

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B.TECH. ELECTRONICS AND COMPUTER ENGINEERING**
**COURSE STRUCTURE & SYLLABUS (2016-17)**
**II YEAR I SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA301ES	Mathematics - IV	4	1	0	4
2	EI302ES	Electronics Devices and Circuits	4	0	0	4
3	EI303ES	Signals and Systems	4	0	0	4
4	MA304BS	Probability Theory and Stochastic Processes	3	1	0	3
5	EI305ES	Java Programming	3	1	0	3
6	EC306ES	Electronics Devices and Circuits Laboratory	0	0	3	2
7	EC307ES	Basic Simulation Laboratory	0	0	3	2
8	EI308ES	Java Programming Laboratory	0	0	3	2
9	*MC300ES	Environmental Science and Technology	3	0	0	0
		<b>Total Credits</b>	<b>21</b>	<b>2</b>	<b>9</b>	<b>24</b>

**II YEAR II SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	EI401ES	Electronic Circuit Analysis	4	0	0	4
2	EI402ES	Digital Logic and Pulse Circuits	4	0	0	4
3	EI404ES	Web Technologies	4	0	0	4
4	CS403ES	Mathematical Foundations for Computer Science	3	1	0	3
5	SM405MS	Business Economic and Financial Analysis	3	0	0	3
6	EI406ES	Electronic Circuit Analysis Laboratory	0	0	3	2
7	EI407ES	Digital Logic and Pulse Circuits Laboratory	0	0	3	2
8	EI409ES	Web Technologies Laboratory	0	0	3	2
9	*MC400HS	Gender Sensitization Laboratory	0	0	3	0
		<b>Total Credits</b>	<b>18</b>	<b>1</b>	<b>12</b>	<b>24</b>

**MA301ES: MATHEMATICS-IV**  
**(Complex Variables and Fourier Analysis)**

**B.Tech. II Year I Sem.**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>4</b>	<b>1</b>	<b>0</b>	<b>4</b>

**Prerequisites:** Foundation course (No Prerequisites).

**Course Objectives:** To learn

- differentiation and integration of complex valued functions
- evaluation of integrals using Cauchy's integral formula
- Laurent's series expansion of complex functions
- evaluation of integrals using Residue theorem
- express a periodic function by Fourier series and a non-periodic function by Fourier transform
- to analyze the displacements of one dimensional wave and distribution of one dimensional heat equation

**Course Outcomes:** After learning the contents of this paper the student must be able to

- analyze the complex functions with reference to their analyticity, integration using Cauchy's integral theorem
- find the Taylor's and Laurent's series expansion of complex functions
- the bilinear transformation
- express any periodic function in term of sines and cosines
- express a non-periodic function as integral representation
- analyze one dimensional wave and heat equation

**UNIT – I**

**Functions of a complex variable:** Introduction, Continuity, Differentiability, Analyticity, properties, Cauchy, Riemann equations in Cartesian and polar coordinates. Harmonic and conjugate harmonic functions-Milne-Thompson method

**UNIT - II**

**Complex integration:** Line integral, Cauchy's integral theorem, Cauchy's integral formula, and Generalized Cauchy's integral formula, Power series: Taylor's series- Laurent series, Singular points, isolated singular points, pole of order m – essential singularity, Residue, Cauchy Residue theorem (Without proof).

**UNIT-III**

**Evaluation of Integrals:** Types of real integrals:

(a) Improper real integrals  $\int_{-\infty}^{\infty} f(x)dx$                       (b)  $\int_c^{c+2\pi} f(\cos \theta, \sin \theta)d\theta$

Bilinear transformation- fixed point- cross ratio- properties- invariance of circles.

**UNIT-IV**

**Fourier series and Transforms:** Introduction, Periodic functions, Fourier series of periodic function, Dirichlet's conditions, Even and odd functions, Change of interval, Half range sine and cosine series.

Fourier integral theorem (without proof), Fourier sine and cosine integrals, sine and cosine, transforms, properties, inverse transforms, Finite Fourier transforms.

**UNIT-V**

**Applications of PDE:** Classification of second order partial differential equations, method of separation of variables, Solution of one dimensional wave and heat equations.

**TEXT BOOKS:**

1. A first course in complex analysis with applications by Dennis G. Zill and Patrick Shanahan, Johns and Bartlett Publishers.
2. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers.
3. Advanced engineering Mathematics with MATLAB by Dean G. Duffy

**REFERENCES:**

1. Fundamentals of Complex Analysis by Saff, E. B. and A. D. Snider, Pearson.
2. Advanced Engineering Mathematics by Louis C. Barrett, McGraw Hill.

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## EI302ES: ELECTRONIC DEVICES AND CIRCUITS

**B.Tech. II Year I Sem.**

L	T	P	C
4	0	0	4

**Pre-requisites:** Nil.

**Course Objectives:** This is a fundamental course, basic knowledge of which is required by all the circuit branch engineers. This course focuses:

- To familiarize the student with the principle of operation, analysis and design of Junction diode, BJT and FET amplifier circuits, transistors and field effect transistors.
- To understand diode as rectifier.
- To study basic principle of filter circuits and various types.

**Course Outcomes:** At the end of the course, the student will be able to:

- Understand and Analyse the different types of diodes, operation and its characteristics
- Design and analyse the DC bias circuitry of BJT and FET
- Design biasing circuits using diodes and transistors.
- To analyze and design diode application circuits, amplifier circuits and oscillators employing BJT, FET devices.

### UNIT - I

**P-N Junction Diode:** Qualitative Theory of P-N Junction, P-N Junction as a Diode, Diode Equation, Volt-Ampere Characteristics, Temperature dependence of VI characteristic, Ideal versus Practical – Resistance levels (Static and Dynamic), Transition and Diffusion Capacitances, Diode Equivalent Circuits, Load Line Analysis, Breakdown Mechanisms in Semiconductor Diodes, Zener Diode Characteristics.

**Special Purpose Electronic Devices:** Principle of Operation and Characteristics of Tunnel Diode (with the help of Energy Band Diagram), Varactor Diode, SCR and Semiconductor Photo Diode.

### UNIT - II

**Rectifiers and Filters:** The P-N junction as a Rectifier, Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Harmonic components in a Rectifier Circuit, Inductor Filters, Capacitor Filters, L- Section Filters,  $\pi$ - Section Filters, Comparison of Filters, Voltage Regulation using Zener Diode.

### UNIT - III

**Bipolar Junction Transistor and UJT:** The Junction Transistor, Transistor Current Components, Transistor as an Amplifier, Transistor Construction, BJT Operation, BJT Symbol, Common Base, Common Emitter and Common Collector Configurations, Limits of Operation, BJT Specifications, BJT Hybrid Model, Determination of h-parameters from

Transistor Characteristics, Comparison of CB, CE, and CC Amplifier Configurations, UJT and Characteristics.

#### UNIT - IV

**Transistor Biasing and Stabilization:** Operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector - Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization Factors, Stabilization against variations in  $V_{BE}$  and  $\beta$ , Bias Compensation using Diodes and Transistors, Thermal Runaway, Thermal Stability, Analysis of a Transistor Amplifier Circuit using h-Parameters.

#### UNIT - V

**Field Effect Transistor:** The Junction Field Effect Transistor (Construction, principle of operation, symbol) – Pinch-off Voltage - Volt-Ampere characteristics, The JFET Small Signal Model, MOSFET (Construction, principle of operation, symbol), MOSFET Characteristics in Enhancement and Depletion modes.

#### TEXT BOOKS:

1. Millman's Electronic Devices and Circuits – J. Millman, C.C.Halkias, and Satyabrata Jit, 2 Ed., 1998, TMH.
2. Electronic Devices and Circuits – David A. Bell, 5 Ed, Oxford
3. Electronic Devices and Circuits – Mohammad Rashid, Cengage Learning, 2013

#### REFERENCE BOOKS:

1. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 Ed., 2008, TMH.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 Ed., 2006, PEI/PHI.
3. Electronic Devices and Circuits – B. P. Singh, Rekha Singh, Pearson, 2Ed, 2013.
4. Electronic Devices and Circuits – Anil K. Maini, Varsha Agarwal, 1Ed, 2009, Wiley India Pvt. Ltd.

### EI303ES: SIGNALS AND SYSTEMS

**B.Tech. II Year I Sem.**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>

**Pre-requisites:** Nil.

**Course Objectives:** This is a core subject, basic knowledge of which is required by all the engineers. This course focuses on:

- To get an in-depth knowledge about signals, systems and analysis of the same using various transforms.

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

- Represent any arbitrary signals in terms of complete sets of orthogonal functions and understands the principles of impulse functions, step function and signum function.
- 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.
- Understands the principle of linear system, filter characteristics of a system and its bandwidth, the concepts of auto correlation and cross correlation and power Density Spectrum.
- Can design a system for sampling a signal.
- For a given system, response can be obtained using Laplace transform, properties and ROC of L.T.
- Study the continuous and discrete signal relation and relation between F.T., L.T. & Z.T, properties, ROC of Z Transform.

#### UNIT - I

**Signal Analysis and Fourier Series: 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, Exponential and Sinusoidal signals, Concepts of Impulse function, Unit Step function, Signum function.

**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.

#### UNIT - II

**Fourier Transforms and Sampling: 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.

**Sampling:** Sampling theorem – Graphical and analytical proof for Band Limited Signals, Types of Sampling - Impulse Sampling, Natural and Flat top Sampling, Reconstruction of

signal from its samples, Effect of under sampling – Aliasing, Introduction to Band Pass sampling.

### UNIT - III

**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 characteristics of Linear Systems, 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.

### UNIT - IV

**Convolution and Correlation of Signals:** Concept of convolution in Time domain and Frequency domain, Graphical representation of Convolution, Convolution property of Fourier Transforms, Cross Correlation and Auto Correlation of functions, Properties of Correlation function, Energy density spectrum, Parseval's Theorem, Power density spectrum, Relation between Auto Correlation 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.

### UNIT - V

**Laplace Transforms:** Review of Laplace Transforms (L.T), Partial fraction expansion, Inverse Laplace Transform, Concept of Region of Convergence (ROC) for Laplace Transforms, Constraints on ROC for various classes of signals, Properties of L.T, Relation between L.T and F.T of a signal, Laplace Transform of certain signals using waveform synthesis.

**Z-Transforms:** Fundamental difference between Continuous and Discrete time signals, Discrete time signal representation using Complex exponential and Sinusoidal components, Periodicity of Discrete time signal using complex exponential signal, 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.

### TEXT BOOKS:

1. Signals, Systems & Communications - B.P. Lathi, BS Publication, 2003.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, 2 Ed., PHI.
3. Principles of Linear Systems and Signals, 2nd Ed, B. P. Lathi, 2009, Oxford.

### REFERENCE BOOKS:

1. Signals & Systems - Simon Haykin and Van Veen, Wiley, 2 Ed.
2. Signals and Systems – A.Rama Krishna Rao – 2008, TMH.
3. Fundamentals of Signals and Systems - Michel J. Robert, 2008, MGH International Edition.

## MA304BS: PROBABILITY THEORY AND STOCHASTIC PROCESSES

**B.Tech. II Year I Sem.**

L	T	P	C
3	0	0	3

**Pre-requisites:** Nil.

**Course Objectives:** The primary objective of this course is:

- To provide mathematical background and sufficient experience so that the student can read, write, and understand sentences in the language of probability theory, as well as solve probabilistic problems in signal processing and Communication Engineering.
- To introduce students to the basic methodology of “probabilistic thinking” and to apply it to problems;
- To understand basic concepts of probability theory and random variables, how to deal with multiple random variables, Conditional probability and conditional expectation, joint distribution and independence, mean square estimation.
- To understand the difference between time averages and statistical averages
- Analysis of random process and application to the signal processing in the communication system.
- To teach students how to apply sums and integrals to compute probabilities, means, and expectations.

**Course Outcomes:** Upon completion of the subject, students will be able to compute:

- Simple probabilities using an appropriate sample space.
- Simple probabilities and expectations from probability density functions (pdfs)
- Likelihood ratio tests from pdfs for statistical engineering problems.
- Least -square & maximum likelihood estimators for engineering problems.
- Mean and covariance functions for simple random processes.

### UNIT - I

**Probability:** Probability introduced through Sets and Relative Frequency, Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Mathematical Model of Experiments, Probability as a Relative Frequency, Joint Probability, Conditional Probability, Total Probability, Baye’s Theorem, Independent Events.

**Random Variable:** Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete, Continuous, and Mixed Random Variables

### UNIT - II

**Distribution & Density Functions:** Distribution and Density functions and their Properties - Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh and Conditional Distribution, Methods of defining Conditional Event, Conditional Density, and Properties.

**Operation on One Random Variable – Expectations:** Introduction, 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 Transformations for a Continuous Random Variable, Non-monotonic Transformations of Continuous Random Variable, Transformation of a Discrete Random Variable.

### **UNIT - III**

#### **Multiple Random Variables:**

Vector Random Variables, Joint Distribution Function, Properties of Joint Distribution, 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 - IV**

#### **Stochastic Processes – Temporal Characteristics:**

The Stochastic 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, Nth 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 and its Properties, Linear System Response of Mean and Mean-squared Value, Autocorrelation Function, Cross-Correlation Functions, Gaussian Random Processes, Poisson Random Process.

### **UNIT - V**

#### **Stochastic Processes – Spectral Characteristics:**

Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, 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 Spectral Density of Input and Output of a Linear System.

#### **TEXT BOOKS:**

1. Probability, Random Variables & Random Signal Principles - Peyton Z. Peebles, 4 Ed., 2001, TMH.
2. Probability and Random Processes – Scott Miller, Donald Childers, 2 Ed, Elsevier, 2012.

**REFERENCE BOOKS:**

1. Probability, Random Variables and Stochastic Processes – Athanasios Papoulis and S. Unnikrishna Pillai, 4 Ed., TMH.
2. Theory of Probability and Stochastic Processes- Pradip Kumar Gosh, University Press
3. Probability and Random Processes with Application to Signal Processing – Henry Stark and John W. Woods, 3 Ed., PE
4. Probability Methods of Signal and System Analysis - George R. Cooper, Clive D. MC Gillem, 3 Ed., 1999, Oxford.
5. Statistical Theory of Communication - S.P. Eugene Xavier, 1997, New Age Publications.

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**EI305ES: JAVA PROGRAMMING****B.Tech. II Year I Sem.**

L	T	P	C
3	0	0	3

**Course Objectives:**

- To understand object oriented programming concepts, and apply them in problem solving.
- To learn the basics of java Console and GUI based programming.

**Course Outcomes:**

- Understanding of OOP concepts and basics of java programming (Console and GUI based).
- The skills to apply OOP and Java programming in problem solving.
- Should have the ability to extend his/her knowledge of Java programming further on his/her own.

**UNIT - I**

**OOP concepts** – Data abstraction, encapsulation, inheritance, benefits of inheritance, polymorphism, classes and objects, Procedural and object oriented programming paradigms

**Java programming** - History of Java, comments, data types, variables, constants, scope and life time of variables, operators, operator hierarchy, expressions, type conversion and casting, enumerated types, control flow - block scope, conditional statements, loops, break and continue statements, simple java stand alone programs, arrays, console input and output, formatting output, constructors, methods, parameter passing, static fields and methods, access control, this reference, overloading methods and constructors, recursion, garbage collection, building strings, exploring string class.

**UNIT - II**

**Inheritance** - Inheritance hierarchies, super and sub classes, Member access rules, super keyword, preventing inheritance: final classes and methods, the Object class and its methods

**Polymorphism**- dynamic binding, method overriding, abstract classes and methods.

**Interfaces** – Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interface.

**Inner classes** – Uses of inner classes, local inner classes, anonymous inner classes, static inner classes, examples.

**Packages**-Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages.

**UNIT - III**

**Exception handling** – Dealing with errors, benefits of exception handling, the classification of exceptions- exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch, throw, throws and finally, re-throwing exceptions, exception specification, built in exceptions, creating own exception sub classes.

**Multithreading** - Differences between multiple processes and multiple threads, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, inter-thread communication, producer consumer pattern.

#### **UNIT - IV**

**Collection Framework in Java** – Introduction to Java Collections, Overview of Java Collection framework, Generics, Commonly used Collection classes– Array List, Vector, Hash table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, calendar and Properties

**Files** – streams- byte streams, character streams, text Input/output, binary input/output, random access file operations, File management using File class.

**Connecting to Database** - JDBC Type 1 to 4 drivers, connecting to a database, querying a database and processing the results, updating data with JDBC.

#### **UNIT - V**

**GUI Programming with Java** - The AWT class hierarchy, Introduction to Swing, Swing vs. AWT, Hierarchy for Swing components, Containers – JFrame, JApplet, JDialog, JPanel, Overview of some swing components- JButton, JLabel, JTextField, JTextArea, simple swing applications, Layout management - Layout manager types – border, grid and flow

**Event handling** - Events, Event sources, Event classes, Event Listeners, Relationship between Event sources and Listeners, Delegation event model, Examples: handling a button click, handling mouse events, Adapter classes.

**Applets** – Inheritance hierarchy for applets, differences between applets and applications, life cycle of an applet, passing parameters to applets, applet security issues.

#### **TEXT BOOK:**

1. Java Fundamentals – A comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.

#### **REFERENCE BOOKS:**

1. Java for Programmers, P. J. Deitel and H. M. Deitel, Pearson education (OR) Java: How to Program P. J. Deitel and H. M. Deitel, PHI.
2. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, Pearson Education
4. Programming in Java, S. Malhotra and S. Choudhary, Oxford Univ. Press.

### EC306ES: ELECTRONIC DEVICES AND CIRCUITS LAB

**B.Tech. II Year I Sem.**

**L T P C**

**Course Code:**

**0 0 3 2**

#### **PART A: (Only for Viva-voce Examination)**

##### **Electronic Workshop Practice (In 3 Lab Sessions):**

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB's
2. Identification, Specifications and Testing of Active Devices, Diodes, BJT's, Low power JFET's, MOSFET's, Power Transistors, LED's, LCD's, SCR, UJT.
3. Study and operation of
  - i. Multimeters (Analog and Digital)
  - ii. Function Generator
  - iii. Regulated Power Supplies
  - iv. CRO

#### **PART B: (For Laboratory Examination)**

1. Forward & Reverse Bias Characteristics of PN Junction Diode.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Input & Output Characteristics of Transistor in CB Configuration and h-parameter calculations.
4. Input & Output Characteristics of Transistor in CE Configuration and h-parameter calculations.
5. Half Wave Rectifier with & without filters.
6. Full Wave Rectifier with & without filters.
7. FET characteristics.
8. Design of Self-bias circuit.
9. SCR characteristics.
10. UJT Characteristics

#### **PART C: Equipment required for Laboratories:**

1. Regulated Power supplies (RPS) : 0-30 V
2. CRO's : 0-20 MHz.
3. Function Generators : 0-1 MHz.
4. Multimeters
5. Decade Resistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital) : 0-20  $\mu$ A, 0-50 $\mu$ A, 0-100 $\mu$ A, 0-10 mA.
8. Voltmeters (Analog or Digital) : 0-50V, 0-100V, 0-250V
9. Electronic Components : Resistors, Capacitors, BJTs, LCDs, SCRs, UJTs, FETs, LEDs, MOSFETs, Diodes - Ge & Si type, Transistors – NPN, PNP type.

**EC307ES: BASIC SIMULATION LAB****B.Tech. II Year I Sem.**

L	T	P	C
0	0	3	2

**Course Objective** is to simulate various signals, systems and their characteristics in different domains like Fourier transform, Laplace transform and Z-transform using MATLAB.

**Course Outcomes:** Students successfully simulate various signals, systems, and characteristics in different domain

**List of Experiments:**

1. Basic Operations on Matrices.
2. Generation of Various Signals and Sequences (Periodic and Aperiodic), such as Unit Impulse, 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 Average Power.
4. Finding the Even and Odd parts of Signal/Sequence and Real and Imaginary parts of Signal.
5. Convolution between Signals and sequences.
6. Auto Correlation and Cross Correlation between Signals and Sequences.
7. Verification of Linearity and Time Invariance Properties of a given Continuous/Discrete System.
8. Computation of unit sample, unit step and sinusoidal responses of the given LTI system and verifying its physical realizability and stability properties.
9. Gibbs Phenomenon
10. Finding the Fourier Transform of a given signal and plotting its magnitude and phase spectrum.
11. Waveform Synthesis using Laplace Transform.
12. Locating the Zeros and Poles and plotting the Pole-Zero maps in S-plane and Z-Plane for the given transfer function.
13. Generation of Gaussian noise (Real and Complex), Computation of its mean, M.S. Value.
14. Sampling Theorem Verification.
15. Removal of noise by Autocorrelation / Cross correlation.
16. Extraction of Periodic Signal masked by noise using Correlation.
17. Verification of Weiner-Khinchine Relations.

**EI308ES: JAVA PROGRAMMING LABORATORY****B.Tech. II Year I Sem.**

L	T	P	C
0	0	3	2

**Course Objectives:**

- To introduce java compiler and eclipse platform.
- To impart hand on experience with java programming.

**Course Outcomes:**

- Basics of java programming, multi-threaded programs and Exception handling.
- The skills to apply OOP in Java programming in problem solving.
- Ability to access data from a DB with Java programs.
- Use of GUI components (Console and GUI based).

**Note:**

1. Use Linux and MySQL for the Lab Experiments. Though not mandatory, encourage the use of Eclipse platform.
2. The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed.

1) Use Eclipse or Netbean platform and acquaint with the various menus. Create a test project, add a test class, and run it. See how you can use auto suggestions, auto fill. Try code formatter and code refactoring like renaming variables, methods, and classes. Try debug step by step with a small program of about 10 to 15 lines which contains at least one if else condition and a for loop.

2) Write a Java program that works as a simple calculator. Use a grid layout to arrange buttons for the digits and for the +, -, \*, % operations. Add a text field to display the result. Handle any possible exceptions like divided by zero.

3a) Develop an applet in Java that displays a simple message.

- b) Develop an applet in Java that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.

4) Write a Java program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception. Display the exception in a message dialog box.

- 5) Write a Java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.
- 6) Write a Java program that connects to a database using JDBC and does add, delete, modify and retrieve operations.
- 7) Write a Java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green with radio buttons. On selecting a button, an appropriate message with “Stop” or “Ready” or “Go” should appear above the buttons in selected color. Initially, there is no message shown.
- 8) Write a Java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contains only the method printArea () that prints the area of the given shape.
- 9) Suppose that a table named Table.txt is stored in a text file. The first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using Labels in Grid Layout.
- 10) Write a Java program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired (Use Adapter classes).
- 11) Write a Java program that loads names and phone numbers from a text file where the data is organized as one line per record and each field in a record are separated by a tab (\t). It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).
- 12) Implement the above program with database instead of a text file.
- 13) Write a Java program that takes tab separated data (one record per line) from a text file and inserts them into a database.
- 14) Write a java program that prints the meta-data of a given table

**TEXT BOOK:**

1. Java Fundamentals – A comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.

**REFERENCE BOOKS:**

1. Java for Programmers, P.J.Deitel and H.M.Deitel, Pearson education (OR) Java: How to Program P.J.Deitel and H.M.Deitel, PHI.



2. Object Oriented Programming through Java, P.Radha Krishna, Universities Press.
3. Thinking in Java, Bruce Eckel, Pearson Education.
4. Programming in Java, S. Malhotra and S. Choudhary, Oxford Univ. Press.

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**MC300ES: ENVIRONMENTAL SCIENCE AND TECHNOLOGY****B.Tech. II Year I Sem.**

L	T	P	C
3	0	0	0

**Course Objectives:**

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations

**Course Outcomes:**

1. Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

**UNIT-I**

**Ecosystems:** Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

**UNIT-II**

**Natural Resources: Classification of Resources:** Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

**UNIT-III**

**Biodiversity And Biotic Resources:** Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

**UNIT-IV**

**Environmental Pollution and Control Technologies: Environmental Pollution:** Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics

of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.

Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Problems and Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol.

#### UNIT-V

**Environmental Policy, Legislation & EIA:** Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

#### TEXT BOOKS:

- 1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
- 2 Environmental Studies by R. Rajagopalan, Oxford University Press.

#### REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B.Botkin & Edward A.Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4<sup>th</sup> Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.

**EI401ES: ELECTRONIC CIRCUIT ANALYSIS****B.Tech. II Year II Sem.**

L	T	P	C
4	0	0	4

**Pre-requisites:** Nil.**Course Objective:** The main objective of the course is:

- To familiarize the student with the analysis and design of basic transistor amplifier circuits and their frequency response characteristics, feedback amplifiers, oscillators, large signal amplifiers and tuned amplifiers

**Course Outcomes:** Upon completion of the subject, students will be able to:

- Design and analyse the DC bias circuitry of BJT and FET
- Analyse the different types of amplifiers, operation and its characteristics
- Design circuits like amplifiers, oscillators using the transistors diodes and oscillators

**UNIT - I**

**Single Stage Amplifiers:** Classification of Amplifiers – Distortion in Amplifiers, Analysis of CE, CC, and CB Configurations with simplified Hybrid Model, Analysis of CE amplifier with Emitter Resistance and Emitter follower, Miller's Theorem and its dual, Design of Single Stage RC Coupled Amplifier using BJT.

**Multi Stage Amplifiers:** Analysis of Cascaded RC Coupled BJT amplifiers, Cascode Amplifier, Darlington Pair, Different Coupling Schemes used in Amplifiers - RC Coupled Amplifier, Transformer Coupled Amplifier, Direct Coupled Amplifier.

**UNIT – II**

**BJT Amplifiers - Frequency Response:** Logarithms, Decibels, General frequency considerations, Frequency response of BJT Amplifier, Analysis at Low and High frequencies, Effect of coupling and bypass Capacitors, The Hybrid-  $\pi$  ( $\pi$ ) - Common Emitter Transistor Model, CE Short Circuit Current Gain, Current Gain with Resistive Load, Single Stage CE Transistor Amplifier Response, Gain-Bandwidth Product, Emitter follower at higher frequencies.

**MOSFET Amplifiers [3]:** Basic concepts, FET Amplifiers, MOS Small signal model, Common source amplifier with Resistive load.

**UNIT – III**

**Feedback Amplifiers:** Concepts of Feedback, Classification of Feedback Amplifiers, General characteristics of Negative Feedback Amplifiers, Effect of Feedback on Amplifier Characteristics, Voltage Series, Voltage Shunt, Current Series and Current Shunt Feedback Configurations, Illustrative Problems.

**Oscillators:** Classification of Oscillators, Conditions for Oscillations, RC Phase Shift Oscillator, Generalized analysis of LC oscillators - Hartley, and Colpitts Oscillators, Wien-Bridge & Crystal Oscillators, Stability of Oscillators.

#### UNIT – IV

**Large Signal Amplifiers:** Classification, Class A Large Signal Amplifiers, Transformer Coupled Class A Audio Power Amplifier, Efficiency of Class A Amplifier, Class B Amplifier, Efficiency of Class B Amplifier, Class-B Push-Pull Amplifier, Complementary Symmetry Class B Push-Pull Amplifier, Distortion in Power Amplifiers, Thermal Stability and Heat Sinks.

#### UNIT – V

**Tuned Amplifiers:** Introduction, Q-Factor, Small Signal Tuned Amplifiers, Effect of Cascading Single Tuned Amplifiers on Bandwidth, Effect of Cascading Double Tuned Amplifiers on Bandwidth, Stagger Tuned Amplifiers, Stability of Tuned Amplifiers.

#### TEXT BOOKS:

1. Integrated Electronics - Jacob Millman and Christos C Halkias, 1991 Ed., 2008, TMH.
2. Electronic Devices and Circuits, B. P. Singh, Rekha Singh, Pearson, 2013.

#### REFERENCE BOOKS:

1. Electronic Circuit Analysis – Rashid, Cengage Learning, 2013
2. Design of Analog CMOS Integrated Circuits – Behzad Razavi, 2008, TMH.
3. Electronic Devices and Circuit Theory - Robert L. Boylestad, Louis Nashelsky, 9 Ed., 2008 PE.
4. Microelectronic Circuits – Sedra and Smith – 5 Ed., 2009, Oxford University Press.
5. Electronic Devices and Circuits - S. Saliyahanan, N. Suresh Kumar, A. Vallavaraj, 2 Ed., 2009, TMH.

**EI402ES: DIGITAL LOGIC AND PULSE CIRCUITS****B.Tech. II Year II Sem.**

L	T	P	C
4	0	0	4

**Prerequisite:** Nil.

**Course Objectives:** This course provides in-depth knowledge of switching theory and the design techniques of digital circuits, which is the basis for design of any digital circuit. The main objectives are:

- To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.
- To understand common forms of number representation in digital electronic circuits and to be able to convert between different representations.
- To implement simple logical operations using combinational logic circuits
- To design combinational logic circuits, sequential logic circuits.
- To explain the complete response of R-C and R-L-C transient circuits.
- To explain clippers, clampers, switching characteristics of transistors and sampling gates.
- To construct various multivibrators using transistors, and design of sweep circuits.

**Course Outcomes:** Upon completion of the course, students should possess the following skills:

- Be able to manipulate numeric information in different forms, e.g. different bases, signed integers, various codes such as BCD.
- Be able to manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions.
- Be able to design and analyze small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits.
- Be able to design and analyze small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.
- Understand the applications of diode as integrator, differentiator, clippers, and clamper circuits.
- Learn various switching devices such as diode, transistor, SCR. Difference between logic gates and sampling gates
- Design Mutivibrators for various applications, synchronization techniques and sweep circuits.

**UNIT - I**

**Number System and Boolean algebra And Switching Functions:** Review of number systems, Complements of Numbers, Codes- Binary Codes, Binary Coded Decimal Code and its Properties, Unit Distance Codes, Error Detecting and Correcting Codes.

**Boolean Algebra:** Basic Theorems and Properties, Switching Functions, Canonical and Standard Form, Algebraic Simplification of Digital Logic Gates, Properties of XOR Gates, Universal Gates, Multilevel NAND/NOR realizations.

#### UNIT - II

**Minimization and Design of Combinational Circuits:** Introduction, The Minimization of switching function using theorem, The Karnaugh Map Method-Up to Five Variable Maps, Tabular Method, Design of Combinational Logic: Adders, Subtractors, comparators, Multiplexers, Demultiplexers.

#### UNIT - III

**Sequential Machines Fundamentals and Applications:** Basic Architectural Distinctions between Combinational and Sequential circuits, The Binary Cell, Fundamentals of Sequential Machine Operation, Latches, Flip Flops: SR, JK, Race Around Condition in JK, JK Master Slave, D and T Type Flip Flops, Conversion from one type of Flip-Flop to another, Shift Registers, Operation of Shift Registers, Bidirectional Shift Registers, Design and Operation of ripple, Ring and BCD Counter, Simple operation of Asynchronous and Synchronous Counters.

#### UNIT - IV

**Linear Wave Shaping:** High pass and low pass RC circuits and their response for Sinusoidal, Step, Pulse, Square, & Ramp inputs, High pass RC network as Differentiator, Low pass RC circuit as an Integrator, Ringing Circuit.

**Non-Linear Wave Shaping:** Diode clippers, Transistor clippers, Clipping at two independent levels, Comparators, Clamping Operation, Clamping circuit taking Source and Diode resistances into account, Clamping Circuit Theorem.

#### UNIT - V

**Multivibrators:** Qualitative Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using Transistors.

**Time Base Generators:** General features of a Time base Signal, Methods of Generating Time Base Waveform, Transistor Miller Time Base generator, Transistor Bootstrap Time Base Generator, Transistor Current Time Base Generators.

#### TEXT BOOKS:

1. Switching and Finite Automata Theory- Zvi Kohavi & Niraj K. Jha, 3<sup>rd</sup> Edition, Cambridge.
2. Millman's Pulse, Digital and Switching Waveforms –J. Millman, H. Taub and Mothiki S. Prakash Rao, 2 Ed., 2008, TMH.
3. Pulse, Switching and Digital Circuits – 5<sup>th</sup> Edition, David A. Bell, Oxford, 2015.

#### REFERENCE BOOKS:

1. Digital Design- Morris Mano, PHI, 3rd Edition.
2. Digital Logic and State Machine Design – Comer, 3rd, Oxford, 2013.
3. Pulse and Digital Circuits – A. Anand Kumar, 2005, PHI.

**EI404ES: WEB TECHNOLOGIES****B.Tech. III Year II Sem.**

L	T	P	C
4	0	0	4

**Course Objectives:**

- To introduce PHP language for server side scripting
- To introduce XML and processing of XML Data with Java
- To introduce Server side programming with Java Servlets and JSP
- To introduce Client side scripting with Javascript and AJAX.

**Course Outcomes:**

- gain knowledge of client side scripting, validation of forms and AJAX programming
- have understanding of server side scripting with PHP language
- have understanding of what is XML and how to parse and use XML Data with Java
- To introduce Server side programming with Java Servlets and JSP

**UNIT - I**

**Introduction to PHP:** Declaring variables, data types, arrays, strings, operators, expressions, control structures, functions, Reading data from web form controls like text boxes, radio buttons, lists etc., Handling File Uploads, Connecting to database (MySQL as reference), executing simple queries, handling results, Handling sessions and cookies

**File Handling in PHP:** File operations like opening, closing, reading, writing, appending, deleting etc. on text and binary files, listing directories

**UNIT - II**

**XML:** Introduction to XML, Defining XML tags, their attributes and values, Document Type Definition, XML Schemas, Document Object Model, XHTML

**Parsing XML Data** - DOM and SAX Parsers in java.

**UNIT - III**

**Introduction to Servlets:** Common Gateway Interface (CGI), Lifecycle of a Servlet, deploying a servlet, The Servlet API, Reading Servlet parameters, Reading Initialization parameters, Handling Http Request & Responses, Using Cookies and Sessions, connecting to a database using JDBC.

**UNIT - IV**

**Introduction to JSP:** The Anatomy of a JSP Page, JSP Processing, Declarations, Directives, Expressions, Code Snippets, implicit objects, Using Beans in JSP Pages, Using Cookies and session for session tracking, connecting to database in JSP.



**UNIT- V**

**Client side Scripting:** Introduction to Javascript: Javascript language - declaring variables, scope of variables, functions, event handlers (onclick, onsubmit etc.), Document Object Model, Form validation. Simple AJAX application.

**TEXT BOOKS:**

1. Web Technologies, Uttam K Roy, Oxford University Press
2. The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill

**REFERENCE BOOKS:**

1. Web Programming, building internet applications, Chris Bates 2<sup>nd</sup> edition, Wiley Dreamtech
2. Java Server Pages –Hans Bergsten, SPD O'Reilly
3. Java Script, D. Flanagan, O'Reilly,SPD.
4. Beginning Web Programming-Jon Duckett WROX.
5. Programming World Wide Web, R. W. Sebesta, Fourth Edition, Pearson.
6. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson.

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**CS403ES: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE****B.Tech. II Year II Sem.**

L	T	P	C
3	0	0	3

**Course Objectives:**

- To introduce the concepts of mathematical logic.
- To introduce the concepts of sets, relations, and functions.
- To perform the operations associated with sets, functions, and relations.
- To relate practical examples to the appropriate set, function, or relation model, and interpret the associated operations and terminology in context.
- To introduce generating functions and recurrence relations.
- To use Graph Theory for solving problems.

**Course Outcomes**

- Ability to apply mathematical logic to solve problems.
- Understand sets, relations, functions, and discrete structures.
- Able to use logical notation to define and reason about fundamental mathematical concepts such as sets, relations, and functions.
- Able to formulate problems and solve recurrence relations.
- Able to model and solve real-world problems using graphs and trees.

**UNIT - I**

**Mathematical logic:** Introduction, Statements and Notation, Connectives, Normal Forms, Theory of Inference for the Statement Calculus, The Predicate Calculus, Inference Theory of the Predicate Calculus.

**UNIT - II**

**Set theory:** Introduction, Basic Concepts of Set Theory, Representation of Discrete Structures, Relations and Ordering, Functions.

**Algebraic Structures:** Introduction, Algebraic Systems, Semi groups and Monoids, Groups, Lattices as Partially Ordered Sets, Boolean algebra.

**UNIT - III**

**Elementary Combinatorics:** Basics of Counting, Combinations and Permutations, Enumeration of Combinations and Permutations, Enumerating Combinations and Permutations with Repetitions, Enumerating Permutations with Constrained Repetitions, Binomial Coefficients, The Binomial and Multinomial Theorems, The Principle of Inclusion-Exclusion.

**UNIT - IV**

**Recurrence Relations:** Generating Functions of Sequences, Calculating Coefficients of generating functions, Recurrence relations, Solving recurrence relations by substitution and

Generating functions, The method of Characteristic roots, Solutions of Inhomogeneous Recurrence Relations.

#### **UNIT - V**

**Graphs:** Basic Concepts, Isomorphisms and Subgraphs, Trees and their Properties, Spanning Trees, Directed Trees, Binary Trees, Planar Graphs, Euler's Formula, Multigraphs and Euler Circuits, Hamiltonian Graphs, Chromatic Numbers, The Four-Color Problem.

#### **TEXT BOOKS:**

1. Discrete Mathematical Structures with Applications to Computer Science, J.P. Tremblay, R. Manohar, McGraw Hill education (India) Private Limited. (**UNITS - I , II**)
2. Discrete Mathematics for Computer Scientists & Mathematicians, Joe L. Mott, Abraham Kandel, Theodore P. Baker, Pearson , 2<sup>nd</sup> ed. (**Units - III, IV, V**)

#### **REFERENCE BOOKS:**

1. Discrete Mathematics and its Applications, Kenneth H. Rosen, 7th Edition, McGraw Hill education (India) Private Limited.
2. Discrete Mathematics, D.S. Malik & M.K. Sen, Revised edition Cengage Learning.
3. Elements of Discrete Mathematics, C. L. Liu and D.P.Mohapatra, 4th edition, McGraw Hill education (India) Private Limited.
4. Discrete Mathematics with Applications, Thomas Koshy, Elsevier.
5. Discrete and Combinatorial Mathematics, R. P. Grimaldi, Pearson.

## SM405MS: BUSINESS ECONOMICS AND FINANCIAL ANALYSIS

**B.Tech. II Year II Sem.**

L	T	P	C
3	0	0	3

**Course Objective:** To learn the basic Business types, impact of the Economy on Business and Firms specifically. To analyze the Business from the Financial Perspective.

**Course Outcome:** The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt. The Students can study the firm's financial position by analysing the Financial Statements of a Company.

### UNIT – I

#### **Introduction to Business and Economics:**

**Business:** Structure of Business Firm, Theory of Firm, Types of Business Entities, Limited Liability Companies, Sources of Capital for a Company, Non-Conventional Sources of Finance.

**Economics:** Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Money Supply in Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multidisciplinary nature of Business Economics.

### UNIT – II

#### **Demand and Supply Analysis:**

**Elasticity of Demand:** Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting.

**Supply Analysis:** Determinants of Supply, Supply Function & Law of Supply.

### UNIT- III

#### **Production, Cost, Market Structures & Pricing:**

**Production Analysis:** Factors of Production, Production Function, Production Function with one variable input, two variable inputs, Returns to Scale, Different Types of Production Functions.

**Cost analysis:** Types of Costs, Short run and Long run Cost Functions.

**Market Structures:** Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, and Monopolistic Competition.

**Pricing:** Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, and Cost Volume Profit Analysis.

#### UNIT-IV

**Financial Accounting:** Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance, Elements of Financial Statements, Preparation of Final Accounts.

#### UNIT -V

**Financial Analysis through Ratios:**

Concept of Ratio Analysis, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios (simple problems).

Introduction to Fund Flow and Cash Flow Analysis (simple problems).

#### TEXT BOOKS:

1. D. D. Chaturvedi, S. L. Gupta, Business Economics - Theory and Applications, International Book House Pvt. Ltd. 2013.
2. Dhanesh K Khatri, Financial Accounting, Tata Mc –Graw Hill, 2011.
3. Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata Mc Graw Hill Education Pvt. Ltd. 2012.

#### REFERENCES:

1. Paresh Shah, Financial Accounting for Management 2e, Oxford Press, 2015.
2. S. N. Maheshwari, Sunil K Maheshwari, Sharad K Maheshwari, Financial Accounting, 5e, Vikas Publications, 2013.

**EI406ES: ELECTRONIC CIRCUIT ANALYSIS LAB****B.Tech. II Year II Sem.**

L	T	P	C
0	0	3	2

**List of Experiments (12 experiments to be done) :****I) Design and Simulation in Simulation Laboratory using any Simulation Software (Any 6 Experiments):**

1. Common Emitter Amplifier
2. Common Source Amplifier
3. Two Stage RC Coupled Amplifier
4. Current shunt and Voltage Series Feedback Amplifier
5. Cascode Amplifier
6. Wien Bridge Oscillator using Transistors
7. RC Phase Shift Oscillator using Transistors
7. Class A Power Amplifier (Transformer less)
9. Class B Complementary Symmetry Amplifier
10. Common Base (BJT) / Common Gate (JFET) Amplifier.

**II) Testing in the Hardware Laboratory (6 Experiments)**

- A) Any Three circuits simulated in Simulation laboratory
- B) Any Three of the following:
1. Class A Power Amplifier (with transformer load)
  2. Class C Power Amplifier
  3. Single Tuned Voltage Amplifier
  4. Hartley & Colpitt's Oscillators
  5. Darlington Pair
  6. MOS Common Source Amplifier

**Equipment required for the Laboratory:**

1. For software simulation of Electronic circuits
  - i) Computer Systems with latest specifications
  - ii) Connected in LAN (Optional)
  - iii) Operating system (Windows XP)
  - iv) Suitable Simulations software
2. For Hardware simulations of Electronic Circuits
  - i) Regulated Power Supply (0-30V)
  - ii) CRO's
  - iii) Functions Generators
  - iv) Multimeters
  - v) Components
3. Win XP/ Linux etc.

**EI407ES: DIGITAL LOGIC AND PULSE CIRCUITS LAB****B.Tech. II Year II Sem.**

L	T	P	C
0	0	3	2

**List of Experiments:**

1. Linear wave Shaping
  - a. RC Low Pass Circuit for different time constants
  - b. RC High Pass Circuit for different time constants
2. Non-linear wave shaping
  - a. Transfer characteristics and response of Clippers:
3. Positive and Negative Clippers
4. Clipping at two independent levels
5. Positive and Negative Clampers
6. Clamping at different reference voltage
7. Design a Bistable Multivibrator and draw its waveforms
8. Design an Astable Multivibrator and draw its waveforms
9. Design a Monostable Multivibrator and draw its waveforms
10. Response of Schmitt Trigger circuit for loop gain less than and greater than one
11. The output- voltage waveform of Boot strap sweep circuit
12. The output- voltage waveform of Miller sweep circuit
13. Design of 2 input logic gates.
14. Design of multiplexer and Demultiplexer.
15. Design of 4-bit parallel load and serial out shift register.
16. Design of ripple/ring/decade counters.
17. Design of Asynchronous and Synchronous counters.

**Note:** Minimum of 14 experiments is to be conducted.

**EI409ES: WEB TECHNOLOGIES LAB****B.Tech. II Year II Sem.**

L	T	P	C
0	0	3	2

**Course Objectives:**

- To enable the student to program web applications using the following technologies HTML, Javascript, AJAX, PHP, Tomcat Server, Servlets, JSP

**Course Outcomes:**

- Use LAMP Stack for web applications
- Use Tomcat Server for Servlets and JSPs
- Write simple applications with Technologies like HTML, Javascript, AJAX, PHP, Servlets and JSPs
- Connect to Database and get results
- Parse XML files using Java (DOM and SAX parsers)

**Note:**

1. Use LAMP Stack (Linux, Apache, MySQL and PHP) for the Lab Experiments. Though not mandatory, encourage the use of Eclipse platform wherever applicable
  2. The list suggests the minimum program set. Hence, the concerned staff is requested to add more problems to the list as needed
- 
1. Install the following on the local machine
    - Apache Web Server (if not installed)
    - Tomcat Application Server locally
    - Install MySQL (if not installed)
    - Install PHP and configure it to work with Apache web server and MySQL (if not already configured)
  2. Write an HTML page including javascript that takes a given set of integer numbers and shows them after sorting in descending order.
  3. Write an HTML page including any required Javascript that takes a number from one text field in the range of 0 to 999 and shows it in another text field in words. If the number is out of range, it should show "out of range" and if it is not a number, it should show "not a number" message in the result box.
  4. Write an HTML page that has one input, which can take multi-line text and a submit button. Once the user clicks the submit button, it should show the number of characters, words and lines in the text entered using an alert message. Words are separated with white space and lines are separated with new line character.
  5. Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next to the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).



6. Create an XML document that contains 10 users information. Write a Java program, which takes User Id as input and returns the user details by taking the user information from the XML document using (a) DOM Parser and (b) SAX parser

Implement the following web applications using (a) PHP, (b) Servlets and (c) JSP:

7. A user validation web application, where the user submits the login name and password to the server. The name and password are checked against the data already available in Database and if the data matches, a successful login page is returned. Otherwise a failure message is shown to the user.
8. Modify the above program to use an xml file instead of database.
9. Modify the above program to use AJAX to show the result on the same page below the submit button.
10. A simple calculator web application that takes two numbers and an operator (+, -, /, \* and %) from an HTML page and returns the result page with the operation performed on the operands.
11. Modify the above program such that it stores each query in a database and checks the database first for the result. If the query is already available in the DB, it returns the value that was previously computed (from DB) or it computes the result and returns it after storing the new query and result in DB.
12. A web application takes a name as input and on submit it shows a hello <name> page where <name> is taken from the request. It shows the start time at the right top corner of the page and provides a logout button. On clicking this button, it should show a logout page with Thank You <name> message with the duration of usage (hint: Use session to store name and time).
13. A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with "Hello <name>, you are not authorized to visit this site" message, where <name> should be replaced with the entered name. Otherwise it should send "Welcome <name> to this site" message.
14. A web application for implementation:  
The user is first served a login page which takes user's name and password. After submitting the details the server checks these values against the data from a database and takes the following decisions.  
If name and password matches, serves a welcome page with user's full name.  
If name matches and password doesn't match, then serves "password mismatch" page  
If name is not found in the database, serves a registration page, where user's full name is asked and on submitting the full name, it stores, the login name, password and full name in the database (hint: use session for storing the submitted login name and password)
15. A web application that lists all cookies stored in the browser on clicking "List Cookies" button. Add cookies if necessary.

#### REFERENCE BOOKS:

1. The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill

2. Web Programming, building internet applications, Chris Bates 2nd edition, Wiley Dreamtech
3. Java Server Pages –Hans Bergsten, SPD O'Reilly
4. Java Script, D.Flanagan, O'Reilly, SPD.
5. Internet and World Wide Web – How to program, Dietel and Nieto, Pearson.

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**MC400HS: GENDER SENSITIZATION LAB****B.Tech. II Year II Sem.**

L	T	P	C
0	0	3	0

**Course Objectives:**

- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

**Course Outcomes:**

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature, and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labour and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

**UNIT - I****UNDERSTANDING GENDER****Gender:** Why Should We Study It? (*Towards a World of Equals*: Unit -1)**Socialization:** Making Women, Making Men (*Towards a World of Equals*: Unit -2)

Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

**UNIT - II****GENDER AND BIOLOGY:****Missing Women:** Sex Selection and Its Consequences (*Towards a World of Equals*: Unit -4)

Declining Sex Ratio. Demographic Consequences.

**Gender Spectrum:** Beyond the Binary (*Towards a World of Equals*: Unit -10)

Two or Many? Struggles with Discrimination.

**UNIT - III****GENDER AND LABOUR**

**Housework:** the Invisible Labour (*Towards a World of Equals*: Unit -3)

“My Mother doesn’t Work.” “Share the Load.”

**Women’s Work:** Its Politics and Economics (*Towards a World of Equals*: Unit -7)

Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions of Work.

**UNIT-IV****ISSUES OF VIOLENCE**

**Sexual Harassment:** Say No! (*Towards a World of Equals*: Unit -6)

Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: “Chupulu”.

**Domestic Violence:** Speaking Out (*Towards a World of Equals*: Unit -8)

Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Additional Reading: New Forums for Justice.

Thinking about Sexual Violence (*Towards a World of Equals*: Unit -11)

Blaming the Victim-“I Fought for my Life....” - Additional Reading: The Caste Face of Violence.

**UNIT - V****GENDER: CO - EXISTENCE**

**Just Relationships:** Being Together as Equals (*Towards a World of Equals*: Unit -12)

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Additional Reading: Rosa Parks-The Brave Heart.

**TEXTBOOK**

All the five Units in the Textbook, “*Towards a World of Equals: A Bilingual Textbook on Gender*” written by A. Suneetha, Uma Bhugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu and published by **Telugu Akademi, Hyderabad**, Telangana State in the year **2015**.

**Note:** Since it is an Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

**REFERENCE BOOKS:**

1. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012
2. Abdulali Sohaila. “I Fought For My Life...and Won.” Available online at:  
<http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulali/>