

**ARTIFICIAL  
INTELLIGENCE &  
DATA SCIENCE  
CURRICULUM**

I BTECH I SEM									
COURSE CODE	COURSE TITLE	COURSE AREA	HOURS/WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-00BS06	LINEAR ALGEBRA AND ADVANCED CALCULUS	BSC	3	1	0	3	30	70	100
AS20-00BS02	ENGINEERING CHEMISTRY	BSC	3	1	0	3	30	70	100
AS20-02ES01	BASIC ELECTRICAL ENGINEERING	ESC	3	1	0	3	30	70	100
AS20-00HS01	ENGLISH	HSMC	2	0	0	2	30	70	100
AS20-04ES01	ELECTRONIC DEVICES AND CIRCUITS	ESC	3	1	0	3	30	70	100
PRACTICAL COURSES									
AS20-04ES05	ELECTRONIC DEVICES AND CIRCUITS LAB	ESC	0	0	2	1	30	70	100
AS20-00HS02	ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB	HSMC	0	0	3	1.5	30	70	100
AS20-00BS03	ENGINEERING CHEMISTRY LAB	BSC	0	0	2	1	30	70	100
VALUE ADDED COURSE									
AS20-00HS03	SOFT SKILLS-I	HSMC	2	0	0	0	25	75	100
TOTAL						17.5			
I BTECH II SEM									
COURSE CODE	COURSE TITLE	COURSE AREA	HOURS/WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-00BS01	DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	BSC	3	1	0	3	30	70	100
AS20-00BS08	APPLIED PHYSICS	BSC	3	1	0	3	30	70	100
AS20-05ES01	PROGRAMMING FOR PROBLEM SOLVING	ESC	3	1	0	3	30	70	100
AS20-03ES02	ENGINEERING GRAPHICS AND DESIGN	ESC	2	0	3	3.5	30	70	100
AS20-00HS07	UNIVERSAL HUMAN VALUES-II	HSMC	3	1	0	3	30	70	100
PRACTICAL COURSES									
AS20-00BS09	APPLIED PHYSICS LAB	BSC	0	0	3	1.5	30	70	100
AS20-05ES02	PROGRAMMING FOR PROBLEM SOLVING LAB	ESC	0	0	3	1.5	30	70	100
AS20-03ES04	ENGINEERING PRACTICES	ESC	0	0	4	2	30	70	100
VALUE ADDED COURSE									
AS20-00HS04	SOFT SKILLS -II	HSMC	2	0	0	0	25	75	100
TOTAL						20.5			

II BTECH I SEM									
Course Code	COURSE TITLE	COURSE AREA	HOURS/ WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-72PC01	DATA STRUCTURES	PCC	3	1	0	3	30	70	100
AS20-05PC01	OBJECT ORIENTED PROGRAMMING THROUGH JAVA	PCC	3	1	0	3	30	70	100
AS20-05PC06	OPERATING SYSTEMS	PCC	3	1	0	3	30	70	100
AS20-72PC02	PRINCIPLES OF ARTIFICIAL INTELLIGENCE	PCC	3	1	0	3	30	70	100
AS20-00HS06	BUSINESS ECONOMICS AND FINANCIAL ANALYSIS	HSMC	3	1	0	3	30	70	100
PRACTICAL COURSES									
AS20-72PC03	DATA STRUCTURES LAB	PCC	0	0	3	1.5	30	70	100
AS20-05PC03	OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB	PCC	0	0	3	1.5	30	70	100
AS20-05PC09	OPERATING SYSTEMS LAB	PCC	0	0	3	1.5	30	70	100
MANDATORY COURSE									
AS20-00MC01	ENVIRONMENTAL SCIENCES	MC	3	0	0	0	0	100	100
VALUE ADDED COURSE* (ANY ONE COURSE OF CHOICE)									
AS20-12PW01	IOT (PROJECT) – IN HOUSE INTERFACING WITH ARDUINO AND RASPBERRY PI	PW	0	0	2	1	25	75	100
AS20-66PW01	ROBOTICS AND ITS APPLICATIONS	PW	0	0	2	1	25	75	100
AS20-72PW01	WEB BASED APPLICATIONS DEVELOPMENT	PW	0	0	2	1	25	75	100
AS20-12PW02	GRAPHIC DESIGN (PHOTOSHOP, CORAL DRAW, 3D MAX)	PW	0	0	2	1	25	75	100
AS20-05PW02	PROJECT BASED LEARNING USING C++	PW	0	0	2	1	25	75	100
<b>TOTAL</b>						<b>20.5</b>			

II BTECH II SEM									
Course Code	COURSE TITLE	COURSE AREA	HOURS/ WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-00BS10	PROBABILITY AND RANDOM PROCESS	BSC	3	1	0	3	30	70	100
AS20-72PC04	DATABASE SYSTEMS	PCC	3	1	0	3	30	70	100
AS20-12PC02	PROGRAMMING ESSENTIALS USING PYTHON	PCC	3	1	0	3	30	70	100
AS20-05PC02	MATHEMATICAL FOUNDATIONS FOR COMPUTER SCIENCE	PCC	3	1	0	3	30	70	100
AS20-04ES06	DIGITAL ELECTRONICS	ESC	3	1	0	3	30	70	100
PRACTICAL COURSES									
AS20-12PC04	PYTHON PROGRAMMING LAB	PCC	0	0	3	1.5	30	70	100
AS20-72PC05	DATABASE SYSTEMS LAB	PCC	0	0	3	1.5	30	70	100
AS20-04ES07	DIGITAL ELECTRONICS LAB	ESC	0	0	3	1.5	30	70	100
MANDATORY COURSE									
AS20-00MC02	GENDER SENSITISATION	MC	3	0	0	0	0	100	100
VALUE ADDED COURSE* (ANY ONE COURSE OF CHOICE)									
AS20-05PW03	INNOVATIVE PROJECT DEVELOPMENT	PW	0	0	2	1	25	75	100
AS20-66PW03	VIRTUAL REALITY	PW	0	0	2	1	25	75	100
AS20-05PW04	ANDROID APP DEVELOPMENT	PW	0	0	2	1	25	75	100
AS20-04PW05	INTRODUCTION TO MATLAB AND ITS APPLICATIONS	PW	0	0	2	1	25	75	100
AS20-72PW02	PROJECT BASED LEARNING USING PYTHON	PW	0	0	2	1	25	75	100
<b>TOTAL</b>						<b>20.5</b>			

**B.TECH  
FIRST YEAR  
FIRST SEMESTER  
SYLLABUS**

**LINEAR ALGEBRA AND ADVANCED CALCULUS**  
**I B.Tech., I SEM**

Course Title: LINEAR ALGEBRA AND ADVANCED CALCULUS	Course Code: AS20-00BS06
Teaching Scheme (L:T:P):3:1:0	Credits:3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs + 16 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: 1.Basic definitions of Matrices 2.Knowledge of Calculus 3.Differentiation and Integration rules	

**Course Overview:** Course include

- Types of matrices and their properties.
- Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form.
- Concept of Sequence.
- Concept of nature of the series.
- Geometrical approach to the mean value theorems and their application to the mathematical problems
- Evaluation of improper integrals using Beta and Gamma functions.
- Partial differentiation, concept of total derivative
- Finding maxima and minima of function of two and three variables.

**Course Objective** To learn

- Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations·
- Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form.
- Concept of nature of the series.
- Geometrical approach to the mean value theorems Evaluation of improper integrals using Beta and Gamma functions.
- Partial differentiation, concept of total derivative. Finding maxima and minima of function of two and three variables

**Course Outcomes:**

CO#	Course Outcomes
C111.1	Convert the set of linear equations in to matrix notation and analyze its solution
C111.2	Apply the concept of orthogonal transformation and reduce quadratic form to canonical form
C111.3	Analyze the nature of series.
C111.4	Describe the applications of the mean value theorems
C111.5	Evaluate the improper integrals using Beta and Gamma functions.
C111.6	Categorize the extreme values of functions of two variables with constraints and without constraints.

## COURSE CONTENT (SYLLABUS)

### UNIT I: MATRICES

Matrices: Types of Matrices (only definitions); rank of a matrix by Echelon form and Normal form; Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations: solving system of Homogeneous and Non-Homogeneous equations- consistency, Gauss elimination method; Gauss Jacobi Iteration Method. Gauss Seidel Iteration Method.

### UNIT-II: EIGEN VALUES AND EIGEN VECTORS

Eigen values and Eigenvectors and their properties; Cayley-Hamilton Theorem (without proof): finding inverse and power of a matrix by Cayley-Hamilton Theorem; Diagonalization; Quadratic forms and Nature, Index and Signature of the Quadratic Forms, Reduction of Quadratic form to canonical forms by Orthogonal Transformation.

### UNIT-III: SEQUENCES & SERIES

Sequence: Definition of a Sequence, Convergence of a sequence (definitions and examples only). Series: Convergent, Divergent and Oscillatory Series; Series of positive terms: Comparison test, p-test, D-Alembert's ratio test; Raabe's test; logarithmic test; Integral test. Alternating series: Leibnitz test; Alternating Convergent series: Absolute and Conditionally Convergence.

### UNIT-IV: SINGLE VARIABLE CALCULUS

Mean value theorems (all the theorems without proof): Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's Series. Definition of Improper Integral: Beta and Gamma functions and their applications.

### UNIT-V: MULTIVARIABLE CALCULUS

Partial Differentiation; Euler's Theorem; Total derivative; Jacobian; Functional dependence & independence, Maxima and minima of functions of two variables and three variables with constraints; without constraints; method of Lagrange's Multipliers.

#### **Text Books:**

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43<sup>rd</sup> Edition, 2014.
2. R.K.Jain, S.R.K. Iyengar Advanced Engineering Mathematics, Narosa Publishing House Pvt.Ltd., 5<sup>th</sup> Edition, 2016

#### **References Books:**

1. N.P. Bali and Manish Goyal, A Text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. B.V.Ramana, Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11<sup>th</sup> Reprint, 2010.

#### **Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. <https://www.khanacademy.org/math/linear-algebra>
2. [https://onlinecourses.nptel.ac.in/noc20\\_ma27](https://onlinecourses.nptel.ac.in/noc20_ma27)
3. <https://www.mooc-list.com/course/calculus-two-sequences-and-series-coursera>

#### **Web Reference/E-Books:**

1. [www.ee.ic.ac.uk](http://www.ee.ic.ac.uk)
2. <http://en.m.wikipedia.org>
3. [www.math.odu.edu](http://www.math.odu.edu)

**ENGINEERING CHEMISTRY  
I B.Tech., I SEM**

Course Title: Engineering Chemistry	Course Code: AS20-00BS02
Teaching Scheme (L:T:P): 3:1:0	Credits:3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs + 16 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Students must have studied two years of intermediate chemistry	

**Course Overview:**

The primary objective of an Engineering Chemistry course is to introduce the students to the concepts and applications of chemistry in Engineering. It should cultivate in them an ability to identify chemistry in each piece of finely engineered products used in households and industry. This course aims to strengthen the fundamental concepts of chemistry and then builds an interface with their industrial applications. It deals with applied and industrially useful topics, such as Water Technology, Molecular Orbital Concepts, Electrode Potential, Electrodes, types of batteries and their industrial applications, Fuels, UV-VIS, IR and NMR concepts.

**Course Objective**

- To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
- To know the modern technology and interpret different problems involved in industrial utilization of water.
- To impart the basic knowledge of atomic, molecular and electronic modifications which makes the student to understand the technology based on them.
- To acquire the knowledge of Electrochemistry and Corrosion which are essential for engineers in Industry.
- Ability to impart the knowledge of fuels to apply the role of chemistry in energy production.
- To acquire the skills pertaining to spectroscopy and to apply them for medical and other fields.

**Course Outcomes (s)**

CO#	Course Outcomes
C112.1	Acquire the Scientific Attitude by means of distinguishing, analyzing and solving various Engineering problems.
C112.2	To know the modern technology and interpret different problems involved in industrial utilization of water.
C112.3	Interpret the knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
C112.4	Summarize the principles and concepts of electrochemistry, corrosion to predict the behavior of a system under different variables.
C112.5	Define and classify the fuels, distinguishing the quality of fuels based on calorific values as well as understand the concepts of petroleum refining.
C112.6	Apply the concepts on basic spectroscopy and application to medical and other fields.



## COURSE CONTENT (SYLLABUS)

### Unit - I:

**Water and its Treatment:** Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness, Numerical problems on Hardness of Water – Estimation of hardness of water by complexometric method. Boiler troubles: Scales and Sludge's and its treatment. Potable water and its specifications - Steps involved in treatment of Potable water – Disinfection of water by ozonization and chlorination – Breakpoint of Chlorination. Boiler feed water and its treatment – Internal Treatment of water: Calgon conditioning, Phosphate conditioning and Colloidal conditioning. External treatment of water – Ion exchange Process. Desalination of Brackish water – Reverse Osmosis.

### Unit – II:

**Molecular Structure and Theories of Bonding:** Introduction - Atomic and Molecular Orbital's. Linear Combination of Atomic Orbital's (LCAO), Molecular orbital's of diatomic molecules, molecular orbital energy level diagrams of  $N_2$ ,  $O_2$  and  $F_2$  molecules.  $\pi$ -molecular orbital's of butadiene. Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d-orbital's in Tetrahedral, Octahedral and Square planar geometries. Band Structure of solids and effect of doping on conductance.

### Unit - III:

**Electrochemistry and Corrosion:** Electro chemical cells – electrode potential, standard electrode potential, Nernst equation, Types of electrodes – Calomel, Quinhydrone and Glass electrode. Determination of  $P^H$  of a solution by using quinhydrone and glass electrode. Electrochemical series and its applications. Batteries – Primary: Lithium cell, secondary batteries: Lead – Acid storage battery and Lithium ion battery.

Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, Differential Aeration Corrosion - water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods - Cathodic protection – Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – methods of application: Galvanizing , Tinning, Metal Cladding.

### Unit - IV:

**Fuels and Combustion:** Introduction-Classification of Fuels – Calorific value, Characteristics of a good fuel - Solid fuels: coal –Classification of a coal by Rank – Analysis of coal – Proximate and Ultimate analysis and their significance. Liquid fuels – Petroleum and its refining, Cracking –types – Fixed bed Catalytic Cracking - Moving bed catalytic cracking. Synthetic Petrol – Fischer-Tropsch's process- Knocking – Octane and Cetane rating, Flash Point, Fire point, Cloud point & Pour Point; Gaseous fuels – Composition and uses of Natural Gas, LPG and CNG.

**Combustion:** Definition, Calorific value of fuel – HCV, LCV; Calculation of air quantity required for combustion of a fuel.

### Unit-V

**Spectroscopic Techniques and applications:** Introduction, Principles of Electronic Spectroscopy: Beer-Lamberts law, Types of electronic transitions, applications of UV–Visible spectroscopy.

IR Spectroscopy: Introduction, Principle, Modes of Molecular vibrations, selection rules, Force Constant, Wave number regions of Some common organic functional groups (C-H,  $NH_2$ , OH, -COOH, C=O,  $C\equiv N$ , C=C,  $C\equiv C$ , C-O-C), Applications of IR Spectroscopy.

$^1H$ -NMR Spectroscopy, Principles of NMR spectroscopy, Chemical shift - Shielding and Deshielding effects, Chemical shifts of some organic protons, Interpretation of NMR Spectra (Alkanes, Alcohol, carbonyl compounds, Alkyl halides) Applications of NMR: Introduction to Magnetic Resonance Imaging.

**Text Books:**

1. Physical Chemistry, by P.W. Atkins
2. Engineering Chemistry by P.C.Jain & M.Jain; Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
3. Fundamentals of Molecular Spectroscopy, by C.N. Banwell.
4. University Chemistry, by B.M. Mahan, Pearson IV Edition.
5. R.V. Gadag & A. Nityananda Shetty., "Engineering Chemistry", I K International Publishing House Private Ltd. New Delhi (2015- Edition).

**References Books:**

1. O.G. Palanna, "Engineering Chemistry", Tata McGraw Hill Education Pvt. Ltd. New Delhi, Fourth Reprint (2015- Edition).
2. "Wiley Engineering Chemistry", Wiley India Pvt. Ltd. New Delhi. Second Edition 2013.
3. B. Jaiprakash, R. Venugopal, Sivakumaraiah and Pushpa Iyengar, Chemistry for Engineering Students, Subhash Publications, Bengaluru, (2015- Edition).
4. Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S. Krishnan.

**Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. <https://nptel.ac.in/courses/105/104/105104102/>
2. <https://nptel.ac.in/courses/105/106/105106119/>
3. <https://nptel.ac.in/courses/103/103/103103163/>
4. <https://nptel.ac.in/courses/104/106/104106096/>
5. <https://nptel.ac.in/courses/115/102/115102025/>
6. <https://nptel.ac.in/courses/103/108/103108162/>
7. <https://nptel.ac.in/courses/103/105/103105110/>
8. <https://nptel.ac.in/courses/104/102/104102113/>

**Web Reference/E-Books:**

S.No	Advanced concepts in syllabus	Website Referred
1	Water & Its Treatment	<a href="https://ocw.mit.edu/courses/civil-and-environmental-engineering/1-85-water-and-wastewater-treatment-engineering-spring-2006/lecture-notes/">https://ocw.mit.edu/courses/civil-and-environmental-engineering/1-85-water-and-wastewater-treatment-engineering-spring-2006/lecture-notes/</a>
2	Lithium Ion Batteries	<a href="https://www.youtube.com/watch?v=fo3DMXwD9ig">https://www.youtube.com/watch?v=fo3DMXwD9ig</a>
3	Fuel Cells	<a href="https://nptel.ac.in/content/storage2/courses/121106014/Week11/lecture34.pdf">https://nptel.ac.in/content/storage2/courses/121106014/Week11/lecture34.pdf</a>
4	IR Spectroscopy	<a href="http://www.chem.ucalgary.ca">www.chem.ucalgary.ca</a>
5	stereochemistry	<a href="http://research.cm.utexas.edu">research.cm.utexas.edu</a>
6	Synthesis of Aspirin	<a href="http://vlab.amrita.edu/?sub=2&amp;brch=191&amp;sim=849&amp;cnt=1">http://vlab.amrita.edu/?sub=2&amp;brch=191&amp;sim=849&amp;cnt=1</a>
7	Defluoridation of fluoride water	<a href="http://www.csir.res.in">www.csir.res.in</a>
8	Engineering Chemistry IIT-MUMBAI	<a href="http://www.cdeep.iitb.ac.in/webpage_data/nptel/Core%20Science/Engineering%20Chemistry%201/TOC-mainM5.htm">http://www.cdeep.iitb.ac.in/webpage_data/nptel/Core%20Science/Engineering%20Chemistry%201/TOC-mainM5.htm</a>
9	MR Spectroscopy	<a href="https://chem.libretexts.org/Textbook_Maps/Organic_Chemistry/Map%3A_A_Organic_Chemistry_(McMurry)/Chapter_13%3A_Structure_Determination_-_Nuclear_Magnetic_Resonance_Spectroscopy">https://chem.libretexts.org/Textbook_Maps/Organic_Chemistry/Map%3A_A_Organic_Chemistry_(McMurry)/Chapter_13%3A_Structure_Determination_-_Nuclear_Magnetic_Resonance_Spectroscopy</a>

**BASIC ELECTRICAL ENGINEERING  
I B.Tech., I SEM**

Course Title: Basic Electrical Engineering	Course Code: AS20-02ES01
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs + 16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Basics of Physics and Mathematics	

**Course Overview:**

Electrical engineering principles are taught in this course. Topics include circuit theory, alternating current theory, DC Machines, induction, motors, Synchronous Machine, cabling, batteries and Switches.

**Course Objective**

- To introduce the concepts of electrical circuits and its components
- To understand magnetic circuits, DC circuits and AC single phase & three phase circuits
- To study and understand the different types of DC/AC machines and Transformers.
- To import the knowledge of various electrical installations.
- To introduce the concept of power, power factor and its improvement.

**Course Outcomes(s)**

CO#	Course Outcomes
C113.1	Understand the basic concepts of Electrical Circuits.
C113.2	Study various concepts in AC circuits
C113.3	Discuss the concepts of transformer and Induction motor.
C113.4	Discuss the concepts of DC Machines and synchronous machines.
C113.5	Describe the operation of different types of cables, wires and batteries.
C113.6	understand the Performance of different protecting equipment's like MCB, FUSE.

**COURSE CONTENT (SYLLABUS)**

**UNIT-I: D.C. CIRCUITS**

Electrical circuit elements R, L and C, voltage and current sources, Kirchoff's laws, Network reduction techniques, Series –parallel, Y- $\Delta$  transformation, analysis of simple circuits with dc excitation. Superposition theorem, Thevenin's theorem and Norton's Theorem.

**UNIT-II: A.C. CIRCUITS**

Representation of sinusoidal waveform, phasor representation, peak and RMS values, real power, reactive power, apparent power, power factor, Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations, series resonance in series R-L-C circuit. Three-phase balanced circuits. Voltage and current relations in star and delta connections.

### **UNIT-III: TRANSFORMERS AND INDUCTION MOTORS**

Transformers: Principle of operation of transformer, Equivalent circuit, losses and efficiency, voltage regulation. Auto-transformer. Three phase transformer connections.

Induction motors: Working principle and operation of three phase induction motor, Losses and efficiency-Brake test. Single-phase induction motor-working principle, operation and applications.

### **UNIT-IV: DC MACHINES AND SYNCHRONOUS MACHINES**

DC machines: Constructional details and working of DC Generator, Methods of excitation, Applications of DC generators. DC Motor - principle of operation, speed control of separately excited DC motor. Applications of DC motors.

Synchronous machines: Construction and working of synchronous generator and its applications.

### **UNIT-V: ELECTRICAL INSTALLATIONS**

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary calculations for energy consumption and battery backup.

#### **Text Books:**

1. "Basic Electrical Engineering", D.C. Kulshreshtha, McGraw Hill, 2019.
2. "Basic Electrical Engineering", A. Chakrabarti, S. Debnath, Tata McGraw Hill, 2012.
3. "Basic Electrical Engineering" - D.P. Kothari and I.J. Nagrath, 3rd edition 2010, Tata McGraw Hill.
4. "Principle of Electrical Engineering", V.K Mehta, R. Mehta, S. Chand Limited, 2011.
5. "Basic Electrical Engineering", V. Mittle & Arvind Mittal, TMH, Second Edition.

#### **References Books:**

1. L.S. Bobrow, Fundamentals of Electrical Engineering", Oxford University Press, 2011
2. Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson, 2010
3. Electrical Engineering Fundamentals, Vincent Deltoro, Second Edition, Prentice Hall India, 1989.

#### **Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. NPTEL Videos on Course "*Basic Electrical Technology*" Co-ordinated by IISc Bangalore  
Link: <https://nptel.ac.in/courses/108/108/108108076/>
2. NPTEL Videos on Course "*Basic Electrical Technology*" Co-ordinated by IIT Kharagpur  
Link: <https://nptel.ac.in/courses/108/105/108105053/>

#### **Web Reference/E-Books:**

- 1) Basic Electrical Engineering By U.A.Bakshi, V.U.Bakshi · 2009  
Link: [https://www.google.co.in/books/edition/Basic\\_Electrical\\_Engineering/Pp47n-yyVEYC?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover](https://www.google.co.in/books/edition/Basic_Electrical_Engineering/Pp47n-yyVEYC?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover)
- 2) Basic Electrical Engineering By Chakrabarti · 2009  
[https://www.google.co.in/books/edition/Basic\\_Electrical\\_Engineering/KuJ44LVAAK4C?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover](https://www.google.co.in/books/edition/Basic_Electrical_Engineering/KuJ44LVAAK4C?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover)
- 3) Basic Electrical Engineering By R. K. Rajput · 2009  
[https://www.google.co.in/books/edition/Basic\\_Electrical\\_Engineering/NamQz0aZMukC?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover](https://www.google.co.in/books/edition/Basic_Electrical_Engineering/NamQz0aZMukC?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover)
- 4) Basic Electrical Engineering By SK Sahdev · 2015  
[https://www.google.co.in/books/edition/Basic\\_Electrical\\_Engineering/8xTLCgAAQBAJ?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover](https://www.google.co.in/books/edition/Basic_Electrical_Engineering/8xTLCgAAQBAJ?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover)

**ENGLISH  
I B.Tech., I SEM**

Course Title: English	Course Code: AS20-00HS01
Teaching Scheme (L:T:P): 2:0:0	Credits:2
Type of Course: Lecture	Total Contact Periods: 32 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70Marks
Prerequisites: <ol style="list-style-type: none"> <li>1. Basic knowledge of English language</li> <li>2. Must obtain Grammar, and basic reading skills</li> <li>3. Able to communicate in English language with basic writing skills</li> <li>4. Able to use different types of vocabulary in different types of situations</li> </ol>	

**Course Overview:**

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.

In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.

**Course Objective:** The course will help to

- Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills
- Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus.
- Develop study skills and communication skills in formal and informal situations.
- Train the students to use language appropriately for Interviews, Group discussions and Public speaking
- Enhance and empower the students in communication skills by concentrating on LSRW skills.

**Course Outcomes(s)**

CO#	Course Outcomes
C114.1	Apply English language effectively in spoken and written forms
C114.2	Analyze the given texts and respond appropriately
C114.3	Apply various grammatical structures in personal and academic fronts.
C114.4	Develop appropriate vocabulary for professional communication
C114.5	Improve competency in various forms of academic and professional writing.
C114.6	Perceive the importance of language skill for the enhancement of employability opportunities.

## COURSE CONTENT (SYLLABUS)

### **UNIT I:**

#### **'Of Parents and Children' from the Essays of Francis Bacon**

Vocabulary: The Concept of Word Formation –The Use of Prefixes and Suffixes.

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.

Reading: Reading and Its Importance- Techniques for Effective Reading.

Basic Writing Skills: Sentence Structures -Use of Phrases and Clauses in Sentences Importance of Proper Punctuation- Techniques for writing precisely – Paragraph writing – Types, Structures and Features of a Paragraph – Creating Coherence-Organizing Principles of Paragraphs in Documents.

### **UNIT II:**

#### **'The Raman Effect' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.**

Vocabulary Building: Homonyms, Homophones and Homographs

Grammar: Misplaced Modifiers

Reading: Sub-skills of Reading- Skimming and Scanning

Writing: Format of a Formal Letter- Writing Formal Letters E.g., Letter of Complaint, Letter of Requisition, Job Application with Resume.

### **UNIT III:**

#### **'Ancient Architecture in India' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.**

Vocabulary: Synonyms and Antonyms.

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

Reading: Comprehension- Intensive Reading and Extensive Reading

Writing: Nature and Style of Sensible Writing- Defining- Describing Objects, Places and Events – Classifying- Providing Examples or Evidence

### **UNIT IV:**

#### **'What Should You Be Eating' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.**

Vocabulary: Standard Abbreviations and Acronyms in English

Grammar: Sequence of Tenses

Reading: Improving Comprehension Skills – Techniques for Good Comprehension

Writing: Information Transfer- Flow Chart- Pie Chart– Essay Writing- Précis Writing.

### **UNIT V:**

#### **'How a Chinese Billionaire Built Her Fortune' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.**

Vocabulary: Technical Vocabulary and their usage

Grammar: Collocations, Commonly Confused Words-Common Errors in English

Reading: Reading Comprehension- Exercises for Practice

Writing: Technical Reports- Introduction - Structure of Reports- Types of Reports - Manuscript Format.

**Text Books:**

1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.
2. The Essays of Frances Bacon, Edited, with introduction and notes by Mary Augusta Scott. Charles Scribner's Sons, New York, 1908,

**References Books:**

1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P. (2018). Communication Skills. Oxford University Press.
3. Wood, F.T. (2007). Remedial English Grammar. Macmillan.
4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
5. Hamp-Lyons, L. (2006). Study Writing. Cambridge University Press.
6. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.
7. English Grammar Usage for Technical Students. DPS Publications, G Victor Emmanuel Raju, G Shailaja Reddy and M Sanjay Saahul.

**1. Practice English Your Own-**

<https://www.immigratemanitoba.com/alt/practise-english-on-your-own.pdf>

**2. Longman English Grammar Practice-**

[file:///C:/Users/user/Downloads/Longman English Grammar Practice intermediate Self Study Edition%20\(learnenglishteam.com\).pdf](file:///C:/Users/user/Downloads/Longman%20English%20Grammar%20Practice%20intermediate%20Self%20Study%20Edition%20(learnenglishteam.com).pdf)

**3. English Grammar through stories by Alan Townend-**

[file:///C:/Users/user/Downloads/English-Grammar-Through-Stories%20\(learnenglishteam.com\).pdf](file:///C:/Users/user/Downloads/English-Grammar-Through-Stories%20(learnenglishteam.com).pdf)

**ELECTRONIC DEVICES AND CIRCUITS  
I B.Tech., -I SEM**

Course Title: ELECTRONIC DEVICES AND CIRCUITS	Course Code: AS20-04ES01
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48 Hrs+ 16 Hrs
Continuous Internal Evaluation: 30 Marks	Semester End Exams: 70 Marks
Prerequisites: Physics	

**Course Overview:**

The creation of electronic circuits requires knowledge of the physics and device technology for the emission and flow control of electrons in vacuum and matter. It uses active devices to control electron flow by amplification and rectification. Electronics has had a major effect on the development of modern society.

**Course Objective**

- To introduce components such as diodes, BJTs and FETs.
- To know the applications of components.
- To know the switching characteristics of components
- To know the need of biasing in Transistors
- To understand of various types of transistor's with its principle of operation

**Course Outcomes(s)**

CO#	Course Outcomes
<b>C115.1</b>	Understand and analyse the characteristics of various components of semiconductor devices and its applications
<b>C115.2</b>	Understand and remember the applications of semiconductor diodes with examples.
<b>C115.3</b>	Analyze different types of transistor configurations with its parameters
<b>C115.4</b>	Understand and Analyze the relation between current amplification factors of the three configurations
<b>C115.5</b>	Analyze different biasing techniques of three terminal semiconductor Bipolar Semiconductor device.
<b>C115.6</b>	Understand and remember the operation of different types of FET's with its characteristics.

**COURSE CONTENT (SYLLABUS)**

**UNIT I:**

**JUNCTION DIODE CHARACTERISTICS AND SOME SPECIAL DIODES:**

Diode and its characteristics, Static and Dynamic resistances, Diode current equation, Temperature dependence of VI characteristic, Transition and Diffusion capacitances, Zener diode and its characteristics, Breakdown Mechanisms in Semi-Conductor (Avalanche and Zener breakdown) Diodes, Varactor Diode, LED, LCD and photo diode characteristics.

**UNIT II:**

**DIODE APPLICATIONS:**

Half wave and Full wave rectifiers and its comparisons. Inductor filter, Capacitor filter, L- section filter,



Pi- section filter and comparison of various filter circuits, Clipping Circuits, Clamper circuits, Application of a zener diode as a voltage regulator. Applications of LED and LCD's. Hall Effect and its applications.

### **UNIT III:**

#### **BIPOLAR JUNCTION TRANSISTOR:**

Principle of Operation, Common Emitter, Common Base and Common Collector Configurations, Volt-ampere characteristics of CB, CE and CC. Transistor current components, Transistor as a switch, switching times. BJT acts as an amplifier, Input and Output characteristics of transistor in Common Base, Common Emitter, and Common collector configurations, Relation between Alpha, Beta and Gamma, Comparison of CE, CB, CC configurations.

### **UNIT IV:**

**BIASING AND STABILISATION:** Transistor Biasing and Stabilization - criteria for fixing operating point, DC & AC load lines, Need for Biasing –Types of biasing's-Fixed Bias, collector to base bias, Self-Bias and voltage divider bias techniques for stabilization, Stabilization factors, ( $S$ ,  $S'$ ,  $S''$ ), Compensation techniques, (Compensation against variation in  $V_{BE}$ ,  $I_{CO}$ ,  $\beta$ ) Thermal run away, Thermal stability, Bias Stability, Bias Compensation using Diodes and thermistors.

### **UNIT V:**

#### **FIELD EFFECT TRANSISTORS:**

Types-The Junction Field Effect Transistor (construction, principle of operation, symbol)- pinch -off Voltage -Volt -Ampere characteristics, MOSFET (construction, principle of operation, symbol) MOSFET characteristics in enhancement and depletion modes.

#### **Text Books:**

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

#### **References Books:**

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

#### **Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. <https://nptel.ac.in/courses/115/102/115102014/>
2. <https://nptel.ac.in/courses/117/101/117101106/>
3. <https://www.coursera.org/learn/electronics>
4. [https://onlinecourses.nptel.ac.in/noc20\\_ee77/preview](https://onlinecourses.nptel.ac.in/noc20_ee77/preview)
5. <https://www.classcentral.com/course/swayam-semiconductor-devices-and-circuits-19997>
6. <https://sggs.ac.in/wp-content/uploads/2020/08/SWAYAM-NPTEL-Equivalence-Courses-w.e.f.2020-21-Electronics.pdf>

#### **Web Reference/E-Books:**

1. <https://www.springer.com/gp/book/9789811502668>
2. <https://www.pdfdrive.com/basic-electronics-for-scientists-and-engineers-e28939124.html>
3. <https://www.smartzworld.com/downloads/download/edc-unit-1-pdf-notes/>
4. <https://www.smartzworld.com/downloads/download/edc-unit-2-pdf-notes/>
5. <https://www.smartzworld.com/downloads/download/edc-unit-3-pdf-notes/>
6. <https://www.smartzworld.com/downloads/download/edc-unit-4-pdf-notes/>

**ELECTRONIC DEVICES & CIRCUITS LAB  
I B.Tech., I SEM**

Course Title: ELECTRONIC DEVICES & CIRCUITS LAB	Course Code: AS20-04ES05
Teaching Scheme (L:T:P):0:0:2	Credits:1
Type of Course: PRACTICALS	Total Contact Periods:48 hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Physics	

**Course Overview:** In This Practical Sessions Students can able to know, how to conduct Experiments by using breadboards and connections on it with different components, and make use of input and output peripherals, and measuring parameters on that equipment. Different semiconductor devices and its characteristics they should understand and analyze through that they can identify the applications of those devices, which may help them to develop prototype model of mini and major projects.

**Course Objective:**

- To know the applications of Semiconductor devices through their characteristics
- To determine characteristics of JFET.
- To understand the amplifying action of a transistor.
- To determine parameters like gain, impedances and band width of BJT and FET amplifier circuits.

**Course Outcomes(s)**

<b>CO NO:</b>	<b>Student will be able to</b>
<b>C116.1</b>	Understand the modifications in its characteristics of two terminal semiconductor devices
<b>C116.2</b>	Understand the analyze specific application of Zener diode through its characteristics.
<b>C116.3</b>	Understand the application of diode as a rectifier
<b>C116.4</b>	Understand and apply different configurations of transistors (BJT, FETs) pertaining to its nature of characteristics.
<b>C116.5</b>	Analyze and evaluate h-parameters of Bipolar Junction Transistor and its importance.
<b>C116.6</b>	Understand and evaluate the amplifying action of a transistor

## LIST OF EXPERIMENTS

### (TWELVE EXPERIMENTS TO BE DONE):

1. PN Junction diode characteristics A) Forward bias B) Reverse bias.
2. V-I Characteristics of LED
3. Photo Diode characteristics
4. Zener diode characteristics
5. Zener Diode acts as a voltage Regulator
6. Full Wave Rectifier with & without filters
7. Input and output characteristics of BJT in CE Configuration
8. Drain and Transfer characteristics of JFET in CS Configuration
9. Drain and Transfer characteristics of MOSFET in CS Configuration
10. Measurement of h-parameters from its CE and CB configurations
11. Verification of Amplifier action of a Transistor
12. Switching characteristics of a transistor

### EXTRA EXPERIMENTS:

1. Half wave rectifier with and without filter
2. Input and output characteristics of BJT in CB Configuration
3. Input and output characteristics of BJT in CC Configuration

### TEXT BOOKS:

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

### REFERENCE BOOKS:

1. The Art of Electronics, Horowitz, 3rd Edition Cambridge University Press
2. Electronic Devices and Circuits, David A. Bell – 5 th Edition, Oxford.
3. Pulse, Digital and Switching Waveforms –J. Millman, H. Taub and Mothiki S. Prakash Rao, 2Ed., 2008, Mc Graw Hill.
4. Electronic Devices and Circuits-by J.B.Guptha.

### Web Reference/E-Books:

W1	<a href="https://www.electronics-tutorials.ws/amplifier/amplifier-classes.html">https://www.electronics-tutorials.ws/amplifier/amplifier-classes.html</a>
W2	<a href="https://www.seas.upenn.edu/~ese319/Lecture_Notes/Lec_10_HF_Model_10.pdf">https://www.seas.upenn.edu/~ese319/Lecture_Notes/Lec_10_HF_Model_10.pdf</a>
W3	<a href="https://whatis.techtarget.com/definition/MOSFET-metal-oxide-semiconductor-field-effect-transistor">https://whatis.techtarget.com/definition/MOSFET-metal-oxide-semiconductor-field-effect-transistor</a>
W4	<a href="https://www.daenotes.com/electronics/digital-electronics/oscillators">https://www.daenotes.com/electronics/digital-electronics/oscillators</a>
W5	<a href="https://www.tutorialspoint.com/amplifiers/classification_of_power_amplifiers.htm">https://www.tutorialspoint.com/amplifiers/classification_of_power_amplifiers.htm</a>

### VIDEO REFERENCES

V1	<a href="https://www.youtube.com/watch?v=NESchIntkR8">https://www.youtube.com/watch?v=NESchIntkR8</a>
V2	<a href="https://www.youtube.com/watch?v=yUEss0DI6ww&amp;t=580s">https://www.youtube.com/watch?v=yUEss0DI6ww&amp;t=580s</a>
V3	<a href="https://www.youtube.com/watch?v=4_nGFY7zgDM">https://www.youtube.com/watch?v=4_nGFY7zgDM</a>
V4	<a href="https://www.youtube.com/watch?v=NMZUevvwMlw">https://www.youtube.com/watch?v=NMZUevvwMlw</a>
V5	<a href="https://www.youtube.com/watch?v=gRcE2t_28co">https://www.youtube.com/watch?v=gRcE2t_28co</a>

**ENGLISH LANGUAGE COMMUNICATION SKILLS LAB  
I B.Tech., I SEM**

Course Title: English Language Communication Skills Lab	Course Code: AS20-00HS02
Teaching Scheme (L:T:P): 0:0:3	Credits:1.5
Type of Course : Practical	Total Contact Periods: 48 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70Marks
Prerequisites: 1. The students should have a basic knowledge of English language 2. Must obtain Grammar, and basic Speaking skills 3. Should able to communicate in English language 4. Able to use different types of vocabulary in different of situations	

**Course Overview:**

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English Language Communication Skills Lab has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.

In ELCS Lab the focus should be on the skills development in the areas of vocabulary, grammar, reading and speaking. For this, the teachers should use the prescribed Lab manual for detailed study. The students should be encouraged in improving communication skills in the lab. The time should be utilized for activity based learning. The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.

**Course Objective:** The course will help to

To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning

To sensitize students to the nuances of English speech sounds, word accent, intonation and rhythm

To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking

To train students to use language appropriately for public speaking and interviews

To improve the fluency of students in spoken English and neutralize their mother tongue influence

CO#	Course Outcomes
<b>C117.1</b>	Learn how to pronounce words using phonetic transcription
<b>C117.2</b>	Improves collaborative skills and maximizes speaking skills
<b>C117.3</b>	Develops Neutralization of accent for intelligibility
<b>C117.4</b>	Develops better understanding of nuances of English language through audio-visual experience
<b>C117.5</b>	Improves language skills according in the different situations, discussions and interviews
<b>C117.6</b>	Develops linguistic, communicative and critical thinking

## COURSE CONTENT (SYLLABUS)

Listening Skills Syllabus: English Language and Communication Skills Lab (ELCS) shall have two parts:

- Computer Assisted Language Learning (CALL) Lab
- Interactive Communication Skills (ICS) Lab

**Exercise – I :** CALL Lab: Introduction to Pronunciation – Speech Sounds – Vowels and Consonants.

- ICS Lab: Understand: Communication at Work Place- Spoken vs. Written language
- Practice: Greetings – Introducing Oneself and Others -Taking Leave – JAM Session- Situational Dialogues.

**Exercise – II :** CALL Lab: Understand: Structure of Syllables – Word Stress .

- Practice: Basic Rules of Word Accent.
- **ICS Lab:** Understand: Features of Good Conversation – Non- verbal Communication.
- Practice: Role Play- Expressions in Various Situations –Making Requests and Seeking Permissions – Telephone Etiquette.

**Exercise – III CALL Lab:** Understand: Intonation- Rhythm-The Influence of Mother Tongue (MTI).

Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.

- **ICS Lab:** Oral Presentations- Introduction to Formal Presentations
- Practice: Formal Presentations- Poster Presentations and PPT's.

**Exercise – IV**

**CALL Lab:** Understand: Listening for General Details.

Practice: Listening Comprehension Tests.

- **ICS Lab:** Public Speaking – Exposure to Structured Talks- Group Discussion
- Practice: Group Discussion.

**Exercise – V**

**CALL Lab:** Understand: Listening for Specific Details.

**Practice:** Listening Comprehension Tests.

- ICS Lab: Interview Skills – concept and process, pre-interview planning, opening strategies, answering strategies, mock interviews.

**Practice: Mock Interviews**

### **References**

1. ELCS LAB MANUAL

2. Practice English Your Own-

<https://www.immigratemanitoba.com/alt/practise-english-on-your-own.pdf>

3. Longman English Grammar Practice-

[file:///C:/Users/user/Downloads/Longman English Grammar Practice intermediate Self Study Edition%20\(learnenglishteam.com\).pdf](file:///C:/Users/user/Downloads/Longman%20English%20Grammar%20Practice%20intermediate%20Self%20Study%20Edition%20(learnenglishteam.com).pdf)

4. English Grammar through stories by Alan Townend-

[file:///C:/Users/user/Downloads/English-Grammar-Through-Stories%20\(learnenglishteam.com\).pdf](file:///C:/Users/user/Downloads/English-Grammar-Through-Stories%20(learnenglishteam.com).pdf)

**ENGINEERING CHEMISTRY LAB  
I B.Tech., I SEM**

Course Title: Engineering Chemistry Lab	Course Code: AS20-00BS03
Teaching Scheme (L:T:P): 0:0:2	Credits:1
Type of Course: Practical	Total Contact Periods:48 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Basics of chemistry	

**Course Overview:**

The course emphasizes active resolution of experimental problems involving volumetric, analytical and instrumental usage; their design and optimization. Analytical, oral presentation, written report, and cooperative problem-solving skills are stressed in the context of chemical sciences practices. Safety awareness is integrated throughout the course.

**COURSE OBJECTIVES:**

The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

1. Estimation of hardness in water to check its suitability for drinking purpose.
2. To determine the rate constant of reactions from concentrations as a function of time.
3. The measurement of physical properties like adsorption and viscosity.
4. To synthesize the drug molecules and check the purity of organic molecules by thin layer chromatographic (TLC) technique.

**Course Outcomes (s)**

CO#	Course Outcomes
C118.1	Analyze the need, design and perform a set of experiments.
C118.2	Differentiate hard and soft water; solve the related numerical problems on water purification and its significance in industry and daily life.
C118.3	Understand the kinetics of a reaction from a change in concentration of reactants or products as a function of time.
C118.4	Employ the basic techniques used in chemistry laboratory for analysis such as Thin Layer Chromatography, volumetric titrations, Conductometric Measurements, Ostwald's viscometer and stalagmometer.
C118.5	To demonstrate the technique of thin Layer Chromatography (TLC) and synthesize drug molecules widely used in industry.
C118.6	Learn safety rules in the practice of laboratory investigations.

### **COURSE CONTENT (syllabus)**

1. Determination of total hardness of water by Complexometric method using EDTA
2. Estimation of Iron using Standard  $\text{KMnO}_4$ .
3. Estimation of an HCl by Conductometric titrations
4. Estimation of Acetic acid by Conductometric titrations
5. Estimation of HCl by Potentiometric titrations
6. Estimation of  $\text{Fe}^{2+}$  by Dichrometry
7. Determination of rate constant of acid catalyzed hydrolysis of methyl acetate
8. Determination of acid value of coconut oil
9. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
10. Determination of surface tension of a give liquid using Stalagmometer
11. Synthesis of Aspirin and Paracetamol
12. Thin layer chromatography calculation of  $R_f$  values. eg ortho and para nitro phenols

#### **Reference Books:**

1. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co., Delhi)
2. An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N. Delhi)
3. Vogel's text book of practical organic chemistry 5<sup>TH</sup> edition
4. Text book on Experiments and calculations in Engineering chemistry – S.S. Dara.

#### **Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. [http://www.cdeep.iitb.ac.in/webpage\\_data/nptel/Core%20Science/Engineering%20Chemistry%201/Course\\_home\\_Lec38.html](http://www.cdeep.iitb.ac.in/webpage_data/nptel/Core%20Science/Engineering%20Chemistry%201/Course_home_Lec38.html)
2. <http://vlabs.iitb.ac.in/vlab/labscs.html>
3. <https://www.vlab.co.in/broad-area-chemical-engineering>

**SOFT SKILLS 1  
I B.Tech., I SEM**

Course Title: Soft Skills 1	Course Code: AS20-00HS03
Teaching Scheme (L:T:P): 2:0:0	Credits: Nil
Type of Course: Lecture	Total Contact Periods:32 Hrs
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks

**Course Overview:**

The students will enhance their communication skills. The course will enable them to become responsible towards their lives and will be able to face challenges, the course will also enable to develop work culture, orientation and will enable them with problem solving abilities.

**Course Objective:-**

1. To develop Communicative Methodology.
2. To lead the life with utmost responsibility.
3. To accept challenges.
4. To develop work orientation in the mindset of the students.
5. To have problem solving ability.

**Course Outcomes(s)**

CO#	Course Outcomes
<b>C119.1</b>	Facilitates better interaction among students.
<b>C119.2</b>	Enhance and improve documentation.
<b>C119.3</b>	Demonstrate leadership qualities.
<b>C119.4</b>	Demonstrate effective presentation skills.
<b>C119.5</b>	Express benevolence.
<b>C119.6</b>	Enhance their communication skills

**COURSE CONTENT (SYLLABUS)**

**UNIT I: Importance of Soft Skills**

Successful Career - Communication - Body Language - Written Communication - Presentation  
Team Work - Professionalism - Interpersonal Skills - Time and Stress Management - Leadership Qualities

**UNIT II: Self Introduction**

Introductory Speech - General Speech - Academic Speech - Evaluation of Speech - Steps of Self Introduction - Basic Questions and Answers - Deliver Self Introduction - Tips of Self Introduction - Body Gestures- Good Eye Contact - Never be Nervous - Do's and Don'ts' of Self Introduction- Examples on Self Introduction

**UNIT III: Body Language**

Introduction – Communicating Body – Studying of body language – 17 concepts of learning body language.



#### **UNIT IV: Communication Skills**

Sounds of English – English as a World Language – Speech formation – Pronunciation – Oral Communication – Written Communication – Face to Face Communication Effective Communication – Presentation – Information Transfer.

#### **UNIT V: Positive Attitude and Positive Thinking**

Introduction – Possible Reactions – Dual Attitude – Indifference Attitude – Negative Attitude – Think Positively – Depend on Positive Thinking – Know – What we are – Benefits of Behaviour – Myths of negative thinking – Tips to become a positive thinker – Moving towards success

#### **Text Books:**

1. Body Language in the work place – Allan and Barbara Pease 2011.
2. Students Handbook: Skill Genie – Higher education department, Government of Andhra Pradesh.
3. Soft Skills – Odhisha State Open University.

#### **Web References:**

1. Extraordinary Communication Skills - By Sandeep Maheshwari I Hindi & English SpeakingPracticeTips <https://www.youtube.com/watch?v=VczVqHJW0gg>
2. Effective Communication Skills Training Video in Hindi <https://www.youtube.com/watch?v=kxAXOh5RmwU>
3. A guide to effective communication <https://www.youtube.com/watch?v=JwjAAGGi-90>
4. A Failure to Communicate <https://www.youtube.com/watch?v=8Ox5LhIJSBE>
5. Non Verbal Communication <https://www.youtube.com/watch?v=SKhsavlvuao>

**B.TECH  
FIRST YEAR  
SECOND SEMESTER  
SYLLABUS**

**DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS**  
**I B.Tech., - II SEM**

Course Title: DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	Course Code: AS20-00BS01
Teaching Scheme (L:T:P):3:1:0	Credits:3
Type of Course: Lecture +Tutorial	Total Contact Periods:48Hrs+ 16 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: 1. knowledge on Derivatives 2. knowledge on Integrations 3. knowledge on Functions	

**Course Overview:**

- Students will able to identify Exact and Non-Exact D.E. and find the solutions by using different methods.
- Students will able to identify Homogeneous and Non-Homogeneous D.E. and find the solutions by using different methods.
- Students will learn and evaluate Double and Triple Integrals.
- Students will learn Gradient, Divergent, Curl and Vector Identities.
- Students will learn and evaluate Line, Surface and Volume Integrals and Vector Integral Theorems.

**Course Objective:**

- Methods of solving the differential equations of first order.
- Methods of solving the differential equations of higher order.
- Evaluation of multiple integrals and their applications.
- The physical quantities involved in engineering field related to vector valued functions.
- The basic properties of vector valued functions and their applications to line, surface and volume integrals.

**Course Outcomes(s)**

CO#	Course Outcomes
C121.1	Acquires various skills pertaining to differential and vector calculus and apply them in different fields of Engineering
C121.2	Determine whether the given differential equation of first order is exact or not.
C121.3	Apply the concept of higher order ODE to real world problems.
C121.4	Analyze and apply the concept of multiple integrals to find areas, volumes.
C121.5	Define Directional Derivative and Scalar Potential Function
C121.6	Evaluate the line, surface and volume integrals and convert them from one to another.

## COURSE CONTENT (SYLLABUS)

### UNIT I: FIRST ORDER ODE

Exact equations; Non-Exact equations; Linear equations; Bernoulli's equations; Newton's Law of Cooling; Law of Natural Growth and Decay; Orthogonal Trajectories.

### UNIT II: HIGHER ORDER LDE

Higher Order Linear Differential Equations with Constant Coefficients; Non-Homogeneous Differential Equations with RHS of the type:  $e^{ax}$ ,  $\sin ax$ ,  $\cos ax$ ,  $x^k$ ,  $e^{ax}v$ ,  $xv$ , Method of Variation of Parameters.

### UNIT III: MULTIPLE INTEGRALS

Evaluation of Double Integrals (Cartesian and Polar); Change of Variables (Cartesian to Polar); Change of Order of Integration (Cartesian form); Areas and Volumes by Double Integrals. Triple Integrals (Cartesian form).

### UNIT IV: VECTOR DIFFERENTIATION

Vector Point Function; Scalar Point Function; Gradient; Divergent; Solenoidal; Curl; Irrotational; Directional Derivative; Scalar Potential Function; Vector Identities.

### UNIT V: VECTOR INTEGRATION

Line Integral; Surface Integral; Volume Integral; Green's Theorem in a plane; Gauss's Divergence Theorem; Stoke's Theorem (without proofs) and Applications.

#### **Text Books:**

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 42<sup>nd</sup> Edition, 2010.
2. S.R.K. Iyengar and R.K. Jain, Advanced Engineering Mathematics, Narosa Publishing House, 5<sup>th</sup> Edition, 2016.
- 3.

#### **References Books:**

1. Dr. M.D. Rai Singhania, Ordinary and Partial Differential Equations, S.Chand and Company Ltd., 18<sup>th</sup> Edition, 2008.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10<sup>th</sup> Edition, John Wiley & Sons, 2011.
3. Murray R. Spiegel, Seymour Lipschutz, Dennis Spellman, Vector Analysis: Schaum's Outlines Series, Tata McGrawHill, 2<sup>nd</sup> Edition, 2009.

#### **Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):**

<https://www.coursera.org/learn/ordinary-differential-equations>

2. [https://onlinecourses.nptel.ac.in/noc20\\_ma15/preview](https://onlinecourses.nptel.ac.in/noc20_ma15/preview)

#### **Web Reference/E-Books:**

1. ENGINEERING MATHEMATICS-II BY Dr.M.SURYANARAYANA REDDY
2. MATHEMATICS-I BY P. SHIVARAMAKRISHNA DAS, C. VIJAYA KUMARI
3. ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS BY Dr.M.D.RAISINGHANIA

**APPLIED PHYSICS  
I B.Tech., -II SEM**

<b>Course Title: ENGINEERING PHYSICS</b>	<b>Course Code: AS20-00BS08</b>
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48Hrs +16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: 1. The student must have basic knowledge of units and dimension of physical quantities, principles of mechanics and laws of optics. 2. The student must be aware of basics of waves and oscillations, fundamental principles of electromagnetic theory. 3. The student must have fundamental knowledge of mathematical concepts like vector algebra, integration and differentiation.	

**Course Overview:**

This course deals with quantum principles and explores their applications in studying the behavior of fundamental entities of atom. It deals with semiconductor devices which are employed in designing electronic systems and in communication field. It deals with the fundamental properties of dielectric and magnetic materials and explore their application in all engineering streams.

**Course Objective**

1. Student explores the dual nature of the particle and applications of Schrodinger Equation.
2. Student identifies the Concept of Energy band formation and analyzes classification of solids.
3. Student distinguishes the differences between Intrinsic and Extrinsic Semiconductors
4. Student explores the different applications of semiconductor devices.
5. Student identifies the behaviour of solids under electric and magnetic field and Understand the concept of superconductivity
6. Student interprets the characteristics of Lasers, types of Lasers, Optical fiber principle and their applications.

**Course Outcomes(s)**

CO#	Course Outcomes
<b>C122.1</b>	Interprets the dual nature of matter waves using quantum principles.
<b>C122.2</b>	Differentiates the physical properties of conductors, insulators and semiconductors using energy band.
<b>C122.3</b>	Identifies the different types of semiconductors using Hall Effect
<b>C122.4</b>	Analyzes the different properties of semiconductor devices and their applications.
<b>C122.5</b>	Explores the different types of Dielectric and Magnetic materials and their applications in different fields.
<b>C122.6</b>	Identifies the different characteristics and applications of lasers and fiber optics

**COURSE CONTENT (SYLLABUS)**

**UNIT I: QUNATUM MECHANICS**

Introduction to Quantum Mechanics (Origin of QM), Dual nature of particles, De Broglie's hypothesis, Matter waves, Heisenberg's uncertainty principle, Photo-electric effect(qualitative), Davisson and Germer's experiment, G.P Thomson experiment, Schrodinger time-independent wave equation-significance of wave function, particle in one dimensional square well potential.

## **UNIT II: INTRODUCTION TO SOLIDS**

Classical Statistics – Maxwell-Boltzmann Distribution(qualitative) Quantum Statistics – Bose-Einstein statistics(qualitative), Fermi – Dirac statistics(qualitative), Density of Energy states, Electrons in a periodic potential – Bloch theorem, Kronig – Penny Model(qualitative), Brillouin Zones (E-K curve), Concept of effective mass of electron, Energy band formation in solids, Classification of solids into Metals, Semiconductors and insulators.

## **UNIT III: SEMICONDUCTOR PHYSICS AND DEVICES**

Semiconductor Physics: Intrinsic and Extrinsic semiconductors, Carrier concentration in intrinsic and extrinsic semiconductors. Dependence of Fermi level on carrier concentration and temperature, carrier transport: diffusion and drift, Hall Effect.

Semiconductor Devices: PN Junction Diode – Junction Formation, Energy Band Diagram, V-I characteristics of PN junction diode, Direct and Indirect band gap semiconductors, LED & Solar cell.

## **UNIT IV: DIELECTRICS AND MAGNETIC PROPERTIES OF MATERIALS**

Dielectric properties: Introduction, Types of Polarizations (Electronic and Ionic) and Calculation of their polarizabilities, Internal fields in solids: (Lorentz Method), Clausius-Mossotti relation, Piezo-electricity, Ferroelectricity, Pyro-electricity and their applications.

Magnetic Properties: Introduction, Bohr magneton, classification of magnetic materials on the basis of magnetic moment, Hysteresis curve based on domain theory, Soft and hard magnetic materials, Applications.

Superconductors: Introduction, type – I and type – II Superconductors, Applications of Superconductors

## **UNIT V: LASERS AND FIBER OPTICS**

Lasers: Introduction, Characteristics of lasers, Absorption, Spontaneous and Stimulated emissions, Relation between Einstein's Coefficients, Population inversion, Metastable state, Pumping, Block Diagram of laser, Construction and working of Ruby Laser, Helium-Neon Laser, Applications of lasers in Defense, Medical field.

Fiber Optics: Introduction to optical fiber, Construction and working of an Optical Fiber, Acceptance angle, Numerical aperture, Types of Optical fibers – Mode & Propagation through Step and Graded index fibers, Attenuation, Applications of optical fibers in Communication System and Sensors.

### **Text Books:**

1. Engineering Physics, B.K. Pandey, S. Chaturvedi - Cengage Learning.
2. A textbook of Engineering Physics, Dr. M. N. Avadhanulu, Dr. P.G. Kshirsagar - S. Chand
3. Halliday and Resnick, Physics - Wiley

### **References Books:**

1. Engineering physics 2<sup>nd</sup> edition –H.K.Malik and A.K. Singh Richard.
2. Introduction to Solid State Physics - Charles Kittel

### **Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. [https://onlinecourses.nptel.ac.in/noc20\\_ph24/preview](https://onlinecourses.nptel.ac.in/noc20_ph24/preview)
2. [https://onlinecourses.nptel.ac.in/noc20\\_ph16/preview](https://onlinecourses.nptel.ac.in/noc20_ph16/preview)
3. <https://www.coursera.org/learn/semiconductor-physics>
4. <https://www.coursera.org/lecture/leds-semiconductor-lasers/active-optical-devices-specialization-introduction-0jner>

### **Web Reference/E-Books:**

1. Physics for Engineers by N. K. Verma
2. Essentials of Applied Physics by Royal M. Frye

**PROGRAMMING FOR PROBLEM SOLVING  
I B.Tech., - II SEM**

Course Title: PROGRAMMING FOR PROBLEM SOLVING	Course Code: AS20-05ES01
Teaching Scheme (L:T:P):3:1:0	Credits:3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs+ 16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Mathematics knowledge, Analytical and Logical skills	

**Course Overview:**

It introduces students to the field of computer science as a discipline for solving problems through computation and provides the foundation for more advanced courses on programming and software development.

**Course Objective**

- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of C programming language.
- To learn the usage of structured programming approach in solving problems.

**Course Outcomes(s)**

CO#	Course Outcomes
C123.1	Designs algorithms and draws flowcharts for solving problems.
C123.2	Converts the algorithms/flowcharts to C programs.
C123.3	Develops the code and tests a given logic in C programming language.
C123.4	Dissects a problem into functions and develops modular reusable code.
C123.5	Demonstrates arrays, pointers, strings and structures in C.
C123.6	Explains Searching and sorting problems.

**COURSE CONTENT (SYLLABUS)**

**UNIT - I**

Problem Solving Using Computers: Computer Overview, Introduction to components of a computer system, Algorithms, Flowchart, Pseudo code with examples, Number systems (Decimal & Binary Conversion).

Overview of C : History of C, Basic structure of C- program, Creating and Running C-Program, Input and output statements.

**UNIT - II**

Fundamentals of C: C-Tokens, Data types, Operators, Expressions, Type conversions, Types of Errors, Input and output statements. Control Statements in C, Decision making and branching, Decision making and Looping statements.

### **UNIT – III**

Structured Programming :Functions: Syntax, Steps ,Types and Category of Functions, parameter passing mechanism. Recursion and Storage Classes

Dynamic memory allocation: malloc(), calloc(), realloc(), free() with example

### **UNIT - IV**

Arrays & Strings: Declaration , Initialization and Accessing Elements, String handling functions, Array of Strings.

Structures and Unions: Defining structures, initializing structures, unions, Array of structures, self referential structures.

Pointers: Types of Pointers Use of Pointers, Dereferencing operations, Examples

### **UNIT - V**

Numerical methods: Roots, Integration and Differentiation Methods, Examples

Linked List: Definition, Types, Implementation Using Self referential Structures:

Files: (only if time is available, otherwise should be done as part of the lab)

### **Text Books:**

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition).
3. Ashok N. Kamthane, Programming in C, 2/e, Pearson Education.
4. Programming with C, by K.R. Venugopal, Tata Mcgraw Hill Publishing Co Ltd

### **References Books:**

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.
2. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression).
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
4. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition.

### **Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. <https://www.coursera.org/learn/computational-thinking-problem-solving>
2. [nptel.ac.in/courses/106105085/4](https://nptel.ac.in/courses/106105085/4)
3. [nptel.ac.in/courses/106105085/2](https://nptel.ac.in/courses/106105085/2)

### **Web Reference/E-Books:**

1. [https://onlinecourses.nptel.ac.in/noc18\\_cs33/preview](https://onlinecourses.nptel.ac.in/noc18_cs33/preview)
2. <http://www.thenewboston.com/>
3. <https://www.codesdope.com/>



**ENGINEERING GRAPHICS AND DESIGN  
I B.Tech., II SEM**

Course Title: ENGINEERING GRAPHICS AND DESIGN	Course Code: AS20-03ES02
Teaching Scheme (L:T:P): 2:0:3	Credits: 3.5
Type of Course: Lecture + Practical	Total Contact Periods: 32Hrs+ 48 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks

**Course Overview:**

Engineering graphics & Design has a well-defined set of standards by which technical drawings are produced. This course teaches the language of engineering graphics from basic sketching through 3-D solid modeling using computer aided design (CAD) software AutoCAD.

**Course Objective**

The objectives of this course are to

- To know the conventions used in Engineering Drawing and comprehend the tools to be used in AutoCAD software.
- To understand the importance of engineering curves.
- To learn to use the orthographic projections for points, lines, planes and solids in different positions.
- To make the students draw the projections of the planes.
- To understand the isometric projections.
- To create simple solid models of various domain applications.

**Course Outcomes(s)**

At the end of the course, students will be able to

CO#	Course Outcomes
C124.1	Apply the concepts of engineering curves in construction using AutoCAD.
C124.2	Solve the problem of projections of points and lines, in different positions using AutoCAD.
C124.3	Solve the problem of projections of planes and solids in different positions using AutoCAD.
C124.4	Solve the problems of Projections of solids and its positions using AutoCAD.
C124.5	Solve the problems on Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions using AutoCAD.
C124.6	Solve the problems on Orthographic Projections and its conversions using AutoCAD.

**COURSE CONTENT (SYLLABUS)**

Introduction to AutoCAD Software: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line, The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.

**UNIT I:**

Introduction to Engineering Drawing: Principles of Engineering drawing and their significance, Conventions, Drawing Instruments.

Engineering Curves: Construction of Ellipse, Parabola and Hyperbola – General and Special methods; Cycloidal curves- Epicycloids and Hypocycloids.

**UNIT II:**

Orthographic Projections, Projections of Points & Straight Lines: Principles of Orthographic Projections – Conventions; Projections of Points in all positions; Projections of lines inclined to both the planes. Projections of Planes: Projections of Planes- Surface Inclined to both the Planes.

**UNIT III:**

Projections of Regular Solids: Projections of Regular Solids inclined to both the Planes – Prisms, Pyramids, Cylinder and Cone.

Sections and Sectional Views: Right regular solids - prism, cylinder, pyramid, cone – use of Auxiliary views.

**UNIT IV:**

Isometric Projections: Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and Compound Solids.

**UNIT V:**

Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions.

Introduction to Solid Modelling: Creation of simple solid models relevant to the domain.

**Text Books:**

1. Engineering Drawing, N. D. Bhatt, 53rd Edition, Charotar Publishing House, 2016.
2. Textbook on Engineering Drawing, K. L. Narayana & P. Kannaiah, SciTech Publishers, 2010.
3. Engineering Drawing and Computer Graphics, M. B. Shah & B. C. Rana, Pearson Education, 2010.
4. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education.
5. Engineering graphics and design, Pradeep Jain, A.P Gautam and Ankitha Maheshwari.

**References Books:**

1. Mastering AutoCAD 2019 and AutoCAD LT 2019, George Omura and Brian C. Benton (Auto CAD 2019), 1st Edition, John Wiley & Sons, Indianapolis, Indiana.
2. AutoCAD Software Theory and User Manuals.
3. Engineering Design, George E. Dieter, Linda C. Schmidt/third edition.
4. Engineering Drawing and design, Cencell Jonson, Jay D. Helsel, Dennis R. Short.
5. Engineering Drawing, Jolhe/fourth edition.

**Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. <https://nptel.ac.in/courses/112/103/112103019/>
2. <https://nptel.ac.in/courses/112/104/112104172/>

**Web Reference/E-Books:**

1. <http://nptel.ac.in/courses/112103019>
2. <http://www.me.umn.edu/courses/me2011/handouts/drawing/blanco-tutorial.html>
3. [https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture notes/env health scienc e\\_students/engineeringdrawing.pdf](https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/env_health_scienc_e_students/engineeringdrawing.pdf)

**Software Required: AutoCADD**

**UNIVERSAL HUMAN VALUES II  
I B.TECH -II SEM**

Course Title: UNIVERSAL HUMAN VALUES II	Course Code: AS20 – 00HS07
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs+ 16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
<b>Prerequisites:</b> <ol style="list-style-type: none"> <li>1. The student must have basic knowledge of Need, Basic Guidelines, Content and Process for Value Education</li> <li>2. Understanding Harmony in the Human Being - Harmony in Myself</li> <li>3. The student must have fundamental knowledge Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship</li> <li>4. The student can able to Understanding Harmony in the Nature and Existence - Whole existence asCoexistence</li> </ol>	

**Course Overview:**

This course is designed for transferring the right understanding and definite human conduct in the students. The conduct of every human differs from human to human. Through this course an attempt is being made to introduce the definite human conduct in students. The conduct of a human being can be definite only if knowledge of right understanding and right human conduct is taught to them.

**Course Objective**

The objective of the course is four fold:

1. Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
3. Strengthening of self-reflection.
4. Development of commitment and courage to act.

**Course Outcome(s)**

CO#	Course Outcomes
<b>C125.1</b>	Basic guideline of human values universally.
<b>C125.2</b>	Understanding the harmony in the human being
<b>C125.3</b>	Learn the rights and responsibilities as an employee, team member and a global citizen
<b>C125.4</b>	To know about society – Harmony @ human relation
<b>C125.5</b>	The student can study the professional ethics and values.
<b>C125.6</b>	Understand the importance of Values and Ethics in their personal lives and Professional careers

## **COURSE CONTENT (SYLLABUS)**

### **UNIT – I**

#### **Course Introduction - Need, Basic Guidelines, Content and Process for Value Education**

Purpose and motivation for the course, recapitulation from Universal Human Values-I-Self-Exploration-what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration. Continuous Happiness and Prosperity- A look at basic Human Aspirations. Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario, Method to fulfil the above human aspirations: understanding and living in harmony at various levels. (Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking)

### **UNIT – II**

#### **Understanding Harmony in the Human Being - Harmony in Myself!**

Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' - happiness and physical facility. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I' Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Health. Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease

### **UNIT- III**

#### **Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship**

Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfilment to ensure mutual happiness; Trust and Respect as the foundational values of relationship, Understanding the meaning of Trust; Difference between intention and competence, Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship, Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals, Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives.

### **UNIT - IV**

#### **Understanding Harmony in the Nature and Existence - Whole existence as Coexistence**

Understanding the harmony in the Nature, Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and selfregulation in nature, Understanding Existence as Co-existence of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence. Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

## UNIT – V

### Implications of the above Holistic Understanding of Harmony on Professional Ethics

Natural acceptance of human values, Definitiveness of Ethical Human Conduct Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order, Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly, and eco-friendly production systems, c. Ability to identify and develop appropriate, technologies and management patterns for above production systems, Case studies of typical holistic technologies, management models and production systems, Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. At the level of society: as mutually enriching institutions and organizations, Sum up, Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. To discuss the conduct as an engineer or scientist etc.

#### Text Books

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010

#### Reference Books

1. Jeevan Vidya: EkParichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi

#### E-RESOURCES:

1. <https://www.yourmorals.org/schwartz.2006.basic%20human%20values.pdf>
2. [https://web.archive.org/web/20080311200942/https://kroc.nd.edu/ocpapers/op\\_16\\_1.pdf](https://web.archive.org/web/20080311200942/https://kroc.nd.edu/ocpapers/op_16_1.pdf)
3. [https://kroc.nd.edu/ocpapers/op\\_16\\_1.pdf](https://kroc.nd.edu/ocpapers/op_16_1.pdf)
4. [https://www.google.com/search?sa=X&biw=1366&bih=657&sxsrf=ALeKk032tvNCeLhiX\\_fL4ciefThZdeN\\_vQ:1607766793377&q](https://www.google.com/search?sa=X&biw=1366&bih=657&sxsrf=ALeKk032tvNCeLhiX_fL4ciefThZdeN_vQ:1607766793377&q)
5. [https://www.researchgate.net/publication/270388493\\_Variations\\_in\\_Value\\_Orientation](https://www.researchgate.net/publication/270388493_Variations_in_Value_Orientation)

#### WEB REFERENCES:

1. <https://furhhd.org/our-programmes/education-and-ethics/universal-human-values-ethics/>
2. [https://www.google.com/search?sa=X&biw=1366&bih=657&sxsrf=ALeKk032tvNCeLhiX\\_fL4ciefThZdeN\\_vQ:1607766793377&q](https://www.google.com/search?sa=X&biw=1366&bih=657&sxsrf=ALeKk032tvNCeLhiX_fL4ciefThZdeN_vQ:1607766793377&q)
3. <https://www.un.org/press/en/2003/sqsm9076.doc.htm>
4. <https://www.kobo.com/ebook/the-psychology-of-conservatism-routledge-revivals>

**APPLIED PHYSICS LAB  
I B.Tech., II SEM**

Course Title: APPLIED PHYSICS LAB	Course Code: AS20-00BS09
Teaching Scheme (L:T:P): (0:0:3)	Credits: 1.5
Type of Course: Practical	Total Contact Periods: 48Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: 1. The student must know the usage of basic tools for measurement of physical quantities. 2. The students must have knowledge of error analyses, types of errors, principles of optics, mechanics, waves and Oscillations	

**Course Overview:**

The course deals with experiments in various fields of physics such as Wave Optics, Wave mechanics, Electronics, Electricity and Magnetism.

**Course Objective**

- To identify the active and passive elements and gain ability to build electronic circuits for solving complex engineering problems.
- To classify the semiconductor materials into p-type or n-type semiconductor and estimate the energy gap of semiconductor diode
- To explore the characteristics of optoelectronic devices
- determines the work function of given material.
- estimate magnetic field intensity and explores the generation of magnetic field.
- To determines the properties of optical fibers using lasers

**Course Outcomes(s)**

CO#	Course Outcomes
C126.1	Compute time constant of RC circuit and resonant frequency of LCR circuit.
C126.2	Identify the type of semiconductor using Hall Effect and determine the Energy gap of a semiconductor diode.
C126.3	Analyze the V-I characteristics of Solar cell and LED.
C126.4	Evaluate work Function of a photo metal using photo electric effect.
C126.5	Summarize the variation of Magnetic Field along the current carrying coils.
C126.6	Estimate the light gathering ability and bending losses of Optical fibers.

### **COURSE CONTENT (SYLLABUS)**

#### **The students have to perform any eight of the following experiments**

1. LCR Circuit: To study the frequency response of LCR series and parallel resonance circuit.
2. R-C Circuit: To study the time response of RC circuit.
3. Hall Effect: To determine Hall voltage and Hall Coefficient of given semiconductor material.
4. Energy Gap: To determine the energy gap of a given Semiconductor.
5. Solar Cell: To study V-I Characteristics of Solar Cell.
6. LED: To study the V-I characteristics of LED.
7. Photoelectric effect: To determine the work function of given material.
8. Stewart- Gee apparatus – To study the variation of magnetic field along the axis of circular current carrying loop.
9. Optical fibre: To determine the Numerical aperture and Acceptance angle of a given fibre.
10. Optical fibre: To study the bending losses in Optical fibres.

#### **References Books:**

1. Practical physics by Dr. Aparna, V.G.S. publications.
2. Physics practical lab manual –SPEC

#### **Online Resources**

1. <https://www.futurelearn.com/courses/teaching-practical-science-physics>
2. <https://www.vlab.co.in/broad-area-physical-sciences>

**PROGRAMMING FOR PROBLEM SOLVING LAB  
I B.Tech., II SEM**

Course Title: PROGRAMMING FOR PROBLEM SOLVING LAB	Course Code: AS20-05ES02
Teaching Scheme (L:T:P)0:0:3	Credits:1.5
Type of Course: Practical	Total Contact Periods: 48Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites:- Mathematics knowledge, Analytical and Logical skills	

**Course Overview:**

This course provides the fundamental concepts of programming using C language, apply the control structures, iterations statements, arrays, functions, strings, pointers, structures, unions and files. This course also explains the concepts of searching and sorting techniques in C language.

**Course Objective**

- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of C programming language.
- To learn the usage of structured programming approach in solving problems.

**Course Outcomes(s)**

CO#	Course Outcomes
C127.1	Develops algorithms for simple problems.
C127.2	Translate given algorithms to a working and correct program.
C127.3	Identifies and correct syntax errors as reported by the compilers.
C127.4	Identifies and correct logical errors encountered during execution.
C127.5	Demonstrates data operations using arrays, strings, structures and pointers of different types.
C127.6	Creates, reads and writes to and from simple text and binary files.

**COURSE CONTENT (SYLLABUS)**

**Practice Sessions:**

Week1:

Tutorial 1: Problem solving using computers(Creating, Compiling & Running Steps , Basic Structure of C Program)-:

Lab1: Familiarization with programming environment

Week2:

Tutorial 2: Variable types and Rules, Formatted I/O statements

Lab 2: Reading and Displaying Different Values Using scanf() & Printf()

Week3:



Tutorial 3: Types of Operators

Lab 3: Simple Computational problems using operators

Week4:

Tutorial 4: Branching and logical expressions:

Lab 4: Problems involving if-then-else structures

Week5:

Tutorial 5: Loops, while, do-while and for loops:

Lab 5: Iterative problems e.g., sum of series, sum of n- natural numbers

Week6:

Tutorial 6: 1D Arrays: searching, sorting:

Lab 6: 1D Array manipulation : insertion, selection and bubble sort

Week7:

Tutorial 7: 2D arrays and Strings

Lab 7: Matrix problems, String operations, string sorting , palindrome string

Week8:

Tutorial 8: Functions, call by value:

Lab 8: Simple functions: factorial ,sum of individual digits, Fibonacci series etc.,

Week9:

Tutorial 9: Recursion, structure of recursive calls

Lab 9: Recursive functions: factorial, Fibonacci, GCD and towers of Hanoi

Week10:

Tutorial 10: Pointers, structures and dynamic memory allocation

Lab 10: Problem solving using Pointers and structures

Week11:

Tutorial 11: Numerical methods (Root finding, numerical differentiation, numerical integration):

Lab 11: Programming for solving Numerical methods problems

Week12

Tutorial 12: Single Linked List using self referential structures

Lab 12: Implementation of Single liked list using self referential structures

Week13:

Tutorial 13: File data type , File pointer, modes of operations, file handling functions

Lab 13: Programs using file handling functions: File copy, Merging of Files

**Text Books:**

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3<sup>rd</sup> Edition).
3. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India.

**References Books:**

1. R.G. Dromey, How to solve it by Computer, Pearson (16<sup>th</sup> Impression).
2. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
3. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4<sup>th</sup> Edition.

**Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. <http://nptel.ac.in/courses/106105085/>
2. <http://nptel.ac.in/courses/106106127/>

**Web Reference/E-Books:**

1. [www.leetcode.com](http://www.leetcode.com)
2. [www.thenewboston.com](http://www.thenewboston.com)
3. [www.codesdope.com](http://www.codesdope.com)

**ENGINEERING PRACTICES  
I B.Tech. II SEM**

Course Title: ENGINEERING PRACTICES	Course Code: AS20-03ES04
Teaching Scheme (L:T:P): 0:0:4	Credits: 2
Type of Course: Practical	Total Contact Periods: 64 Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks

**Course Overview:**

**Mechanical Engineering Practices** is a place where students acquire knowledge on the operation of various processes involved in manufacturing and production. The Workshop Practice course makes students competent in handling practical work in engineering environment.

**Course Objective**

**The objectives of this course are to**

- To Study of different hand operated power tools, uses and their demonstration.
- To gain a good basic working knowledge required for the production of various engineering products.
- To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at work place.
- It explains the construction, function, use and application of different working tools, equipment and machines.
- To study commonly used carpentry joints.
- To have practical exposure to various welding and joining processes.
- Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

**Course Outcomes(s)**

CO#	Course Outcomes
C128.1	Apply the concepts of engineering workshop practice on machine tools and their operations.
C128.2	Expertise on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding.
C128.3	Recognize the tools and apply different trades of Engineering practices on drilling, material removing, measuring, chiseling etc.
C128.4	Apply basic knowledge on electrical engineering for house wiring practice.
C128.5	Manufacture the given material to desired product in a particular pattern by tin smithy.
C128.6	Mould the component of different size and shape by black smithy in on Furnace

## COURSE CONTENT (SYLLABUS)

### 1. TRADES FOR EXERCISES:

#### At least two exercises from each trade:

- I. Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint).
- II. Fitting – (V-Fit, Dovetail Fit & Semi-circular fit).
- III. Tin-Smithy – (Square Tin, Rectangular Tray & Conical Funnel).
- IV. Foundry – (Preparation of Green Sand Mould using Single Piece and Split Pattern).
- V. Welding Practice – ( Arc Welding & Gas Welding).
- VI. House-wiring – (Parallel & Series, Two-way Switch and Tube Light).
- VII. Black Smithy – ( Round to Square, Fan Hook and S-Hook).

### 2. TRADES FOR DEMONSTRATION & EXPOSURE:

Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tools in construction and Wood Working.

#### **Text Books:**

1. Workshop Practice /B. L. Juneja / Cengage
2. Workshop Manual / K. Venugopal / Anuradha.

#### **References Books:**

1. Work shop Manual - P. Kannaiah/ K. L. Narayana/ SciTech
2. Workshop Manual / Venkat Reddy/ BSP.

#### **Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. <https://nptel.ac.in/courses/112/107/112107145/>
2. <https://nptel.ac.in/courses/112/107/112107144/>

#### **Web Reference/E-Books:**

1. [https://books.google.co.in/books/about/MECHANICAL\\_WORKSHOP\\_PRACTICE.html?id=rHhJlb-ye4C](https://books.google.co.in/books/about/MECHANICAL_WORKSHOP_PRACTICE.html?id=rHhJlb-ye4C)
2. <https://www.youtube.com/watch?reload=9&v=4gpjof5ESKQ>

**SOFT SKILLS 2  
I B.Tech., II SEM**

Course Title: Soft Skills 2	Course Code: AS20-00HS04
Teaching Scheme (L:T:P):2:0:0	Credits: 0
Type of Course: Lecture	Total Contact Periods: 32 Hrs
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks

**Course Objective: -**

1. To develop Optimistic Nature.
2. To enhance the skills related to Group Discussion.
3. To make the students to have commitment.
4. To have dedication as well determination.
5. To develop confidence.

**Course Outcomes:**

<b>CO#</b>	<b>Course Outcomes</b>
C129.1	Analyze excellent behavioral attitude.
C129.2	Apply amicable solutions to problematic issues in life.
C129.3	Understand the importance of functional and practical work.
C129.4	Create goal oriented personality.
C129.5	Understand soft skills and life skills.
C129.6	Remember to be committed and determined.

**COURSE CONTENT (SYLLABUS)**

**UNIT I: Linguistic Ability**

Writing Skills - Reading Skills - Listening Skills - Speaking Skills - Just a Minute Program – JAM – Improving Vocabulary.

**UNIT II: Effective Communication**

Introduction – Communicative Methodology – Way to Communicate perfectly – Communicative series – Descriptive Communication – Process of Communication – Barriers of Communication – Essentials of Communication – Improving existing Communication – Strategies to improve Communication – Corporate Communication – Assess the Communication – How to be a successful Communicator.

**UNIT III: Ethical Values**

Meaning of Ethics- Importance of Education – Moral Values – Eradication of problems – Influence of the society – Developing self-motivational skills – Source of Ethics – Develop Ethics – Ethics related to Life.

**UNIT IV: Confidence**

Self Confidence – Self Esteem – Importance of Confidence – Right decision Making – Turn towards Productivity – Things can be had with Confidence – Self Identity – Building good career – Self Reliance – Quotes of Confidence.

**UNIT V:** Introduction – Initiation – Verbal Oriented – Purpose of Group Discussion –Importance of Group Discussion – Involvement in Group Discussion - Learning Attitude – Skill Development Platform – Primary Level Topics and Discussion – Able Participation – Practice Group Discussion.

**Text Books:**

1. Body Language in the work place – Allan and Barbara Pease 2011.
2. Students Handbook: Skill Genie – Higher education department, Government of Andhra Pradesh.
3. Soft Skills – Odhisha State Open University.

**Web References:**

1. Extraordinary Communication Skills - By Sandeep Maheshwari I Hindi & English SpeakingPracticeTips <https://www.youtube.com/watch?v=VczVqHJW0gg>
2. Effective Communication Skills Training Video in Hindi <https://www.youtube.com/watch?v=kxAXOh5RmwU>
3. A guide to effective communication <https://www.youtube.com/watch?v=JwjAAqGi-90>
4. A Failure to Communicate <https://www.youtube.com/watch?v=8Ox5LhIJSBE>
5. Non Verbal Communication <https://www.youtube.com/watch?v=SKhsavlvuao>

**B.TECH  
SECOND YEAR  
FIRST SEMESTER  
SYLLABUS**

## DATA STRUCTURES

II B.Tech I SEM

Course Title: Data Structures	Course Code: AS20-72PC01
Teaching Scheme (L: T:P): 3:1:0	Credits:3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs+ 16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Programming for Problem Solving	

### Course Overview:

This course will deliver the knowledge in introducing the concepts of various data structures such as linked lists, stacks, queues, trees and graphs along with the applications.

### Course Objective

- To understand the basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.
- To understand the notations used to analyze the Performance of algorithms.
- To understand the behavior of data structures such as stacks, queues, trees, hash tables, search trees, Graphs and their representations.
- To choose an appropriate data structure for a specified application.
- To understand and analyze various searching and sorting algorithms.
- To learn to implement ADTs such as lists, stacks, queues, trees, graphs, search trees in C++ to solve problems.



## COURSE CONTENT

### UNIT - I

**Introduction to Data Structures:** abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

### UNIT - II

**Dictionaries:** linear list representation, skip list representation, operations - insertion, deletion and searching. **Hash Table Representation:** hash functions, collision resolution-separate chaining, open addressing, linear probing, quadratic probing, double hashing, rehashing, extendible hashing.

### UNIT – III

**Search Trees:** Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Red –Black, Splay Trees.

### UNIT - IV

**Graphs:** Graph Implementation Methods. Graph Traversal Methods. **Sorting:** Heap Sort, External Sorting- Model for external sorting, Merge Sort.

### UNIT - V

**Pattern Matching and Tries:** Pattern matching algorithms-Brute force, the Boyer – Moore algorithm, the Knuth-Morris-Pratt algorithm, Standard Tries, Compressed Tries, Suffix tries.

### TEXT BOOKS:

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press.
2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Education.

### REFERENCE BOOK:

1. Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B.A. Forouzan Cengage Learning.

**OBJECT ORIENTED PROGRAMMING THROUGH JAVA  
II B.TECH., I SEMESTER**

Course Title: OBJECT ORIENTED PROGRAMMING THROUGH JAVA	Course Code: AS20-05PC01
Teaching Scheme (L:T:P)3:1:0	Credits:3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48 + 16 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: - Programming for Problem Solving	

**Course Overview:**

The Course provides a comprehensive coverage of conceptual and practical Java language, describing its syntax, keywords, and fundamental programming principles to become a proficient Java Programmer. At the outset, the course ignites Object Oriented thinking and explores with the evolution of Java and its basics. It gives strong foundation on Inheritance, Packages and Interfaces and also discusses Exception Handling and Multithreaded mechanisms. The course examines java concepts such as Applets and Event handling.

**Course Objective**

- To understand object-oriented programming concepts, and apply them in solving problems.
- To introduce the principles of inheritance and polymorphism; and demonstrate how they relate to the design of abstract classes.
- To introduce the implementation of packages and interfaces.
- To introduce the concepts of exception handling and multithreading.
- To introduce the design of Graphical User Interface using applets and swing controls.

**Course Outcomes(s)**

CO#	Course Outcomes
<b>C212.1</b>	Solves real world problems using OOP techniques.
<b>C212.2</b>	Understands the use of abstract classes.
<b>C212.3</b>	Solves problems using java collection framework and I/O classes.
<b>C212.4</b>	Creates multithreaded applications with synchronization.
<b>C212.5</b>	Develops applets for web applications.
<b>C212.6</b>	Designs GUI based applications.

## COURSE CONTENT

### UNIT – I

**Object-oriented thinking:** Away of viewing world–Agents and Communities, messages and methods, Responsibilities, Classes and Instances, Class Hierarchies-Inheritance, Method binding, Overriding and Exceptions, Summary of Object-Oriented concepts. Java buzzwords, An Overview of Java, Data types, Variables and Arrays, operators, expressions, control statements, Introducing classes, Methods and Classes, String handling, String Tokenizer, Buffer Reader class ,scanner class

### UNIT – II

**Inheritance:** Inheritance concept, Inheritance basics, Member access, Constructors, Creating Multilevel hierarchy, super uses, using final with inheritance, Polymorphism: adhoc polymorphism, pure polymorphism, method overriding, abstract classes, Object class, forms of inheritance-specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance.

**Interfaces:** defining an interface, implementing interfaces, Nested interfaces, applying interfaces, variables in interfaces and extending interfaces.

### UNIT – III

**Packages:** Defining a Package, CLASSPATH, Access protection, importing packages.

**Exception handling:** Fundamentals of exception handling, Exception types, Termination or presumptive models, Uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws and finally, built-in exceptions, creating own exception subclasses.

### UNIT – IV

**Multithreading:** Differences between thread-based multitasking and process-based multitasking, Java thread model, creating threads, thread priorities, synchronizing threads, and inter thread communication.

**Applets:** Applets and HTML, Security Issues, Applets and Applications, passing parameters to applets.

### UNIT – V

**AWT:** Fundamentals, Components of AWT, Layout Managers.

**Event Handling:** The Delegation event model- Events, Event sources, Event Listeners, Event classes, Handling mouse and keyboard events, Adapter classes, Inner classes, Anonymous Inner classes, A Simple Swing Application.

**TEXT BOOKS:**

1. Java The complete reference, 9<sup>th</sup> edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

**REFERENCES BOOKS:**

1. An Introduction to programming and OO design using Java, J. Nino and F.A. Hosch, John Wiley & sons.
2. Introduction to Java programming, Y. Daniel Liang, Pearson Education.
3. Object Oriented Programming through Java, P. Radha Krishna, Universities Press.
4. Programming in Java, S. Malhotra, S. Chudhary, 2<sup>nd</sup> edition, Oxford Univ. Press.
5. Java Programming and Object oriented Application Development, R. A. Johnson, Cengage Learning.

**ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. <https://www.coursera.org/learn/c-plus-plus-a>
2. <https://www.coursera.org/learn/c-plus-plus-b>
3. <https://www.coursera.org/learn/object-oriented-java>
4. <https://www.coursera.org/specializations/java-object-oriented>

**WEB REFERENCE/E-BOOKS:**

1. <http://ndl.iitkgp.ac.in/document/xttk-4kfhvUwVIXBW>
2. <http://www.rehancodes.com/files/oop-using-c++-by-joyce-farrell.pdf>
3. <http://www.nptel.ac.in/courses/106103115/36>

**OPERATING SYSTEMS  
II B.TECH., I SEMESTER**

Course Title: OPERATING SYSTEMS	Course Code: AS20-05PC06
Teaching Scheme (L:T:P): (3:1:0)	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48 + 16 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Computer Architecture	

**Course Overview:**

This course enables the students to interpret main components of operating system and their working, identify the role of Operating System in process scheduling and synchronization, analyze the way of addressing deadlock, understand memory management techniques and I/O systems, describes the way of handling files and security.

**Course Objective**

- To understand the OS role in the overall computer system.
- To study the operations performed by OS as a resource manager.
- To understand the scheduling policies of OS.
- To understand the different memory management techniques.
- To understand process concurrency and synchronization.
- To understand the concepts of input/output, storage and file management.
- To understand the goals and principles of protection.
- Introduce system call interface for file and process management.
- To study different OS and compare their features.

**Course Outcomes(s)**

CO#	Course Outcomes
C213.1	Compares the different operating systems and basic architectural components involved in OS design
C213.2	Solves problems related to the process management
C213.3	Analyzes the deadlocks and solves the problem of deadlock
C213.4	Solves the problem of process communication and inter process communication
C213.5	Explains the concept of Memory management
C213.6	Explains the concept of File system management and its application

**COURSE CONTENT**

**UNIT - I**

**Operating System:** Introduction, Structures: Simple Batch, Multi programmed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services, System Calls.

**UNIT – II**

**Process and CPU Scheduling:** Process concepts and scheduling, Operations on processes, Cooperating Processes, Threads, and Interposes Communication, Scheduling

Criteria, Scheduling Algorithms, Multiple: Processor Scheduling.

**System call interface for process management:** fork, exit, wait, waitpid, exec

### **UNIT - III**

**Deadlocks:** System Model, Deadlocks Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, and Recovery from Deadlock

**Process Management and Synchronization:** The Critical Section Problem, Synchronization Hardware, Semaphores, and Classical Problems of Synchronization, Critical Regions, Monitors

### **UNIT - IV**

**Interprocess Communication Mechanisms:** IPC between processes on a single computer system, IPC between processes on different systems, using pipes, FIFOs, message queues, shared memory.

**Memory Management and Virtual Memory:** Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation, Segmentation with Paging, Demand Paging, Page Replacement, Page Replacement Algorithms.

### **UNIT - V**

**File System Interface and Operations:** Access methods, Directory Structure, Protection, File System Structure, Allocation methods, Free-space Management. Usage of open, create, read, write, close, lseek, stat, ioctl system calls.

**Case Studies:** Linux system design Principles and architecture, Windows design principles and architecture.

### **TEXT BOOKS:**

1. Operating System Concepts, Abraham Silberschatz, Peter B. Galvin, Greg Gagne, 9th Edition, Wiley, 2016 India Edition.
2. Operating Systems – Internals and Design Principles, W. Stallings, 7th Edition, Pearson.

### **REFERENCES BOOKS:**

1. Modern Operating Systems, Andrew S Tanenbaum, 3rd Edition, PHI.
2. Operating Systems: A concept-based Approach, 2nd Edition, D.M. Dhamdhare, TMH.
3. Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.
4. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
5. Principles of Operating systems, Naresh Chauhan, Oxford University Press.

### **ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. <https://www.coursera.org/learn/embedded-operating-system>
2. [nptel.ac.in/courses/Webcourse.../Operating%20Systems](http://nptel.ac.in/courses/Webcourse.../Operating%20Systems)

### **WEB REFERENCE/E-BOOKS:**

1. <http://geeksforgeeks.org/Operating Systems/>

## PRINCIPLES OF ARTIFICIAL INTELLIGENCE

II B.Tech I SEM

Course Title: PRINCIPLES OF ARTIFICIAL INTELLIGENCE	Course Code: AS20-72PC02
Teaching Scheme (L: T:P): 3:1:0	Credits: 3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs+ 16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Programming for Problem Solving	

### Course Objectives:

- To understand the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities
- To learn different knowledge representation techniques
- To understand the applications of AI: namely Game Playing, Theorem Proving, Expert Systems, Machine Learning and Natural Language Processing

### COURSE CONTENT

#### UNIT – I:

**Introduction:** Introduction to Artificial Intelligence, Foundations and History of Artificial Intelligence, Sub areas of AI Applications of Artificial Intelligence, Intelligent Agents, Structure of Intelligent Agents. Computer vision, Natural Language Possessing.

#### UNIT – II:

**Introduction to Search:** Searching for solutions, Uniformed search strategies, Informed search strategies, Local search algorithms and optimistic problems, Adversarial Search, Search for games, Alpha – Beta pruning.

#### UNIT – III:

**Knowledge Representation & Reasoning:** Propositional logic, Theory of first order logic, Inference in First order logic, Forward & Backward chaining, Resolution, Probabilistic reasoning, Utility theory, Hidden Markov Models (HMM), Bayesian Networks.

#### UNIT-IV:

**Machine-Learning Paradigms:** Introduction. Machine Learning Systems. Supervised and Unsupervised Learning. Inductive Learning. Learning Decision Trees, Deductive Learning. Clustering, Support Vector Machines.

**Artificial Neural Networks:** Introduction, Artificial Neural Networks, Single-Layer Feed Forward Networks, Multi-Layer Feed-Forward Networks, Radial-Basis Function Networks, Design Issues of Artificial Neural Networks, Recurrent Networks.

**UNIT-V:**

**Pattern Recognition:** Introduction, Design principles of pattern recognition system, Statistical Pattern recognition, Parameter estimation methods – Principle Component Analysis (PCA) and Linear Discriminant Analysis (LDA), Classification Techniques – Nearest Neighbour (NN) Rule, Bayes Classifier, Support Vector Machine (SVM), K – means clustering.

**TEXT BOOKS:**

1. Saroj Kaushik. Artificial Intelligence. Cengage Learning. 2011
2. Russell, Norvig: Artificial intelligence, A Modern Approach, Pearson Education, Second Edition. 2004
3. Artificial Intelligence – A Modern Approach – Stuart Russell and Peter Norvig, Pearson Education.
4. Artificial Intelligence – Elaine Rich and Kevin Knight, McGraw-Hill

**REFERENCE BOOK:**

1. Rich, Knight, Nair: Artificial intelligence, Tata McGraw Hill, Third Edition 2009.
2. Introduction to Artificial Intelligence by Eugene Charniak, Pearson.
3. Introduction to Artificial Intelligence and expert systems Dan W.Patterson. PHI.
4. Artificial Intelligence by George Fluger Pearson fifth edition.
5. Introduction to Artificial Intelligence – E Charniak and D McDermott, Pearson Education



**BUSINESS ECONOMICS AND FINANCIAL ANALYSIS  
II B.TECH., I SEMESTER**

Course Title: BUSINESS ECONOMICS AND FINANCIAL ANALYSIS	Course Code: AS20-00HS06
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48 + 16 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
<b>Prerequisites:</b> 1. The student must have basic of business, micro and macro-economic environment. 2. The student understands the demand and demand forecasting methods. 3. The student must have a fundamental of production and pricing methods. 4. The students can understand the basic of financial management 5. The student can able to understand the ratio how its impact the company financial	

**Course Overview:**

The present course is designed in such a way that it gives an overview of concepts of Economics. Managerial Economics enables students to understand micro environment in which markets operate how price determination is done under different kinds of competitions. Financial Analysis gives clear idea about concepts, conventions and accounting procedures along with introducing students to fundamentals of ratio analysis and interpretation of financial statements. Break Even Analysis is very helpful to the Business Concern for Decision Making, controlling and forward Strategic Planning. Ratio analysis gives an idea about financial forecasting, financial planning, controlling the business and decision making.

**Course Objective**

1. To understand the Business, impact of Micro and Macro Economic Environment on business decisions.
2. To learn the basic business types, impact of the economy on Business and Firms specifically.
3. To prepare, analyze, interpret the financial statements for business decision making.
4. To Understand the Principles of Accounting, Accounting Process.
5. To analyse the financial statement of a company.
6. To apply ratio's to find out financial position of the company.

**Course Outcomes(s)**

CO#	Course Outcomes
C215.1	Understand the Economic Principles in Business
C215.2	Analyse the Forecast Demand and Supply
C215.3	Understand Production and Cost Estimates
C215.4	Apply Market Structure and Pricing Practices.
C215.5	Understand the firm's financial position.
C215.6	Analyse the Financial Statements of a Company

## COURSE CONTENT

### UNIT – I

**Introduction to Business and Economics:** Business: Nature and scope of business, Structure of Business Firm, Theory of Firm, Types of Business Entities, Sources of Capital for a Company, Non-Conventional Sources of Finance.

**Economics:** The themes of economics, scarcity and efficiency, three fundamental economic problems, society's capability, Production possibility frontiers (PPF), Productive efficiency Vs economic efficiency, economic growth & stability, Micro economies and Macro economies, relationship between micro, macro and managerial economics with other discipline, the role of markets and government, Positive Vs negative externalities.

### UNIT – II

**Demand and Supply Analysis:** Determinants of demand and supply, Demand and Supply Function, Law of Demand and supply, Elasticity of Demand and supply, Types of Elasticity, 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. Case study.

### UNIT- III

**Production Analysis:** Factors of Production, Production Function concepts, law of variables proportion, Returns to Scale, Different Types of Production Functions. Cost analysis: different Costs concepts, Short run and Long run Cost Functions, Revenue curves of firms.

**Market Structures:** Market classification, Perfect and imperfect competition, Monopoly, Monopolistic competition, Duopoly, Oligopoly. Pricing methods and strategies: Objectives, Factors, General consideration of pricing, methods of pricing, Dual pricing, Price discrimination. Product Life Cycle based Pricing, Break Even Analysis. Case study

### 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 subsidiary book, Elements of Financial Statements, and Preparation of Final Accounts. Problems

### UNIT – V

**Financial Analysis through Ratios:** Concept of Ratio Analysis, importance of ratio 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. Varshney and Maheshwari. Managerial Economics. Sultan Chand. New Delhi
2. Dornbusch, Fischer and Startz, Macroeconomics, McGraw Hill, 11th edition, 2010.
3. Samuelson, Managerial Economics, 6th edition, Wiley
4. I.M .Pandey, Financial Management, Vikas Publishing House. New Delhi.

### **REFERENCE BOOKS**

1. Khan M Y, Indian Financial System, Tata McGraw Hill, 7th edition, 2011
2. Yogesh, Maheswari, Management Economics, PHI learning, New Delhi, 2012.
3. Karl E. Case and Ray C. Fair, Principles of Economics, Pearson Education Inc., 8th Edition, 2007.
4. Dominick Salvatore, Theory and Problems of Micro Economic Theory. Tata Mac GrawHill, New Delhi.

### **ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. [https://onlinecourses.nptel.ac.in/noc19\\_hs28/preview](https://onlinecourses.nptel.ac.in/noc19_hs28/preview)
2. [https://onlinecourses.nptel.ac.in/noc19\\_ma07/preview](https://onlinecourses.nptel.ac.in/noc19_ma07/preview)
3. [https://onlinecourses.nptel.ac.in/noc19\\_mg01/preview](https://onlinecourses.nptel.ac.in/noc19_mg01/preview)

### **NPTEL Video Course:**

1. <https://www.youtube.com/watch?v=51-nXPx3cw4&list=PLbMVogVj5nJTG7ahmEJc4MlcGT0hCr5ik>
2. <https://www.youtube.com/watch?v=vLPpF0hunwc&list=PLbMVogVj5nJRTAVF4-tueujAFiLKIV3Mo>

### **WEB REFERENCE/E-BOOKS:**

1. [www.icsi.edu](http://www.icsi.edu)
2. <https://www.inderscience.com/jhome.php?jcode=gber>
3. [https://www.googleadservices.com/pagead/aclk?sa=L&ai=DChcSEwj56O-Uu9XxAhWtISsKHTSdCYUYABAAGgJzZg&ae=2&ohost=www.google.com&cid=CAESQeD2u1\\_CESbm6r\\_whRhIZ\\_S92\\_IOPg\\_v9T1T1OU-oasT4bb3AxR39-4EH1Kh3R-ILPiEIt7Rm\\_TvoMTMUwkt98PF&sig=AOD64\\_03kddmVm1B9YjnAY04UV8Yst1sCg&q&adurl&ved=2ahUKEwjs-uWUu9XxAhVJzDgGHXDgDFAQ0Qx6BAgCEAE](https://www.googleadservices.com/pagead/aclk?sa=L&ai=DChcSEwj56O-Uu9XxAhWtISsKHTSdCYUYABAAGgJzZg&ae=2&ohost=www.google.com&cid=CAESQeD2u1_CESbm6r_whRhIZ_S92_IOPg_v9T1T1OU-oasT4bb3AxR39-4EH1Kh3R-ILPiEIt7Rm_TvoMTMUwkt98PF&sig=AOD64_03kddmVm1B9YjnAY04UV8Yst1sCg&q&adurl&ved=2ahUKEwjs-uWUu9XxAhVJzDgGHXDgDFAQ0Qx6BAgCEAE)

**DATA STRUCTURES LAB**  
**II B.Tech., I SEM**

Course Title: Data Structures Through C Lab	Course Code: AS20-72PC03
Teaching Scheme (L: T:P): 0:0:3	Credits: 1.5
Type of Course: Practical	Total Contact Periods: 48Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Programming for Problem Solving Lab	

**Course Overview:**

This course will deliver the knowledge in introducing the concepts of various data structures such as linked lists, stacks, queues, trees and graphs along with the applications.

**Course Objective**

- It covers various concepts of C programming language
- It introduces searching and sorting algorithms
- It provides an understanding of data structures such as stacks and queues

**LIST OF EXPERIMENTS:**

1. Write a program that uses functions to perform the following operations on singly linked list.:

- i) Creation    ii) Insertion    iii) Deletion    iv) Traversal

2. Write a program that uses functions to perform the following operations on doubly linked list.:

- i) Creation    ii) Insertion    iii) Deletion    iv) Traversal

3. Write a program that uses functions to perform the following operations on circular linked list.:

- i) Creation    ii) Insertion    iii) Deletion    iv) Traversal

4. Write a program that implement stack (its operations) using

- i) Arrays    ii) Pointers

5. Write a program that implement Queue (its operations) using

- i) Arrays    ii) Pointers

6. Write a program that implements the following sorting methods to sort a given list of integers

in ascending order    i) Bubble sort    ii) Selection sort    iii) Insertion sort

7. Write a program that use both recursive and non-recursive functions to perform the following

searching operations for a Key value in a given list of integers:

    i) Linear search      ii) Binary search

8. Write a program to implement the tree traversal methods.

9. Write a program to implement the graph traversal methods.

**TEXT BOOKS:**

1. Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, *Universities Press*.

2. Data Structures using C – A. S. Tanenbaum, Y. Langsam, and M. J. Augenstein, *PHI/Pearson Education*.

**REFERENCE BOOK:**

1. Data Structures: A Pseudocode Approach with C, 2nd Edition,

2. R. F. Gilberg and B. A. Forouzan, Cengage *Learning*.

**OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB  
II B.TECH., I SEMESTER**

Course Title: OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB	Course Code: AS20-05PC03
Teaching Scheme (L:T:P)0:0:3	Credits:1.5
Type of Course: Practical	Total Contact Periods: 48 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: - Data Structures	

**Course Overview:**

The hands-on course provides a comprehensive coverage of practical Java language, describing its syntax, keywords, and fundamental programming principles to become a proficient Java Programmer. The course stress on the strengths of Java to write efficient, maintainable, and portable code. The course focuses on a different aspect of core Java Environment suitable for advance learning, teaching, research, and commercial software development. At the outset it revise the control statements and then explores with the concepts of Inheritance and Interfaces. Exception Handling, Multithreaded mechanisms and File I/O is also been practiced. The concepts such as AWT Controls, Event handling, Applets and Swings are deeply Practiced to build GUI based applications. Overall, the knowledge of this course is essential to learn other similar OOP based technologies and advanced Java and hence stands as a pre-requisite for few fore coming courses like Struts and Spring Framework, Hibernate Framework, and to build Mini and Major Project Work applications.

**Course Objective**

- To write programs using abstract classes.
- To write programs for solving real world problems using java collection frame work.
- To write multithreaded programs.
- To write GUI programs using swing controls in Java.
- To introduce java compiler and eclipse platform.
- To impart hands on experience with java programming.

**Course Outcomes(s)**

CO#	Course Outcomes
<b>C217.1</b>	Develop a java Program using basic java concepts
<b>C217.2</b>	Create a java program that implements Exception handling
<b>C217.3</b>	Generates a java which implements multithreaded concepts.
<b>C217.4</b>	Develop a java program which implements java collection framework
<b>C217.5</b>	Design a java program which implements events
<b>C217.6</b>	Design a java program which implements AWT components

## COURSE CONTENT

1. a) Write a Java Program to Reverse a given Number.  
b) Write a Java Program to Find the Factorial of a Given Number.
2. a) Write a Java Program to Generate a Random Number.  
b) Write a Java Program to find a given number is Armstrong or Not.
3. a) Write a Java Program to copy all elements from one array into another array  
b) Write a Java Program to Perform Linear Search on Given Series
4. Write a Java Program to show case application of Constructor.
5. Use Eclipse or Net bean 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.
6. a) 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.
7. 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 Num 2 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.
8. 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.
9. Write a Java program to create an abstract class named Shape that contains two integers and an empty method named print Area (). 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 print Area () that prints the area of the given shape.
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. Write a Java program to list all the files in a directory including the files present in all its subdirectories.

13. Write a Java program that implements Quick sort algorithm for sorting a list of names in ascending order

14. Write a Java program that implements Bubble sort algorithm for sorting in descending order and also shows the number of interchanges occurred for the given set of integers.

**TEXT BOOKS:**

1. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.
2. Understanding Object-Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

**REFERENCES BOOKS:**

1. Java for Programmers, P. J. Deitel and H. M. Deitel, 10th Edition Pearson education.
2. Thinking in Java, Bruce Eckel, Pearson Education.
3. Java Programming, D. S. Malik and P. S. Nair, Cengage Learning.
4. Core Java, Volume 1, 9<sup>th</sup> edition, Cay S. Horstmann and G Cornell, Pearson.

**ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. <https://www.coursera.org/learn/c-plus-plus-a>
2. <https://www.coursera.org/learn/c-plus-plus-b>
3. <https://www.coursera.org/learn/object-oriented-java>
4. <https://www.coursera.org/specializations/java-object-oriented>

**WEB REFERENCE/E-BOOKS:**

1. <http://www.nptel.ac.in>
2. <http://www.javaworld.com>



**OPERATING SYSTEMS LAB  
II B.TECH., I SEMESTER**

Course Title: OPERATING SYSTEMS LAB	Course Code: AS20-05PC09
Teaching Scheme (L:T:P):0:0:3	Credits:1.5
Type of Course: Practical	Total Contact Periods: 48 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Object Oriented Programming through Java Lab	

**Course Overview:**

This Laboratory covers the major methods of inter process communications (IPC), which is the basis of all client / server applications under UNIX, Linux utilities. There will be extensive Programming exercises in shell scripts. It also emphasizes various programming concepts in IPC, multithreaded programming and socket programming.

**Course Objective**

- To learn Unix commands and shell programming.
- To implement various CPU Scheduling Algorithms.
- To implement Process Creation and Inter Process Communication.
- To implement Deadlock Avoidance and Deadlock Detection Algorithms.
- To implement Page Replacement Algorithms.
- To implement File Organization and File Allocation Strategies.

**Course Outcomes(s)**

CO#	Course Outcomes
C218.1	Applies basic services and functionalities of the operating system using system calls
C218.2	Writes programs for using system calls
C218.3	Implements Bankers algorithm for deadlock avoidance and prevention
C218.4	Implements semaphores for producer-consumer problem
C218.5	Illustrates the IPC mechanisms
C218.6	Constructs the memory management techniques

**COURSE CONTENT**

1. Write C programs to simulate the following CPU Scheduling algorithms  
a) FCFS    b) SJF    c) Round Robin    d) priority
2. Write programs using the I/O system calls of UNIX/LINUX operating system  
(open, read, write, close, fcntl, seek, stat, opendir, readdir)
3. Write a C program to simulate Bankers Algorithm for Deadlock Avoidance and Prevention.
4. Write a C program to implement the Producer – Consumer problem using semaphores using UNIX/LINUX system calls.

5. Write C programs to illustrate the following IPC mechanisms
  - a) Pipes
  - b) FIFOs
  - c) Message Queues
  - d) Shared Memory
6. Write C programs to simulate the following memory management techniques
  - a) Paging
  - b) Segmentation

**TEXT BOOKS:**

1. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley
2. Advanced programming in the Unix environment, W.R.Stevens, *Pearson* education.

**REFERENCES BOOKS:**

1. Operating Systems – Internals and Design Principles, William Stallings, Fifth Edition– 2005, Pearson Education/PHI
2. Operating System - A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum, 2nd edition, Pearson/PHI
4. UNIX Programming Environment, Kernighan and Pike, PHI/Pearson Education
5. UNIX Internals: The New Frontiers, U. Vahalia, Pearson Education

**ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. <https://www.udacity.com/course/introduction-to-operatingsystems>
2. [nptel.ac.in/courses/Web course./Operating%20Systems](http://nptel.ac.in/courses/Web%20course./Operating%20Systems)

**WEB REFERENCE/E-BOOKS:**

1. [http://geeksforgeeks.org/Operating Systems/](http://geeksforgeeks.org/Operating%20Systems/)

**ENVIRONMENTAL SCIENCES**  
**II B.Tech., I SEM**

Course Title: Environmental Sciences	Course Code: AS20-00MC01
Teaching Scheme (L:T:P): 3:0:0	Credits:0
Type of Course: Lecture	Total Contact Periods:48 Hrs
Continuous Internal Evaluation-0 Marks	Semester End Exams-100 Marks

**Course Objective: To learn**

- The importance of ecological balance for sustainable development.
- The impacts of developmental activities and mitigation measures.
- The environmental policies and regulations.
- New developmental projects for sustainable development of nations.

**Course Outcomes (s)**

CO#	Course Outcomes
<b>C219.1</b>	Understand the importance of ecological balance and principles
<b>C219.2</b>	Evaluates the impact of developmental activities on ecological balance
<b>C219.3</b>	Understand various environmental acts and policies
<b>C219.4</b>	Gain knowledge about effect of Environment on Human health
<b>C219.5</b>	Understands the importance of environmental regulations helping in sustainable development
<b>C219.6</b>	Develop technologies for the sustainable development based on ecological principles

**COURSE CONTENT (SYLLABUS)**

**UNIT-I**

**Ecosystem:** Definition, scope and importance of ecosystem, classification, structure and function of an ecosystem, food chains, food web, Ecological Pyramids, Flow of energy, biochemical cycles, bio accumulation, bio magnification, Carrying capacity, ecosystem value services.

**UNIT-II**

**Natural resources:** Water resources: use and over utilization of surface and ground water, floods and droughts, measures taken to mitigate the intensity of floods and droughts. Dams: benefits and problems. Mineral resources: Use and exploitation, Environmental effects of extracting mineral resources, Land resources: Forest resources, uses of forests, causes of Deforestation. Energy resources: Growing energy needs, Renewable and non-renewable energy sources. Use of alternative energy sources and case studies. Projects of renewable energy resources in different states of India.

**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 megadiversity nation. Hot spots of

biodiversity. Threats to biodiversity, conservation of biodiversity: in-situ and ex-situ conservation and 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: characterization and management. e-waste and its management. **Pollution control technologies:** Wastewater treatment methods: primary, secondary and tertiary. Overview of air pollution control technologies. **Global environmental problems and global efforts:** Climate change and impacts on human environment. Ozone depletion and ozone depleting substances (ODS). International conventions/protocols: Earth summit, Kyoto protocol and Montreal protocol.

#### UNIT-V

**Environmental policy, legislation and 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 rule, Hazardous waste management and handling rule. EIA: EIA structure, methods of base line 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, Rain water harvesting, Environmental education, Urban sprawl, Human health, Environmental ethics, Concept of green building, Life cycle assessment (LCA).

#### TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by ErachBharucha for University Grants Commission.
2. Textbook of Environmental Science and Technology- Dr. M. Anji Reddy, BS Publications.
3. Environmental Studies by Anubha Kaushik, New Age International Publishers.

#### REFERENCE BOOKS:

1. Environmental Studies by R. Rajagopalan, Oxford University press.
2. Introduction to Environmental Science by Y. Anjaneyulu, BS Publications.
3. Environmental Science: Towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd, NewDelhi.

#### Online Resources (SWAYAM/NPTEL/MOOCs/COURSERA):

1. <https://nptel.ac.in/courses/120/108/120108002/>
2. [https://onlinecourses.nptel.ac.in/noc20\\_ge16/preview](https://onlinecourses.nptel.ac.in/noc20_ge16/preview)
3. <https://nptel.ac.in/courses/121/106/121106014/>
4. <https://nptel.ac.in/courses/120/108/120108004/>

**Web Reference/E-Books:**

<b>S.No</b>	<b>Advanced concepts</b>	<b>Website Referred</b>
1	Ecosystem	<a href="https://youmatter.world/en/definition/ecosystem-definition-example/">https://youmatter.world/en/definition/ecosystem-definition-example/</a>
2	Natural Resources	<a href="https://wwf.panda.org/knowledge_hub/teacher_resources/webfieldtrips/natural_resources/">https://wwf.panda.org/knowledge_hub/teacher_resources/webfieldtrips/natural_resources/</a>
3	Biodiversity	<a href="https://www.nationalgeographic.org/encyclopedia/biodiversity/">https://www.nationalgeographic.org/encyclopedia/biodiversity/</a> <a href="https://www.natureserve.org/conservation-tools/biodiversity-indicators-dashboard">https://www.natureserve.org/conservation-tools/biodiversity-indicators-dashboard</a>
4	Pollution	<a href="https://www.nationalgeographic.org/encyclopedia/pollution/">https://www.nationalgeographic.org/encyclopedia/pollution/</a> <a href="https://www.livescience.com/22728-pollution-facts.html">https://www.livescience.com/22728-pollution-facts.html</a> <a href="https://www.worldwildlife.org/threats/pollution">https://www.worldwildlife.org/threats/pollution</a> <a href="https://www.nrdc.org/stories/air-pollution-everything-you-need-know">https://www.nrdc.org/stories/air-pollution-everything-you-need-know</a> <a href="https://www.who.int/health-topics/air-pollution#tab=tab_1">https://www.who.int/health-topics/air-pollution#tab=tab_1</a> <a href="https://www.history.com/news/7-deadly-environmental-disasters">https://www.history.com/news/7-deadly-environmental-disasters</a> <a href="https://www.insider.com/worst-modern-manmade-disasters-world-environment-day-2019-5">https://www.insider.com/worst-modern-manmade-disasters-world-environment-day-2019-5</a>
5	Environmental policy	<a href="https://www.britannica.com/topic/environmental-policy">https://www.britannica.com/topic/environmental-policy</a> <a href="https://www.unece.org/fr/env/welcome.html">https://www.unece.org/fr/env/welcome.html</a>
6	EIA	<a href="http://alphace.ac.in/downloads/notes/cv/10cv847.pdf">http://alphace.ac.in/downloads/notes/cv/10cv847.pdf</a>

**IOT (PROJECT) – IN HOUSE INTERFACING WITH ARDUINO AND RASPBERRY PI  
II B.TECH., I SEMESTER  
VALUE ADDED COURSE**

Course Title: IOT (PROJECT) – IN HOUSE INTERFACING WITH ARDUINO AND RASPBERRY PI	Course Code: AS20-12PW01
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical Work	Total Contact Periods: 32 Hours
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks

**Course Overview:** The Internet of Things is transforming our physical world into a complex and dynamic system of connected devices on an unprecedented scale.

**Course Objective:** The objectives of this course are, In this course, student will explore various components of Internet of things such as Sensors, internetworking and cyber space. In the end they will also be able to design and implement IoT circuits and solutions.

**Course Outcomes (s):**

On Successful completion of the course, students will be able to

CO#	Course Outcomes
C2110.1	Understand general concepts of Internet of Things
C2110.2	Recognize various devices, sensors and applications
C2110.3	Apply design concept to IoT solutions
C2110.4	Analyze various M2M and IoT architectures
C2110.5	Evaluate design issues in IoT applications
C2110.6	Create IoT solutions using sensors, actuators and Devices

**COURSE CONTENT**

**UNIT - I**

**Introduction to IoT:** Sensing, Actuation, Networking basics, Communication Protocols, Sensor Networks, Machine-to-Machine Communications, IoT Definition, Characteristics. IoT Functional Blocks, Physical design of IoT, Logical design of IoT, Communication models & APIs.

**UNIT - II**

**M2M to IoT:** The Vision-Introduction, From M2M to IoT, M2M towards IoT-the global context, A use case example, Differing Characteristics. Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT,

**M2M vs IoT An Architectural Overview:** Building architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. Reference Architecture and Reference Model of IoT.

### **UNIT - III**

**IoT Reference Architecture:** Getting Familiar with IoT Architecture, Various architectural views of IoT such as Functional, Information, Operational and Deployment.

**Constraints affecting design in IoT world:** Introduction, Technical design Constraints.

### **UNIT - IV**

**Domain specific applications of IoT:** Home automation, Industry applications, Surveillance applications, Other IoT application.

### **UNIT - V**

**Developing IoT solutions:** Introduction to Python, Introduction to different IoT tools, Introduction to Arduino and Raspberry Pi Implementation of IoT with Arduino and Raspberry, Cloud Computing, Fog Computing, Connected Vehicles, Data Aggregation for the IoT in Smart Cities, Privacy and Security Issues in IoT.

### **TEXT BOOKS:**

1. Dieter Uckelmann et.al, Architecting the Internet of Things, Springer, 2011
2. Jan Holler, Vlasios Tsiatsis, Catherine Mulligan, Stefan Avesand, Stamatis Karnouskos, David Boyle, "From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence", 1st Edition, Academic Press, 2014
3. Arshdeep Bahga and Vijay Madiseti, Internet of Things A Hand-on Approach, Universities press, 2015.

### **REFERENCES BOOKS:**

1. Charalampos Doukas , Building Internet of Things with the Arduino, Create space, April 2002
2. Dr. Ovidiu Vermesan and Dr. Peter Friess, Internet of Things: From research and innovation to market deployment, River Publishers 2014.

### **ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. <https://nptel.ac.in/courses/106/105/106105166/>

### **WEB REFERENCE/E-BOOKS:**

1. [http://alvarestech.com/temp/smar/Smar/Book2021/Industry4.0/2019/Dimitrios%20Serpanos,Marilyn%20Wolf\(auth.\)%20-%20-%20Internet-of-Things%20\(IoT\)%20Systems\\_%20Architectures,%20Algorithms,%20Methodologies-Springer%20International%20Publishing%20\(2018\).pdf](http://alvarestech.com/temp/smar/Smar/Book2021/Industry4.0/2019/Dimitrios%20Serpanos,Marilyn%20Wolf(auth.)%20-%20-%20Internet-of-Things%20(IoT)%20Systems_%20Architectures,%20Algorithms,%20Methodologies-Springer%20International%20Publishing%20(2018).pdf)

**ROBOTICS AND ITS APPLICATIONS  
II B.TECH., I SEMESTER  
VALUE ADDED COURSE**

Course Title: ROBOTICS AND ITS APPLICATIONS	Course Code: AS20- 66PW01
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical Work	Total Contact Periods: 32 Hours
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks
Prerequisites: Mathematics, Micro processor	

**Course Overview:**

The course would cover the fundamental concepts and mathematics required to understand, analyze, design and control robotic manipulators for industrial applications or research. As robotics is a very wide field, after taking this course, students could then take more advanced courses/topics in focused areas like, motion planning, AI, unmanned vehicles, etc. Students could use this course to lay the foundation of other courses they teach involving robotics like, manufacturing automation, AI, Computer vision applications, etc.

**Course Objective:** The objective of this Course is:

- To introduce basic concepts, parts of robots and types of robots
- To make the students familiar with various drive systems of robots, sensors and their applications in programming of robots
- To discuss the applications of robots, and implementations of robots

**Course Outcomes(s)**

CO#	Course Outcomes
C2110.1	Understand the basic concepts of working of robot
C2110.2	Analyze the function of sensor in robot and design the robotic arm with various tools
C2110.3	Analyze and design to Program the robot for a typical application and path planning using robotic vision
C2110.4	Understand the various robot programming languages
C2110.5	Conduct and design the experiments for various robot operations
C2110.6	Apply and use the advanced techniques for robot processing

**COURSE CONTENT (SYLLABUS)**

**UNIT - I**

**Introduction:** Introduction, brief history, types, classification and usage, science and technology of robots, Artificial Intelligence in Robotics, some useful websites, textbooks and research journals



## **UNIT - II**

**Elements of Robots:** Joints, Links, Actuators, and Sensors : Representation of joints, link representation using D-H parameters, Examples of D-H parameters and link transforms, different kind of actuators, stepper-DC-servo-and brushless motors, model of a DC servo motor, types of transmissions, purpose of sensor-internal and external sensor, common sensors, encoders-tachometers-strain gauge based force torque sensor, proximity and distance measuring sensors and vision

## **UNIT - III**

**End Effectors:** Classification of end effectors, tools as end effectors, drive system for grippers, mechanical adhesive, vacuum magnetic, grippers, hooks and scoops, gripper force analysis and gripper design, active and passive grippers

**Planning and Navigation:** Introduction, path planning, overview, road map path planning-cell decomposition path planning, potential field path planning, obstacle avoidance, case studies

## **UNIT - IV**

**Vision system:** Robotic vision systems-image representation, object recognition and categorization, depth measurement, image data compression, visual inspection, software considerations

**Robot Programming:** Introduction to robot languages, VAL, RAPID ,language, basic commands, motion instructions, pick and place operation using industrial robot manual mode, automatic mode, subroutine command based programming, move master command language, introduction, syntax, simple problems

## **UNIT - V**

**Field and service robots / Industrial Robots:** Ariel robots, collision avoidance robots for agriculture, mining, exploration, underwater, civilian and military applications, nuclear applications, space applications, Industrial robots, artificial intelligence in robots, application of robots in material handling, continuous arc welding, spot welding-spray painting, assembly operation, cleaning,etc

## **TEXT BOOKS:**

1. Richared D.Klafter.Thomas Achmielewski and Mickael Negin, Robotic Engineering an Integrated approach prentice hall India- newdelhi-2001
2. Saeed B.Nikku, Introduction to Robotics, analysis, control and applications Wiley- India 2nd edition-2011

## **REFERENCE BOOKS:**

1. Industrial robotic technology-programming and application by M.P.Groover et al, McGrawhill 2008
2. Robotics technology and flexible automation by S.R. Deb, TMH 2009

## **RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. [https://onlinecourses.nptel.ac.in/noc20\\_de11/preview](https://onlinecourses.nptel.ac.in/noc20_de11/preview)
2. [https://onlinecourses.nptel.ac.in/noc19\\_me74/preview](https://onlinecourses.nptel.ac.in/noc19_me74/preview)

## **WEB REFERENCE/E-BOOKS:**

1. <https://www.javatpoint.com/robotics-tutorial>
2. [https://www.tutorialspoint.com/artificial\\_intelligence/artificial\\_intelligence\\_robotics.htm](https://www.tutorialspoint.com/artificial_intelligence/artificial_intelligence_robotics.htm)
3. <https://www.toptal.com/robotics/programming-a-robot-an-introductory-tutorial>

**WEB BASED APPLICATIONS DEVELOPMENT  
II B.TECH., I SEMESTER  
VALUE ADDED COURSE**

Course Title: WEB BASED APPLICATIONS DEVELOPMENT	Course Code: AS20- 72PW01
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical Work	Total Contact Periods: 32 Hours
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks

**4. COURSE CONTENT (SYLLABUS)**

**5.**

6. Week 1: Essential HTML topics to develop applications
7. Week 2: Essential CSS Topics to develop applications
8. Week 3: Essential java script to develop applications
9. Week 4: Essential Database manage topics to develop applications
10. Week 5: design the application for "Login authentication"
11. Week 6: develop an application for "Word count"
12. Week 7: develop an application for "Quiz Exam"
13. Week 8: design the Survey form for any company
14. Week 9: develop "Timer/Stop Watch" application
15. Week 10: Build your own Portfolio Website
16. Week 11: Build your college website

**GRAPHIC DESIGN (PHOTOSHOP, CORAL DRAW, 3D MAX)  
II B.TECH., I SEMESTER  
VALUE ADDED COURSE**

Course Title: GRAPHIC DESIGN (PHOTOSHOP, CORAL DRAW, 3D MAX)	Course Code: AS20-12PW02
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical Work	Total Contact Periods: 32 Hours
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks
Prerequisites: Candidates must have any degree or diploma in Graphic Design. Students must have a wide understanding of Graphic Designing tools. Any certificate in the HTML, Photoshop, CSS or Web Design can act as an added advantage.	

**Course Overview:** Implement the fundamentals of color: visual, rhythm, and pattern in design · Use scale, weight, direction, texture, and space in a composition.

**Course Objective:**

- To develop, design and implement two and three dimensional graphical structures
- To enable students to acquire knowledge Multimedia compression and animations
- To learn Creation, Management and Transmission of Multimedia objects.

CO#	Course Outcomes
C2110.1	Basic skills using Photoshop software and the peripherals.
C2110.2	Ability to use a range of tools and filters in Photoshop
C2110.3	Ability to print with a variety of techniques and papers.
C2110.4	Creatively solve visual problems.
C2110.5	Evaluate, adjust, refine, and rework solutions.
C2110.6	Use instructor and peer criticism to improve skills and rework solutions.

**COURSE CONTENT**

**UNIT - I**

**2D Primitives:** Elements of pictures created in computer graphics, Graphics input primitives and devices. Drawing primitives in open GL and Basic open GL programming, open GL basic Graphics primitives, Output primitives, Line, Circle and Ellipse drawing algorithms, Attributes of output primitives.

**UNIT - II**

**2D Geometric Transformations:** 2D Viewing, Window-Viewport Transformation, Two dimensional Geometric transformations, Line, Polygon, Curve and Text clipping algorithms.

**UNIT - III**

**3D Concepts:** Projections, Three dimensional object representation, Parallel and Perspective Polygons, 69Splines, Quadric Surfaces, Visualization of data sets, 3D affine

transformations 3DRotations using Quaternions, Viewing, Visible surface identification, Color Models, 3DTransformations in open GL

#### **UNIT - IV**

**Multimedia Basics: Introduction** and definitions, applications, elements, Animations, Compression, Types of Compressions: Lossless, Loss, Video compression, Image Compression, Audio compression, Data and file format standards, Multimedia data structures: KD Trees ,R trees.

#### **UNIT V**

**Multimedia Authoring And Applications:** Creating interactive multimedia, Multimedia Authoring Systems, Multimedia Authoring Software Applications, Video On demand ,Virtual Reality , Augmented Reality , Content based retrieval in digital libraries.

#### **TEXT BOOKS:**

1. Donald D. Hearn, M. Pauline Baker and Warren Carithers, "Computer Graphics with Open GL", Fourth Edition, Pearson Education, 2010.
2. Ze-Nian Li and Mark S.Drew, "Fundamentals of Multimedia", First Edition, Pearson Education, 2007.

#### **REFERENCE BOOKS:**

1. F.S.Hill, "Computer Graphics using OPENGL", Second edition, Pearson Education, 2003.
2. Prabhat K Andleigh, Kiran Thakrar, "Multimedia systems design", First Edition, PHI, 2007.

#### **RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. <https://nptel.ac.in/courses/112/102/112102101/>
2. <https://nptel.ac.in/courses/107/101/107101001/>

#### **WEB REFERENCE/E-BOOKS:**

1. <http://ptgmedia.pearsoncmg.com/images/9780321827333/samplepages/0321827333.pdf>
2. <http://myy.haaga-helia.fi/~woljo/photoshop/an-introduction-to-adobe-photoshop.pdf>
3. [https://cdn.billiger.com/dynimg/pu0dDTvLQQTgPmie0WLuXvt4H9rycHjeBa9LTdXG2DA4V1JW8rrM7KbpsQTrCAVZt-4\\_1H\\_mQ7dEd-iLJR2GY8/Corel-CorelDRAW-Graphics-Suite-X6-DE-Win-Bedienungsanleitung-38935e.pdf](https://cdn.billiger.com/dynimg/pu0dDTvLQQTgPmie0WLuXvt4H9rycHjeBa9LTdXG2DA4V1JW8rrM7KbpsQTrCAVZt-4_1H_mQ7dEd-iLJR2GY8/Corel-CorelDRAW-Graphics-Suite-X6-DE-Win-Bedienungsanleitung-38935e.pdf)
4. <https://www.engraversnetwork.com/files/CorelDRAW-X7-Training.pdf>
5. [https://ptgmedia.pearsoncmg.com/images/9780672336997/samplepages/0672336997\\_5.pdf](https://ptgmedia.pearsoncmg.com/images/9780672336997/samplepages/0672336997_5.pdf)

**PROJECT BASED LEARNING USING C++  
II B.TECH., I SEMESTER  
VALUE ADDED COURSE**

Course Title: PROJECT BASED LEARNING USING C++	Course Code: AS20-05PW02
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical Work	Total Contact Periods: 32 Hours
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks

**Course Overview:**

This course introduces the student to object-oriented programming through a study of the concepts of program specification and design, algorithm development, and coding and testing using a modern software development environment. Students learn how to write programs in an object-oriented high level programming language. Students will be equipped with fundamental programming, Arrays, Functions, Exception, class, objects, etc.

**Course Objective:** The objective of this Course is:

- Understand and use the basic programming constructs of C++
- Manipulate various C++ data types, such as arrays, strings, and pointers
- Isolate and fix common errors in C++ programs
- Use memory appropriately, including proper allocation/deallocation procedures
- Apply object-oriented approaches to software problems in C++

**Course Outcomes(s)**

CO#	Course Outcomes
<b>C2110.1</b>	Understand the Basics of object and class in C++.
<b>C2110.2</b>	Understand the Basic concept of Object Orientation, object identity and Encapsulation.
<b>C2110.3</b>	Analyze the given problem statements to create basic program designs.
<b>C2110.4</b>	Implement different functions for input and output, various data types, basic operators, files and functions.
<b>C2110.5</b>	Implement programming techniques to solve problems in the C++ programming language
<b>C2110.6</b>	Apply the concepts and principles of the programming language to the real-world problems and solve the problems through project-based learning.

## **COURSE CONTENT (SYLLABUS)**

- Week 1: Login and Registration System
- Week 2: Car Rental System.
- Week 3: Bookshop inventory system.
- Week 4: Student Report Management System.
- Week 5: Sudoku Game.
- Week 6: Using Graphics to Draw and Move Shapes
- Week 7: Customer Billing System
- Week 8: Phonebook Application
- Week 9: Snake Game.
- Week 10: Payroll Management System

### **TEXT BOOK:**

1. Reeta Sahoo, C++ Projects- Khanna Book Publication

### **REFERENCE BOOKS:**

2. Stanley Lippman, Josée Lajoie, Barbara Moo, C++ Primer-Fifth edition
3. Bruce Eckel, Thinking in C++: Introduction to Standard C++-Second Edition

### **RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. [https://onlinecourses.swayam2.ac.in/aic20\\_sp06/preview](https://onlinecourses.swayam2.ac.in/aic20_sp06/preview)
2. [https://onlinecourses.nptel.ac.in/noc19\\_cs38/preview](https://onlinecourses.nptel.ac.in/noc19_cs38/preview)
3. [https://onlinecourses.nptel.ac.in/noc21\\_cs02/preview](https://onlinecourses.nptel.ac.in/noc21_cs02/preview)

### **WEB REFERENCE/E-BOOKS:**

1. <https://www.javatpoint.com/cpp-tutorial>
2. <https://www.tutorialspoint.com/cplusplus/index.htm>
3. <https://www.cplusplus.com/doc/tutorial/>
4. <https://www.learncpp.com/>

**B.TECH  
SECOND YEAR  
SEOND SEMESTER  
SYLLABUS**

**PROBABILITY AND RANDOM PROCESS  
II B.TECH., II SEMESTER**

Course Title: PROBABILITY AND RANDOM PROCESS	Course Code: AS20-00BS10
Teaching Scheme (L:T:P)3:1:0	Credits:3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48 + 16 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks

**Course Overview:**

- Basic concepts of probability and Random Variables
- Discrete probability distributions like Binomial, Poisson and their properties etc.
- Continuous Probability distributions like Normal, Gamma, and Exponential distributions.
- Concept of fitting of straight line, parabola and other curves
- The testing of hypothesis and large sample procedures

**Course Objective**

- The ideas of probability and random variables
- The various discrete probability distributions and their properties.
- The various continuous probability distributions and their properties.
- The basic ideas of statistics including measures of central tendency, correlation and regression.
- The statistical methods of studying data samples and identify the Samples to make decisions for samples given.

**Course Outcomes(s)**

CO#	Course Outcomes
C221.1	Formulate and solve problems involving random variables
C221.2	Apply statistical methods for analysing experimental data by probability distributions
C221.3	Identify Various discrete and continuous probability distributions and their properties
C221.4	Evaluation of regression and correlation
C221.5	Analyze the statistical methods of studying data samples
C221.6	Analyze to make important decisions for few samples which are taken from a larger data.

**COURSE CONTENT**

**UNIT - I**

**Random Variables:** Introduction to Basic Probability, Random variables: Discrete Random Variable, Continuous Random variables, Expectation of Random Variables: Variance of Random variables, Moments.



## **UNIT – II**

**Discrete Probability Distributions:** Binomial Distributions, Poisson Distributions, Evaluation of statistical parameters for these distributions, Poisson approximation to the binomial distribution.

## **UNIT – III**

**Continuous Random Variable & Distributions: Continuous** random variables and their properties, Distribution functions and densities, Normal Distributions, Exponential Distributions, Gamma Distributions, Evaluation of statistical parameters for these distributions.

## **UNIT – IV**

**Applied Statistics: Curve** fitting by the method of least squares: fitting of straight-line, Second-degree parabola and more general curves, Correlation and regression: Rank correlation.

## **UNIT – V**

**Testing Of Hypothesis:** Test of significance: Null Hypothesis, Alternative Hypothesis-Type I Error –Type II Error, Large sample test for single proportion, Difference of proportions, Single mean: Difference of means, Test for single mean, Difference of means for small samples, Test for ratio of variances for small samples.

### **TEXT BOOKS:**

1. S C Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, Khanna Publications
2. S.R.K. Iyengar, R.K Jain Advanced engineering Mathematics ,Narosa publishing house, Fifth Edition,2016.

### **REFERENCES BOOKS:**

1. Miller and Freund's, Probability and Statistics for Engineers, 8<sup>th</sup> Edition, Pearson Educations
2. Sheldon Ross, A First Course in Probability, 9<sup>th</sup> Edition, Pearson Education India.

### **ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. <https://www.my-mooc.com/en/categorie/statistics-and-probability>
2. <https://www.khanacademy.org/math/statistics-probability>

### **WEB REFERENCE/E-BOOKS:**

1. Fundamentals Of Mathematical Statistics By S.C.Guptha, V.K Kapoor
2. Probability And Statistics For Engineers By Miller & Freund's

## DATABASE SYSTEMS

II B.Tech II SEM

Course Title: DATABASE SYSTEMS	Course Code: AS20-72PC04
Teaching Scheme (L: T:P): 3:1:0	Credits:3
Type of Course: Lecture +Tutorial	Total Contact Periods: 48Hrs+ 16Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks

### Course Overview:

This course will deliver the knowledge in introducing the concepts of database and how to interact with the database using SQL and PL/SQL

### Course Objective:

- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- To understand the relational database design principles.
- To become familiar with the basic issues of transaction processing and concurrency control.
- To become familiar with database storage structures and access techniques.

## COURSE CONTENT

### UNIT – I:

**Introduction to Databases**, History of Database Systems, Types of Databases, Applications of Databases, Database, Purpose of Database Systems, View of Data

**RELATIONAL MODEL BASICS:** Attributes, Schemas, Tuples, Domains, Equivalent Representation of a Relations, Relation Instances, Keys of Relations

### UNIT – II:

**DATA BASE DESIGN:** introduction, entity types, ER Diagrams, Entities, Attributes and Entity sets, weak Entities, keys, constraints, relationship sets, Schema architecture, queries, database languages, queries, Constrains

### UNIT – III:

**SQL:** introduction to SQL, Data Definition Language(DDL)- Create, Drop, Alter, Truncate, Rename, Data Manipulation Language (DML)-Insert, Update, Delete, Data Query Language (DQL)-Select, Data Control Language (DCL)-Grant, Revoke, Transaction Control Language (TCL)-Commit, Rollback, Savepoint, Views, Indexes, Assertions

**UNIT – IV:**

**RELATIONAL ALGEBRA & CALCULUS:** Algebra introduction, Set operations on relations, Projection, Selection, Cartesian Product, Joins, Division, Tuple Relational Calculus - The Domain Relational Calculus

**NORMALIZATION** Functional dependencies, anomalies, Decomposition, 1NF 2NF, 3NF, BCNF, 4NF, 5NF; Multi-valued Dependencies

**UNIT – V:**

**PL/SQL:** Introduction, Benefits of PL/SQL, PL/SQL architecture, Data types, Variables and constants, Operators, conditional and unconditional statements -Simple if, if... else, nested if..Else, if..else Ladder, Selection Case, Simple Case, GOTO Label and EXIT, iterations-Simple loops, While Loops, For Loops and Nested Loops, Functions, procedures, cursors & Triggers.

**TEXT BOOKS:**

1. Database Systems, The Complete Book by Hector Garcia-Molina Jeffrey D. Ullman Jennifer Widom, Second Edition.
2. Fundamentals of Database Systems, RamezElmasri and Navathe Pearson Education, 6th edition
3. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, McGrawHill Education (India) Private Limited, 3rdEdition.

**REFERENCE BOOK:**

1. Introduction to Database Systems, C.J.Date Pearson Education
2. Database Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TATA McGraw Hill 3rd Edition
3. Database System Concepts, Silberschatz, Korth, McGraw hill, 5th edition.

**PROGRAMMING ESSENTIALS USING PYTHON  
II B.TECH., II SEMESTER**

Course Title: PROGRAMMING ESSENTIALS USING PYTHON	Course Code: AS20-12PC02
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48 + 16 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Programming and Problem Solving, Data Structures	

**Course Overview:** Python is a language with a simple syntax, and a powerful set of libraries. It is an interpreted language, with a rich programming environment, including a robust debugger and profiler. While it is easy for beginners to learn, it is widely used in many scientific areas for data exploration. This course is an introduction to the Python programming language for students without prior programming experience. We cover data types, control flow, object-oriented programming, and graphical user interface-driven applications. The examples and problems used in this course are drawn from diverse areas such as text processing, simple graphics creation and image manipulation, HTML and web programming, and genomics

**Course Objective**

- To know the basics of Core Programming including data types, control structures, algorithm development, and program design with functions.
- To understand the fundamental principles of Object-Oriented Programming, as well as in-depth data and information processing techniques.
- To solve problems, explore real-world software development challenges, and create practical and contemporary applications.

**Course Outcomes(s)**

CO#	Course Outcomes
C223.1	Explain various operators used in python.
C223.2	Apply the string handling functions to solve the given problem.
C223.3	Describe Object oriented concepts with python.
C223.4	Use image processing techniques in python programming to solve a given problem.
C223.5	Discuss the functions of networking in python.
C223.6	Demonstrate significant experience with the Python program development environment.

## COURSE CONTENT

### UNIT - I

#### Introduction:

Installing Python; basic syntax, interactive shell, editing, saving, and running a script variable, assignments; immutable variables; numerical types; arithmetic operators and expressions; comments in the program; understanding error messages.

### UNIT - II

#### CONDITIONAL STATEMENT & STRINGHANDLING

Conditions, Boolean logic, logical operators; ranges; Control statements: if-else, loops (for, while); short-circuit (lazy) evaluation. Arrays: Declaration, Initialization of Arrays, Accessing of Arrays. String manipulations: subscript operator, indexing, slicing a string; strings and number system: converting strings to numbers and vice versa. Binary, octal, hex decimal numbers.

### UNIT - III

#### FUNCTIONS

Functions: Introduction, Defining and Calling a Void Function, designing a Program to Use Functions, Local Variables, Passing Arguments to Functions, Global Variables and Global Constants, Value-Returning Functions-Generating Random Numbers, the math Module, Storing Functions in Modules. Recursion: Introduction, Problem Solving with Recursion, Examples of Recursive Algorithms.

### UNIT - IV

#### OBJECT ORIENTED PROGRAMMING WITHPYTHON

Classes and OOP: classes, objects, attributes and methods; defining classes; design with classes, data modeling; persistent to rage of objects–OOP, continued: inheritance, polymorphism, operator overloading; abstract classes; exception handling, try block.

### UNIT - V

#### DATA STRUCTURES

List-operations, Indexing, Slicing, Methods; Tuples, operations, Indexing, Slicing, MethodsDictionaries, operations, Indexing, Slicing, Methods; Sets, sequences, In- Built functions.

Sorting Techniques: Insertion sort, Bubble Sort, Selection Sort

#### **TEXT BOOKS:**

1. Learning Python: Powerful Object-Oriented Programming:5th Edition Shroff;Fifth edition(24 July 2013)
2. Guidovan Rossum and FredL.DrakeJr,“An Introduction to Python–Revised and updated for Python3.2, Network Theory Ltd., 2011.

#### **REFERENCES BOOKS:**

1. Python Essential Reference. Addison-Wesley Professional; 4TH edition (July19, 2009)by DavidM. Baezly.
2. on Cook book” O Reilly Media;3 Edition (June1,2013)by David M.Baezly.

#### **ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. <https://www.coursera.org/python>
2. <https://www.edx.org/python>

**MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE  
II B.TECH., II SEMESTER**

Course Title: MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	Course Code: AS20-05PC02
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48 + 16 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Data Structures	

**Course Overview:**

The Course provides Introduction to the formal mathematical concepts of computer science for the beginning student. Topics include elementary logic, induction, algorithmic processes, graph theory and models of computation.

**Course Objective**

- 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.

**Course Outcomes(s)**

CO#	Course Outcomes
C224.1	Applies mathematical logic to solve problems.
C224.2	Explains sets, relations, functions, and discrete structures.
C224.3	Explains the use of logical notation to define and reason about fundamental mathematical concepts such as sets, relations, and functions.
C224.4	Formulates problems and solve recurrence relations.
C224.5	Models and generates the function
C224.6	Explain the use of Graph Theory for solving problems.

**COURSE CONTENT**

**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.
2. Discrete Mathematics for Computer Scientists & Mathematicians, Joe L. Mott, Abraham Kandel, Theodore P. Baker, Pearson , 2nd ed.

**REFERENCES 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.

**ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. <https://nptel.ac.in/courses/111/107/111107058/>

**DIGITAL ELECTRONICS  
II B.TECH., II SEMESTER**

Course Title: DIGITAL ELECTRONICS	Course Code:AS20-04ES06
Teaching Scheme (L:T:P): 3:1:0	Credits:3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48 + 16 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: EDC	

**Course Overview:**

To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.

**Course Objective**

- 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 impart to student the concepts of sequential circuits, enabling them to analyse sequential systems in terms of state machines.
- To implement synchronous state machines using flip-flops.

**Course Outcomes(s)**

CO#	Course Outcomes
C225.1	Explain working of different logic families and logic gates.
C225.2	Solve Boolean expressions to minimize various combinational functions.
C225.3	Design and implement various Combinational logic circuits.
C225.4	Analyze and design various sequential circuits.
C225.5	Explain the process of Analog to Digital conversion and Digital to Analog conversion.
C225.6	Develop the given logical problem using PLD's

**COURSE CONTENT**

**UNIT - I**

**Fundamentals of Digital Systems and Logic Families:** Digital signals, digital circuits, AND, OR, NOT, NAND, NOR and Exclusive-OR operations, Boolean algebra, examples of IC gates, number systems-binary, signed binary, octal hexadecimal number, binary arithmetic, one's and two's complements arithmetic, codes, error detecting and correcting codes, characteristics of digital ICs, digital logic families, TTL, Schottky TTL and CMOS logic, interfacing CMOS and TTL, Tri-state logic.



## **UNIT - II**

**Combinational Digital Circuits:** Standard representation for logic functions, K-map representation, and simplification of logic functions using K-map, minimization of logical functions. Don't care conditions, Multiplexer, De-Multiplexer/Decoders, Adders, Subtractors, BCD arithmetic, carry look ahead adder, serial ladder, ALU, elementary ALU design, popular MSI chips, digital comparator, parity checker/generator, code converters, priority encoders, decoders/drivers for display devices, Q-M method of function realization.

## **UNIT - III**

**Sequential Circuits and Systems:** A 1-bit memory, the circuit properties of Bi-stable latch, the clocked SR flip flop, J, K, T and D types flip-flops, applications of flip-flops, shift registers, applications of shift registers, serial to parallel converter, parallel to serial converter, ring counter, sequence generator, ripple (Asynchronous) counters, synchronous counters, counters design using flip flops, special counter IC's, asynchronous sequential counters, applications of counters.

## **UNIT - IV**

**A/D and D/A Converters:** Digital to analog converters: weighted resistor/converter, R-2R Ladder D/A converter, specifications for D/A converters, examples of D/A converter ICs, sample and hold circuit, analog to digital converters: quantization and encoding, parallel comparator A/D converter, successive approximation A/D converter, counting A/D converter, dual slope A/D converter, A/D converter using voltage to frequency and voltage to time conversion, specifications of A/D converters, example of A/D converter ICs.

## **UNIT - V**

**Semiconductor Memories and Programmable Logic Devices:** Memory organization and operation, expanding memory size, classification and characteristics of memories, sequential memory, read only memory (ROM), read and write memory(RAM), content addressable memory (CAM), charge de coupled device memory (CCD), commonly used memory chips, ROM as a PLD, Programmable logic array, Programmable array logic, complex Programmable logic devices (CPLDS), Field Programmable Gate Array (FPGA).

### **TEXT BOOKS:**

1. R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.
2. M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016.

### **REFERENCES BOOKS:**

1. A. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016

### **WEB REFERENCE/E-BOOKS:**

1. <https://doi.org/10.1515/9783110263787.73>

**PYTHON PROGRAMMING LAB  
II B.TECH., II SEMESTER**

Course Title: PYTHON PROGRAMMING LAB	Course Code: AS20-12PC04
Teaching Scheme (L:T:P):0:0:3	Credits:1.5
Type of Course: Practical	Total Contact Periods: 48 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Object Oriented Programming	

**Course Overview:**

Students will be able to learn primary fundamentals of python programming and potential of python is to achieve modern computing requirements.

**Course Objective**

- To be able to introduce core programming basics and program design with functions using Python programming language.
- To understand a range of Object-Oriented Programming, as well as in-depth data and information processing techniques.
- To understand the high-performance programs designed to strengthen the practical expertise.

**Course Outcomes(s)**

CO#	Course Outcomes
C226.1	Study the basic concepts scripting and the contributions of scripting language.
C226.2	Demonstrate proficiency in handling Strings and File Systems.
C226.3	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
C226.4	Explore python especially the object oriented concepts, and the built in objects of Python.
C226.5	Create practical and contemporary applications such as TCP/IP network programming.
C226.6	Identify Database Connectivity Concepts and Object Relational Managers in Modules.

**COURSE CONTENT**

1. Write a program to demonstrate different number data types in Python.
2. Write a program to perform different Arithmetic Operations on numbers in Python.
3. Write a program to create, concatenate and print a string and accessing sub-string from a given string.
4. Write a python script to print the current date in the following format "Sun May 29 02:26:23 IST 2017".
5. Write a program to create, append, and remove lists in python.
6. Write a program to demonstrate working with tuples in python.
7. Write a program to demonstrate working with dictionaries in python.

8. Write a python program to find largest of three numbers.
9. Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [ Formula:  $c/5 = f-32/9$  ] .
10. Write a Python program to construct the following pattern, using a nested for loop

```
*
* *
* * *
* * * *
* * * * *
* * * *
* *
*
```

11. Write a Python script that prints prime numbers less than 20.
12. Write a python program to find factorial of a number using Recursion.
13. Write a program that accepts the lengths of three sides of a triangle as inputs. The program output should indicate whether or not the triangle is a right triangle (Recall from the Pythagorean Theorem that in a right triangle, the square of one side equals the sum of the squares of the other two sides).
14. Write a python program to define a module to find Fibonacci Numbers and import the module to another program.
15. Write a python program to define a module and import a specific function in that module to another program.
16. Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first file should be input and written to the second file.
17. Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order.
18. Write a Python class to convert an integer to a roman numeral.
19. Write a Python class to implement  $\text{pow}(x, n)$ .
20. Write a Python class to reverse a string word by word.

**TEXT BOOKS:**

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.

**REFERENCES BOOKS:**

1. Dive into Python, Mike.
2. Learning Python, 4th Edition by Mark Lutz.
3. Programming Python, 4th Edition by Mark Lutz.

**ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. <https://www.coursera.org/python>
2. <https://www.edx.org/python>

**WEB REFERENCE/E-BOOKS:**

1. <http://www.w3schools.com>
2. <http://docs.python.org>
3. <http://www.tutorialspoint.com>
4. <http://www.learnpython.org>

**DATABASE SYSTEMS LAB**  
**II B.Tech., II SEM**

Course Title: DATABASE SYSTEMS LAB	Course Code: AS20-72PC05
Teaching Scheme (L: T:P): 0:0:3	Credits: 1.5
Type of Course: Practical	Total Contact Periods: 48Hrs
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Data Structures Lab	

**Course Overview:**

This course will deliver the knowledge in introducing the concepts of various data structures such as linked lists, stacks, queues, trees and graphs along with the applications.

**Course Objective**

- It covers various concepts of C programming language
- It introduces searching and sorting algorithms
- It provides an understanding of data structures such as stacks and queues

**LIST OF EXPERIMENTS:**

**Experiment 1: Draw the ER Diagram for College Database**

Analyze the problem carefully and come up with the entities in it. Identify what data has to be

Persisted in the database. This contains the entities, attributes etc. Identify the primary keys for all the entities. Identify the other keys like candidate keys, partial keys, if any.

**Experiment 2: Concept design with E-R Model for College Database**

Apply cardinalities for each relationship. Identify strong entities and weak entities (if any). Indicate the type of relationships (total / partial). Try to incorporate generalization, aggregation, specialization etc wherever required.

**Experiment 3: Relational Model for College Database**

Represent all the entities (Strong, Weak) in tabular fashion. Represent relationships in a tabular fashion. There are different ways of representing relationships as tables based on the cardinality. Represent attributes as columns in tables or as tables based on the requirement. Different types of attributes (Composite, Multi-valued, and Derived) have different way of representation.

**Experiment 4: Installation of Oracle/Mysql and practicing DDL commands.** In this week student will learn Creating databases, how to create tables, altering the database, dropping tables and databases, truncate, rename commands etc.

**Experiment 5: Practicing following DML commands –**

SELECT – retrieve data from the a database

INSERT – insert data into a table

UPDATE – updates existing data within a table

DELETE – deletes all records from a table, the space for the records remain

**Experiment 6: Practicing DCL commands** -Grant, Revoke, TCL commands-Commit, Rollback.

**Experiment 7: Querying**

In this experiment students will practice queries (along with sub queries) using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.

**Experiment 8: Querying**

In this experiment students will practice queries (along with sub queries) using Aggregate Functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING.

**Experiment 9:** Working with Conversion Functions & String Functions Queries using Conversion Functions (TO\_CHAR, TO\_NUMBER AND TO\_DATE), String Functions (CONCATENATION, LPAD, RPAD, LTRIM, RTRIM, LOWER, UPPER, INITCAP, LENGTH, SUBSTR AND INSTR), Date Functions (SYSDATE, NEXT\_DAY, ADD\_MONTHS, LAST\_DAY, MONTHS\_BETWEEN), LEAST, GREATEST, TRUNC, ROUND, TO\_CHAR, TO\_DATE.

**Experiment 10:** Write a Queries on Views- CREATE, UPDATE, RENAME, DROP

**Experiment 11:** a) Write a PL/SQL program to find factorial of a given number

b) Write a PL/SQL program to print Fibonacci Series

**Experiment 12:** Write a PL/SQL program to implement procedures, Cursors and Triggers.

**TEXT BOOK(S) :**

1. Oracle PL/SQL by Example, Benjamin Rosenzweig, Elena Silvestrova, Pearson Education 3rd Ed
2. Oracle Database Logic PL/SQL Programming, Scott Urman, Tata Mc-Graw Hill.
3. SQL and PL/SQL for Oracle 10g, Black Book, Dr .P.S. Deshpande

**DIGITAL ELECTRONICS LAB  
II B.TECH., II SEMESTER**

Course Title: DIGITAL ELECTRONICS LAB	Course Code: AS20-04ES07
Teaching Scheme (L:T:P): 0:0:3	Credits:1.5
Type of Course: Practical	Total Contact Periods: 48 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Digital Electronics and EDC	

**Course Overview:**

To learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.

**Course Objective**

- 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 impart to student the concepts of sequential circuits, enabling them to analyses sequential systems in terms of state machines.
- To implement synchronous state machines using flip-flops.

**Course Outcomes(s)**

CO#	Course Outcomes
<b>C218.1</b>	Identify the various digital ICs and understand their operation.
<b>C218.2</b>	Understand the basic logic gates and to verify their operation
<b>C218.3</b>	Construct basic combinational circuits and verify their functionalities
<b>C218.4</b>	Apply the design procedures to design basic sequential circuits
<b>C218.5</b>	Verify truth tables and excitation tables of various flip flops
<b>C218.6</b>	Understand working of Logic families

## **COURSE CONTENT**

1. Realization of Boolean Expressions using Gates
2. Design and realization logic gates using universal gates
3. Generation of clock using NAND / NOR gates
4. Design a 4 – bit Adder / Subtractor
5. Design and realization a 4 – bit gray to Binary and Binary to Gray Converter
6. Design and realization of a 4 bit pseudo random sequence generator using logic gates.
7. Design and realization of an 8 bit parallel load and serial out shift register using flip-flops.
8. Design and realization a Synchronous and Asynchronous counters using flip-flops
9. Design and realization of Asynchronous counters using flip-flops
10. Design and realization 8x1 using 2x1 mux
11. Design and realization 2 bit comparator
12. Verification of truth tables and excitation tables
13. Realization of logic gates using DTL, TTL, ECL, etc.,
14. State machines

### **TEXT BOOKS:**

1. R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.
2. M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016.

### **REFERENCES BOOKS:**

1. A. Kumar, "Fundamentals of Digital Circuits", Prentice Hall India, 2016

### **WEB REFERENCE/E-BOOKS:**

1. <https://doi.org/10.1515/9783110263787.73>

**GENDER SENSATIZATION  
II B.TECH., II SEMESTER  
MANDATORY COURSE**

Course Title: GENDER SENSATIZATION	Course Code: AS20-00MC02
Teaching Scheme (L:T:P):3:0:0	Credits: 0
Type of Course: Lecture + Assignment	Total Contact Periods:48 Hrs
Continuous Internal Evaluation-0 Marks	Semester End Exams-100 Marks
Prerequisites: Gender vs Sex, Gender in contemporary India, Gender discrimination works in our society, Men and women live together as equals, Build up a sense of appreciation of women	

**Course Overview:**

This course is designed to understand the issues related to Gender and how Gender discrimination impacts in our society and how to encounter them. 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.

**Course Objective**

- 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(s)**

CO#	Course Outcomes
C219.1	Develop a better understanding of important issues related to gender in contemporary India.
C219.2	Sensitize 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.
C219.3	Attain a finer grasp of how gender discrimination works in our society and how to counter it.
C219.4	Acquire insight into the gendered division of labor and its relation to politics and economics.
C219.5	Men and women students and professionals will be better equipped to work and live together as equals.
C219.6	Build up a sense of appreciation of women in all walks of life.



## COURSE CONTENT

### UNIT – I

#### **Understanding Gender: Introduction**

#### **What is Gender and why does it matter?**

#### **Gender Relations and Status in the Household**

#### **Masculinities**

#### **Gender Analysis and mainstreaming**

**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.

#### **Teacher’s Role in Promoting/Advancing Gender Sensitization**

#### **STRATEGIES / MEASURES TO PROMOTE GENDER SENSITIZATION**

**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.

**Sexual Harassment—Women at all levels of employment and all levels of workplace are affected.**

### 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.

#### **Promoting gender equality to prevent violence against women**

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**

#### **The Value of Coexistence, Passive coexistence, Active coexistence**

**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:**

1. Suneetha, Uma Bhrugubanda, DuggiralaVasanta, Rama Melkote,Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu **"Towards a World of Equals: A Bilingual Textbook on Gender"** published by Telugu Akademi, Hyderabad, Telangana State, **2015**.

**REFERENCE BOOKS:**

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

**ONLINE RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. <https://nptel.ac.in/courses/110/105/110105080/>
2. <https://nptel.ac.in/courses/109/103/109103122/>

**WEB REFERENCE/E-BOOKS:**

1. <http://www.mcrhrdi.gov.in/adr%202016/presentations/Gender%20Sensitisation%20For%20FCs.pdf>
2. <https://mangaloreuniversity.ac.in/sites/default/files/2019/Course%20-%206%20Gender%20School%20&%20Society%20-%20English%20Version.pdf>
3. <http://ncw.nic.in/notice/gender-sensitization-module-gender-sensitization-and-legal-awareness-programme-collaboration>

**INNOVATIVE PROJECT DEVELOPMENT  
II B.TECH., II SEMESTER  
VALUE ADDED COURSE**

Course Title: INNOVATIVE PROJECT DEVELOPMENT	Course Code: AS20-05PW03
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical	Total Contact Periods: 32 Hours
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks
Prerequisites: C Programming	

**Course Overview:**

Design Thinking is Human-centered problem solving tool which emphasize on Empathy, Collaboration, Co- creation and Stakeholder feedback to unlock Creativity and Innovation, which devises feasible and viable Big Idea/solutions. The key to the process is empathizing with the users (citizen) to uncover unmet needs by understanding their beliefs, values, motivations, behaviors, pains, gains and challenges and to provide innovative solution concepts

**Course Objective:**

The objective of this Course is:

- Equip the students to work on real projects by designing needs and solutions with communities (users/citizen)
- To deeply understand the people they're looking to serve, to dream up scores of ideas, and to create innovative new solutions rooted in people's actual needs using Design Thinking
- To develop innovative solutions through step by step guide with samples and ready to use templates.

**Course Outcomes(s)**

CO#	Course Outcomes
<b>C2210.1</b>	Understands basic phases of Design Thinking
<b>C2210.2</b>	Describes Exploratory research methods
<b>C2210.3</b>	Analyzes using concept maps for various projects
<b>C2210.4</b>	Understands the process of Ideation
<b>C2210.5</b>	Develops prototypes for various projects
<b>C2210.6</b>	Applies Design Thinking for developing innovative projects

## COURSE CONTENT (SYLLABUS)

### UNIT - I

**Why Innovate** : What is Design Thinking, But is it only designers, who think this way?  
Why  
Design Thinking?

### UNIT - II

**Immersion:** Preliminary immersion – Reframing, Exploratory Research, Desk Research, In-Depth immersion, Interviews, Cultural Probes, Generative sessions, A Day in the Life, Shadowing

### UNIT - III

**Analysis And Synthesis:** Insight Cards, Affinity Diagram, Conceptual Map, Guiding Criteria, Personas, Empathy Map, User's Journey, Blueprint

### UNIT - IV

**Ideation** : Brainstorming, Co-creation workshop, Idea Menu, Decision Matrix

### UNIT - V

**Prototyping** : Paper Prototyping, Volumetric Model, Staging, Storyboard, Service Prototyping

### TEXT BOOKS

1. Maurício Vianna, Ysmar Vianna, Design Thinking – Business Innovation, MJV Press
2. Moritz Gekeler, A practical guide to design thinking

### REFERENCE BOOKS

1. The Brown Book Of Design Thinking, J. Berengueres, UAE University College
2. The Design Thinking Handbook by Eli Wooleri

**VIRTUAL REALITY  
II B.TECH., II SEMESTER  
VALUE ADDED COURSE**

Course Title: VIRTUAL REALITY	Course Code: AS20-66PW03
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical	Total Contact Periods: 32 Hours
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks
Prerequisites: Mathematics, Engineering Graphics	

**Course Overview:**

This course will introduce you to Virtual Reality (VR). The course will teach you everything from the basics of VR- the hardware and the history of VR- to different applications of VR, the psychology of Virtual Reality, and the challenges of the medium. A learner with no previous experience in Virtual Reality and/or game programming will be able to evaluate existing VR applications, and design, test, and implement their own VR experiences/games using Unity by the end of the specialisation.

**Course Objective:** The objective of this Course is:

- Familiarize with fundamentals of Virtual Reality.
- Deal with the behaviour of light in lenses and human vision.
- Facilitate preliminaries of visual perception on spectrum of light and visual rendering.
- Impart the knowledge of tracking 2D and 3D orientation.
- Demonstrate the physics of sound and use of Haptic.
- Familiarize with evaluation of Virtual Reality Systems.

**Course Outcomes(s)**

CO#	Course Outcomes
<b>C2210.1</b>	Understand goals of VR and the geometry involved in Virtual world.
<b>C2210.2</b>	Understand optical aberrations of light and relates the Cornea of human eye to Photoreceptors which implies the eye movement.
<b>C2210.3</b>	Identify depth, motion, colour of Visual perception and use it for Visual rendering.
<b>C2210.4</b>	Apply knowledge of tracking 2D and 3D orientation for tracking position and orientation of the attached bodies.
<b>C2210.5</b>	Understand perception and rendering of audio system in Virtual Reality and analyse the haptic devices and interfaces.
<b>C2210.6</b>	Understand perceptual training and evaluate experiments on Human subjects related to VR Systems.

## COURSE CONTENT

### UNIT - I

**VIRTUAL REALITY AND VIRTUAL ENVIRONMENTS:** The historical development of VR: Scientific landmarks Computer Graphics, Real-time computer graphics, Flight simulation, Virtual environments, Requirements for VR, benefits of Virtual reality.

**HARDWARE TECHNOLOGIES FOR 3D USER INTERFACES:** Visual Displays Auditory Displays, Haptic Displays, Choosing Output Devices for 3D User Interfaces.

### UNIT - II

**3D USER INTERFACE INPUT HARDWARE:** Input device characteristics, Desktop input devices, Tracking Devices, 3D Mice, Special Purpose Input Devices, Direct Human Input, Home - Brewed Input Devices, Choosing Input Devices for 3D Interfaces.

### UNIT - III

**SOFTWARE TECHNOLOGIES:** Database - World Space, World Coordinate, World Environment, Objects - Geometry, Position / Orientation, Hierarchy, Bounding Volume, Scripts and other attributes, VR Environment - VR Database, Tessellated Data, LODs, Cullers and Occludes, Lights and Cameras, Scripts, Interaction - Simple, Feedback, Graphical User Interface, Control Panel, 2D Controls, Hardware Controls, Room / Stage / Area Descriptions, World Authoring and Playback, VR toolkits, Available software in the market

### UNIT - IV

**3D INTERACTION TECHNIQUES:** 3D Manipulation tasks, Manipulation Techniques and Input Devices, Interaction Techniques for 3D Manipulation, Design Guidelines - 3D Travel Tasks, Travel Techniques, Design Guidelines - Theoretical Foundations of Wayfinding, User Centered Wayfinding Support, Environment Centered Wayfinding Support, Evaluating Wayfinding Aids, Design Guidelines - System Control, Classification, Graphical Menus, Voice Commands, Gestural Commands, Tools, Multimodal System Control Techniques, Design Guidelines, Case Study: Mixing System Control Methods, Symbolic Input Tasks, symbolic Input Techniques, Design Guidelines, Beyond Text and Number entry .

**DESIGNING AND DEVELOPING 3D USER INTERFACES:** Strategies for Designing and Developing Guidelines and Evaluation.

**VIRTUAL REALITY APPLICATIONS:** Engineering, Architecture, Education, Medicine, Entertainment, Science, Training.

### UNIT - V

**Augmented and Mixed Reality:** Taxonomy, technology and features of augmented reality, difference between AR and VR, Challenges with AR, AR systems and functionality, Augmented reality methods, visualization techniques for augmented reality, wireless displays in educational augmented reality applications, mobile projection interfaces, marker-less tracking for augmented reality, enhancing interactivity in AR environments, evaluating AR systems.

**TEXT BOOKS:**

1. Alan B Craig, William R Sherman and Jeffrey D Will, "Developing Virtual Reality Applications: Foundations of Effective Design", Morgan Kaufmann, 2009.
2. Gerard Jounghyun Kim, "Designing Virtual Systems: The Structured Approach", 2005.
3. Doug A Bowman, Ernest Kuijff, Joseph J LaViola, Jr and Ivan Poupyrev, "3D User Interfaces, Theory and Practice", Addison Wesley, USA, 2005.

**REFERENCE BOOKS:**

1. Oliver Bimber and Ramesh Raskar, "Spatial Augmented Reality: Merging Real and Virtual Worlds", 2005.
2. Burdea, Grigore C and Philippe Coiffet, "Virtual Reality Technology", Wiley Interscience, India, 2003.
3. John Vince, "Virtual Reality Systems", Addison Wesley, 1995.
4. Howard Rheingold, "Virtual Reality: The Revolutionary Technology and how it Promises to Transform Society", Simon and Schuster, 1991.
5. William R Sherman and Alan B Craig, "Understanding Virtual Reality: Interface, Application and Design (The Morgan Kaufmann Series in Computer Graphics)". Morgan Kaufmann Publishers, San Francisco, CA, 2002
6. Alan B. Craig, Understanding Augmented Reality, Concepts and Applications, Morgan Kaufmann, 2013

**RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. <https://nptel.ac.in/courses/121106013/>
2. <https://nptel.ac.in/syllabus/106106138/>

**WEB REFERENCE/E-BOOKS:**

1. <https://hackr.io/tutorials/learn-virtual-reality>
2. <https://tutorials.one/virtual-reality/>

**ANDROID APP DEVELOPMENT  
II B.TECH., II SEMESTER  
VALUE ADDED COURSE**

Course Title: ANDROID APP DEVELOPMENT	Course Code: AS20-05PW04
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical	Total Contact Periods: 32 Hours
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks
Prerequisites: JAVA Programming	

**Course Overview:**

Android Development is one of the trending domains of programming as it holds the majority market of today. The key to becoming a successful Android app developer is getting the fundamentals right. The course will help you in utilising the right tools and technologies to build user-friendly applications from scratch, easily. Learn the core concepts of styles, menu, intents, activities and testings with the advanced database and libraries. You'll learn how to effectively cooperate with the lifecycle of Android activities.

**Course Objective:**

- To demonstrate their understanding of the fundamentals of Android operating systems
- To improves their skills of using Android software development tools
- To demonstrate their ability to develop software with reasonable complexity on mobile platform
- To demonstrate their ability to deploy software to mobile devices
- To demonstrate their ability to debug programs running on mobile devices

**Course Outcomes(s)**

<b>CO#</b>	<b>Course Outcomes</b>
<b>C2210.1</b>	Understands Android Application Development Framework And The Various Types Of Android Applications
<b>C2210.2</b>	Understands Android Application Lifecycle
<b>C2210.3</b>	Describes The Various User Interface Layouts
<b>C2210.4</b>	Develops Programs For Communication Through Android Applications
<b>C2210.5</b>	Develops Programs For Accessing Files Through Android Application
<b>C2210.6</b>	Develops Various Android Applications



## COURSE CONTENT (SYLLABUS)

### UNIT - I

**Introduction to Android Operating System:** Android OS design and Features :Android development framework, SDK features, Installing and running applications on Android Studio, Creating AVDs, Types of Android applications, Best practices in Android programming, Android tools

### UNIT - II

**Android application components:** Android Manifest file, Externalizing resources like values, themes, layouts, Menus etc, Resources for different devices and languages, Runtime Configuration Changes

**Android Application Lifecycle:** Activities, Activity lifecycle, activity states, monitoring state changes

### UNIT – III

**Android User Interface:** Measurements, Device and pixel density independent measuring Layouts : Linear, Relative, Grid and Table Layouts User Interface (UI) Components : Editable and non-editable TextViews, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers Event Handling : Handling clicks or changes of various UI components

**Fragments:** Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities, Multi-screen Activities

### UNIT - IV

**Intents and Broadcasts:** Intent, Using intents to launch Activities, Explicitly starting new Activity, Implicit Intents, Passing data to Intents, Getting results from Activities, Native Actions, using Intent to dial a number or to send SMS

**Broadcast Receivers:** Using Intent filters to service implicit Intents, Resolving Intent filters, finding and using Intents received within an Activity Notifications: Creating and Displaying notifications, Displaying Toasts

### UNIT - V

**Persistent Storage:** Files, Using application specific folders and files, creating files, reading data from files, listing contents of a directory

**Shared Preferences:** Creating shared preferences, saving and retrieving data using Shared Preference

### TEXT BOOKS:

1. Professional Android 4 Application Development, Reto Meier, Wiley India, (Wrox), 2012
2. Android Application Development for Java Programmers, James C Sheusi, Cengage Learning, 2013

**REFERENCE BOOK:**

1. Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox), 2013

**RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. Android app using Kotlin - By Prof Kannan Moudgalya - Principal Investigator of Spoken Tutorial Project, Indian Institute of Technology Bombay
2. Modern Application Development  
By Prof. Aamod Sane, Prof. Abhijat Vichare, Prof. Madhavan Mukund, Persistent Computing Institute, Persistent Computing Institute, Chennai Mathematical Institute

**WEB REFERENCE/E-BOOKS:**

1. <https://endangcahyapermana.files.wordpress.com/2016/05/android-application-development-for-for-dummies.pdf>
2. [http://yuliana.lecturer.pens.ac.id/Android/Buku/professional\\_android\\_4\\_application\\_development.pdf](http://yuliana.lecturer.pens.ac.id/Android/Buku/professional_android_4_application_development.pdf)
3. <https://www.mediapiac.com/uploads/conference/presenters/documents/17/8.pdf>
4. <http://projanco.com/Library/Android%20App%20Development%20in%20Android%20Studio%20-%20Java%20plus%20Android%20edition%20for%20beginners.pdf>

**INTRODUCTION TO MATLAB AND ITS APPLICATIONS**  
**II B.TECH., II SEMESTER**  
**VALUE ADDED COURSE**

Course Title: INTRODUCTION TO MATLAB AND ITS APPLICATIONS	Course Code: AS20-04PW05
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical	Total Contact Periods: 32 Hours
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks
Prerequisites: Linear Algebra and Signals & Systems, Engineering Graphics	

**Course Overview:**

This course deals with the concept of MATLAB Software and writing simple programs in MATLAB.

**Course Objective:** The objective of this Course is:

- To create awareness to students about MATLAB software environment.
- Students will understand the basics of MATLAB software and its data class.
- To enable the students to learn basic MATLAB programming for engineering application.
- MATLAB Simulink for simulation, analysis and design of the system.

**Course Outcomes(s)**

CO#	Course Outcomes
<b>C2210.1</b>	Understand the fundamentals to simulation software
<b>C2210.2</b>	Understand the matrices and arrays in MATLAB
<b>C2210.3</b>	Understand the working of matrices and expression in MATLAB
<b>C2210.4</b>	Understand the Common windows and graphics working in MATLAB
<b>C2210.5</b>	Understand the Flow control and Data structure handling in MATLAB
<b>C2210.6</b>	Understand the Scripting and function availability in MATLAB

**COURSE CONTENT (SYLLABUS)**

**UNIT - I**

**Introduction To Simulation Software:** About MATLAB, MATLAB System, how to start MATLAB

**Matrices And Arrays:** Entering Matrices sum and transpose, subscripts, Colon Operator, magic Function, Variables and constants: Definition, naming (identifiers or labels for different entities), initialization and accessing of variables. Constants and their representation.

## **UNIT - II**

**Working With Matrices:** Generating Matrices, the load Function, M-Files, Concatenation, Deleting Rows and Columns, Linear Algebra, Arrays Multivariate Data, Scalar Expansion, Logical Subscripting, find Function.

**Expressions:** Variables, Numbers, Operators, Functions, Expressions.

## **UNIT - III**

**Command Window:** The format Function, Suppressing Output, Entering Long Statements, Command Line Editing.

**Graphics:** Plotting Process, Editing Process, Preparing Graphs, Basic Plotting Functions, Mesh & Surface Plot, and Image Reading & Writing, Printing graphics, Simple programs.

## **UNIT - IV**

**Flow Control:** If, else, and else if, switch and case, for, while, continue, break try - catch, return.

**Other Data Structures:** Multidimensional Arrays, Cell Arrays, Characters and Text, Structures, Simple programs.

## **UNIT - V**

**Scripts & Functions:** Scripts, Functions, Global Variables, Passing String Arguments to Functions, eval Function, Function Handles, Vectorization, Pre allocation, Simple programs.

### **TEXT BOOKS:**

1. MATLAB & Its Applications in Engineering By: Raj Kumar Bansal, Ashok Kumar Goel, Manoj Kumar Sharma
2. A Guide to MATLAB: For Beginners & Experienced Users By: Kevin R. Coombes, John E. Osborn, Garrett J. Stuck

### **REFERENCE BOOKS:**

1. Learning to Program with MATLAB: Building GUI Tools 1st Edition by Craig S. Lent

### **RESOURCES (SWAYAM/NPTEL/MOOCs/COURSERA):**

1. <https://matlabacademy.mathworks.com/>
2. <https://www.coursera.org/learn/matlab>
3. [https://onlinecourses.nptel.ac.in/noc20\\_ge05/preview](https://onlinecourses.nptel.ac.in/noc20_ge05/preview)

### **WEB REFERENCE/E-BOOKS:**

1. <http://www.freebookcentre.net/Language/Matlab-Books.html>
2. [http://www.mathworks.com/help/releases/R2014b/pdf\\_doc/matlab/getstart.pdf](http://www.mathworks.com/help/releases/R2014b/pdf_doc/matlab/getstart.pdf)
3. <https://www.mccormick.northwestern.edu/documents/students/undergraduate/introduction-to-matlab.pdf>
4. <https://ocw.mit.edu/resources/res-18-002-introduction-to-matlab-spring-2008/>

**PROJECT BASED LEARNING USING PYTHONS**  
**II B.TECH., II SEMESTER**  
**VALUE ADDED COURSE**

Course Title: PROJECT BASED LEARNING USING PYTHON	Course Code: AS20-72PW02
Teaching Scheme (L: T:P): 0:0:2	Credits: 1
Type of Course: Practical	Total Contact Periods: 32Hrs
Continuous Internal Evaluation: 25 Marks	Semester End Exams : 75 Marks

**COURSE CONTENT (SYLLABUS)**

1. Develop word count application with python
2. Develop GUI application for calendar with python
3. Convert Image to a Pencil Sketch using Python
4. Develop GUI application for Countdown Timer/ Alarm with python
5. Password Generator with python
6. Quiz Application
7. Develop GUI application for converter (1. Currency, 2. Length, 3. Area)
8. Python Snake Game
9. Sudoku Solver
10. Develop application to convert text to speech
11. create your own QR codes and encode/decode with python