III SEMESTER (II/IV -1 SEM)

S. NO	COURSE CODE	SUBJECT NAME	L	T	P	HOURS	CREDITS	PREREQUISTES
1	15EN2103	Professional communication skills	0	0	4	4	2	NIL
2	15MT2005	Probability & Stochastic Models	2	2	2	6	4	NIL
3	15CS2002	Object Oriented Programming	2	2	2	6	4	NIL
4	15EM2001	Computer Organization & Architecture	2	2	2	6	4	15EC1101
5	15EC2002	Signal Analysis	2	2	2	6	4	NIL
6	15EC2103	Analog Electronic Circuit Design	2	4	2	8	5	NIL

SYLLABUS

II/IV B.TECH (I SEM)

PROBABILITY AND STOCHASTIC MODELS

Course Code : 15MT2005 **L-T-P :2-2-2**

Pre-requisite :NIL **Credits : 4**

Mapping of course outcomes with student outcomes:

CO.No	Course outcome	Mapped SO	BTL
1	Construct the probability distribution of a random variable, based on a real-world situation, and use it to compute expectation and variance	**e**	**2**
2	Predict the relationship between two variables and construct the linear and non-linear regression lines for the given data	**e**	**2**
3	Model the Single and multi server markovian queuing models with finite and infinite capacity.	**k**	**2**
4	Verify and validate the simulation models.	**k**	2
5	Verify the solution of problems through MATLAB/MINITAB.	**k**	**2**

Probability and Random variables: Definitions of probability, Sample space, Axioms of probability, Conditional probability, Addition, Multiplication and Bayes' theorem. Random variables, Joint and marginal probabilities, Mathematical expectation.

Standard discrete and continuous distributions: Definitions and simple properties of Binomial, Poisson, Geometric, Hyper-Geometric, Uniform, Exponential, Weibull and Normal distributions, Applications of the above distributions.

Correlation and Regression: Correlation coefficient for grouped and ungrouped data, Rank correlation. Linear and Non-Linear Regression.

Stochastic Processes: Discrete-Time Markov Chains, Continuous- Time Markov Chains.

Queueing models: Single and multi server markovian queuing models with finite and infinite capacity. Networks of queues.

Simulation: Introduction to simulation, simulation examples, general principles, statistical models in simulation. Verification and validation of simulation models.

Text Books

1. Ronald E. Walpole, Sharon L. Myers and Keying Ye, "Probability and Statistics for Engineers and Scientists", 8th Edition, Pearson.
2. Kishore S Trivedi, "Probability& Statistics with Reliability, Queueing and Computer Science Applications", 2nd Edition, Wiley India, 2009.

Reference Books

1. Richard A Johnson , Miller & Freund's Probability and Statistics for Engineers, 11th Edition PHI, New Delhi.
2. Jerry Banks, John S Carson, Barry L Nelson, David M Nicol, Discrete- Event System Simulation, 4th Edition, Pearson
3. Jay L. Devore, Probability and Statistics for Engineers, CENAGE learning.S C Gupta and V K Kapoor , Fundamentals of Mathematical Statistics, 11th Edition, S Chand & Sons, New Delhi.

OBJECT ORIENTED PROGRAMMING

Course code : 15 CS 2002 L – T – P: 2-2-2
Pre Requisite : NIL Credits :4

Mapping of Course outcomes with Student outcomes

CO.NO.	Course outcome's	Mapped SO	BTL
CO1	Understand Basic Concepts of OOP, introduction to classes and objects through Java Language and apply.	e	2
CO2	Understand the concepts of constructors, Overloading, parameter passing, access control, Inheritance and apply.	e	2
CO3	Understand Packages, Interfaces, and Exception Handling and apply.	e	2
CO4	Understand I/O Streams & apply and understand Basic Concepts of Multi -Threading	k	3

Syllabus: Introduction: Object-Oriented Programming, OOP Principles, Encapsulation, Inheritance and Polymorphism Java as a OOPs & Internet Enabled language, The Byte code, Data types, Variables, Dynamic initialization, scope and life time of variables, Arrays, Operators, Control statements, Type Conversion and Casting, Compiling and running of simple Java program. Classes and Objects: Concepts of classes and objects, Declaring objects, Assigning Object Reference Variables, Methods, Constructors, Access Control, Garbage Collection, Usage of static with data and methods, usage of final with data, Overloading methods and constructors, parameter passing - call by value, recursion, Nested classes. Inheritance: Inheritance Basics, member access rules, Usage of super key word, forms of inheritance, Method Overriding, Abstract classes, Dynamic method dispatch, Using final with inheritance, The Object class. Packages and Interfaces: Packages, Classpath, Importing packages, differences between classes and interfaces, Implementing & Applying interface. I/O Streams- file, byte streams, character streams, Exception Handling: Exception Handling fundamentals, Types of Exceptions, Usage of try and catch, throw, throws and finally keywords, Multithreading.

Text Books:

1. Herbert Schildt, “The Complete Reference Java2”, 7th edition TMH,(2002).
2. Timothy A. Budd, “An Introduction to Object-Oriented Programming”, 3/E, Pearson, (2008).

Reference Books:

1. Jim Keogh, “The Complete Reference J2EE”, TMH, (2006).
2. Deitel & Deitel, “‘JAVA – How to program”, 6th edition, PHI,(2007).
3. Cay.S.Horstmann and Gary Cornell “Core Java 2, Vol 1, Fundamentals”, Seventh Edition, Pearson Education.

COMPUTER ORGANIZATION AND ARCHITECTURE

Course code : 15EM2001 L – T – P: 2 – 2 - 2

Pre Requisite : 15EC1101 Credits: 4

Mapping of course outcomes with student outcomes:

C.O. No.	Course outcome	Mapped SO	BTL
CO1	Understand the functionality and design the CPU functional units - control unit, registers, the arithmetic and logic unit, the instruction execution unit, and the interconnections among these components.	C,K	2
CO2	Understand, analyze and design main, cache and virtual memory organizations.	C,K	2
CO3	Understand, analyze and design different types of I/O transfer techniques.	C,K	2
CO4	Understand the design issues of RISC and CISC CPUs and the design issues of pipeline architectures.	C,K	2
CO5	Able to Design combinational and sequential circuits using LOGISIM	C,K	2

Syllabus:

Introduction to computer system and its sub modules, Number System and Representation of information, Arithmetic and Logical operation and hardware implementation of Arithmetic and Logic Unit, Introduction to memory Unit, control unit and Instruction Set. Working with an ALU, Concepts of Machine level programming, Assembly level programming and High level programming. Various addressing modes and designing of an Instruction set. Concepts of subroutine and subroutine call, use of stack for handling subroutine call and return. Introduction to CPU design, Instruction interpretation and execution, Micro-operation and their RTL specification. Hardwired control CPU design. Micro programmed control CPU design. Concepts of semiconductor memory, CPU-memory interaction, organization of memory modules. Cache memory and related mapping and replacement policies. Virtual memory. Introduction to input/output processing, working with video display unit and keyboard and routine to control them. Program controlled I/O transfer. Interrupt controlled I/O transfer, DMA controller. Secondary storage and type of storage devices. Introduction to buses and connecting I/O devices to CPU and memory. Introduction to RISC and CISC paradigm. Design issues of a RISC

processor and example of an existing RISC processor. Introduction to pipelining and pipeline hazards, design issues of pipeline architecture. Instruction level parallelism and advanced issues.

Text Books :

1. William Stallings, Computer Organization and Architecture: Designing for Performance, 8/e, Pearson Education India. 2010.
2. D. A. Patterson and J. L. Hennessy, Computer Organization and Design, 4/e, Morgan Kaufmann, 2008.

Reference Books :

1. A. S. Tanenbaum, Structured Computer Organization, 5/e, Prentice Hall of India, 2009.
2. V. C. Hamacher, Z. G. Vranesic and S. G. Zaky, Computer Organization, 5/e, McGraw Hill, 2002.

SIGNAL ANALYSIS

Course Code: 15 EC 2002 **L–T–P: 2-2-2**
Pre Requisite : NIL **Credits: 4**

Mapping of the Course Outcomes with Student Outcomes

CO. No.	Course Outcome	Mapped SO	BTL
CO 1	Demonstrate signals and their Spectra	**a**	**2**
CO 2	Analyze discrete time systems	**a**	**2**
CO 3	Design filters to cater signal analysis needs	**k**	**2**
CO 4	Analyze non stationary signals in time and frequency domains	**k**	**2**

Syllabus

Introduction to signal and system, Elementary signals, Signal properties and operations, Orthogonal signal space, Signal approximation using orthogonal functions, Orthogonal Properties of Sinusoidal functions Exponential and trigonometric Fourier series, Complex Fourier spectrum, Fourier Transform, Properties of Fourier Transform, Fourier transform of Periodic Signals, Case studies

Sampling of continuous time signals, sampling theorem, DTFT, DFT, FFT, Z-Transform, Properties of Z-Transform, Case studies. DT Systems, Classification of DT systems, System Function, Impulse Response, Response for an arbitrary input, Causality and stability of LTI systems ,case studies

Realization of discrete time systems, Design of Butterworth IIR low pass filter, FIR low pass filter using windows, Case studies Time frequency analysis: STFT, Wavelet transform and applications, Case studies

Text books

1. Simon Haykin and Barry Van Veen, “Signals and systems”, Wiley, (2003).
2. J G Proakis and D G Manolakis, “Digital Signal Processing”, Pearson Education, (2007).
3. A. V. Oppenheim, R.W.Schafer and J R Buck, “Digital Signal Processing”, Pearson Education, (2007).
4. M. Vetterli and J. Kovacevic, “Wavelets and Sub band Coding”, Prentice Hall, (1995).

Reference Books

1. Alan. V. Oppenheim, Alan.V.Willsky, “Signals and systems”, Prentice-Hall signal processing series.
2. Raghuveerrao and AjitS.Bopardikar, “Wavelet transforms: Introduction, Theory and applications”, Pearson Education Asia, (2000).
3. Stark, “Wavelets and signal processing: An application based introduction”, Springer, (2005).
4. Dimitris G. Manalakis and Vinay Ingle, “Applied Digital Signal Processing, theory, and practice”, Cambridge University Press, New York, (2011).
5. S. Mallat, “A Wavelet Tour of Signal Processing”, 2nd edition, Academic Press, (1999).

Simulation Books

1. Vinay, Ingle, John G Proakis, “Digital Signal Processing Using Matlab”, Pearson Education.
2. Nasser Kehtarnavaz, Namjin Kim, “Digital Signal Processing System Level Design using LabVIEW”, Elsevier.
3. E. S. Gopi, “Mathematical Summary for Digital Signal Processing Applications with Matlab”, Springer.

ANALOG ELECTRONIC CIRCUIT DESIGN

Course Code : 15 EC 2103 **L–T–P: 2-4-2**

Pre Requisite : NIL **Credits: 5**

Mapping of the Course Outcomes with Student Outcomes

CO. No.	Course Outcome	Mapped SO	BTL
CO1	Understand the industrial processes and organizations connected with the profession and relate classroom learning with real life situation by taking into the consideration of various design concepts	**c**	**3**
CO2	Understanding the concepts of various diodes and their applications.	**c**	**3**
CO3	BJT concepts as operation, biasing and frequency response	**c,k**	**3**
CO4	FET concepts as operation, biasing and frequency response	**c,k**	**3**
CO5	Feedback concepts and their analysis	**c,k**	**3**
CO6	Concepts of various oscillators and applications.	**c,k**	**3**

Syllabus

P-N Junctions: Diode theory, forward and reverse-biased junctions, reverse-bias breakdown, load line analysis, diode applications - Limiters, clippers, clampers, voltage multipliers, half wave & full wave rectification, Capacitor filters, π-section filter, ripple factor, Special purpose diodes - Zener diode, Varactor, light emitting diodes, Laser diodes. Regulators: Series and shunt voltage regulator, percentage regulation, Concept of SMPS.

Transistor biasing & stability: Q point, Self-Bias-CE, Compensation techniques, h-model of Transistor, Expression of voltage gain, current gain, input & output impedance, Trans-resistance & Trans-conductance, Emitter follower circuits, High frequency model of Transistor, FET fundamentals, Configurations, current-voltage characteristics, parameters of JFET, Biasing of JFET, Biasing of MOSFET.

Transistor amplifiers: RC coupled amplifier, Function of all components, Equivalent circuit, derivation of voltage gain, Current gain, Input impedance & output impedance, Frequency response characteristics, Lower & upper frequencies, Bandwidth, Concept of Wide band amplifier, FET small signal model, Common drain common gate configurations.

Operational amplifiers: Ideal OPAMP, Differential amplifier, Constant current source, CMRR, Open & closed loop circuits, importance of feedback loop (positive & negative), inverting & non-inverting amplifiers, Voltage follower circuits.

Application of Operational amplifiers: Adder, Integrator & Differentiator, Comparator, Schmitt Trigger, Instrumentation Amplifier, Log & Antilog amplifier, Trans-conductance multiplier, Precision rectifier, Voltage to current & Current to voltage converter.

Filter Circuits: Analysis of Low pass, High pass, Band pass, Band reject, All pass filters (first and second order only) using operational amplifier.
Feedback amplifier & Oscillators: Concept of Feedback, Negative & Positive feedback, Voltage/Current, Series/Shunt feedback, Berkhausen criterion, Colpit , Hartley's, Phase shift, Wien bridge, & Crystal oscillators.
Power amplifiers: Class A, B, AB, C, Conversion efficiency, Distortion.
Multivibrators: Monostable, Bistable multivibrators, Monostable & Astable operation using 555 timer.
Special function circuits: VCO & PLL

Text Books:

1. Muhammad H. Rashid, "Microelectronic Circuit Analysis and Design", Oxford Press.
2. Sedra & Smith, "Micro-Electronic Circuits theory and applications" 2nd edition, Cengage Learning.

Reference Books:

1. Jacob Millman & Christos C. Halkias, "Integrated Electronics", Tata -McGraw Hill, 2nd Edition, (2010).
2. Robert L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuit Theory", PHI. 9th Edition.