

## COURSE STRUCTURE

<b>I BTECH I SEM</b>									
<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>COURSE AREA</b>	<b>HOURS/ WEEK</b>			<b>CREDIT</b>	<b>Internal Marks</b>	<b>External marks</b>	<b>Total Marks</b>
			L	T	P				
AS20-00BS06	LINEAR ALGEBRA AND ADVANCED 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 PROBLEMSOLVING	ESC	3	1	0	3	30	70	100
AS20-02ES01	BASIC ELECTRICAL ENGINEERING	ESC	3	1	0	3	30	70	100
AS20-03ES02	ENGINEERING GRAPHICS AND DESIGN	ESC	2	0	3	3.5	30	70	100
<b>PRACTICAL COURSES</b>									
AS20-00BS09	APPLIED PHYSICS LAB	BSC	0	0	3	1.5	30	70	100
AS20-05ES02	PROGRAMMING FOR PROBLEMSOLVING LAB	ESC	0	0	3	1.5	30	70	100
AS20-03ES04	ENGINEERING PRACTICES	ESC	0	0	4	2	30	70	100
<b>VALUE ADDED COURSE</b>									
AS20-00HS03	SOFT SKILLS-I	HSMC	2	0	0	0	25	75	100
<b>TOTAL</b>						<b>20.5</b>			

<b>I BTECH II SEM</b>									
<b>COURSE CODE</b>	<b>COURSE TITLE</b>	<b>COURSE AREA</b>	<b>HOURS/ WEEK</b>			<b>CREDIT</b>	<b>Internal Marks</b>	<b>External marks</b>	<b>Total Marks</b>
			<b>L</b>	<b>T</b>	<b>P</b>				
AS20-00BS01	DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	BSC	3	1	0	3	30	70	100
AS20-00BS02	ENGINEERING CHEMISTRY	BSC	3	1	0	3	30	70	100
AS20-05ES03	DATA STRUCTURES THROUGH C++	ESC	3	1	0	3	30	70	100
AS20-04ES01	ELECTRONIC DEVICES & CIRCUITS	ESC	3	1	0	3	30	70	100
AS20-00HS01	ENGLISH	HSMC	2	0	0	2	30	70	100
<b>PRACTICAL COURSES</b>									
AS20-05ES04	DATA STRUCTURES THROUGH C++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
<b>VALUE ADDED COURSE</b>									
AS20-00HS04	SOFT SKILLS-II	HSMC	2	0	0	0	25	75	100
<b>TOTAL</b>						<b>17.5</b>			

II BTECH I SEM									
Course Code	COURSE TITLE	COURSE AREA	HOURS/ WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-00BS10	PROBABILITY AND RANDOM PROCESSES	BSC	3	1	0	3	30	70	100
AS20-04ES06	DIGITAL ELCTRONICS	ESC	3	1	0	3	30	70	100
AS20-05ES06	COMPUTER ORGANIZATION AND ARCHITECTURE	ESC	3	1	0	3	30	70	100
AS20-05PC01	OBJECT ORIENTED PROGRAMMING THROUGH JAVA	PCC	3	1	0	3	30	70	100
AS20-12PC01	ANALYSIS AND DESIGN OF ALGORITHMS	PCC	3	1	0	3	30	70	100
PRACTICAL COURSES									
AS20-05ES07	IT WORKSHOP LAB	ESC	0	0	3	1.5	30	70	100
AS20-04ES07	DIGITAL ELECTRONICS LAB	ESC	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
MANDATORY COURSE									
AS20-00MC02	GENDER SENSITISATION	MC	3	0	0	0	0	100	100
VALUE ADDED COURSE* (ANY ONE COURSE OF CHOICE)									
AS20-12PW01	IOT (PROJECT) – IN HOUSE INTERFACING WITH ARDUINOAND RASPBERRY PI	PW	0	0	2	1	25	75	100
AS20-66PW01	ROBOTICS AND ITS APPLICATIONS	PW	0	0	2	1	25	75	100
AS20-12PW02	GRAPHIC DESIGN (PHOTOSHOP, CORAL DRAW,3D MAX)	PW	0	0	2	1	25	75	100
AS20-05PW01	PROJECT BASED LEARNING USING JAVA	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					
AS20-00HS07	UNIVERSAL HUMAN VALUES II	HSMC	3	1	0	3	30	70	100	
AS20-05PC04	DATABASE MANAGEMENT SYSTEMS	PCC	3	1	0	3	30	70	100	
AS20-12PC02	PROGRAMMING ESSENTIALS USING PYTHON	PCC	3	1	0	3	30	70	100	
AS20-12PC03	PRINCIPLES OF OPERATING SYSTEMS	PCC	3	1	0	3	30	70	100	
AS20-05PC02	MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	PCC	3	1	0	3	30	70	100	
PRACTICAL COURSES										
AS20-05PC08	DATABASE MANAGEMENT SYSTEMS LAB	PCC	0	0	3	1.5	30	70	100	
AS20-12PC04	PYTHON PROGRAMMING LAB	PCC	0	0	3	1.5	30	70	100	
AS20-12PC05	OPERATING SYSTEMS LAB	PCC	0	0	3	1.5	30	70	100	
MANDATORY COURSE										
AS20-00MC03	CONSTITUTION OF INDIA	MC	3	0	0	0	0	100	100	
VALUE ADDED COURSE* (ANY ONE COURSE OF CHOICE)										
AS20-12PW03	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	
AS20-04PW07	EMBEDDED SYSTEM DESIGN USING ADVANCED PROCESSORS	PW	0	0	2	1	25	75	100	
<b>TOTAL</b>						<b>20.5</b>				

III BTECH I SEM									
Course Code	COURSE TITLE	COURSE AREA	HOURS/ WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-12PC06	FORMAL LANGUAGES AUTOMATA THOERY	PCC	3	1	0	3	30	70	100
AS20-12PC07	OBJECT ORIENTED SOFTWARE ENGINEERING	PCC	3	1	0	3	30	70	100
AS20-05ES08	DATA COMMUNICATION AND COMPUTERNETWORKS	ESC	3	1	0	3	30	70	100
AS20-12PE1X	PROFESSIONAL ELECTIVE -I	PE	3	1	0	3	30	70	100
AS20-12OE1X	OPEN ELECTIVE -1	OE	3	0	0	3	30	70	100
PRACTICAL COURSES									
AS20-12PC08	COMPUTER NETWORKS LAB	PCC	0	0	3	1.5	30	70	100
AS20-12PC09	SOFTWARE ENGINEERING LAB	PCC	0	0	3	1.5	30	70	100
AS20-00HS05	ADVANCED ENGLISH COMMUNICATION SKILLS LAB	HSMC	0	0	3	1.5	30	70	100
MANDATORY COURSE									
AS20-00MC07	INTELLECTUAL PROPERTY RIGHTS	MC	3	0	0	0	0	100	100
AS20-00MC05	ARTIFICIAL INTELLIGENCE	MC	3	0	0	0	0	100	100
VALUE ADDED COURSE* (ANY ONE COURSE OF CHOICE)									
AS20-00HS10	APTITUDE SKILLS	HSMC	0	0	2	1	25	75	100
AS20-00HS11	STARTUP MANAGEMENT	HSMC	0	0	2	1	25	75	100
AS20-00HS12	ERP TOOLS	HSMC	0	0	2	1	25	75	100
<b>TOTAL</b>						<b>20.5</b>			

Professional Elective-I									
Course Code	COURSE TITLE	COURSE AREA	HOURS/ WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-12PE11	PRINCIPALS OF PROGRAMMING LANGUAGES	PE	3	1	0	3	30	70	100
AS20-12PE12	MIDDLEWARE TECHNOLOGIES	PE	3	1	0	3	30	70	100
AS20-12PE13	DATA ANALYTICS	PE	3	1	0	3	30	70	100
AS20-12PE14	IMAGE PROCESSING	PE	3	1	0	3	30	70	100
AS20-12PE15	LINUX PROGRAMMING	PE	3	1	0	3	30	70	100
<b>TOTAL</b>						<b>3</b>			

Open Elective-I									
Course Code	COURSE TITLE	COURSE AREA	HOURS/ WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-12OE11	SOFTWARE ENGINEERING	OE	3	0	0	3	30	70	100
AS20-12OE12	INTERNET OF THINGS	OE	3	0	0	3	30	70	100
AS20-12OE13	OPERATING SYSTEMS	OE	3	0	0	3	30	70	100
AS20-12OE14	OBJECT ORIENTED PROGRAMMING THROUGH JAVA	OE	3	0	0	3	30	70	100
<b>TOTAL</b>						<b>3</b>			

III BTECH II SEM									
Course Code	COURSE TITLE	COURSE AREA	HOURS/ WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-00HS06	BUSINESS ECONOMICS FINANCIAL ANALYSIS	HSMC	3	1	0	3	30	70	100
AS20-12PC10	PRINCIPLES OF COMPILER CONSTRUCTION	PCC	3	1	0	3	30	70	100
AS20-12PC11	INTERNET OF THINGS	PCC	3	1	0	3	30	70	100
AS20-05PE2X	PROFESSIONAL ELECTIVE -II	PE	3	1	0	3	30	70	100
AS20-05OE2X	OPEN ELECTIVE -II	OE	3	0	0	3	30	70	100
PRACTICAL COURSES									
AS20-12PC12	COMPILER CONSTRUCTION LAB	PCC	0	0	3	1.5	30	70	100
AS20-12PC13	INTERNET OF THINGS LAB	PCC	0	0	3	1.5	30	70	100
AS20-12PEXX	PROFESSIONAL ELECTIVE - II LAB	PCC	0	0	3	1.5	30	70	100
MANDATORY COURSE									
AS20-00MC04	PROFESSIONAL ETHICS	MC	3	0	0	0	0	100	100
AS20-00MC06	CYBER SECURITY	MC	3	0	0	0	0	100	100
VALUE ADDED COURSE* (ANY ONE COURSE OF CHOICE)									
AS20-12PW04	WEB PRODUCT DEVELOPMENT	PW	0	0	2	1	25	75	100
AS20-12PW05	3D PRINTING DESIGN	PW	0	0	2	1	25	75	100
AS20-66PW04	DRONE APPLICATIONS	PW	0	0	2	1	25	75	100
AS20-66PW05	AI APPLICATION IN HEALTH CARE	PW	0	0	2	1	25	75	100
AS20-05PW06	ETHICAL HACKING	PW	0	0	2	1	25	75	100
<b>TOTAL</b>						<b>20.5</b>			

Professional Elective-II									
Course Code	COURSE TITLE	COURSE AREA	HOURS/ WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-12PE21	SCRIPTING LANGUAGES	PE	3	1	0	3	30	70	100
AS20-12PE22	WEB TECHNOLOGIES	PE	3	1	0	3	30	70	100
AS20-12PE23	MOBILE APPLICATION DEVELOPMENT	PE	3	1	0	3	30	70	100
AS20-12PE24	R PROGRAMMING	PE	3	1	0	3	30	70	100
AS20-12PE25	NETWORK PROGRAMMING	PE	3	1	0	3	30	70	100
<b>TOTAL</b>						<b>3</b>			

Professional Elective-II (LAB)									
Course Code	COURSE TITLE	COURSE AREA	HOURS/ WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-12PE26	SCRIPTING LANGUAGES LAB	PE	0	0	3	1.5	30	70	100
AS20-12PE27	WEB TECHNOLOGIES LAB	PE	0	0	3	1.5	30	70	100
AS20-12PE28	MOBILE APPLICATION DEVELOPMENT LAB	PE	0	0	3	1.5	30	70	100
AS20-12PE29	R PROGRAMMING LAB	PE	0	0	3	1.5	30	70	100
AS20-12PE30	NETWORK PROGRAMMING LAB	PE	0	0	3	1.5	30	70	100
<b>TOTAL</b>						<b>1.5</b>			

Open Elective-II									
Course Code	COURSE TITLE	COURSE AREA	HOURS/WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-12OE21	WEB TECHNOLOGIES	OE	3	0	0	3	30	70	100
AS20-12OE22	SOFTWARE TESTING METHODOLOGIES	OE	3	0	0	3	30	70	100
AS20-12OE23	CLOUD COMPUTING	OE	3	0	0	3	30	70	100
AS20-12OE24	COMPUTER GRAPHICS	OE	3	0	0	3	30	70	100
<b>TOTAL</b>						<b>3</b>			



IV BTECH I SEM									
Course Code	COURSE TITLE	COURSE AREA	HOURS/ WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-12PC14	DATA MINING	PCC	3	1	0	3	30	70	100
AS20-12PC15	SOFTWARE TESTING METHDOLOGIES	PCC	3	1	0	3	30	70	100
AS20-12PC16	MACHINE LEARNING	PCC	3	1	0	3	30	70	100
AS20-12PE3X	PROFESSIONAL ELECTIVE-III	PE	3	1	0	3	30	70	100
AS20-12OE3X	OPEN ELECTIVE-III (MOOCS)	OE	3	0	0	3	30	70	100
PRACTICAL COURSES									
AS20-12PC17	MACHINE LEARNING LAB	PCC	0	0	3	1.5	30	70	100
AS20-12PC18	DATA MINING LAB	PCC	0	0	3	1.5	30	70	100
AS20-12PW06	MINI PROJECT	PW	0	0	3	2	30	70	100
VALUE ADDED COURSE*									
AS20-00HS13	INTERVIEW SKILLS	HSMC	0	0	2	1	25	75	100
<b>TOTAL</b>						<b>21</b>			

Professional Elective-III									
Course Code	COURSE TITLE	COURSE AREA	HOURS/WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-12PE31	CLOUD COMPUTING	PE	3	1	0	3	30	70	100
AS20-12PE32	DISTRIBUTED DATABASES	PE	3	1	0	3	30	70	100
AS20-12PE33	WEB SECURITY	PE	3	1	0	3	30	70	100
AS20-12PE34	AD-HOC & SENSOR NETWORKS	PE	3	1	0	3	30	70	100
AS20-12PE35	INFORMATION RETRIEVAL SYSTEM	PE	3	1	0	3	30	70	100
<b>TOTAL</b>						<b>3</b>			

Open Elective-III (MOOCs)									
Course Code	COURSE TITLE	COURSE AREA	HOURS/WEEK			CRED IT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-12OE31	R PROGRAMMING	OE	3	0	0	3	30	70	100
AS20-12OE32	HARDWARE SECURITY	OE	3	0	0	3	30	70	100
AS20-12OE33	DISTRIBUTED SYSTEMS	OE	3	0	0	3	30	70	100
AS20-12OE34	SOCIAL NETWORK ANALYSIS	OE	3	0	0	3	30	70	100
<b>TOTAL</b>						<b>3</b>			

**IV BTECH II SEM**

Course Code	COURSE TITLE	COURSE AREA	HOURS/ WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-12PE4X	PROFESSIONAL ELECTIVE-IV	PE	3	1	0	3	30	70	100
AS20-12PE5X	PROFESSIONAL ELECTIVE -V	PE	3	1	0	3	30	70	100
AS20-12OE4X	OPEN ELECTIVE -IV	OE	3	0	0	3	30	70	100
<b>PRACTICAL COURSE</b>									
AS20-12PW08	MAJOR PROJECT	PW	0	0	24	10	30	70	100
<b>TOTAL</b>						<b>19</b>			

**Professional Elective-IV**

Course Code	COURSE TITLE	COURSE AREA	HOURS/ WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-12PE41	ORGANIZATIONAL BEHAVIOUR	PE	3	1	0	3	30	70	100
AS20-12PE42	CYBER FORENSICS	PE	3	1	0	3	30	70	100
AS20-12PE43	NEURAL NETWORKS & DEEP LEARNING	PE	3	1	0	3	30	70	100
AS20-12PE44	MOBILE COMPUTING	PE	3	1	0	3	30	70	100
AS20-12PE45	REAL TIME SYSTEMS	PE	3	1	0	3	30	70	100
<b>TOTAL</b>						<b>3</b>			

Professional Elective-V									
Course Code	COURSE TITLE	COURSE AREA	HOURS/ WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-12PE51	NATURAL LANGUAGE PROCESSING	PE	3	1	0	3	30	70	100
AS20-12PE52	HUMAN COMPUTER INTERACTION	PE	3	1	0	3	30	70	100
AS20-12PE53	SOFTWARE PROJECT MANAGEMENT	PE	3	1	0	3	30	70	100
AS20-12PE54	BLOCKCHAIN TECHNOLOGY	PE	3	1	0	3	30	70	100
AS20-12PE55	INFORMATION SECURITY	PE	3	1	0	3	30	70	100
<b>TOTAL</b>						<b>3</b>			

Open Elective-IV									
Course Code	COURSE TITLE	COURSE AREA	HOURS/ WEEK			CREDIT	Internal Marks	External marks	Total Marks
			L	T	P				
AS20-12OE41	GREEN COMPUTING	OE	3	0	0	3	30	70	100
AS20-12OE42	SOFTWARE TESTING	OE	3	0	0	3	30	70	100
AS20-12OE43	CRYPTOGRAPHY AND NETWORKSECURITY	OE	3	0	0	3	30	70	100
AS20-12OE44	MOBILE COMPUTING	OE	3	0	0	3	30	70	100
<b>TOTAL</b>						<b>3</b>			

\*Open Elective – Students should take Open Electives from The List of Open Electives Offered by Other Departments/Branches Only.

**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 analyse 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

### 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)



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

Course Title: Applied Physics	Course Code: AS20-00BS08
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
<p>Prerequisites:</p> <ul style="list-style-type: none"> <li>• The student must have basic knowledge of units and dimension of physical quantities, principles of mechanics and laws of optics.</li> <li>• The student must be aware of basics of waves and oscillations, fundamental principles of electromagnetic theory.</li> <li>• The student must have fundamental knowledge of mathematical concepts like vector algebra, integration and differentiation.</li> </ul>	

**Course Overview:**

This course deals with quantum principles and explores their applications in studying the behaviour 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**

- To explore the dual nature of the particle and applications of Schrodinger Equation.
- To identify the Concept of Energy band formation and analyze classification of solids.
- To distinguish the differences between Intrinsic and Extrinsic Semiconductors
- To explore the different applications of semiconductor devices.
- To identify the behaviour of solids under electric and magnetic field and understand the concept of superconductivity
- To interpret the characteristics of Lasers, types of Lasers, Optical fiber principle and their applications.

**Course Outcomes (s)**

CO#	Course Outcomes
C112.1	Interprets the dual nature of matter waves using quantum principles.
C112.2	Differentiates the physical properties of conductors, insulators and semiconductors using energy band.
C112.3	Identifies the different types of semiconductors using Hall Effect
C112.4	Analyzes the different properties of semiconductor devices and their applications.
C112.5	Explores the different types of Dielectric and Magnetic materials and their applications in different fields.
C112.6	Identifies the different characteristics and applications of lasers and fiber optics

## COURSE CONTENT

### **Unit - I: QUANTUM 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 2nd 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. <https://ocw.mit.edu/courses/physics/8-231-physics-of-solids-i-fall-2006/download-course-materials/>
2. <http://web.mit.edu/6.732/www/texts.html>

**PROGRAMMING FOR PROBLEM SOLVING**  
**I B.Tech., I 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
C113.1	Designs algorithms and draws flowcharts for solving problems.
C113.2	Converts the algorithms/flowcharts to C programs.
C113.3	Develops the code and tests a given logic in C programming language.
C113.4	Dissects a problem into functions and develops modular reusable code.
C113.5	Demonstrates arrays, pointers, strings and structures in C.
C113.6	Explains Searching and sorting problems.

**COURSE CONTENT**

**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/>

**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
C114.1	Understand the basic concepts of Electrical Circuits.
C114.2	Study various concepts in AC circuits
C114.3	Discuss the concepts of transformer and Induction motor.
C114.4	Discuss the concepts of DC Machines and synchronous machines.
C114.5	Describe the operation of different types of cables, wires and batteries.
C114.6	understand the Performance of different protecting equipment's like MCB, FUSE.

## COURSE CONTENT

### 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/KuJ44LVA4K4C?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover](https://www.google.co.in/books/edition/Basic_Electrical_Engineering/KuJ44LVA4K4C?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/8xTLCgAAQB AJ?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover](https://www.google.co.in/books/edition/Basic_Electrical_Engineering/8xTLCgAAQB AJ?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover)



**ENGINEERING GRAPHICS AND DESIGN**  
**I B.Tech., I 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
C115.1	Apply the concepts of engineering curves in construction using AutoCAD.
C115.2	Solve the problem of projections of points and lines, in different positions using AutoCAD.
C115.3	Solve the problem of projections of planes and solids in different positions using AutoCAD.
C115.4	Solve the problems of Projections of solids and its positions using AutoCAD.
C115.5	Solve the problems on Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions using AutoCAD.
C115.6	Solve the problems on Orthographic Projections and its conversions using AutoCAD.

## COURSE CONTENT

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**

**APPLIED PHYSICS LAB**  
**I B.Tech., I 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: 48 Hrs
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 Electronics, Optics, Opto-Electronics, Communication, Electricity and Magnetism.

**Course Objective**

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

**Course Outcomes(s)**

CO#	Course Outcomes
C116.1	Compute time constant of RC circuit and resonant frequency of LCR circuit.
C116.2	Identify the type of semiconductor using Hall Effect and determine the Energy gap of a semiconductor diode.
C116.3	Analyze the V-I characteristics of Solar cell and LED.
C116.4	Evaluate work Function of a photo metal using photo electric effect.
C116.5	Summarize the variation of Magnetic Field along the current carrying coils.
C116.6	Estimate the light gathering ability and bending losses of Optical fibers.

**LIST OF EXPERIMENTS/DEMONSTRATIONS:**

**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://nptel.ac.in/courses/115/105/115105120/>
2. <https://nptel.ac.in/courses/115/105/115105110/>
3. <https://nptel.ac.in/courses/115/105/115105121/>
4. <https://www.futurelearn.com/courses/teaching-practical-science-physics>
5. <https://www.vlab.co.in/broad-area-physical-sciences>

**Web Reference/E-Books:**

1. <https://ocw.mit.edu/courses/physics/8-231-physics-of-solids-i-fall-2006/download-course-materials/>
2. <http://web.mit.edu/6.732/www/texts.html>

**PROGRAMMING FOR PROBLEM SOLVING LAB**  
**I B.Tech., I 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
C117.1	Develops algorithms for simple problems.
C117.2	Translate given algorithms to a working and correct program.
C117.3	Identifies and correct syntax errors as reported by the compilers.
C117.4	Identifies and correct logical errors encountered during execution.
C117.5	Demonstrates data operations using arrays, strings, structures and pointers of different types.
C117.6	Creates, reads and writes to and from simple text and binary files.

## COURSE CONTENT

### 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 linked 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. I 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
C118.1	Apply the concepts of engineering workshop practice on machine tools and their operations.
C118.2	Expertise on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding.
C118.3	Recognize the tools and apply different trades of Engineering practices on drilling, material removing, measuring, chiseling etc.
C118.4	Apply basic knowledge on electrical engineering for house wiring practice.
C118.5	Manufacture the given material to desired product in a particular pattern by tin smithy.
C118.6	Mould the component of different size and shape by black smithy in on Furnace

## COURSE CONTENT

### 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. Kanniah/ 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 1**  
**I B.Tech., I SEM**  
**VALUE ADDED COURSE**

Course Title: Soft Skills 1	Course Code: AS20-00HS03
Teaching Scheme (L:T:P): 0:0:2	Credits: Nil
Type of Course: Practical	Total Contact Periods:32 Hrs
Continuous Internal Evaluation: 25Marks	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
C119.1	Facilitates better interaction among students.
C119.2	Enhance and improve documentation.
C119.3	Demonstrate leadership qualities.
C119.4	Demonstrate effective presentation skills.
C119.5	Express benevolence.
C119.6	Enhance their communication skills

**COURSE CONTENT**

**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: knowledge on Derivatives, knowledge on Integrations, knowledge on Functions	

**Course Overview:**

- Students will be able to identify Exact and Non-Exact D.E. and find the solutions by using different methods.
- Students will be 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

### 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.

#### **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):**

1. <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

**ENGINEERING CHEMISTRY**  
**I B.Tech., II 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
C122.1	Acquire the Scientific Attitude by means of distinguishing, analyzing and solving various Engineering problems.
C122.2	To know the modern technology and interpret different problems involved in industrial utilization of water.
C122.3	Interpret the knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
C122.4	Summarize the principles and concepts of electrochemistry, corrosion to predict the behavior of a system under different variables.
C122.5	Define and classify the fuels, distinguishing the quality of fuels based on calorific values as well as understand the concepts of petroleum refining.
C122.6	Apply the concepts on basic spectroscopy and application to medical and other fields.



## COURSE CONTENT

### 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 ozonation 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<sub>2</sub>, OH, -COOH, C=O, C≡N, C=C, C≡C, C-O-C), Applications of IR Spectroscopy.

<sup>1</sup>H-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	research.cm.utexas.edu
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	NMR Spectroscopy	<a href="https://chem.libretexts.org/Textbook_Maps/Organic_Chemistry/Map%3A_Organic_Chemistry_(McMurry)/Chapter_13%3A_Structure_Determination_-_Nuclear_Magnetic_Resonance_Spectroscopy">https://chem.libretexts.org/Textbook_Maps/Organic_Chemistry/Map%3A_Organic_Chemistry_(McMurry)/Chapter_13%3A_Structure_Determination_-_Nuclear_Magnetic_Resonance_Spectroscopy</a>

**DATA STRUCTURES THROUGH C++  
I B.Tech., II SEM**

Course Title: Data Structures Through C++	Course Code: AS20-05ES03
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 Outcomes(s)**

CO#	Course Outcomes
C123.1	Explain basic concepts of OOP's and Asymptotic Notations
C123.2	Explain basic concepts such as Abstract Data Types, Linear and Non Linear Data structures.
C123.3	Explain Non Linear Data structures like trees and graphs.
C123.4	Implements and know the application of algorithms for sorting.
C123.5	Understands the importance of hashing and different hashing techniques
C123.6	Design programs using a variety of data structures, including binary and general tree structures, search trees, heaps, graphs, and AVL-trees.

## COURSE CONTENT

### UNIT - I

**C++ Programming Concepts:** Review of C, input and output in C++, functions in C++- value parameters, reference parameters, Parameter passing, function overloading, function templates, Exceptions-throwing an exception and handling an exception, arrays, pointers, new and delete operators, class and object, access specifiers , friend functions, constructors and destructor, Operator overloading, class templates, Inheritance and Polymorphism.

**Basic Concepts** - Data objects and Structures, Algorithm Specification-Introduction, Recursive algorithms, Data Abstraction, Performance analysis-time complexity and space complexity, Asymptotic Notation-Big O, Omega and Theta notations, Complexity Analysis Examples, Introduction to Linear and Non Linear data structures.

### UNIT - II

**Representation of single, two dimensional arrays,** sparse matrices-array and linked representations.

**Linear list** ADT-array representation and linked representation, Singly Linked Lists- Operations- Insertion, Deletion, Circularly linked lists-Operations for Circularly linked lists, Doubly Linked Lists- Operations- Insertion, Deletion.

**Stack** ADT, definition, array and linked implementations, applications-infix to postfix conversion, Postfix expression evaluation, recursion implementation, Queue ADT, definition, array and linked Implementations, Circular queues-Insertion and deletion operations.

### UNIT - III

**Trees** – definition, terminology, Binary trees-definition, Properties of Binary Trees, Binary Tree ADT, representation of Binary Trees-array and linked representations, Binary Tree traversals, threaded binary trees.

**Priority Queues** –Definition and applications, Max Priority Queue ADT-implementation-Max Heap-Definition, Insertion into a Max Heap, Deletion from a Max Heap.

### UNIT - IV

**Searching** - Linear Search, Binary Search, Hashing-Introduction, hash tables, hash functions, Overflow Handling, Comparison of Searching methods.

**Sorting**-Insertion Sort, Selection Sort, Radix Sort, Quick sort, Heap Sort, Merge sort, Comparison of Sorting methods.

### UNIT - V

**Graphs**-Definitions, Terminology, Applications and more definitions, Properties, Graph ADT, Graph Representations- Adjacency matrix, Adjacency lists, Graph Search methods - DFS and BFS, Complexity analysis.

**Search Trees**-Binary Search Tree ADT, Definition, Operations- Searching, Insertion and Deletion, Balanced search trees-AVL Trees-Definition and Examples only, B-Trees- Definition and Examples only, Red-Black Trees-Definitions and Examples only, Comparison of Search Trees.

### **Text Books:**

1. Data structures, Algorithms and Applications in C++, 2nd Edition, Sartaj Sahni, Universities Press.
2. Data structures and Algorithms in C++, Adam Drozdek, 4th edition, Cengage

### **References Books:**

1. Data structures with C++, J. Hubbard, Schaum's outlines, TMH.
2. Data structures and Algorithms in C++, M.T. Goodrich, R. Tamassia and D. Mount, Wiley India.
3. Data structures and Algorithm Analysis in C++, 3rd edition, M. A. Weiss, Pearson.
4. Classic Data Structures, D. Samanta, 2nd edition, PHI.

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

1. <https://www.coursera.org/learn/data-structures>
2. <https://www.coursera.org/specializations/data-structures-algorithms>
3. <http://nptel.ac.in/courses//data-structures>

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

1. <http://gvpcse.azurewebsites.net/pdf/data.pdf>
2. <http://www.sncwgs.ac.in/wp-content/uploads/2015/11/Fundamental-Data-Structures.pdf>
3. <http://www.learnerstv.com/Free-Computer-Science-Video-lectures-ltv247-Page1.htm>
4. <http://ndl.iitkgp.ac.in/document/yVCWqd6u7wgye1qwh9xY7-3lcmoMApVUMmjlExpIb1zste4YXX1pSpX8a2mLgDzZ-E41CJ6PVmY4S0MqVbxsFQ>
5. <http://nptel.ac.in/courses/106102064/1>

**ELECTRONIC DEVICES AND CIRCUITS**  
**I B.Tech., II 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: 48Hrs+ 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**

The objectives of this course are to

- 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)**

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

CO#	Course Outcomes
C124.1	Understand the modifications in its characteristics of 2 and 3 terminal semiconductor devices
C124.2	Gain the practical knowledge of JFET, BJT and some special purpose electronic devices.
C124.3	Design the amplifier circuits under given requirements
C124.4	Analyze the parameters of BJT amplifiers with its frequency response
C124.5	Know the importance of h-parameters in Bipolar Junction Transistor characteristics and its importance in application areas.
C124.6	Design different types of clippers and clampers and identifying its applications

## COURSE CONTENT

### 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 Semiconductor (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:

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/115/102/115102014/>
2. <https://nptel.ac.in/courses/117/101/117101106/>
3. <https://www.coursera.org/learn/electronics>

**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>

**ENGLISH**  
**I B.Tech.-II 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: 1. Basic knowledge of English language 2. Must obtain Grammar, and basic reading skills 3. Able to communicate in English language with basic writing skills 4. Able to use different types of vocabulary in different types 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 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
C125.1	Apply English language effectively in spoken and written forms
C125.2	Analyse the given texts and respond appropriately
C125.3	Apply various grammatical structures in personal and academic fronts.
C125.4	Develop appropriate vocabulary for professional communication
C125.5	Improve competency in various forms of academic and professional writing.
C125.6	Perceive the importance of language skill for the enhancement of employability opportunities.

**COURSE CONTENT**

**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.

**Web Reference/E-Books**

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_English_Grammar_Practice_intermediate_Self_Study_Edition%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)

**DATA STRUCTURES THROUGH C++ LAB**  
**I B.Tech., II SEM**

Course Title: Data Structures Through C++ Lab	Course Code: AS20-05ES04
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical	Total Contact Periods: 48Hrs
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 write and execute programs in C++ to solve problems using data structures such as arrays, linked lists, stacks, queues, trees, graphs, hash tables and search trees.
- To learn to write C++ programs to implement various sorting and searching algorithms.

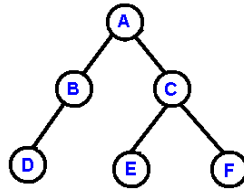
**Course Outcomes(s)**

After completion of course the student is able to

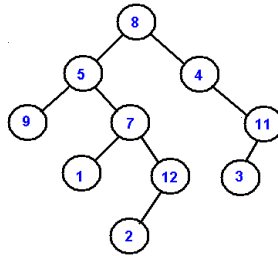
CO#	Course Outcomes
C126.1	Develop C++ programs for real time applications using basic elements like control statements, arrays, functions pointers and string.
C126.2	Understands the importance of Linear data structures like stacks and queues.
C126.3	Explain the Non Linear Data Structures like trees and graphs.
C126.4	Implements and know the application of algorithms for sorting.
C126.5	Explain various search techniques.
C126.6	Explain the applications of various data structures.

**LIST OF EXPERIMENTS/DEMONSTRATIONS**

1. Write a C++ program that uses functions to perform the following:
  - a. Create a singly linked list of integers.
  - b. Delete a given integer from the above linked list.
  - c. Display the contents of the above list after deletion.
2. Write a template based C++ program that uses functions to perform the following:
  - a. Create a doubly linked list of elements.
  - b. Delete a given element from the above doubly linked list.
  - c. Display the contents of the above list after deletion.
3. Write a C++ program that uses stack operations to convert a given infix expression into its postfix equivalent, Implement the stack using an array.
4. Write a C++ program to implement a double ended queue ADT using an array, using a doubly linked list.
5. Write a C++ program that uses functions to perform the following:



- a. Create a binary search tree of characters.
  - b. Traverse the above Binary search tree recursively in preorder, inorder and post order.
6. Write a C++ program that uses function templates to perform the following:
  - a. Search for a key element in a list of elements using linear search.
  - b. Search for a key element in a list of sorted elements using binary search.
7. Write a C++ program to perform the following operations:
  - a. Insertion into an AVL-tree
  - b. Deletion from an AVL-tree.
8. Write a template based C++ program that implements selection sort algorithm to arrange a list of elements in descending order.
9. Write a template based C++ program that implements Quick sort algorithm to arrange a list of elements in ascending order.
10. Write a C++ program that implements Heap sort algorithm for sorting a list of integers in ascending order.
11. Write a C++ program that implements Merge sort algorithm for sorting a list of integers in ascending order.
12. Write a C++ program to implement all the functions of a dictionary(ADT) using hashing.
13. Write a C++ program that implements Radix sort algorithm for sorting a list of integers in ascending order.
14. Write a C++ program that uses functions to perform the following:



- a. Create a binary search tree of integers.
  - b. Traverse the above Binary search tree non recursively in inorder.
15. Write a C++ program that uses functions to perform the following:
- a. Create a binary search tree of integers.
  - b. Search for an integer key in the above binary search tree non recursively.
  - c. Search for an integer key in the above binary search tree recursively.

**Text Books:**

1. Data structures, Algorithms and Applications in C++, S.Sahni, University Press (India) Pvt.Ltd, 2nd edition, Universities Press Orient Longman Pvt. Ltd.
2. Data structures and Algorithms in C++, Michael T.Goodrich, R.Tamassia and Mount, Wiley student edition, John Wiley and Sons.
3. Data structures using C and C++, Langsam, Augenstein and Tanenbaum, PHI.

**References Books:**

1. Data Structures using C++, D. S. Malik, 2nd edition, Cengage learning.
2. Data Structures using C++, V. Patil, Oxford University Press.
3. C++Plus Data Structures, 4<sup>th</sup> edition, Nell Dale, Jones and Bartlett student edition.

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

1. <https://www.coursera.org/learn/data-structures>
2. <https://www.coursera.org/specializations/data-structures-algorithms>

**Web Reference/E-Books:**

1. <http://gvpce.azurewebsites.net/pdf/data.pdf>
2. <http://www.sncwgs.ac.in/wp-content/uploads/2015/11/Fundamental-Data-Structures.pdf>
3. <http://www.learnerstv.com/Free-Computer-Science-Video-lectures-ltv247-Page1.htm>

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



**Course Outcome:**

CO#	Course Outcomes
C127.1	Learn how to pronounce words using phonetic transcription
C127.2	Improves collaborative skills and maximizes speaking skills
C127.3	Develops Neutralization of accent for intelligibility
C127.4	Develops better understanding of nuances of English language through audio-visual experience
C127.5	Improves language skills according in the different situations, discussions and interviews
C127.6	Develops linguistic, communicative and critical thinking

**COURSE CONTENT**

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>

**Text Books**

1. 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_English_Grammar_Practice_intermediate_Self_Study_Edition%20(learnenglishteam.com).pdf)

2. English Grammar through stories by Alan Townend-

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**ENGINEERING CHEMISTRY LAB**  
**I B.Tech., II 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
C128.1	Analyze the need, design and perform a set of experiments.
C128.2	Differentiate hard and soft water; solve the related numerical problems on water purification and its significance in industry and daily life.
C128.3	Understand the kinetics of a reaction from a change in concentration of reactants or products as a function of time.
C128.4	Employ the basic techniques used in chemistry laboratory for analysis such as Thin Layer Chromatography, volumetric titrations, Conduct metric Measurements, Ostwald's viscometer and stalagmometer.
C128.5	To demonstrate the technique of thin Layer Chromatography (TLC) and synthesize drug molecules widely used in industry.
C128.6	Learn safety rules in the practice of laboratory investigations.

**COURSE CONTENT  
LIST OF EXPERIMENTS**

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 -II**  
**I B.Tech. II SEM**  
**VALUE ADDED COURSE**

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

**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:**

CO#	Course Outcomes
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**

**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=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  
SECOND YEAR  
FIRST SEMESTER  
SYLLABUS**

**PROBABILITY AND RANDOM PROCESS  
II B.TECH., I 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
C211.1	Formulate and solve problems involving random variables
C211.2	Apply statistical methods for analysing experimental data by probability distributions
C211.3	Identify Various discrete and continuous probability distributions and their properties
C211.4	Evaluation of regression and correlation
C211.5	Analyze the statistical methods of studying data samples
C211.6	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

**DIGITAL ELECTRONICS  
II B.TECH., I 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
<b>C212.1</b>	Explain working of different logic families and logic gates.
<b>C212.2</b>	Solve Boolean expressions to minimize various combinational functions.
<b>C212.3</b>	Design and implement various Combinational logic circuits.
<b>C212.4</b>	Analyze and design various sequential circuits.
<b>C212.5</b>	Explain the process of Analog to Digital conversion and Digital to Analog conversion.
<b>C212.6</b>	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>

**COMPUTER ORGANIZATION AND ARCHITECTURE  
II B.TECH., I SEMESTER**

Course Title: COMPUTER ORGANIZATION AND ARCHITECTURE	Course Code: AS20-05ES06
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:**

This course will discuss the basic concepts of computer architecture and organization that can help the participants to have a clear view as to how a computer system works. Examples and illustrations will be mostly based on a popular Reduced Instruction Set Computer (RISC) platform. Illustrative examples and illustrations will be provided to convey the concepts and challenges to the participants. Starting from the basics, the participants will be introduced to the state-of-the-art in this field.

**Course Objective**

- The purpose of the course is to introduce principles of computer organization and the basic architectural concepts.
- It begins with basic organization, design, and programming of a simple digital computer and introduces simple register transfer language to specify various computer operations.
- Topics include computer arithmetic, instruction set design, microprogrammed control unit, pipelining and vector processing, memory organization and I/O systems, and multiprocessors.

**Course Outcomes(s)**

CO#	Course Outcomes
C213.1	Understand the basics of processor design and their impact on instructions sets.
C213.2	Demonstrate an understanding of the design of the functional units of a digital computer system.
C213.3	Infer and manipulate representations of numbers stored in digital computers.
C213.4	Understand the design and working of Interfaces and memory devices
C213.5	Design a pipeline for consistent execution of instructions with minimum hazards.
C213.6	Demonstrate an understanding of the design of the basic computer and its instruction sets

**COURSE CONTENT**

**UNIT – I**

**Digital Computers:** Introduction, Block diagram of Digital Computer, Definition of Computer Organization, Computer Design and Computer Architecture. Register Transfer Language and Micro operations: Register Transfer language, Register Transfer, Bus and memory transfers, Arithmetic Micro operations, logic micro-operations, shift micro-operations, Arithmetic logic shift unit.

### UNIT - II

**Basic Computer Organization and Design:** Instruction codes, Computer Registers, Computer instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input – Output and Interrupt.

**Micro-programmed Control:** Control memory, Address sequencing, micro program example, design of control unit.

### UNIT - III

**Central Processing Unit:** General Register Organization, Instruction Formats, Addressing modes, Data Transfer and Manipulation, Program Control.

**Data Representation:** Data types, Complements, Fixed Point Representation, Floating Point Representation.

### UNIT - IV

**Computer Arithmetic:** Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating: point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

**Input-Output Organization:** Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt Direct memory Access.

### UNIT - V

**Memory Organization:** Memory Hierarchy, Main Memory, Auxiliary memory, Associate Memory, Cache Memory.

**Reduced Instruction Set Computer:** CISC Characteristics, RISC Characteristics.

### TEXT BOOK:

1. Computer System Architecture – M. Moris Mano, Third Edition, Pearson/PHI.

### REFERENCE BOOKS:

1. Computer Organization – Car Hamacher, Zvonks Vranesic, Safea Zaky, V<sup>th</sup> Edition, McGrawHill.
2. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
3. Structured Computer Organization – Andrew S. Tanenbaum, 4<sup>th</sup> Edition, PHI/Pearson.

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

1. <https://www.coursera.org/learn/comparch>
2. <http://nptel.ac.in/video.php?subjectId=106102062>
3. <http://nptel.ac.in/courses/106102062/>

### WEB REFERENCE/E-BOOKS:

1. [http://www.hp.com/hpinfo/newsroom/press\\_kits/2013/hpmoonshot2013/DS\\_Moonshot\\_System.pdf](http://www.hp.com/hpinfo/newsroom/press_kits/2013/hpmoonshot2013/DS_Moonshot_System.pdf)
2. <https://www.hpe.com/h20195/v2/getpdf.aspx/c04168328.pdf?ver=11>
3. [http://documents.opto22.com/casestudies/2183\\_Case\\_Study\\_San\\_Diego\\_Supercomputer\\_Center.pdf](http://documents.opto22.com/casestudies/2183_Case_Study_San_Diego_Supercomputer_Center.pdf)

**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>C214.1</b>	Solves real world problems using OOP techniques.
<b>C214.2</b>	Understands the use of abstract classes.
<b>C214.3</b>	Solves problems using java collection framework and I/O classes.
<b>C214.4</b>	Creates multithreaded applications with synchronization.
<b>C214.5</b>	Develops applets for web applications.
<b>C214.6</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>



**ANALYSIS AND DESIGN OF ALGORITHMS  
II B.TECH., I SEMESTER**

Course Title: ANALYSIS AND DESIGN OF ALGORITHMS	Course Code: AS20-12PC01
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:**

This course will provide the program analysis skills needed to develop computer applications efficiently. This course will be begun by covering the asymptotic notations necessary in the study of time and space complexities. Next, it covers the concepts of divide and conquers to analyze the decomposition of complex problems. Further, it discusses the concepts of greedy method to solve the spanning trees and knapsack problems. Then move on to dynamic programming and back tracking to analyze the complex problems with exponential time complexity. Next it covers branch and bound concepts to study the pruning strategies and cost function. Finally, it covers the topics of NP-Hard and NP-Complete to study the non deterministic algorithm.

**Course Objective**

- To understand and apply the algorithm analysis techniques.
- To critically analyze the efficiency of alternative algorithmic solutions for the same problem.
- To understand different algorithm design techniques.
- To understand the limitations of Algorithmic power

**Course Outcomes(s)**

CO#	Course Outcomes
C215.1	Analyze algorithms and estimate their best-case, worst-case and average-case behavior.
C215.2	Design algorithms using standard paradigms like: Greedy, Divide and Conquer, Dynamic Programming and Backtracking.
C215.3	Analyze and solve the problems on Knapsack problem, Job sequencing with deadlines, Minimum cost spanning trees, Single source shortest path problem
C215.4	Construct algorithms using advance data structures and implement traversals techniques.
C215.5	Choose NP class problems and formulate solutions using standard approaches.
C215.6	Explain good principles of algorithm design and apply the same to real word problems.

## COURSE CONTENT

### UNIT-I:

#### INTRODUCTION

Algorithm definition, Pseudocode Specifications, Performance Analysis Space Complexity, Time Complexity, Asymptotic Notations-Big-Oh, Omega, and Theta.

#### DIVIDE AND CONQUER

Divide and Conquer Methodology, Binary Search, Merge sort, Quick sort, Strassen's Matrix Multiplication.

### UNIT-II:

DISJOINT SETS: Disjoint set operations, union and find algorithms, AND/OR graphs, Connected Components and Spanning trees, Bi-connected components

#### BACK TRACKING

The General Method, The n-Queens Problem, Sum of subsets, Graph coloring, Hamiltonian cycles, Knapsack Problem.

### UNIT-III:

#### THE GREEDY METHOD

General Method, Knapsack Problem, Job sequencing with deadlines, Minimum-cost spanning trees- Prim's Algorithm and Kruskal's algorithm, Single source shortest Path.

### UNIT-IV:

#### DYNAMIC PROGRAMMING

General method, Floyd's Algorithm for the All-pairs shortest path, Matrix Chain Multiplication, Optimal Binary search trees, 0/1 Knapsack, the travelling sales man problem.

### UNIT-V:

#### BRANCH AND BOUND

General method, applications - Travelling sales person problem, 0/1 knapsack problem LC Branch and Bound solution, FIFO Branch and Bound solution.

#### NP-HARD AND NP-COMPLETE PROBLEMS

Basic concepts, non-deterministic algorithms, NP-Hard and NP Complete Classes.

### Text Books:

1. Fundamentals of Computer Algorithms, 2nd Edition, Ellis Horowitz, Sartaj Sahni and S. Rajasekharan, Universities Press.
2. Design and Analysis of Algorithms, P. H. Dave, H. B. Dave, 2nd edition, Pearson Education.

**References Books:**

1. Anany Levitin, Introduction to the Design and Analysis of Algorithms, Third Edition, Pearson Education, 2012.
2. R. C. T. Lee, S. S. Tseng, R.C. Chang and T. Tsai (2006), Introduction to Design and Analysis of Algorithms A strategic approach, McGraw Hill, India.

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

1. <https://www.coursera.org/learn/introduction-to-algorithms>
2. [https://onlinecourses.nptel.ac.in/noc16\\_cs04/preview](https://onlinecourses.nptel.ac.in/noc16_cs04/preview)

**IT WORKSHOP LAB  
II B.TECH., I SEMESTER**

Course Title: IT WORKSHOP LAB	Course Code: AS20-05ES07
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

**Course Overview:**

IT workshop works in a learning-by-doing mode. It concentrates more on hands-on experience for the participants rather theoretical classes. It enables the participant to make the best use of Microsoft Office Suite in their day-to-day requirements and make use of it to improve the standards in the educational environment. The IT Workshop prepares the participant to have a hands-on experience in maintaining and troubleshooting a PC by themselves.

**Course Objective**

The IT Workshop for engineers is a training lab course spread over 60 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, Power Point and Publisher.

PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition, hardware and software level troubleshooting process, tips and tricks would be covered. The students should work on working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.

Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber-attacks would be introduced. Productivity tools module would enable the students in crafting professional word documents, excel spread sheets, power point presentations and personal web sites using the Microsoft suite of office tools and LaTeX.

**Course Outcomes(s)**

CO#	Course Outcomes
<b>C216.1</b>	Demonstrate knowledge on computer system such as system unit, input devices, output devices connected to the computer.
<b>C216.2</b>	Applies troubleshooting and uses the booting process that includes switching on the system, execution of POST routine, the bootstrap loader, and loading of the operating system, and getting it ready for use.
<b>C216.3</b>	Analyzes with parts of Word window, to create and save a document, to set page settings, create header and footers, to use various formatting features such as bold face ,italic size, underline, subscript, line spacing changing Text direction, etc.
<b>C216.4</b>	Applies with parts of Excel window, To create and save a workbook with single and/or multiple worksheets to apply operation son range of cells using built –in formulae.
<b>C216.5</b>	Applies with parts of PowerPoint win, to create and save a new presentation, apply design templates to a presentation to insert, edit and delete a slide.
<b>C216.6</b>	Creates different PPTs software application

**COURSE CONTENT**

**PC Hardware**

**Task 1:** Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

**Task 2:** Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

**Task 3:** Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

**Task 4:** Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

**Task 5: Hardware Troubleshooting:** Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

**Task 6: Software Troubleshooting:** Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

### Internet & World Wide Web

**Task1: Orientation & Connectivity Boot Camp:** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

**Task 2: Web Browsers, Surfing the Web:** Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

**Task 3: Search Engines & Netiquette:** Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

**Task 4: Cyber Hygiene:** Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install an antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

### LaTeX and WORD

**Task 1 – Word Orientation:** The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

**Task 2: Using LaTeX and Word** to create project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

**Task 3: Creating project abstract** Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

**Task 4 : Creating a Newsletter :** Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

### Excel

**Excel Orientation:** The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four

tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

**Task 1: Creating a Scheduler** - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

**Task 2 : Calculating GPA** - .Features to be covered:- Cell Referencing, Formulae in excel – average, std.deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP

**Task 3: Performance Analysis** - Features to be covered:- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

### LaTeX and MS/equivalent (FOSS) tool Power Point

**Task 1:** Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes: - PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and PowerPoint. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

**Task 2:** Second week helps students in making their presentations interactive. Topic covered during this week includes: Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts.

**Task 3:** Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), and Inserting – Background, textures, Design Templates, Hidden slides.

### **REFERENCES BOOKS:**

1. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
2. The Complete Computer upgrade and repair book, 3rd edition Cheryl A Schmidt, WILEY Dreamtech
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. PC Hardware - A Handbook – Kate J. Chase PHI (Microsoft)
5. LaTeX Companion – Leslie Lamport, PHI/Pearson.
6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.
7. IT Essentials PC Hardware and Software Labs and Study Guide Third Edition by Patrick Regan – CISCO Press, Pearson Education.

**DIGITAL ELECTRONICS LAB  
II B.TECH., I 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>C217.1</b>	Identify the various digital ICs and understand their operation.
<b>C217.2</b>	Understand the basic logic gates and to verify their operation
<b>C217.3</b>	Construct basic combinational circuits and verify their functionalities
<b>C217.4</b>	Apply the design procedures to design basic sequential circuits
<b>C217.5</b>	Verify truth tables and excitation tables of various flip flops
<b>C217.6</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>

**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>C218.1</b>	Develop a java Program using basic java concepts
<b>C218.2</b>	Create a java program that implements Exception handling
<b>C218.3</b>	Generates a java which implements multithreaded concepts.
<b>C218.4</b>	Develop a java program which implements java collection framework
<b>C218.5</b>	Design a java program which implements events
<b>C218.6</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>

**GENDER SENSATIZATION  
II B.TECH., I 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
<b>C219.1</b>	Develop a better understanding of important issues related to gender in contemporary India.
<b>C219.2</b>	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.
<b>C219.3</b>	Attain a finer grasp of how gender discrimination works in our society and how to counter it.
<b>C219.4</b>	Acquire insight into the gendered division of labor and its relation to politics and economics.
<b>C219.5</b>	Men and women students and professionals will be better equipped to work and live together as equals.
<b>C219.6</b>	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>

**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: 25Marks	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
<b>C2110.1</b>	Understand general concepts of Internet of Things
<b>C2110.2</b>	Recognize various devices, sensors and applications
<b>C2110.3</b>	Apply design concept to IoT solutions
<b>C2110.4</b>	Analyze various M2M and IoT architectures
<b>C2110.5</b>	Evaluate design issues in IoT applications
<b>C2110.6</b>	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%20\(auth.\)%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%20(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: 25Marks	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
<b>C2110.1</b>	Understand the basic concepts of working of robot
<b>C2110.2</b>	Analyze the function of sensor in robot and design the robotic arm with various tools
<b>C2110.3</b>	Analyze and design to Program the robot for a typical application and path planning using robotic vision
<b>C2110.4</b>	Understand the various robot programming languages
<b>C2110.5</b>	Conduct and design the experiments for various robot operations
<b>C2110.6</b>	Apply and use the advanced techniques for robot processing

**COURSE CONTENT**

**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>

**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: 25Marks	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.

**Course Outcomes**

CO#	Course Outcomes
<b>C2110.1</b>	Basic skills using Photoshop software and the peripherals.
<b>C2110.2</b>	Ability to use a range of tools and filters in Photoshop
<b>C2110.3</b>	Ability to print with a variety of techniques and papers.
<b>C2110.4</b>	Creatively solve visual problems.
<b>C2110.5</b>	Evaluate, adjust, refine, and rework solutions.
<b>C2110.6</b>	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, Splines, Quadric Surfaces , Visualization of data sets , 3D affine transformations 3D Rotations using Quaternions , Viewing , Visible surface identification , Color Models, 3D Transformations 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/pu0dDTvLOQTgPmie0WLuXvt4H9rycHjeBa9LTdXG2DA4V1JW8rrM7KbpsQTrCAVZt-4\\_1H\\_mQ7dEd-iLJR2GY8/Corel-CorelDRAW-Graphics-Suite-X6-DE-Win-Bedienungsanleitung-38935e.pdf](https://cdn.billiger.com/dynimg/pu0dDTvLOQTgPmie0WLuXvt4H9rycHjeBa9LTdXG2DA4V1JW8rrM7KbpsQTrCAVZt-4_1H_mQ7dEd-iLJR2GY8/Corel-CorelDRAW-Graphics-Suite-X6-DE-Win-Bedienungsanleitung-38935e.pdf)
4. <https://www.enraversnetwork.com/files/CorelDRAW-X7-Training.pdf>
5. <https://ptgmedia.pearsoncmg.com/images/9780672336997/samplepages/0672336995.pdf>

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

Course Title: PROJECT BASED LEARNING USING JAVA	Course Code: AS20-05PW01
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical Work	Total Contact Periods: 32 Hours
Continuous Internal Evaluation: 25Marks	Semester End Exams : 75 Marks
Prerequisites: OOPS and Core Java	

**Course Overview:**

This course is paced to provide a solid foundation in Java for programmers without syntax experience in a C-based language. Intensive and hands-on, the course emphasizes becoming productive quickly as a Java programmer. Besides learning the basic structure and syntax of the language, students will also learn object-oriented principles and how they are applied in Java applications. The course then covers the I/O streams and collections API packages. This course is current to Java 8 and uses the Eclipse / Netbean IDE.

**Course Objective:**

- To introduce the object-oriented programming concepts.
- 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>C2110.1</b>	Solve real world problems using OOP techniques
<b>C2110.2</b>	Understand the functionalities of Inheritance, Interface and Packages.
<b>C2110.3</b>	Solves problems using java collection framework and Stream based I/O classes.
<b>C2110.4</b>	Develops multithreaded applications with synchronization.
<b>C2110.5</b>	Designs web applications using Applets
<b>C2110.6</b>	Designs GUI based applications with Swing concept

## COURSE CONTENT

Week 1: Airline reservation system

Week 2: Course management system.

Week 3: Electricity billing system

Week 4: e-Healthcare management system.

Week 5: Email client software.

Week 6: Library management system

Week 7: Network packet sniffer

Week 8: Online bank management system

Week 9: Online quiz management system.

Week 10: Online Survey System

### **Beyond the Syllabus**

- a) Supply chain management system
- b) Data visualization software

### **TEXT BOOK:**

1. Kathy Sierra, Bert Bates, Head First Java, 2nd Edition-O'Reilly Publication

### **REFERENCE BOOKS:**

2. Peter Verhas, Java Projects - Second Edition, Packt Publication
3. Kanetkar Yashavant P, Java Projects - BPB Publication

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

1. [https://onlinecourses.swayam2.ac.in/aic20\\_sp13/preview](https://onlinecourses.swayam2.ac.in/aic20_sp13/preview)
2. [https://onlinecourses.nptel.ac.in/noc19\\_cs84/preview](https://onlinecourses.nptel.ac.in/noc19_cs84/preview)

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

1. <https://www.w3schools.com/java/>
2. <https://www.tutorialspoint.com/java/index.htm>
3. <https://www.javatpoint.com/java-tutorial>

**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: 25Marks	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

- 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  
SECOND SEMESTER  
SYLLABUS**

**UNIVERSAL HUMAN VALUES -II  
II B.TECH., II SEMESTER**

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: 48 + 16 Hours
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 as Coexistence</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. To Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
2. To Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
3. To Strengthening of self-reflection.
4. To Development of commitment and courage to act.
5. To Understanding Harmony in the Nature and Existence.
6. To Understanding of Harmony on Professional Ethics

**Course Outcomes**

After completion of the course the student is able to,

CO#	Course Outcomes
<b>C221.1</b>	Understand Basic guideline of human values universally.
<b>C221.2</b>	Understanding the harmony in the human being
<b>C221.3</b>	Analyse about society – Harmony @ human relation
<b>C221.4</b>	Remember the student can study the professional ethics and values.
<b>C221.5</b>	Understand harmony in the nature and existence
<b>C221.6</b>	Understanding of Harmony on Professional Ethics

## COURSE CONTENT

### 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 self-regulation 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: Ek Parichaya, 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

**DATABASE MANGEMENT SYSTEMS  
II B.TECH., II SEMESTER**

Course Title: DATABASE MANGEMENT SYSTEMS	Course Code: AS20-05PC04
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:- Object oriented Programming , Mathematical Foundations of Computer Science	

**Course Overview:**

This course introduces the core principles and techniques required in the design and implementation of database systems. This course focus on relational database management systems, including database design theory: E-R modeling, data definition and manipulation languages, database security and administration. It also covers essential DBMS concepts such as: Transaction Processing, Concurrency Control and Recovery and various types of databases like distributed database, and intelligent database, Client/Server. It also provides students with theoretical knowledge and practical skills in the use of databases and database management systems in information technology applications.

**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 Outcomes(s)**

CO#	Course Outcomes
<b>C222.1</b>	Demonstrates the basic elements of a relational database management system.
<b>C222.2</b>	Identifies the data models for relevant problems.
<b>C222.3</b>	Designs entity relationship model and converts entity relationship diagrams into RDBMS and formulates SQL queries on the data.
<b>C222.4</b>	Applies normalization for the development of application software.
<b>C222.5</b>	Describes various transactional properties and lock-based protocols
<b>C222.6</b>	Describes storage and indexing like tree structured and Hash based indexing.

## COURSE CONTENT

### UNIT - I

**Database System Applications:** A Historical Perspective, File Systems versus a DBMS, the Data Model, Levels of Abstraction in a DBMS, Data Independence, Structure of a DBMS

**Introduction to Database Design:** Database Design and ER Diagrams, Entities, Attributes, and Entity Sets, Relationships and Relationship Sets, Additional Features of the ER Model, Conceptual Design With the ER Model.

### UNIT - II

**Introduction to the Relational Model:** Integrity constraint over relations, enforcing integrity constraints, querying relational data, logical data base design, introduction to views, destroying/altering tables and views.

Relational Algebra, Tuple relational Calculus, Domain relational calculus.

### UNIT - III

**SQL: QUERIES, CONSTRAINTS, TRIGGERS:** form of basic SQL query, UNION, INTERSECT, and EXCEPT, Nested Queries, aggregation operators, NULL values, complex integrity constraints in SQL, triggers and active data bases.

**Schema Refinement:** Problems caused by redundancy, decompositions, problems related to decomposition, reasoning about functional dependencies, FIRST, SECOND, THIRD normal forms, BCNF, lossless join decomposition, multi-valued dependencies, FOURTH normal form, FIFTH normal form.

### UNIT - IV

**Transaction Concept:** Transaction State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for serializability, Lock Based Protocols, Timestamp Based Protocols, Validation-Based Protocols, Multiple Granularity, Recovery and Atomicity, Log-Based Recovery, Recovery with Concurrent Transactions.

### UNIT - V

**Data on External Storage:** File Organization and Indexing, Cluster Indexes, Primary and Secondary Indexes, Index data Structures, Hash Based Indexing, Tree base Indexing, Comparison of File Organizations, Indexes and Performance Tuning, Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM), B+ Trees: A Dynamic Index Structure.

#### **TEXT BOOKS:**

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, *Tata Mc Graw Hill*, 3rd Edition
2. Database System Concepts, Silberschatz, Korth, *Mc Graw hill*, V edition.

#### **REFERENCES BOOKS:**

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate, *Pearson Education*

3. Introduction to Database Systems, C. J. Date, *Pearson Education*
4. Oracle for Professionals, The X Team, S.Shah and V. Shah, *SPD*.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, *PHI*.

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

1. [https://onlinecourses.nptel.ac.in/noc19\\_cs46/preview](https://onlinecourses.nptel.ac.in/noc19_cs46/preview)
2. [https://onlinecourses.nptel.ac.in/noc20\\_cs60/preview](https://onlinecourses.nptel.ac.in/noc20_cs60/preview)
3. [https://onlinecourses.swayam2.ac.in/cec19\\_cs05/preview](https://onlinecourses.swayam2.ac.in/cec19_cs05/preview)

**WEB REFERENCE/E-BOOKS:**

1. <https://www.javatpoint.com/dbms-tutorial>
2. <https://www.tutorialspoint.com/dbms/index.htm>



**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
<b>C223.1</b>	Explain various operators used in python.
<b>C223.2</b>	Apply the string handling functions to solve the given problem.
<b>C223.3</b>	Describe Object oriented concepts with python.
<b>C223.4</b>	Use image processing techniques in python programming to solve a given problem.
<b>C223.5</b>	Discuss the functions of networking in python.
<b>C223.6</b>	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>

**PRINCIPLES OF OPERATING SYSTEMS  
II B.TECH., II SEMESTER**

Course Title: PRINCIPLES OF OPERATING SYSTEMS	Course Code: AS20-12PC03
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
<b>C224.1</b>	Compares the different operating systems and basic architectural components involved in OS design
<b>C224.2</b>	Solves problems related to the process management
<b>C224.3</b>	Analyzes the deadlocks and solves the problem of deadlock
<b>C224.4</b>	Solves the problem of process communication and interprocess communication
<b>C224.5</b>	Explains the concept of Memory management
<b>C224.6</b>	Explains the concept of File system management and its application

**COURSE CONTENT**

**UNIT - I**

**Operating System:** Introduction, Structures :Simple Batch, Multiprogrammed, 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. Dhamdhere, 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. <https://nptel.ac.in/courses/106/106/106106144/>
3. [https://onlinecourses.nptel.ac.in/noc21\\_cs88/preview](https://onlinecourses.nptel.ac.in/noc21_cs88/preview)

**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
C225.1	Applies mathematical logic to solve problems.
C225.2	Explains sets, relations, functions, and discrete structures.
C225.3	Explains the use of logical notation to define and reason about fundamental mathematical concepts such as sets, relations, and functions.
C225.4	Formulates problems and solve recurrence relations.
C225.5	Models and generates the function
C225.6	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/>

**DATABASE MANAGEMENT SYSTEM LAB  
II B.TECH., II SEMESTER**

Course Title: DATABASE MANAGEMENT SYSTEM LAB	Course Code: AS20-05PC08
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

**Course Overview:**

This course introduces the core principles and techniques required in the design and implementation of database systems. This course focus on relational database management systems including data definition language, data manipulating languages. SQL is used to share and manage data, particularly the data that is found in relational database management systems - where the data is organized in tables, and where multiple files, each containing tables of data, may be related together by a common field. This course will cover the Oracle 10g PL/SQL programming language. Student will learn to control data sharing and learn to develop triggers, procedures, functions, cursors.

**Course Objective**

This course will enable students to

- Foundation knowledge in database concepts, technology and practice to groom students into well- informed database application developers.
- Strong practice in SQL programming through a variety of database problems.
- Develop database applications using front-end tools and back-end DBMS.

**Course Outcomes(s)**

CO#	Course Outcomes
<b>C226.1</b>	Designs and implements a database schema for given problem.
<b>C226.2</b>	Acquire skills in using SQL commands for data definition and data manipulation
<b>C226.3</b>	Applies the normalization techniques for development of application software to realistic problems.
<b>C226.4</b>	Formulates queries using SQL DML/DDL/DCL commands.
<b>C226.5</b>	Develop solutions for database applications using procedures, cursors and triggers.
<b>C226.6</b>	Declare and enforce integrity constraints on a database using RDBMS.

## COURSE CONTENT

### 1. Consider the following schema for a Library Database:

BOOK(Book\_id, Title, Publisher\_Name, Pub\_Year)

BOOK\_AUTHORS(Book\_id, Author\_Name)

PUBLISHER(Name, Address, Phone)

BOOK\_COPIES(Book\_id, Programme\_id, No-of\_Copies)

BOOK\_LENDING(Book\_id, Programme\_id, Card\_No, Date\_Out, Due\_Date)

LIBRARY\_PROGRAMME(Programme\_id, Programme\_Name, Address)

### To implement the following task:

1. Concept design with E-R Model
2. Relational Model
3. Normalization
4. Practicing DDL commands
5. Practicing DML commands
6. Querying (using ANY, ALL, IN, Exists, NOT EXISTS, UNION, INTERSECT, Constraints etc.)
7. Queries using Aggregate functions, GROUP BY, HAVING and Creation and dropping of Views.
8. Triggers (Creation of insert trigger, delete trigger, update trigger)
9. Procedures
10. Usage of Cursors

### TEXT BOOKS:

1. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata Mc Graw Hill, 3rd Edition
2. Database System Concepts, Silberschatz, Korth, McGraw Hill, 5<sup>th</sup> edition.

### REFERENCES BOOKS:

1. Database Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7<sup>th</sup> Edition.
2. Fundamentals of Database Systems, Elmasri Navrate, *Pearson Education*
3. Introduction to Database Systems, C.J. Date, *Pearson Education*
4. Oracle for Professionals, The X Team, S. Shah and V. Shah, *SPD*.
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, *PHI*.
6. Fundamentals of Database Management Systems, M. L. Gillenson, Wiley Student Edition.

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

1. <http://nptel.ac.in/video.php?subjectId=106106093>
2. <http://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-830-database-systems-fall-2010/>

### WEB REFERENCE/E-BOOKS:

1. [www.tutorialspoint.com/dbms/](http://www.tutorialspoint.com/dbms/)



**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
<b>C227.1</b>	Study the basic concepts scripting and the contributions of scripting language.
<b>C227.2</b>	Demonstrate proficiency in handling Strings and File Systems.
<b>C227.3</b>	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
<b>C227.4</b>	Explore python especially the object oriented concepts, and the built in objects of Python.
<b>C227.5</b>	Create practical and contemporary applications such as TCP/IP network programming.
<b>C227.6</b>	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>

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

Course Title: OPERATING SYSTEMS LAB	Course Code: AS20-12PC05
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 Outcome(s):**

CO#	Course Outcomes
C228.1	Applies basic services and functionalities of the operating system using system calls
C228.2	Writes programs for using system calls
C228.3	Implements Bankers algorithm for deadlock avoidance and prevention
C228.4	Implements semaphores for producer-consumer problem
C228.5	Illustrates the IPC mechanisms
C228.6	Constructs the memory management techniques

**COURSE CONTENT**

1. Write programs using the following system calls of UNIX operating system: fork, exec, getpid, exit, wait, close.
2. Write programs using the I/O System calls of UNIX operating system (open, read, write,etc).
3. Given the list of processes, their CPU burst times. Display/print the Gantt chart for

- FCFS scheduling algorithm. Compute and print the average waiting time and average turnaroundtime.
4. Given the list of processes, their CPU burst times and arrival times. Display the Gantt chart for SJF scheduling algorithm. Compute and print the average waiting time and average turnaround time.
  5. Given the list of processes, their CPU burst times and time quantum. Display the Gantt chart for Round robin scheduling algorithm. Compute and print the average waiting time and average turnaround time.
  6. Given the list of processes, their CPU burst times and arrival times. Display the Gantt chart for Priority scheduling algorithm. Compute and print the average waiting time and average turnaroundtime.
  7. Develop application using Inter-Process Communication (using shared memory, pipes or message queues).
  8. Implement the Producer-Consumer problem using semaphores (using UNIX systemcalls).
  9. Implement Memory management schemes like paging and segmentation.
  10. Implement Memory allocation schemes like First fit, Best fit and Worstfit.
  11. Implement the Banker's algorithms to avoid Deadlock.
  12. Write a C program to simulate disk scheduling algorithms:
    - FCFS
    - SCAN
    - C-SCAN

### **Text Books:**

1. Ramaz Elmasri, A. Gil Carrick, David Levine, –Operating Systems – A Spiral Approach, Tata McGraw Hill Edition, 2010.
2. Achyut S. Godbole, Atul Kahate, –Operating Systems, Mc Graw Hill Education, 2016.
3. Andrew S. Tanenbaum, –Modern Operating Systems, Second Edition, Pearson Education, 2004.

### **References 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.

### **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)

**CONSTITUTION OF INDIA  
II B.TECH., II SEMESTER  
MANDATORY COURSE**

Course Title: CONSTITUTION OF INDIA	Course Code:AS20-00MC03
Teaching Scheme (L:T:P) : 3:0:0	Credits: 0
Type of Course: Lecture	Total Contact Periods: 48 Hours
Continuous Internal Evaluation-0 Marks	Semester End Exams-100 Marks
Prerequisites:- The course on constitution of India highlights key features of Indian Constitution, like directive principles of state policy, fundamental rights and duties, and the various organs of constitution. The course aims at providing general awareness about the Indian Constitution, and is not developed for the study on Law.	

**Course Overview:**

Identify and explore the basic features and modalities about Indian constitution. Differentiate and relate the functioning of Indian parliamentary system at the center and state level. Differentiate different aspects of Indian Legal System and its related bodies.

**Course Objective**

- To Enable the student to understand the importance of constitution
- To understand the structure of executive, legislature and judiciary
- To understand philosophy of fundamental rights and duties.
- To know about the Administration, Concept and Development of Human Rights,
- To understand the autonomous nature of constitutional bodies like Supreme Court and high court, controller and auditor general of India and election commission of India.
- understand the central and state relation, financial and administrative.

**Course Outcomes(s)**

CO#	Course Outcomes
<b>C229.1</b>	To understand the sources, features and principles of Indian Constitution.
<b>C229.2</b>	To analyze about Union Government, State government and its administration.
<b>C229.3</b>	To remember to get acquainted with Local administration and Pachayati Raj.
<b>C229.4</b>	To understand Be aware of basic concepts and developments of Human Rights.
<b>C229.5</b>	To apply Gain knowledge on roles and functioning of Election Commission.
<b>C229.6</b>	To understand the election commission for sustaining democracy, application.

## COURSE CONTENT

### UNIT - I

**Constitution:** Introduction to constitution of India, Meaning and importance of Constitution, Making of Indian Constitution, Sources, Salient features of Indian Constitution, and constitutional history, Features, citizenship, Preamble,

**Fundamental Rights and Directive Principles:** Fundamental Rights, Fundamental Duties, Directive Principles of State Policy.

### UNIT - II

**Government of Indian Union :** President of India : Election and Powers , Prime Minister and Council of Ministers Lok Sabha , Cabinet and Central Secretariat :Composition and Powers, Rajya Sabha : Composition and Powers, Federalism, Centre: State relationship, Lok Sabha, Rajya Sabha,

**Government of Indian State:** State Government and its Administration Governor :Powers, Chief Minister and Council of Ministers, Legislative Assembly : Composition and powers, Legislative Council : Composition and powers State Secretariat: Organization, Structure and Functions,

### UNIT - III

**The Judiciary:** Features of judicial system in India, Supreme Court : Structure, functions and jurisdiction, High Court : Structure, function and jurisdiction,

**Local Administration District's Administration head:** Role and Importance, Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation, B: Pachayati raj: Introduction, PRI: Zila Pachayat, Elected officials and their roles, CEO Zila Pachayat: Position and role, Block level: Organizational Hierarchy (Different departments), Village level: Role of Elected and Appointed officials, Importance of grass root democracy

### UNIT - IV

**Concept and Development of Human Rights:** Meaning Scope and Development of Human Rights, United Nations and Human Rights : UNHCR, UDHR 1948, ICCPR 1996 and ICESCR 1966,

**Human Rights in India:** Protection of Human Rights Act, 1993 (NHRC and SHRC), First, Second and Third Generation Human Rights, Judicial Activism and Human Rights. Citizen oriented measures – RTI and PIL – Provisions and significance

### UNIT - V

**Federalism in India :** Features, Election Commission: Election Commission: Role and Functioning, Chief Election Commissioner and Election Commissioners, State Election Commission: Role and Functioning.

Institute and Bodies for the welfare of SC/ST/OBC and women 117

### TEXT BOOK:

1. Durga Das Basu, Introduction to the Constitution of India, Gurgaon; LexisNexis, 2018 (23rd edn.)
2. M.V.Pylee, India's Constitution, New Delhi; S. Chand Pub., 2017 (16th edn.)
3. J.A. Siwach, Dynamics of Indian Government & Politics

**REFERENCE BOOK:**

1. M.V. Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd. New Delhi
2. Durga Das Basu, Bharatada Samvidhana Parichaya, Gurgaon; LexisNexis Butterworths Wadhwa, 2015
3. M.V. Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd. New Delhi
4. J.N. Pandey, The Constitutional Law of India, Allahabad; Central Law Agency, 2018 (55th edn.)

**E-RESOURCES:**

1. [nptel.ac.in/courses/109104074/8](http://nptel.ac.in/courses/109104074/8)
2. [nptel.ac.in/courses/109104045/](http://nptel.ac.in/courses/109104045/)
3. [nptel.ac.in/courses/101104065/](http://nptel.ac.in/courses/101104065/)
4. [www.hss.iitb.ac.in/en/lecture-details](http://www.hss.iitb.ac.in/en/lecture-details)
5. [www.iitb.ac.in/en/event/2nd-lecture-institute-lecture-series-indian-constitution](http://www.iitb.ac.in/en/event/2nd-lecture-institute-lecture-series-indian-constitution)

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

Course Title: INNOVATIVE PROJECT DEVELOPMENT	Course Code: AS20-12PW03
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical	Total Contact Periods: 32 Hours
Continuous Internal Evaluation: 25Marks	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

### 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. Mauricio 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: 25Marks	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: 25Marks	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)**

CO#	Course Outcomes
<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

### 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: 25Marks	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
C2210.1	Understand the fundamentals to simulation software
C2210.2	Understand the matrices and arrays in MATLAB
C2210.3	Understand the working of matrices and expression in MATLAB
C2210.4	Understand the Common windows and graphics working in MATLAB
C2210.5	Understand the Flow control and Data structure handling in MATLAB
C2210.6	Understand the Scripting and function availability in MATLAB

**COURSE CONTENT**

**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/>

**EMBEDDED SYSTEM DESIGN USING ADVANCED PROCESSORS  
II B.TECH., II SEMESTER  
VALUE ADDED COURSE**

Course Title: EMBEDDED SYSTEM DESIGN USING ADVANCED PROCESSORS	Course Code: AS20-04PW07
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical	Total Contact Periods: 32 Hours
Continuous Internal Evaluation: 25Marks	Semester End Exams : 75 Marks
Prerequisites: Basics of Microcontroller and Microprocessor, C-language Programming.	

**Course Overview:**

An embedded system is nearly any computing system other than a desktop computer. An embedded system is a dedicated system which performs the desired function upon power up, repeatedly. Embedded systems are found in a variety of common electronic devices such as consumer electronics ex. Cell phones, pagers, digital cameras, VCD players, portable Video games, calculators, etc.

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

1. Understanding of RISC principles and RISC processor architectures.
2. Deep understanding of ARM architecture and its organization.
3. Programming concepts of ARM based microcontroller.
4. Fundamentals of operating system for Embedded System.

**Course Outcomes:**

After completion of the course, students will be able to:

CO#	Course Outcomes
<b>C2210.1</b>	Apply the knowledge of ARM architecture and organization for modern ARM devices.
<b>C2210.2</b>	Utilize knowledge, techniques and skill to integrate microcontroller hardware and software.
<b>C2210.3</b>	Use the concepts of Embedded operating System for designing OS based application.
<b>C2210.4</b>	Design of embedded system using ARM cores
<b>C2210.5</b>	Design the system applications using Embedded C programming.
<b>C2210.6</b>	Understand the design requirements and architecture of embedded systems.

**COURSE CONTENT:**

**UNIT - I**

**ARM Architecture:** ARM Design Philosophy, Registers, Program Status Register, Instruction Pipeline, Interrupts and Vector Table, Architecture Revision, ARM Processor Families

**UNIT - II**

**ARM Programming Model – I:** Instruction Set: Data Processing Instructions, Addressing Modes, Branch, Load, Store Instructions, PSR Instructions, Conditional Instructions

**UNIT - III**

**ARM Programming Model – II:** Thumb Instruction Set: Register Usage, Other Branch Instructions, Data Processing Instructions, Single-Register and Multi Register Load-Store Instructions, Stack, Software Interrupt Instructions

**UNIT - IV**

**ARM Programming:** Simple C Programs using Function Calls, Pointers, Structures, Integer and Floating Point Arithmetic, Assembly Code using Instruction Scheduling, Register Allocation, Conditional Execution and Loops..

**UNIT - V**

**Memory Management:** Details of ARM MMU, Page Tables, Translation, Access Permissions, Context Switch..

**TEXT BOOKS:**

- 1.ARM Systems Developer's Guides- Designing, Optimizing System Software – Andrew N. Sloss, Dominic Symes, Chris Wright, 2008, Elsevier.
2. ARM system on chip Architecture: Steve Furber, Person Education Addison Wesley, (2/E) 2000

**REFERENCE BOOKS :**

- 1.Guide to RISC Processors for Programmers and Engineers: Sivarama P. Dandamudi, Springer, (2005)
- 2.Embedded System Design: Steve Heath, Butterworth Helnemann,(2/E) (2002)
- 3.Micro C/OS II The Real Time Kernel: Jean J. Labrosse, CMPBooks,(2/E) (2002)

**SOFTWARE**

1. <https://www.keil.com/download/>
2. <https://www.flashmagictool.com/download.html&d=flashmagic>

**WEB RESOURCES:**

1. <https://developer.arm.com/documentation/ddi0487/latest/>
2. [https://www.keil.com/support/man/docs/uv4/uv4\\_creating\\_apps.htm](https://www.keil.com/support/man/docs/uv4/uv4_creating_apps.htm)
3. <https://www.nxp.com/docs/en/user-guide/UM10139.pdf>
4. [https://embetronicx.com/tutorials/microcontrollers/lpc2148/lcd\\_interfacing-with-lpc2148-arm7/](https://embetronicx.com/tutorials/microcontrollers/lpc2148/lcd_interfacing-with-lpc2148-arm7/)
5. [https://www.exploreembedded.com/wiki/LPC2148\\_Led\\_Blinking](https://www.exploreembedded.com/wiki/LPC2148_Led_Blinking)