization of Ring and Twisted Ringcounters
11. Design and realization of 8x1 MUX using 2x1MUX
12. Design and realization of 4 bit comparator
13. Design and realization of a sequence detector-a finite statemachine
14. Realization of logic gates using DTL,ECL

List of Equipment/Software(with Specifications or Range) Required:

1. 5 V Fixed Regulated Power Supply/ 0-5V or more Regulated PowerSupply.
2. 20 MHz Oscilloscope with DualChannel.
3. Bread board and components/ TrainerKit.
4. Multimeter.

EC308PC: BASIC SIMULATION LAB

B.Tech. II Year I Semester								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
EC308PC	**Core**	-	-	2	1	30	70	100
Contact Classes: Nil	**Tutorial Classes: Nil**	**Practical Classes: 30**				**Total Classes: 30**		

Prerequisite: Nil

Course Objectives: The course should enable the students to:

1. Understand the basics of MATLAB.
2. Simulate the generation of signals and operations on them.
3. Illustrate Gibbs phenomenon.
4. Analyze the signals using Fourier, Laplace and Ztransforms.

Note:

- All the experiments are to be simulated using MATLAB or equivalentsoftware
- Minimum of 15 experiment are to becompleted

List of Experiments:

1. Basic Operations onMatrices.
2. Generation of Various Signals and Sequences (Periodic and Aperiodic), such as UnitImpulse, Unit Step, Square, Saw tooth, Triangular, Sinusoidal, Ramp,Sinc.
3. Operations on Signals and Sequences such as Addition, Multiplication, Scaling,Shifting, Folding, Computation of Energy and AveragePower.
4. Finding the Even and Odd parts of Signal/Sequence and Real and Imaginary parts ofSignal.
5. Convolution for Signals andsequences.
6. Auto Correlation and Cross Correlation for Signals andSequences.
7. Verification of Linearity and Time Invariance Properties of a given Continuous/DiscreteSystem.
8. Computation of Unit sample, Unit step and Sinusoidal responses of the given LTI systemand verifying its physical realiazability and stabilityproperties.
9. Gibbs PhenomenonSimulation.
10. Finding the Fourier Transform of a given signal and plotting its magnitude and phasespectrum.
11. Waveform Synthesis using LaplaceTransform.
12. Locating the Zeros and Poles and plotting the Pole-Zero maps in S-plane and Z-Plane forthe given transferfunction.
13. Generation of Gaussian noise (Real and Complex), Computation of its mean, M.S. Value andits Skew, Kurtosis, and PSD, Probability DistributionFunction.
14. Verification of SamplingTheorem.
15. Removal of noise by Autocorrelation / Crosscorrelation.
16. Extraction of Periodic Signal masked by noise usingCorrelation.
17. Verification of Weiner-KhinchineRelations.
18. Checking a Random Process for Stationarity in Widesense.

List of Equipment/Software (with Specifications or Range) Required:

1. Computer System with latest specifications connected
2. Window Xp or equivalent
3. Simulation software-MAT Lab or any equivalent simulation software

MC309HS: CONSTITUTION OF INDIA

B.Tech. II Year I Semester								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
		L	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
MC309HS	**MC**	3	-	-	0	30	70	100
Contact Classes: 45	**Tutorial Classes: Nil**	**Practical Classes: Nil**				**Total Classes: 45**		
Prerequisite: Nil								

The Constitution of India is the supreme law of India. Parliament of India cannot make any law which violates the Fundamental Rights enumerated under the Part III of the Constitution. The Parliament of India has been empowered to amend the Constitution under Article 368, however, it cannot use this power to change the "basic structure" of the constitution, which has been ruled and explained by the Supreme Court of India in its historical judgments. The Constitution of India reflects the idea of "Constitutionalism" – a modern and progressive concept historically developed by the thinkers of "liberalism" – an ideology which has been recognized as one of the most popular political ideology and result of historical struggles against arbitrary use of sovereign power by state. The historic revolutions in France, England, America and particularly European Renaissance and Reformation movement have resulted into progressive legal reforms in the form of "constitutionalism" in many countries. The Constitution of India was made by borrowing models and principles from many countries including United Kingdom andAmerica.

The Constitution of India is not only a legal document but it also reflects social, political and economic perspectives of the Indian Society. It reflects India's legacy of "diversity". It has been said that Indian constitution reflects ideals of its freedom movement; however, few critics have argued that it does not truly incorporate our own ancient legal heritage and cultural values. No law can be "static" and therefore the Constitution of India has also been amended more than one hundred times. These amendments reflect political, social and economic developments since the year 1950. The Indian judiciary and particularly the Supreme Court of India has played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it "as one of the strongest court in the world".

Course content

1. Meaning of the constitution law andconstitutionalism
2. Historical perspective of the Constitution ofIndia
3. Salient features and characteristics of the Constitution ofIndia
4. Scheme of the fundamentalrights
5. The scheme of the Fundamental Duties and its legalstatus
6. The Directive Principles of State Policy – Its importance andimplementation
7. Federal structure and distribution of legislative and financial powers between the Union and the States
8. Parliamentary Form of Government in India – The constitution powers and status of the President ofIndia
9. Amendment of the Constitutional Powers andProcedure
10. The historical perspectives of the constitutional amendments inIndia
11. Emergency Provisions: National Emergency, President Rule, FinancialEmergency
12. Local Self Government – Constitutional Scheme inIndia
13. Scheme of the Fundamental Right toEquality
14. Scheme of the Fundamental Right to certain Freedom under Article19
15. Scope of the Right to Life and Personal Liberty under Article21

MC301EC: DATA STRUCTURES

B.Tech. II Year I Semester								
Course Code	**Category**	**Hours/Week**			**Credits**	**Maximum Marks**		
MC301EC	**MC**	**L**	**T**	**P**	**C**	**CIA**	**SEE**	**Total**
		3	-	-	0	30	70	100
Contact Classes: 45	**Tutorial Classes: Nil**	**Practical Classes: Nil**				**Total Classes: 45**		

Prerequisite: Mathematical Knowledge at pre-university level

Course Objectives: The course should enable the students to:

1. Learn the basic techniques of algorithm analysis.
2. Demonstrate searching and sorting algorithms and analyze their time complexities.
3. Implement linear data structures viz. stack, queue and linked list.
4. Demonstrate non-linear data structures viz. tree and graph traversal algorithms.
5. Study and choose appropriate data structure to solve problems in real world

Course Outcomes:

Unit - I: INTRODUCTION TO DATA STRUCTURES, SEARCHING AND SORTING

Basic concepts: Introduction to data structures, classification of data structures, operations on data structures; Searching techniques: Linear search and Binary search; Sorting techniques: Bubble sort, selection sort, insertion sort and comparison of sorting algorithms.

Unit - II: LINEAR DATA STRUCTURES

Stacks: Primitive operations, implementation of stacks using arrays, applications of stacks arithmetic expression conversion and evaluation; Queues: Primitive operations; Implementation of queues using Arrays, applications of linear queue, circular queue and double ended queue (deque).

Unit - III: LINKED LISTS

Linked lists: Introduction, singly linked list, representation of a linked list in memory, operations on a single linked list; Applications of linked lists: Polynomial representation and sparse matrix manipulation. Types of linked lists: Circular linked lists, doubly linked lists; Linked list representation and operations of Stack and Queue.

Unit - IV: NON LINEAR DATA STRUCTURES

Trees: Basic concept, binary tree, binary tree representation, array and linked representations, binary tree traversal, binary tree variants, application of trees; Graphs: Basic concept, graph terminology, graph implementation, graph traversals, Application of graphs.

Unit - V: BINARY TREES AND HASHING

Binary search trees: Binary search trees, properties and operations; Balanced search trees: AVL trees; Introduction to M-Way search trees, B trees; Hashing and collision: Introduction, hash tables, hash functions, collisions, applications of hashing.

Text Books:

1. Rance D. Necaise, “Data Structures and Algorithms using Python”, Wiley, John Wiley & Sons, INC.,

2011.
2. Benjamin Baka, David Julian, “Python Data Structures and Algorithms”, Packt Publishing Ltd., 2017.

Reference Books:

1.S. Lipschutz, “Data Structures”, Tata McGraw Hill Education, 1st Edition, 2008.
2. D. Samanta, “Classic Data Structures”, PHI Learning, 2nd Edition, 2004.

Web References:

1. https://www.tutorialspoint.com/data_structures_algorithms/algorithms_basics.htm
2. https://www.codechef.com/certification/data-structures-and-algorithms/prepare
3. https://www.cs.auckland.ac.nz/software/AlgAnim/dsToC.html
4. https://online-learning.harvard.edu/course/data-structures-and-algorithms

MC311: ADVANCED PYTHON PROGRAMMING LAB

B.Tech. II Year I Semester

Course Code	Category	Hours/Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
MC311	MC	-	-	3	0	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 45				Total Classes: 45		

Prerequisite:

1. A course on "Data Science, GUI and Web Programming".
2. A course on "Python Programming".

Course Objectives: At the end of the course students should be able to:

1. Manipulate and Analyze dataset.
2. Perform statistical analysis.
3. Effectively visualizing result.
4. Develop the skill of designing Graphical user Interfaces.
5. Develop Database Application.

List of Experiments:

LIST OF PROGRAMS:

1. Create Regular Expressions that
   a) Recognize following strings bit, but, bat, hit, hat or hut
   b) Match any pair of words separated by a single space, that is, first and last names.
   c) Match any word and single letter separated by a comma and single space, as in last name, first initial.
   d) Match simple Web domain names that begin with www. and end with a ".com" suffix; for example, www.yahoo.com. Extra Credit: If your regex also supports other high-level domain names, such as .edu, .net, etc. (for example, www.foothill.edu).
   e) Match a street address according to your local format (keep your regex general enough to match any number of street words, including the type designation). For example, American street addresses use the format: 1180 Bordeaux Drive. Make your regex flexible enough to support multi-word street names such as: 3120 De la Cruz Boulevard.
2. Create Regular Expressions that:
   a) Extract the complete timestamps from each line.
   b) Extract the complete e-mail address from each line.
   c) Extract only the months from the timestamps.
   d) Extract only the years from the timestamps.
   e) Extract only the time (HH:MM:SS) from the timestamps.
3. Write a multithread program to create 3 threads where one thread calculates the factorial and second thread calculates square and third thread calculates the summation of a list of numbers.
4. Write a python program to create two threads to count how many lines in two text files (one thread will count lines from first file and other thread from second file).
5. Write a python script that performs basic operations using MySQL database and a corresponding Python database adapter.
6. Write a python script that performs basic operations using SQLite Database and a corresponding Python database adapter

7. Write a program to demonstrate operations in Numpy.
8. Write a python program to demonstrate data indexing, selection and filtering in Pandas.
9. Write a python program to create GUI application to illustrate slider tool that controls the size of the text font in the label widget.(Greater the slider position, larger the font and vice-versa)
10. Write a python program to create GUI application to implement road signs with the appropriate foreground and background colors based on sign type stop,wait and Go signal.
11. Write a python program to create a "Comments" or "Feedback" page for a Web site. Take user feedback via a form, process the data in your script, and return a "thank you" screen.
12. Create a CGI application that not only saves files to the server's disk, but also displays the content of file back to the client.

TEXT BOOKS:

1. Core Python Programming, Wesley J. Chun, Third Edition, Pearson.
2. Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython by Wes McKinny, O'Reilly Media.
3. Elegant SciPy: The Art of Scientific Python By Nunez-Iglesias, Stefan van der Walt, Harriet Dashnow, O'Reilly Media.
4. A. Lukaszewski, MySQL for Python: Database Access Made Easy, Pact Publisher.

REFERENCE BOOKS:

1. Data Science from Scratch, 2nd Edition by Joel Grus, O'Reilly Media, Inc, May 2019.
2. Scipy and Numpy: An Overview for Developers by Eli Bressert, O'Reilly Media.

List of Equipment/Software (with Specifications or Range) Required:

1. **Python.org**