COURSE STRUCTURE

I- BTECH I SEM									
COURSE CODE	**COURSE TITLE**	**COURSE AREA**	**HOURS/ WEEK**			**CREDIT**	**Internal Marks**	**External marks**	**Total Marks**
			L	T	P				
AS20-00BS06	LINEAR ALGEBRA AND ADVANCED CALCULUS	BSC	3	1	0	3	30	70	100
AS20-00BS08	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 ANDDESIGN	ESC	2	0	3	3.5	30	70	100
PRACTICAL COURSES									
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
VALUE ADDED COURSE									
AS20-00HS03	SOFT SKILLS-I	HSMC	2	0	0	0	25	75	100
TOTAL						**20.5**			

I BTECH II SEM									
COURSE CODE	**COURSE TITLE**	**COURSE AREA**	**HOURS/ WEEK**			**CREDIT**	**Internal Marks**	**External marks**	**Total Marks**
			L	**T**	**P**				
AS20-00BS01	DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS	BSC	3	1	0	3	30	70	100
AS20-00BS02	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
PRACTICAL COURSES									
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
VALUE ADDED COURSE									
AS20-00HS04	SOFT SKILLS-II	HSMC	2	0	0	0	25	75	100
TOTAL						**17.5**			

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
AS20-05ES06	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
AS20-05PC02	MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE	PCC	3	1	0	3	30	70	100
AS20-04ES06	DIGITAL ELCTRONICS	ESC	3	1	0	3	30	70	100
PRACTICAL COURSES									
AS20-05ES07	IT WORKSHOP 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
AS20-04ES07	DIGITAL ELECTRONICS LAB	ESC	0	0	3	1.5	30	70	100
MANDATORY COURSE									
AS20-00MC02	GENDER SENSITISATION	MC	3	0	0	0	0	100	100
VALUE ADDED COURSE* (ANY ONE COURSE OF CHOICE)									
AS20-12PW01	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
TOTAL						**20.5**			

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
AS20-05PC05	DESIGN AND ANALYSIS OF ALGORITHMS	PCC	3	1	0	3	30	70	100
AS20-05PC06	OPERATING SYSTEMS	PCC	3	1	0	3	30	70	100
AS20-05PC07	PYTHON PROGRAMMING	PCC	3	0	0	3	30	70	100
PRACTICAL COURSES									
AS20-05PC08	DATABASE MANAGEMENT SYSTEMS LAB	PCC	0	0	3	1.5	30	70	100
AS20-05PC09	OPERATING SYSTEMS LAB	PCC	0	0	3	1.5	30	70	100
AS20-05PC10	PYTHON PROGRAMMING 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)									
AS20-05PW03	INNOVATIVE PROJECT DEVELOPMENT	PW	0	0	2	1	25	75	100
AS20-66PW03	VIRTUAL REALITY	PW	0	0	2	1	25	75	100
AS20-05PW04	ANDROID APP DEVELOPMENT	PW	0	0	2	1	25	75	100
AS20-04PW05	INTRODUCTION TO MATLAB AND ITS APPLICATIONS	PW	0	0	2	1	25	75	100
AS20-04PW07	EMBEDDED SYSTEM DESIGN USING ADVANCED PROCESSORS	PW	0	0	2	1	25	75	100
TOTAL						**20.5**			

III BTECH I SEM									
Course Code	**COURSE TITLE**	**COURSE AREA**	**HOURS/WEEK**			**CREDIT**	**Internal Marks**	**External marks**	**Total Marks**
			L	**T**	**P**				
AS20-05PC11	FORMAL LANGUAGES AND AUTOMATA THOERY	PCC	3	1	0	3	30	70	100
AS20-05PC12	SOFTWARE ENGINEERING	PCC	3	1	0	3	30	70	100
AS20-12ES01	PRINCIPLES OF COMMUNICATION AND COMPUTER NETWORKS	ESC	3	1	0	3	30	70	100
AS20-05PE1X	PROFESSIONAL ELECTIVE –I	PE	3	1	0	3	30	70	100
AS20-05OE1X	OPEN ELECTIVE -1	OE	3	0	0	3	30	70	100
PRACTICAL COURSES									
AS20-00HS05	ADVANCED ENGLISH COMMUNICATION SKILLS LAB	HSMC	0	0	3	1.5	30	70	100
AS20-05PC13	SOFTWARE ENGINEERING LAB	PCC	0	0	3	1.5	30	70	100
AS20-05PC14	COMPUTER NETWORKS LAB	PCC	0	0	3	1.5	30	70	100
MANDATORY COURSE									
AS20-00MC05	ARTIFICIAL INTELLIGENCE	MC	3	0	0	0	0	100	100
AS20-00MC07	INTELLECTUAL PROPERTY RIGHTS	MC	3	0	0	0	0	100	100
VALUE ADDED COURSE* (ANY ONE COURSE OF CHOICE)									
AS20-00HS10	APTITUDE SKILLS	HSMC	2	0	0	1	25	75	100
AS20-00HS11	STARTUP MANAGEMENT	HSMC	2	0	0	1	25	75	100
AS20-00HS12	ERP TOOLS	HSMC	2	0	0	1	25	75	100
TOTAL						**20.5**			

Professional Elective-I									
Course Code	**COURSE TITLE**	**COURSE AREA**	**HOURS/ WEEK**			**CREDIT**	**Internal Marks**	**External marks**	**Total Marks**
			L	**T**	**P**				
AS20-05PE11	LINUX PROGRAMMING	PE	3	1	0	3	30	70	100
AS20-05PE12	IMAGE PROCESSING	PE	3	1	0	3	30	70	100
AS20-05PE13	DATA ANALYTICS	PE	3	1	0	3	30	70	100
AS20-05PE14	MULTIMEDIA COMPUTING	PE	3	1	0	3	30	70	100
AS20-05PE15	PRINCIPLES OF PROGRAMMING LANGUAGES	PE	3	1	0	3	30	70	100
TOTAL						**3**			

Open Elective-I									
Course Code	**COURSE TITLE**	**COURSE AREA**	**HOURS/WEEK**			**CREDIT**	**Internal Marks**	**External marks**	**Total Marks**
			L	**T**	**P**				
AS20-05OE11	MATHEMATICAL FOUNDATIONS FOR COMPUTER SCIENCE	OE	3	0	0	3	30	70	100
AS20-05OE12	DATA BASE MANAGEMENT SYSTEMS	OE	3	0	0	3	30	70	100
AS20-05OE13	COMPUTER ORGANIZATION AND ARCHITECTURE	OE	3	0	0	3	30	70	100
AS20-05OE14	OBJECT ORIENTED PROGRAMMING THROUGH C++	OE	3	0	0	3	30	70	100
TOTAL						**3**			

III BTECH II SEM									
Course Code	**COURSE TITLE**	**COURSE AREA**	**HOURS/ WEEK**			**CREDIT**	**Internal Marks**	**Externa l marks**	**Total Marks**
			L	T	P				
AS20-00HS06	BUSINESS ECONOMICS FINANCIAL ANALYSIS	HSMC	3	1	0	3	30	70	100
AS20-05PC15	MACHINE LEARNING	PCC	3	1	0	3	30	70	100
AS20-05PC16	COMPILER DESIGN	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									
AS20-05PC17	MACHINE LEARNING LAB	PCC	0	0	3	1.5	30	70	100
AS20-05PC18	COMPILER DESIGN LAB	PCC	0	0	3	1.5	30	70	100
AS20-05PC19	WEB PROGRAMMING 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)									
AS20-05PW05	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
TOTAL						**20.5**			

Professional Elective-II									
Course Code	**COURSE TITLE**	**COURSE AREA**	**HOURS/ WEEK**			**CREDIT**	**Internal Marks**	**External marks**	**Total Marks**
			L	**T**	**P**				
AS20-05PE21	WEB TECHNOLOGIES	PE	3	1	0	3	30	70	100
AS20-05PE22	R PROGRAMMING	PE	3	1	0	3	30	70	100
AS20-05PE23	SCRIPTING LANGUAGES	PE	3	1	0	3	30	70	100
AS20-05PE24	SOFTWARE TESTING METHODOLOGIES	PE	3	1	0	3	30	70	100
AS20-05PE25	MOBILE APPLICATION DEVELOPMENT	PE	3	1	0	3	30	70	100
TOTAL						**3**			

Open Elective-II									
Course Code	**COURSE TITLE**	**COURSE AREA**	**HOURS/WEEK**			**CREDIT**	**Internal Marks**	**External marks**	**Total Marks**
			L	**T**	**P**				
AS20-05OE21	COMPUTER NETWORKS	OE	3	0	0	3	30	70	100
AS20-05OE22	OPERATING SYSTEMS	OE	3	0	0	3	30	70	100
AS20-05OE23	DATA STRUCTURE	OE	3	0	0	3	30	70	100
AS20-05OE24	JAVA PROGRAMMING	OE	3	0	0	3	30	70	100
TOTAL						**3**			

IV BTECH I SEM									
Course Code	**COURSE TITLE**	**COURSE AREA**	**HOURS/ WEEK**			**CREDIT**	**Internal Marks**	**External marks**	**Total Marks**
			L	**T**	**P**				
AS20-05PC20	COMPUTER AND NETWORK SECURITY	PCC	3	1	0	3	30	70	100
AS20-05PC21	DATA MINING	PCC	3	1	0	3	30	70	100
AS20-05PC22	MODERN SOFTWARE ENGINEERING	PCC	3	1	0	3	30	70	100
AS20-05PE3X	PROFESSIONAL ELECTIVE-III	PE	3	1	0	3	30	70	100
AS20-05OE3X	OPEN ELECTIVE-III (MOOCS)	OE	3	0	0	3	30	70	100
PRACTICAL COURSES									
AS20-05PC23	COMPUTER AND NETWORK SECURITY LAB	PCC	0	0	3	1.5	30	70	100
AS20-05PC24	DATA MINING LAB	PCC	0	0	3	1.5	30	70	100
AS20-05PW07	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
TOTAL						**21**			

Professional Elective-III									
Course Code	**COURSE TITLE**	**COURSE AREA**	**HOURS/ WEEK**			**CREDIT**	**Internal Marks**	**External marks**	**Total Marks**
			L	**T**	**P**				
AS20-05PE31	SOFTWARE PROCESS AND PROJECT MANAGEMENT	PE	3	1	0	3	30	70	100
AS20-05PE32	SOFT COMPUTING	PE	3	1	0	3	30	70	100
AS20-05PE33	CLOUD COMPUTING	PE	3	1	0	3	30	70	100
AS20-05PE34	INTERNET OF THINGS	PE	3	1	0	3	30	70	100
AS20-05PE35	ADHOC SENSOR NETWORKS	PE	3	1	0	3	30	70	100
TOTAL						**3**			

Open Elective-III (MOOCs)									
Course Code	**COURSE TITLE**	**COURSE AREA**	**HOURS/WEEK**			**CREDIT**	**Internal Marks**	**External marks**	**Total Marks**
			L	**T**	**P**				
AS20-05OE31	ADVANCED COMPUTER ARCHITECTURE	OE	3	0	0	3	30	70	100
AS20-05OE32	PHP AND MYSQL	OE	3	0	0	3	30	70	100
AS20-05OE33	MODERN APPLICATION DEVELOPMENT	OE	3	0	0	3	30	70	100
AS20-05OE34	FOUNDATIONS OF CRYPTOGRAPHY	OE	3	0	0	3	30	70	100
TOTAL						**3**			

IV BTECH II SEM									
Course Code	**COURSE TITLE**	**COURSE AREA**	**HOURS/ WEEK**			**CREDIT**	**Internal Marks**	**External marks**	**Total Marks**
			L	**T**	**P**				
AS20-05PE4X	PROFESSIONAL ELECTIVE-IV	PE	3	1	0	3	30	70	100
AS20-05PE5X	PROFESSIONAL ELECTIVE -V	PE	3	1	0	3	30	70	100
AS20-05OE4X	OPEN ELECTIVE -IV	OE	3	0	0	3	30	70	100
PRACTICAL COURSE									
AS20-05PW08	MAJOR PROJECT	PW	0	0	24	10	30	70	100
TOTAL						**19**			

Professional Elective-IV									
Course Code	**COURSE TITLE**	**COURSE AREA**	**HOURS/ WEEK**			**CREDIT**	**Internal Marks**	**External marks**	**Total Marks**
			L	**T**	**P**				
AS20-05PE41	ORGANIZATIONAL BEHAVIOR	PE	3	1	0	3	30	70	100
AS20-05PE42	NEURAL NETWORKS AND DEEP LEARNING	PE	3	1	0	3	30	70	100
AS20-05PE43	HUMAN COMPUTER INTERACTION	PE	3	1	0	3	30	70	100
AS20-05PE44	CYBER FORENSICS	PE	3	1	0	3	30	70	100
AS20-05PE45	INFORMATION RETRIEVAL SYSTEMS	PE	3	1	0	3	30	70	100
TOTAL						**3**			

Professional Elective-V									
Course Code	**COURSE TITLE**	**COURSE AREA**	**HOURS/ WEEK**			**CREDIT**	**Internal Marks**	**External marks**	**Total Marks**
			L	T	P				
AS20-05PE51	DESIGN PATTERNS	PE	3	1	0	3	30	70	100
AS20-05PE52	DISTRIBUTED SYSTEMS	PE	3	1	0	3	30	70	100
AS20-05PE53	HIGH PERFORMANCE COMPUTING	PE	3	1	0	3	30	70	100
AS20-05PE54	BLOCKCHAIN AND CRYPTOCURRENCY	PE	3	1	0	3	30	70	100
AS20-05PE55	MIDDLEWARE TECHNOLOGIES	PE	3	1	0	3	30	70	100
TOTAL						**3**			

Open Elective-IV									
Course Code	**COURSE TITLE**	**COURSE AREA**	**HOURS/ WEEK**			**CREDIT**	**Internal Marks**	**External marks**	**Total Marks**
			L	**T**	**P**				
AS20-05OE41	SOFTWARE ENGINEERING	OE	3	0	0	3	30	70	100
AS20-05OE42	CYBER SECURITY	OE	3	0	0	3	30	70	100
AS20-05OE43	MOBILE COMPUTING	OE	3	0	0	3	30	70	100
AS20-05OE44	DATA MINING	OE	3	0	0	3	30	70	100
TOTAL						**3**			

*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 (SYLLABUS)

UNIT I:MATRICES

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

UNIT-II: EIGEN VALUES AND EIGEN VECTORS

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

UNIT-III: SEQUENCES & SERIES

Sequence: Definition of a Sequence, Convergence of a sequence (definitions and examples only).

Series: Convergent, Divergent and Oscillatory Series; Series of positive terms: Comparison test, p-test, D-Alembert's ratio test; Raabe's test; logarithmic test; Integral test. Alternating series: Leibnitz test; Alternating Convergent series: Absolute and Conditionally Convergence.

UNIT-IV: SINGLE VARIABLE CALCULUS

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

UNIT-V: MULTIVARIABLE CALCULUS

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

Text Books:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43nd Edition, 2014.
2. R.K.Jain, S.R.K. Iyengar Advanced Engineering Mathematics, Narosa Publishing House Pvt.Ltd.,5 thEdition,2016

References Books:

1. **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, 11th Reprint, 2010.

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1.https://www.khanacademy.org/math/linear-algebra
2.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
2 http://en.m.wikipedia.org
3 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

Prerequisites:

- The student must have basic knowledge of units and dimension of physical quantities, principles of mechanics and laws of optics.
- The student must be aware of basics of waves and oscillations, fundamental principles of electromagnetic theory.
- The student must have fundamental knowledge of mathematical concepts like vector algebra, integration and differentiation.

Course Overview:

This course deals with quantum principles and explores their applications in studying the 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 (SYLLABUS)

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: DIELCTRICS 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
2. 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 (SYLLABUS)

UNIT - I
Problem Solving Using Computers :Computer Overview, Introduction to components of a computer system, Algorithms ,Flowchart, Pseudo code with examples, Number systems(Decimal & Binary Conversion).
Overview of C **:**History of C, Basic structure of C- program, Creating and Running C-Program, Input and output statements.

UNIT - II
Fundamentals of C: C-Tokens, Data types, Operators, Expressions, Type conversions, Types of Errors , Input and output statements.

Control Statements in C
Decision making and branching, Decision making and Looping statements.

UNIT – III
Structured Programming :Functions: Syntax, Steps ,Types and Category of Functions, parameter passing mechanism. Recursion and Storage Classes
Dynamic memory allocation**:** malloc(), calloc(), realloc(), free() with example

UNIT - IV
Arrays & Strings: Declaration , Initialization and Accessing Elements, String handling functions, Array of Strings.
Structures and Unions: Defining structures, initializing structures, unions, Array of structures, self referential structures.
Pointers: Types of Pointers Use of Pointers, Dereferencing operations, Examples

UNIT - V
Numerical methods: Roots, Integration and Differentiation Methods, Examples
Linked List: Definition, Types, Implementation Using Self referential Structures:
Files: (only if time is available, otherwise should be done as part of the lab)

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

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

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://www.coursera.org/learn/computational-thinking-problem-solving
2. nptel.ac.in/courses/106105085/4
3. nptel.ac.in/courses/106105085/2

Web Reference/E-Books:

1. 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 (SYLLABUS)

UNIT-I: D.C. CIRCUITS

Electrical circuit elements R, L and C, voltage and current sources, Kirchoff's laws, Network reduction techniques, Series –parallel, Y-Δ 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: **W**orking 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
2) Basic Electrical Engineering By Chakrabarti · 2009
https://www.google.co.in/books/edition/Basic_Electrical_Engineering/KuJ44LVAAK4C?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover
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
4) Basic Electrical Engineering By SK Sahdev · 2015
https://www.google.co.in/books/edition/Basic_Electrical_Engineering/8xTLCgAAQBAJ?hl=en&gbpv=1&dq=basic+electrical+engineering+books&printsec=frontcover

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 (SYLLABUS)

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

UNIT I:
Introduction to Engineering Drawing**:** Principles of Engineering drawing and their significance, Conventions, Drawing Instruments.
Engineering Curves**:** Construction of Ellipse, Parabola and Hyperbola – General and Special methods; Cycloidal curves- Epicycloids and Hypocycloids.

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

UNIT III:
Projections of Regular Solids: Projections of Regular Solids inclined to both the Planes – Prisms, Pyramids, Cylinder and Cone.
Sections and Sectional Views**:** Right regular solids - prism, cylinder, pyramid, cone – use of Auxiliary views.

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

UNIT V:
Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions.
Introduction to Solid Modelling**:** Creation of simple solid models relevant to the domain.

Text Books:

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

References Books:

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

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

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

Web Reference/E-Books:

1. http://nptel.ac.in/courses/112103019
2. http://www.me.umn.edu/courses/me2011/handouts/drawing/blanco-tutorial.html
3. https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/env_health_scienc e_students/engineeringdrawing.pdf

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 liked list using self referential structures

Week13:

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

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

Text Books:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill.
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd 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 (16th Impression).
2. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
3. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th 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
2. www.thenewboston.com
3. 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 pluming, 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 (SYLLABUS)

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

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

2. TRADES FOR DEMONSTRATION & EXPOSURE:

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

Text Books:

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

References Books:

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

Online Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

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

Web Reference/E-Books:

1. https://books.google.co.in/books/about/MECHANICAL_WORKSHOP_PRACTICE.html?id=rHhJlb-_ye4C
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): 2:0:0	Credits: 0
Type of Course: Lecture	Total Contact Periods:32 Hrs
Continuous Internal Evaluation: 25Marks	Semester End Exams : 75Marks

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 faces 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 (SYLLABUS)

UNIT I: Importance of Soft Skills
Successful Career - Communication - Body Language - Written Communication - Presentation
Team Work - Professionalism - Interpersonal Skills - Time and Stress Management - Leadership Qualities

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

UNIT III: Body Language
Introduction – Communicating Body – Studying of body language – 17 concepts of learning body language.

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

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

Text Books:

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

Web References:

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

B.TECH
FIRST YEAR
SECOND SEMESTER
SYLLABUS

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

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

Course Overview:

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

Course Objective:

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

Course Outcomes(s)

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

COURSE CONTENT (SYLLABUS)

UNIT I: FIRST ORDER ODE
Exact equations; Non-Exact equations; Linear equations; Bernoulli's equations; Newton's Law of Cooling; Law of Natural Growth and Decay; Orthogonal Trajectories.

UNIT II: HIGHER ORDER LDE
Higher Order Linear Differential Equations with Constant Coefficients; Non-Homogeneous Differential Equations with RHS of the type: e^{ax}, sinax, cosax, 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
VectorPointFunction;ScalarPointfunction;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, 42nd Edition, 2010.
2. S.R.K. Iyengarand R.K.Jain,Advanced Engineering Mathematics, Narosa Publishing House,5th Edition, 2016.
3.

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

Web Reference/E-Books:
1. ENGINEERIMG 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 (SYLLABUS)

Unit - I:

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

Unit – II:

Molecular Structure and Theories of Bonding: Introduction - Atomic and Molecular Orbital's. Linear Combination of Atomic Orbital's (LCAO), Molecular orbital's of diatomic molecules, molecular orbital energy level diagrams of N_2, O_2 and F_2 molecules. Π-molecular orbital's of butadiene.

Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d- orbital's in Tetrahedral, Octahedral and Square planar geometries. Band Structure of solids and effect of doping on conductance.

Unit - III:

Electrochemistry and Corrosion: Electro chemical cells – electrode potential, standard electrode potential, Nernst equation, Types of electrodes – Calomel, Quinhydrone and Glass electrode. Determination of P^H of a solution by using quinhydrone and glass electrode. Electrochemical series

and its applications. Batteries – Primary: Lithium cell, secondary batteries: Lead – Acid storage battery and Lithium ion battery.

Causes and effects of corrosion – theories of chemical and electrochemical corrosion –

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

Unit - IV:

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

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

Unit-V

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

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

^{1}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	https://ocw.mit.edu/courses/civil-and-environmental-engineering/1-85-water-and-wastewater-treatment-engineering-spring-2006/lecture-notes/
2	Lithium Ion Batteries	https://www.youtube.com/watch?v=fo3DMXwD9ig
3	Fuel Cells	https://nptel.ac.in/content/storage2/courses/121106014/Week11/lecture34.pdf
4	IR Spectroscopy	www.chem.ucalgary.ca
5	stereochemistry	research.cm.utexas.edu
6	Synthesis of Aspirin	http://vlab.amrita.edu/?sub=2&brch=191&sim=849&cnt=1
7	Deflouridation of fluoride water	www.csir.res.in
8	Engineering Chemistry IIT-MUMBAI	http://www.cdeep.iitb.ac.in/webpage_data/nptel/Core%20Science/Engineering%20Chemistry%201/TOC-mainM5.htm
9	NMR Spectroscopy	https://chem.libretexts.org/Textbook_Maps/Organic_Chemistry/Map%3A_Organic_Chemistry_(McMurry)/Chapter_13%3A_Structure_Determination_-_Nuclear_Magnetic_Resonance_Spectroscopy

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 (SYLLABUS)

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++,AdamDrozdek,4thedition,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 (SYLLABUS)

UNIT I:

JUNCTION DIODE CHARACTERISTICS AND SOME SPECIAL DIODES:

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

UNIT II:
DIODE APPLICATIONS:
Half wave and Full wave rectifiers and its comparisons. Inductor filter, Capacitor filter, L- section filter, Pi- section filter and comparison of various filter circuits, Clipping Circuits, Clamper circuits, Application of a zener diode as a voltage regulator. Applications of LED and LCD's. Hall Effect and its applications.

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

UNIT IV:
BIASING AND STABILISATION: Transistor Biasing and Stabilization - criteria for fixing operating point, DC & AC load lines, Need for Biasing –Types of biasing's-Fixed Bias, collector to base bias, Self-Bias and voltage divider bias techniques for stabilization, Stabilization factors, (S, S', S''), Compensation techniques, (Compensation against variation in V_{BE}, I_{co}, β) 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 (SYLLABUS)

UNIT I:
'Of Parents and Children' from the Essays of Francis Bacon

Vocabulary: The Concept of Word Formation –The Use of Prefixes and Suffixes.
Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.
Reading: Reading and Its Importance- Techniques for Effective Reading.
Basic Writing Skills: Sentence Structures -Use of Phrases and Clauses in Sentences Importance of Proper Punctuation- Techniques for writing precisely – Paragraph writing – Types, Structures and Features of a Paragraph – Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT II:
'The Raman Effect' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary Building: Homonyms, Homophones and Homographs
Grammar:Misplaced Modifiers
Reading:Sub-skills of Reading- Skimming and Scanning
Writing:Format of a Formal Letter-Writing Formal Letters E.g.., Letter of Complaint, Letter of Requisition, Job Application with Resume.

UNIT III:
'Ancient Architecture in India' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

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

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

UNIT IV:
'What Should You Be Eating' from the prescribed textbook 'English for Engineers' published by Cambridge University Press.

Vocabulary: Standard Abbreviations and Acronyms in English
Grammar: Sequence of Tenses
Reading**:** Improving Comprehension Skills – Techniques for Good Comprehension
Writing: Information Transfer- Flow Chart- Pie Chart– Essay Writing-Précis Writing.

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

Vocabulary: Technical Vocabulary and their usage
Grammar:Collocations, Commonly Confused Words-Common Errors in English
Reading: Reading Comprehension-Exercises for Practice
Writing**:**Technical Reports- Introduction - Structure of Reports- Types of Reports - Manuscript Format.

Text Books:

1. Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.
2.The Essays of Frances Bacon,Edited,with introduction and notes by Mary Augusta Scott.Charales 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
3. English Grammar through stories by Alan Townend-
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.

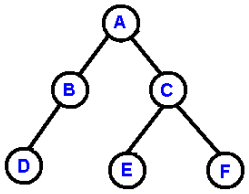
Course Outcomes(s)
After completion of course the student is able to

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.

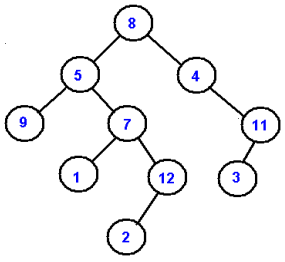
LIST OF EXPERIMENTS/DEMONSTRATIONS

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, 4th 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://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

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 (SYLLABUS)

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

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

Exercise – I :

- CALL Lab: Introduction to Pronunciation – Speech Sounds – Vowels and Consonants.
- ICS Lab: Understand: Communication at Work Place- Spoken vs. Written language. Practice: Greetings – Introducing Oneself and Others -Taking Leave – JAM Session- Situational Dialogues.

Exercise – II :

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

Exercise – III

- **CALL Lab:** Understand: Intonation- Rhythm-The Influence of Mother Tongue (MTI). Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.
- **ICS Lab:** Oral Presentations- Introduction to Formal Presentations

- Practice: Formal Presentations- Poster Presentations and PPT's.

Exercise – IV

CALL Lab: Understand: Listening for General Details.

Practice: Listening Comprehension Tests.

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

Practice: Group Discussion.

Exercise – V

CALL Lab: Understand: Listening for Specific Details.
Practice: Listening Comprehension Tests.

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

Practice: Mock Interviews

References

1. ELCS LAB MANUAL
2. Practice English Your Own-
https://www.immigratemanitoba.com/alt/practise-english-on-your-own.pdf

Text Books

1. Longman English Grammar Practice-
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-
file:///C:/Users/user/Downloads/English-Grammar-Through-Stories%20(learnenglishteam.com).pdf

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, Ostwlad'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 (SYLLABUS)
LIST OF EXPERIMENTS

1. Determination of total hardness of water by Complexometric method using EDTA
2. Estimation of Iron using Standard $KMnO_4$.
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 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 Rf 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 5TH 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

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):2:0:0	Credits: Nil
Type of Course: Lecture	Total Contact Periods: 32 Hrs
Continuous Internal Evaluation: 25Marks	Semester End Exams : 75Marks
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 (SYLLABUS)

UNIT I: Linguistic Ability
Writing Skills - Reading Skills - Listening Skills - Speaking Skills - Just a Minute Program – JAM – Improving Vocabulary.

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

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

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

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

Text Books:

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

Web References:

1. Extraordinary Communication Skills - By Sandeep Maheshwari I Hindi & English SpeakingPracticeTips https://www.youtube.com/watch?v=VczVqHJW0gg
2. Effective Communication Skills Training Video in Hindi https://www.youtube.com/watch?v=kxAXOh5RmwU
3. A guide to effective communication https://www.youtube.com/watch?v=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, 8th Edition, Pearson Educations
2. Sheldon Ross, A First Course in Probability, 9 th 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

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
C212.1	Understand the basics of processor design and their impact on instructions sets.
C212.2	Demonstrate an understanding of the design of the functional units of a digital computer system.
C212.3	Infer and manipulate representations of numbers stored in digital computers.
C212.4	Understand the design and working of Interfaces and memory devices
C212.5	Design a pipeline for consistent execution of instructions with minimum hazards.
C212.6	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, Vth Edition, McGrawHill.
2. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI.
3. Structured Computer Organization – Andrew S. Tanenbaum, 4th 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_Mo onshot_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_Super com puter_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
C213.1	Solves real world problems using OOP techniques.
C213.2	Understands the use of abstract classes.
C213.3	Solves problems using java collection framework and I/O classes.
C213.4	Creates multithreaded applications with synchronization.
C213.5	Develops applets for web applications.
C213.6	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, 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. 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, 2nd 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-4kfhvUwVlXBW
2. http://www.rehancodes.com/files/oop-using-c++-by-joyce-farrell.pdf
3. http://www.nptel.ac.in/courses/106103115/36

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
II B.TECH., I 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.
- To use Graph Theory for solving problems.

Course Outcomes(s)

CO#	Course Outcomes
C214.1	Applies mathematical logic to solve problems.
C214.2	Explains sets, relations, functions, and discrete structures.
C214.3	Explains the use of logical notation to define and reason about fundamental mathematical concepts such as sets, relations, and functions.
C214.4	Formulates problems and solve recurrence relations.
C214.5	Models and Generates the function
C214.6	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. (UNITS – I , II)
2. Discrete Mathematics for Computer Scientists & Mathematicians, Joe L. Mott, Abraham Kandel, Theodore P. Baker, Pearson , 2nd ed. (Units – III, IV, V)

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/

WEB REFERENCE/E-BOOKS:

1. https://lecturenotes.in/subject/381/mathematical-foundations-of-computer-science-mfcs
2. https://www.iith.ac.in/~aravind/Files-DM/LLM-MFCS-2012.pdf
3. http://web.stanford.edu/class/archive/cs/cs103/cs103.1164/notes/Mathematical%20Foundations%20of%20Computing.pdf

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
C215.1	**Explain** working of different logic families and logic gates.
C215.2	**Solve** Boolean expressions to minimize various combinational functions.
C215.3	**Design** and implement various Combinational logic circuits.
C215.4	**Analyze** and design various sequential circuits.
C215.5	**Explain** the process of Analog to Digital conversion and Digital to Analog conversion.
C215.6	**Develop** the given logical problem using PLD's

COURSE CONTENT (SYLLABUS)

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 lCs, 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 lCs, 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

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
C216.1	Demonstrate knowledge on computer system such as system unit, input devices, output devices connected to the computer.
C216.2	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.
C216.3	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.

C216.4	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.
C216.5	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.
C216.6	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.

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
C217.1	Develop a java Program using basic java concepts
C217.2	Create a java program that implements Exception handling
C217.3	Generates a java which implements multithreaded concepts.
C217.4	Develop a java program which implements java collection framework
C217.5	Design a java program which implements events
C217.6	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, 9th 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

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

COURSE CONTENT (SYLLABUS)

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

TEXT BOOKS:

1. R. P. Jain, "Modern Digital Electronics", McGraw Hill Education, 2009.

2. M. M. Mano, "Digital logic and Computer design", Pearson Education India, 2016.

REFERENCES BOOKS:

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

WEB REFERENCE/E-BOOKS:

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

GENDER SENSATIZATION
II B.TECH., 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
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	

Course Overview:
This course is designed to understand the issues related to Gender and how Gender discrimination impacts in our society and how to encounter them. Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

Course Objective

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

Course Outcomes(s)

CO#	Course Outcomes
C219.1	Develop a better understanding of important issues related to gender in contemporary India.
C219.2	Sensitize to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
C219.3	Attain a finer grasp of how gender discrimination works in our society and how to counter it.
C219.4	Acquire insight into the gendered division of labor and its relation to politics and economics.
C219.5	Men and women students and professionals will be better equipped to work and live together as equals.
C219.6	Build up a sense of appreciation of women in all walks of life.

COURSE CONTENT

UNIT – I
Understanding Gender: Introduction
What is Gender and why does it matter?
Gender Relations and Status in the Household
Masculinities
Gender Analysis and mainstreaming
Gender: Why Should We Study It? (*Towards a World of Equals*: Unit -1)
Socialization: Making Women, Making Men (*Towards a World of Equals*: Unit – 2 Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

UNIT – II
Gender and Biology:
Missing Women: Sex Selection and Its Consequences (*Towards a World of Equals*: Unit -4), Declining sex ratio. Demographic Consequences.
Teacher's Role in Promoting/Advancing Gender Sensitization
STRATEGIES / MEASURES TO PROMOTE GENDER SENSITIZATION
Gender Spectrum: Beyond the Binary (*Towards a World of Equals*: Unit -10)
Two or Many? Struggles with Discrimination.

UNIT – III
Gender and Labour:
Housework: the Invisible Labour (*Towards a World of Equals*: Unit -3)
"My Mother doesn't Work." "Share the Load."
Women's Work: Its Politics and Economics (*Towards a World of Equals*: Unit -7)
Fact and Fiction.Unrecognized and Unaccounted work. Additional Reading: Wages andConditions 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-abdulal/

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- 25 Marks	Semester End Exams-75 Marks

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

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

Course Outcomes (s):
On Successful completion of the course, students will be able to

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

COURSE CONTENT

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

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

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

UNIT - III

IoT Reference Architecture: Getting Familiar with IoT Architecture, Various architectural views of IoT such as Functional, Information, Operational and Deployment.
Constraints affecting design in IoT world: Introduction, Technical design Constraints.

UNIT - IV

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

UNIT - V

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

TEXT BOOKS:

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

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

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

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

Course Objective: The objective of this Course is:

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

Course Outcomes(s)

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

COURSE CONTENT (SYLLABUS)

UNIT - I

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

UNIT - II

Elements of Robots: Joints, Links, Actuators, and Sensors : Representation of joints,

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

UNIT - III

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

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

UNIT - IV

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

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

UNIT - V

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc20_de11/preview
2. 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
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- 25 Marks	Semester End Exams-75 Marks
Prerequisites: Candidates must have any degree or diploma in Graphic Design. Students must have a wide understanding of Graphic Designing tools. Any certificate in the HTML, Photoshop, CSS or Web Design can act as an added advantage.	

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

Course Objective:

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

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

COURSE CONTENT

UNIT - I

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

UNIT - II

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

UNIT - III

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

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

UNIT - IV

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

UNIT V

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

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

WEB REFERENCE/E-BOOKS:

1. http://ptgmedia.pearsoncmg.com/images/9780321827333/samplepages/0321827333.pdf
2. http://myy.haaga-helia.fi/~woljo/photoshop/an-introduction-to-adobe-photoshop.pdf
3. https://cdn.billiger.com/dynimg/pu0dDTvLOQTgPmie0WLuXvt4H9rycHjeBa9LTdXG2DA4V1JW8rrM7KbpsQTrCAVZt-4_1H_mQ7dEd-iLJR2GY8/Corel-CorelDRAW-Graphics-Suite-X6-DE-Win-Bedienungsanleitung-38935e.pdf
4. https://www.engraversnetwork.com/files/CorelDRAW-X7-Training.pdf
5. https://ptgmedia.pearsoncmg.com/images/9780672336997/samplepages/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- 25 Marks	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
C2110.1	Solve real world problems using OOP techniques
C2110.2	Understand the functionalities of Inheritance, Interface and Packages.
C2110.3	Solves problems using java collection framework and Stream based I/O classes.
C2110.4	Develops multithreaded applications with synchronization.
C2110.5	Designs web applications using Applets
C2110.6	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
2. 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- 25 Marks	Semester End Exams-75 Marks

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

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

Course Outcomes(s)

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

COURSE CONTENT (SYLLABUS)

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

TEXT BOOK:

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

REFERENCE BOOKS:

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

RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.swayam2.ac.in/aic20_sp06/preview
2. https://onlinecourses.nptel.ac.in/noc19_cs38/preview
3. 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

Prerequisites:
1. The student must have basic knowledge of Need, Basic Guidelines, Content and Process for Value Education
2. Understanding Harmony in the Human Being - Harmony in Myself
3. The student must have fundamental knowledge Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship
4. The student can able to Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

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 aboutthemselves (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
C221.1	Understand Basic guideline of human values universally.
C221.2	Understanding the harmony in the human being
C221.3	Analyse about society – Harmony @ human relation
C221.4	Remember the student can study the professional ethics and values.
C221.5	Understand harmony in the nature and existence
C221.6	Understanding of Harmony on Professional Ethics

COURSE CONTENT (SYLLABUS)

UNIT – I

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

UNIT – II

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

UNIT- III

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

UNIT - IV

Understanding Harmony in the Nature and Existence - Whole existence as Coexistence: Understanding the harmony in the Nature, Interconnectedness and

mutual fulfilment among the four orders of nature- recyclability and 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 SEM

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
C222.1	Demonstrates the basic elements of a relational database management system.
C222.2	Identifies the data models for relevant problems.
C222.3	Designs entity relationship model and converts entity relationship diagrams into RDBMS and formulates SQL queries on the data.
C222.4	Applies normalization for the development of application software.
C222.5	Describes various transactional properties and lock-based protocols
C222.6	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
2. https://onlinecourses.nptel.ac.in/noc20_cs60/preview
3. 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

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

Course Title: DESIGN AND ANALYSIS OF ALGORITHMS	Course Code: AS20-05PC05
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:

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 nondeterministic algorithm.

Course Objective

- To enable students to estimate complexity of programs and to write computer applications with optimal time and space requirements.
- Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize dynamic-programming algorithms, and analyze them.
- Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them.
- Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems, when appropriate. Synthesize new graph algorithms and algorithms that employ graph computations as key components, and analyze them.
- Analyze randomized algorithms. Employ indicator random variables and linearity of expectation to perform the analyses. Recite analyses of algorithms that employ this method of analysis.

Course Outcomes(s)

CO#	Course Outcomes
C223.1	Analyze algorithms and estimate their best-case, worst-case and average-case behavior.
C223.2	Design algorithms using standard paradigms like:Greedy, Divide and Conquer, Dynamic Programming and Backtracking.
C223.3	Analyze and solve the problems on Knapsack problem, Job sequencing with deadlines, Minimum cost spanning trees, Single source shortest path problem
C223.4	Construct algorithms using advance data structures and implement traversals techniques.
C223.5	Choose NP class problems and formulate solutions using standard approaches.
C223.6	Explain good principles of algorithm design and apply the same to real word problems.

COURSE CONTENT

UNIT - I

Introduction: Algorithm definition, Pseudo code Specifications, Performance Analysis Space Complexity, Time Complexity, Asymptotic Notations-Big-Oh, Omega, and Theta.

Divide And Conquer: General Method, Finding Maximum and Minimum, Merge Sort, Quick sort, Strassen's Matrix Multiplication.

UNIT - II

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

UNIT - III

Dynamic Programming: General method, All pairs shortest path, Matrix Chain Multiplication, Optimal Binary search trees, 0/1 Knapsack, the travelling salesman problem.

UNIT - IV

Back Tracking: The General Method, The n-Queens Problem, Sum of subsets, Graph coloring, Hamiltonian cycles, Knapsack 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. Ellis Horowitz, Satraj Sahni, Rajasekharam (2007), Fundamentals of Computer Algorithms, 2nd edition, University Press, New Delhi.

REFERENCES BOOKS:

1. R. C. T. Lee, S. S. Tseng, R.C. Chang and T. Tsai (2006), Introduction to Design and Analysis of Algorithms Astrategic approach, McGraw Hill, India.
2. Allen Weiss (2009), Data structures and Algorithm Analysis in C++, 2nd edition, Pearson education, New Delhi.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://www.coursera.org/learn/introduction-to-algorithms
2. https://onlinecourses.nptel.ac.in/noc16_cs04/preview
3. https://www.edx.org/course/algorithms-iitbombayx-cs213-3x

WEB REFERENCE/E-BOOKS:

1. https://www.cs.usfca.edu/~galles/visualization/Algorithms.html

OPERATING SYSTEMS
II B.TECH., II SEMESTER

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

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

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

Course Outcomes(s)

CO#	Course Outcomes
C224.1	Compares the different operating systems and basic architectural components involved in OS design
C224.2	Solves problems related to the process management
C224.3	Analyzes the deadlocks and solves the problem of deadlock
C224.4	Solves the problem of process communication and interprocess communication
C224.5	Explains the concept of Memory management
C224.6	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. nptel.ac.in/courses/Webcourse…/Operating%20Systems

WEB REFERENCE/E-BOOKS:

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

PYTHON PROGRAMMING
II B.TECH., II SEMESTER

Course Title: PYTHON PROGRAMMING	Course Code: AS20-05PC07
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	

Course Overview:
The purpose of the course is to provide the basic programming methodology and writing programs in python. This course will enable one to learn programming skills necessary to implement all the basic mathematical, scientific calculations and various operations. Python is a general-purpose interpreted, interactive, object-oriented, and high-level programming language.

Course Objective
- Handle Strings and Files in Python.
- Understand Lists, Dictionaries and Regular expressions in Python.
- Implement Object Oriented Programming concepts in Python.
- Build Web Services and introduction to Network and Database Programming in Python.

Course Outcomes(s)

CO#	Course Outcomes
C225.1	Identify Python syntax and semantics and be fluent in the use of Python flow control and functions.
C225.2	Demonstrate proficiency in handling Strings and File Systems.
C225.3	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions
C225.4	Interpret the concepts of Object-Oriented Programming as used in Python.
C225.5	Explain exemplary applications related to Network Programming, Web Services and Databases in Python.
C225.6	Identify Database Connectivity Concepts and Object Relational Managers in Modules.

COURSE CONTENT

UNIT – I

Introduction: Python Basics, Objects- Python Objects, Standard Types, Other Built-in Types, Internal Types, Standard Type Operators, Standard Type Built-in Functions, Categorizing the Standard Types, Unsupported Types Numbers : Introduction to Numbers, Integers, Floating Point Real Numbers, Complex Numbers, Operators, Built-in Functions, Related Modules Sequences - Strings, Lists, and Tuples, Mapping and Set Types.

UNIT – II

FILES: File Objects, File Built-in Function [open()], File Built-in Methods, File Built-in Attributes, Standard Files, Command-line Arguments, File System, File Execution, Persistent Storage Modules, Related Modules.

Modules: Modules and Files, Namespaces, Importing Modules, Importing Module Attributes, Module Built-in Functions, Packages, Other Features of Modules.

UNIT – III

Exceptions: Exceptions in Python, Detecting and Handling Exceptions, Context Management, Exceptions as Strings, Raising Exceptions, Assertions, Standard Exceptions, Creating Exceptions, Why Exceptions (Now)?, Why Exceptions at All?, Exceptions and the Sys Module, Related Modules.

Regular Expressions: Introduction, Special Symbols and Characters, Res and Python.

UNIT – IV

Multithreaded Programming: Introduction, Threads and Processes, Python, Threads, and the Global Interpreter Lock, Thread Module, Threading Module, Related Modules.

GUI Programming: Introduction, Tkinter and Python Programming, Brief Tour of Other GUIs, Related Modules and Other GUIs.

UNIT – V

Database Programming: Introduction, Python Database Application Programmer's Interface (DB- API), Object Relational Managers (ORMs), Related Modules.

WEB Programming: Introduction, Wed Surfing with Python, Creating Simple Web Clients, Advanced Web Clients, CGI-Helping Servers Process Client Data, Building CGI Application Advanced CGI, Web (HTTP) Servers.

TEXT BOOKS:

1. Core Python Programming, Wesley J. Chun, Second Edition, Pearson.
2. Exploring Python, Timothy Budd, Mc Graw Hill Publication, ISBN: 9780073523378, August 2010.

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.learnpython.org/
2. https://docs.python.org/2/tutorial/index.html
3. http://en.wikibooks.org/wiki/Non-Programmer%27s_Tutorial_for_Python_3/Intro
4. https://developers.google.com/edu/python/introduction
5. https://www.datacamp.com/courses/intro-to-python-for-data-science

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
C226.1	Designs and implements a database schema for given problem.
C226.2	Acquire skills in using SQL commands for data definition and data manipulation
C226.3	Applies the normalization techniques for development of application software to realistic problems.
C226.4	Formulates queries using SQL DML/DDL/DCL commands.
C226.5	Develop solutions for database applications using procedures, cursors and triggers.
C226.6	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, 5th 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*.
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/

OPERATING SYSTEMS LAB
II B.TECH., II SEMESTER

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

Course Overview:

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

Course Objective

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

Course Outcomes(s)

CO#	Course Outcomes
C227.1	Applies basic services and functionalities of the operating system using system calls
C227.2	Writes programs for using system calls
C227.3	Implements Bankers algorithm for deadlock avoidance and prevention
C227.4	Implements semaphores for producer-consumer problem
C227.5	Illustrates the IPC mechanisms
C227.6	Constructs the memory management techniques

COURSE CONTENT

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

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

TEXT BOOKS:

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

REFERENCES BOOKS:

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

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://www.udacity.com/course/introduction-to-operatingsystems
2. nptel.ac.in/courses/Web course./Operating%20Systems

WEB REFERENCE/E-BOOKS:

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

PYTHON PROGRAMMING LAB
II B.TECH., II SEMESTER

Course Title: PYTHON PROGRAMMING LAB	Course Code: AS20-05PC10
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
C228.1	Study the basic concepts scripting and the contributions of scripting language.
C228.2	Demonstrate proficiency in handling Strings and File Systems.
C228.3	Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
C228.4	Explore python especially the object oriented concepts, and the built in objects of Python.
C228.5	Create practical and contemporary applications such as TCP/IP network programming.
C228.6	Identify Database Connectivity Concepts and Object Relational Managers in Modules.

COURSE CONTENT

1. Write a program to demonstrate different number data types in Python.
2. Write a program to perform different Arithmetic Operations on numbers in Python.
3. Write a program to create, concatenate and print a string and accessing sub-string from a given string.
4. Write a python script to print the current date in the following format "Sun May 29 02:26:23 IST 2017".
5. Write a program to create, append, and remove lists in python.
6. Write a program to demonstrate working with tuples in python.
7. Write a program to demonstrate working with dictionaries in python.
8. Write a python program to find largest of three numbers.
9. Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula: c/5 = f-32/9] .
10. Write a Python program to construct the following pattern, using a nested for loop

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

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

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

1. To Enable the student to understand the importance of constitution
2. To understand the structure of executive, legislature and judiciary
3. To understand philosophy of fundamental rights and duties.
4. To know about the Administration, Concept and Development of Human Rights,
5. 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. C115.5
6. To understand the central and state relation, financial and administrative.

Course Outcomes(s)

CO#	Course Outcomes
C229.1	To understand the sources, features and principles of Indian Constitution.
C229.2	To analyze about Union Government, State government and its administration.
C229.3	To remember to get acquainted with Local administration and Pachayati Raj.
C229.4	To understand Be aware of basic concepts and developments of Human Rights.
C229.5	To apply Gain knowledge on roles and functioning of Election Commission.
C229.6	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
2. nptel.ac.in/courses/109104045/
3. nptel.ac.in/courses/101104065/
4. www.hss.iitb.ac.in/en/lecture-details
5. 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: AS20-05PW03
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical	Total Contact Periods: 32 Hours
Continuous Internal Evaluation- 25 Marks	Semester End Exams-75 Marks
Prerequisites: C Programming	

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

Course Objective:
The objective of this Course is:

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

Course Outcomes(s)

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

COURSE CONTENT (SYLLABUS)

UNIT - I

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

UNIT - II

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

UNIT - III

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

UNIT - IV

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

UNIT - V

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

TEXT BOOKS

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

REFERENCE BOOKS

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

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

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

Course Overview:

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

Course Objective: The objective of this Course is:

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

Course Outcomes(s)

CO#	Course Outcomes
C2210.1	Understand goals of VR and the geometry involved in Virtual world.
C2210.2	Understand optical aberrations of light and relates the Cornea of human eye to Photoreceptors which implies the eye movement.
C2210.3	Identify depth, motion, colour of Visual perception and use it for Visual rendering.
C2210.4	Apply knowledge of tracking 2D and 3D orientation for tracking position and orientation of the attached bodies.
C2210.5	Understand perception and rendering of audio system in Virtual Reality and analyse the haptic devices and interfaces.
C2210.6	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, Gestrual Commands, Tools, Mutimodal 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: Meging Real and Virtual Worlds", 2005.
2. Burdea, Grigore C and Philippe Coiffet, "Virtual Reality Technology", Wiley Interscience, India, 2003.
3. John Vince, "Virtual Reality Systems", Addison Wesley, 1995.
4. Howard Rheingold, "Virtual Reality: The Revolutionary Technology and how it Promises to Transform Society", Simon and Schuster, 1991.
5. William R Sherman and Alan B Craig, "Understanding Virtual Reality: Interface, Application and Design (The Morgan Kaufmann Series in Computer Graphics)". Morgan Kaufmann Publishers, San Francisco, CA, 2002
6. Alan B. Craig, Understanding Augmented Reality, Concepts and Applications, Morgan Kaufmann, 2013

RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

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

WEB REFERENCE/E-BOOKS:

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

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

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

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

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

Course Outcomes(s)

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

COURSE CONTENT (SYLLABUS)

UNIT - I

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

UNIT - II

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

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

UNIT – III

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

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

UNIT - IV

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

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

UNIT - V

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

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

TEXT BOOKS:

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

REFERENCE BOOK:

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

RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

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

WEB REFERENCE/E-BOOKS:

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

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

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

Course Overview:

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

Course Objective: The objective of this Course is:

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

Course Outcomes(s)

CO#	Course Outcomes
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 (SYLLABUS)

UNIT - I

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

Matrices And Arrays: Entering Matrices sum and transpose, subscripts, Colon Operator, magic Function, Variables and constants: Definition, naming (identifiers or

labels for different entities), initialization and accessing of variables. Constants and their representation.

UNIT - II

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

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

UNIT - III

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

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

UNIT - IV

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

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

UNIT - V

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1.https://matlabacademy.mathworks.com/
2.https://www.coursera.org/learn/matlab
3.https://onlinecourses.nptel.ac.in/noc20_ge05/preview

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

COURSE CONTENT (SYLLABUS):

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
3. https://www.nxp.com/docs/en/user-guide/UM10139.pdf
4. https://embetronicx.com/tutorials/microcontrollers/lpc2148/lcd_interfacing-with-lpc2148-arm7/
5. https://www.exploreembedded.com/wiki/LPC2148_Led_Blinking

B.TECH
THIRD YEAR
FIRST SEMESTER
SYLLABUS

FORMAL LANGUAGES AND AUTOMATA THEORY
III B.TECH., I SEMESTER

Course Title: FORMAL LANGUAGES AND AUTOMATA THEORY	Course Code: AS20-05PC11
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 Networks, Operating System	

Course Overview:

This course deals with the basic techniques of Compiler Construction and tools that can used to perform Syntax-directed translation of a high-level programming language into an executable code. This will provide deeper insights into the more advanced semantics aspects of programming languages, code generation, machine independent optimizations, dynamic memory allocation, types and their inferences, object orientation. The course is presented to the students by using power point projections, lecture notes, subjective and objective tests, assignments, and laboratory

Course Objectives:

1. To teach concepts of language translation and phases of compiler design
2. To describe the common forms of parsers.
3. To inculcate knowledge of parser by parsing LL parser and LR parser
4. To demonstrate intermediate code using technique of syntax directed translation
5. To illustrate the various optimization techniques for designing various optimizing compilers

Course Outcome:

CO#	Course Outcomes
C311.1	Design Finite Automata and Push down Automata and Turing Machines
C311.2	Apply compiler construction tools and describes the Functionality of each stage of compilation process
C311.3	Construct Grammars for Natural Languages and find the Syntactical Errors/Semantic errors during the compilations using parsing techniques
C311.4	Analyze different representations of intermediate code
C311.5	Construct new compiler for new languages
C311.6	Design a Code Generator and Apply code optimization rules.

COURSE CONTENT

UNIT - I

Introduction to Finite Automata: Structural Representations, Automata and Complexity, the Central Concepts of Automata Theory – Alphabets, Strings, Languages, Problems.

Nondeterministic Finite Automata: Formal Definition, an application, Text Search, Finite Automata with Epsilon-Transitions.

UNIT - II

Deterministic Finite Automata: Definition of DFA, How a DFA Process Strings, The language of DFA, Conversion of NFA with €-transitions to NFA without €-transitions. Conversion of NFA to DFA, Moore and Melay machines

Regular Expressions: Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expressions, Conversion of Finite Automata to Regular Expressions.

UNIT - III

Pumping Lemma for Regular Languages, Statement of the pumping lemma, Applications of the Pumping Lemma.

Closure Properties of Regular Languages: Closure properties of Regular languages, Decision Properties of Regular Languages, Equivalence and Minimization of Automata.

UNIT - IV

Context-Free Grammars: Definition of Context-Free Grammars, Derivations Using a Grammar, Leftmost and Rightmost Derivations, the Language of a Grammar, Sentential Forms, Parse Tress, Applications of Context-Free Grammars, Ambiguity in Grammars and Languages.

Push Down Automata: Definition of the Pushdown Automaton, the Languages of a PDA, Equivalence of PDA's and CFG's, Acceptance by final state, Acceptance by empty stack, Deterministic Pushdown Automata. From CFG to PDA, From PDA to CFG.

UNIT - V

Normal Forms for Context- Free Grammars: Eliminating useless symbols, Eliminating €- Productions. Chomsky Normal form Griebech Normal form.

Pumping Lemma for Context-Free Languages: Statement of pumping lemma, Applications

Closure Properties of Context-Free Languages: Closure properties of CFL's, Decision Properties of CFL's

Turing Machines: Introduction to Turing Machine, Formal Description, Instantaneous description, the language of a Turing machine, Types of Turing machine**,** Turing machines and halting

TEXT BOOKS:

1. Introduction to Automata Theory, Languages, and Computation, 3nd Edition, John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, Pearson Education.
2. Theory of Computer Science – Automata languages and computation, Mishra and Chandrashekaran, 2nd edition, PHI.

REFERENCES BOOKS:

1. Introduction to Languages and The Theory of Computation, John C Martin, TMH.
2. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
3. A Text book on Automata Theory, P. K. Srimani, Nasir S. F. B, Cambridge University Press.
4. Introduction to the Theory of Computation, Michael Sipser, 3rd edition, Cengage Learning.
5. Introduction to Formal languages Automata Theory and Computation Kamala Krithivasan, Rama R, Pearson

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://nptel.ac.in/courses/111/103/111103016/
2. https://onlinecourses.nptel.ac.in/noc21_cs19/preview

WEB REFERENCE/E-BOOKS:

1. https://www.tutorialspoint.com/automata_theory/index.htm
2. https://www.javatpoint.com/automata-tutorial

SOFTWARE ENGINEERING
III B.TECH., I SEMESTER

Course Title: SOFTWARE ENGINEERING	Course Code: AS20-05PC12
Teaching Scheme (L:T:P):3:1:0	Credits:3
Type of Course: Lecture + Assignment	Total Contact Periods: 48 + 16 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Data Structure, Computer Architecture	

Course Overview:
Software engineering is a detailed study of engineering to the design, development and maintenance of software. Software engineering was introduced to address the issues of low-quality software projects. The outcome of software engineering is an efficient and reliable software product. The candidates would learn about different process models, analysis and documentation of software requirement system. They will learn on different software analysis and design models and techniques. They will also learn on software project management fundamentals and various testing, debugging and validation techniques of software development.

Course Objective
1. To understand the software life cycle system and the different software architectural views.
2. To understand the software requirement engineering and SRS document.
3. A general understanding of software process models.
4. To aware of Software Engineering methods and practices, and their appropriate application.
5. To understand the V and V techniques, design of software product

Course Outcomes(s)

CO#	Course Outcomes
C312.1	Understand Generic view of process & its model process towards software engineering
C312.2	Apply the functional and non-functional requirements to model an effective software product.
C312.3	Analyze, design and implement an object-oriented approach system.
C312.4	Enhance the testing tools for effective debugging.
C312.5	Analyze the metrics, risk and the quality issues for designing a process/ product.
C312.6	Test security levels of a software and mange security software's.

COURSE CONTENT

UNIT – I

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, Legacy Software, Software myths.

A Generic view of process: Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

Process models: The waterfall model, Incremental process models, Evolutionary process models, The Unified process.

UNIT - II

Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

System models: Context Models, Behavioural models, Data models, Object models, structured methods.

UNIT – III

Design Engineering: Design process and Design quality, Design concepts, the design model.

Creating an architectural design: Software architecture, Data design, Architectural styles and patterns, Architectural Design.

Object-Oriented Design: Objects and object classes, An Object-Oriented design process, Design evolution.

Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

UNIT - IV

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

Product metrics: Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Metrics for Process and Products: Software Measurement, Metrics for software quality.

UNIT –V

Risk Management: Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

Quality Management : Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

TEXT BOOKS:

1. Software engineering A practitioner's Approach, Roger S Pressman, 6th edition. McGraw Hill International Edition.
2. Software Engineering, Ian Sommerville, 7th edition, Pearson education.

REFERENCES BOOKS:

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering: A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008.
3. Fundamentals of Software Engineering, Rajib Mall, PHI, 2005.
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
5. Software Engineering1: Abstraction and modelling, Diner Bjorner, Springer International edition, 2006.
6. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition 2006.
7. Software Engineering Foundations, Yingux Wang, Auerbach Publications, 2008.
8. Software Engineering Principles and Practice, Hans Van Vliet, 3rd edition, John Wiley & Sons Ltd.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.swayam2.ac.in/cec20_cs07/preview
2. https://nptel.ac.in/courses/106/105/106105087/
3. https://onlinecourses.nptel.ac.in/noc19_cs69/preview

WEB REFERENCE/E-BOOKS:

1. https://www.javatpoint.com/software-engineering-tutorial
2. https://www.tutorialspoint.com/software_engineering/index.htm

PRINCIPLES OF COMMUNICATION AND COMPUTER NETWORKS
III B.TECH., I SEMESTER

Course Title: PRINCIPLES OF COMMUNICATION AND COMPUTER NETWORKS	Course Code: AS20-12ES01
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, Data Structures	

Course Overview:
This course presents an in-depth discussion of the most important networking protocols comprising the TCP/IP protocol suite. Students will be able to understand state of the art in network protocols, architectures, and applications.

Course Objective

- Describe how computer networks are organized with the concept of layered approach.
- Implement a simple LAN with hubs, bridges and switches.
- Describe how packets in the Internet are delivered.
- Analyze the contents in a given Data Link layer packet, based on the layer concept.
- Design logical sub-address blocks with a given address block.
- Decide routing entries given a simple example of network topology
- Describe how routing protocols work.

Course Outcomes(s)

CO#	Course Outcomes
C313.1	Describes about the architecture of network topology and need for reference model
C313.2	Understand the error correction and detection methods used in DLL and goodness of frame structure
C313.3	An awareness about routing, IP addresses and subnetting
C313.4	Provides information regarding congestion control mechanism at transport layer
C313.5	Provides deep knowledge about the working of HTTP and DNS at application layer
C313.6	Describes the various basic computer networking

COURSE CONTENT

UNIT - I

Network hardware: Network software, OSI, TCP/IP Reference models, Example Networks: ARPANET, Internet.

Physical Layer: Guided Transmission media: twisted pairs, coaxial cable, fiber optics, Wireless transmission.

UNIT - II

Data link layer: Design issues, framing, Error detection and correction.

Elementary data link protocols: simplex protocol, A simplex stop and wait protocol for an error-free channel, A simplex stop and wait protocol for noisy channel.

UNIT - III

Sliding Window protocols: A one-bit sliding window protocol, A protocol using Go-Back-N, A protocol using Selective Repeat, Example data link protocols.

Medium Access sub layer: The channel allocation problem, Multiple access protocols: ALOHA, Carrier sense multiple access protocols, collision free protocols. Wireless LANs, Data link layer switching.

UNIT - IV

Network Layer: Design issues, Routing algorithms: shortest path routing, Flooding, Hierarchical routing, Broadcast, Multicast, distance vector routing, Congestion Control Algorithms, Quality of Service, Internetworking, The Network layer in the internet.

Transport Layer: Transport Services, Elements of Transport protocols, Connection management, TCP and UDP protocols.

UNIT - V

Application Layer: Domain name system, SNMP, Electronic Mail; the World WEB, HTTP, Streaming audio and video.

TEXT BOOK

1. Computer Networks -- Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. Pearson Education/PHI

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networks-S. Keshav, 2nd Edition, Pearson Education
2. Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.swayam2.ac.in/cec19_cs07/preview
2. https://nptel.ac.in/courses/106/105/106105081/

WEB REFERENCE/E-BOOKS:

1. https://www.javatpoint.com/computer-network-tutorial
2. https://www.geeksforgeeks.org/computer-network-tutorials/
3. https://www.tutorialspoint.com/data_communication_computer_network/index.htm

LINUX PROGRAMMING
III B.TECH., I SEMESTER
PROFESSIONAL ELECTIVE - I

Course Title: LINUX PROGRAMMING	Course Code: AS20-05PE11
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: Operating Systems, Computer Organization	

Course Overview:
This course explains the fundamental ideas behind the open source operating system approach to programming. Knowledge of Linux helps to understand OS level programming. Like the successful computer languages that came before, Linux is the blend of the best elements of its rich heritage combined with the innovative concepts required by its unique environment. This course involves kernel concepts, basics commands, shell scripting, file processing, Socket programming, Processes, Inter process communication.

Course Objective
1. Ability to learn principles of operating system including File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking Commands, Basic Linux commands, Scripts and filters.
2. Ability to familiarize fundamentals of the Bourne again shell (bash), shell programming, pipes, input and output redirection Control structures, arithmetic in shell interrupt processing, functions, debugging shell scripts.
3. To learn fundamentals of file concepts kernel support for file, File structure related system calls (file API's).
4. Understanding Process and Inter process communication.
5. Understanding semaphore and shared memory.

Course Outcomes(s)

CO#	Course Outcomes
C314.1	Understand the basic commands of Linux operating system and can write shell scripts.
C314.2	Analysis and design a Shell Programming using Linux commands.
C314.3	Analysis and design an application to manipulate internal kernel level Linux File System.
C314.4	Develop IPC-API's that can be used to control various processes for synchronization.
C314.5	Develop Network Programming that allows applications to make efficient use of resources available on different machines in a network.
C314.6	Create shared memory segments, pipes, message queues and can exercise interposes communication.

COURSE CONTENT

UNIT - I

Introduction to Linux and Linux Utilities: A brief history of LINUX, architecture of LINUX, features of LINUX, introduction to vi editor.

Linux commands: PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, unlink, du, df, mount, umount, find, unmask, ulimit, ps, w, finger, arp, ftp, telnet, rlogin.Text Processing utilities and backup utilities , tail, head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, cpio

UNIT - II

Introduction to Shells: Linux Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell/Environment Customization.

Filters: Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count Characters, Words or Lines, Comparing Files.

UNIT - III

Grep: Operation, grep Family, Searching for File Content.

Sed : Scripts, Operation, Addresses, commands, Applications, grep and sed.

Unix File Structure: Introduction to UNIX file system, inode (Index Node), file descriptors, system calls and device drivers.

File Management :File Structures, System Calls for File Management – create, open, close, read, write, lseek, link, symlink, unlink, stat, fstat, lstat, chmod, chown, Directory API – opendir, readdir, closedir, mkdir, rmdir, umask.

UNIT - IV

Process and Signals: Process, process identifiers, process structure: process table, viewing processes, system processes, process scheduling, starting new processes: waiting for a process, zombie processes, orphan process, fork, vfork, exit, wait, waitpid, exec, signals functions, unreliable signals, interrupted system calls, kill, raise, alarm, pause, abort, system, sleep functions, signal sets.

File locking: creating lock files, locking regions, use of read and write with locking, competing locks, other lock commands, deadlocks.

UNIT - V

Inter Process Communication: Pipe, process pipes, the pipe call, parent and child processes, and named pipes: fifos, semaphores: semget, semop, semctl, message queues: msgget, msgsnd, msgrcv, msgctl, shared memory: shmget, shmat, shmdt, shmctl, ipc status commands.

Introduction To Sockets: Socket, socket connections - socket attributes, socket addresses, socket, connect, bind, listen, accept, socket communications.

TEXT BOOKS:

1. W. Richard. Stevens (2005), Advanced Programming in the UNIX Environment, 3rd edition, Pearson Education, New Delhi, India.
2. Behrouz A. Forouzan, Richard F. Gilberg.Thomson, UNIX and shell Programming

REFERENCES BOOKS:

1. Sumitabha Das, UNIX Concepts and Applications, 4th Ed, TMH
2. W.R.Stevens, UNIX Network Programming, PHI.
3. Linux System Programming, Robert Love, O'Reilly, SPD.
4. Advanced Programming in the UNIX environment, 2nd Edition, W.R.Stevens, Pearson Education.
3. UNIX Network Programming, W.R. Stevens, PHI. UNIX for Programmers and Users, 3rd Edition.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://nptel.ac.in/courses/117/106/117106113/
2. https://onlinecourses.swayam2.ac.in/aic20_sp24/preview
3. https://www.coursera.org/learn/linux-for-developers

WEB REFERENCE/E-BOOKS:

1. https://www.tutorialspoint.com/unix/index.htm
2. https://www.javatpoint.com/linux-tutorial
3. https://digital.com/custom-software-development-companies/linux-programming/

IMAGE PROCESSING
III B.TECH., I SEMESTER
PROFESSIONAL ELECTIVE - I

Course Title: IMAGE PROCESSING	Course Code: AS20-05PE12
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: Computational Mathematics, Computer Oriented Statistical Methods	

Course Overview:
This course is designed to give undergraduate students all the fundamentals in 2-D digital image processing with emphasis in image processing techniques, image filtering design and applications.

Course Objective
1. Provide a theoretical and mathematical foundation of fundamental Digital Image Processing concepts.
2. The topics include image acquisition; sampling and quantization; pre-processing; enhancement; restoration; segmentation; and compression.

Course Outcomes(s)

CO#	Course Outcomes
C314.1	Understand the basic concepts of two-dimensional signal acquisition, sampling, and quantization.
C314.2	Determine the knowledge of filtering techniques
C314.3	Validate the knowledge of 2D transformation techniques.
C314.4	Understand the Image Restoration Degradation Model in image processing
C314.5	Demonstrate the knowledge of image enhancement, segmentation, restoration and compression techniques.
C314.6	Understand and analyse the Redundancies and their Removal Methods, Fidelity Criteria in Image Compression

COURSE CONTENT

UNIT – I

Digital Image Fundamentals: Digital Image through Scanner, Digital Camera. Concept of Gray Levels. Gray Level to Binary Image Conversion. Sampling and Quantization. Relationship between Pixels. Imaging Geometry. 2D Transformations-DFT, DCT, KLT and SVD.

UNIT – II

Image Enhancement in Spatial Domain Point Processing: Histogram Processing, Spatial Filtering, Enhancement in Frequency Domain, Image Smoothing, Image Sharpening.

UNIT – III

Image Restoration Degradation Model: Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square Filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT – IV

Image Segmentation Detection of Discontinuities: Edge Linking and Boundary Detection, Thresholding, Region Oriented Segmentation.

UNIT – V

Image Compression Redundancies and their Removal Methods: Fidelity Criteria, Image Compression Models, Source Encoder and Decoder, Error Free Compression, Lossy Compression.

TEXT BOOKS:

1. Digital Image Processing: R.C. Gonzalez & R. E. Woods, Addison Wesley/ Pearson Education, 2nd Ed, 2004.

REFERENCES BOOKS:

1. Fundamentals of Digital Image Processing: A. K. Jain, PHI.
2. Digital Image Processing using MAT LAB: Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins: Pearson Education India, 2004.
3. Digital Image Processing: William K. Pratt, John Wilely, 3rd Edition, 2004.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc19_ee55/preview
2. https://onlinecourses.nptel.ac.in/noc21_ee23/preview

WEB REFERENCE/E-BOOKS:

1. https://www.tutorialspoint.com/dip/index.htm
2. https://www.geeksforgeeks.org/digital-image-processing-basics/

DATA ANALYTICS
III B.TECH., I SEMESTER
PROFESSIONAL ELECTIVE - I

Course Title: DATA ANALYTICS	Course Code: AS20-05PE13
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: Database Management Systems, Knowledge of probability and statistics.	

Course Overview:
This course is designed to give undergraduate students all the fundamentals in 2-D digital image processing with emphasis in image processing techniques, image filtering design and applications.

Course Objective
1. To explore the fundamental concepts of data analytics.
2. To learn the principles and methods of statistical analysis
3. Discover interesting patterns, analyze supervised and unsupervised models and estimate the accuracy of the algorithms.
4. To understand the various search methods and visualization techniques.

Course Outcomes(s)

CO#	Course Outcomes
C314.1	Understand the impact of data analytics for business decisions and strategy
C314.2	Carry out data analysis/statistical analysis
C314.3	To carry out standard data visualization and formal inference procedures
C314.4	Design Data Architecture
C314.5	Understand various Data Sources
C314.6	Understand various data visualization technique in data analytics

COURSE CONTENT

UNIT - I
Data Management: Design Data Architecture and manage the data for analysis, understand various sources of Data like Sensors/Signals/GPS etc. Data Management, Data Quality (noise, outliers, missing values, duplicate data) and Data Processing & Processing.

UNIT - II
Data Analytics: Introduction to Analytics, Introduction to Tools and Environment, Application of Modelling in Business, Databases & Types of Data and variables, Data Modelling Techniques, Missing Imputations etc. Need for Business Modelling.

UNIT - III

Regression: Concepts, Blue property assumptions, Least Square Estimation, Variable Rationalization, and Model Building etc.

Logistic Regression: Model Theory, Model fit Statistics, Model Construction, Analytics applications to various Business Domains etc.

UNIT - IV

Object Segmentation: Regression Vs Segmentation: Supervised and Unsupervised Learning, **Tree Building** : Regression, Classification, Overfitting, Pruning and Complexity, Multiple Decision Trees etc.

Time Series Methods: Arima, Measures of Forecast Accuracy, STL approach, Extract features from generated model as Height, Average Energy etc and Analyze for prediction

UNIT - V

Data Visualization: Pixel-Oriented Visualization Techniques, Geometric Projection Visualization Techniques, Icon-Based Visualization Techniques, Hierarchical Visualization Techniques, Visualizing Complex Data and Relations.

TEXT BOOKS:

1. Student's Handbook for Associate Analytics – II, III.
2. Data Mining Concepts and Techniques, Han, Kamber, 3rd Edition, Morgan Kaufmann Publishers.

REFERENCES BOOKS:

1. Introduction to Data Mining, Tan, Steinbach and Kumar, Addision Wisley, 2006.
2. Data Mining Analysis and Concepts, M. Zaki and W. Meira
3. Mining of Massive Datasets, Jure Leskovec Stanford Univ. Anand Rajaraman Milliway Labs Jeffrey D Ullman Stanford Univ.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc20_cs46/preview
2. https://onlinecourses.nptel.ac.in/noc21_cs45/preview

WEB REFERENCE/E-BOOKS:

1. https://www.tutorialspoint.com/excel_data_analysis/data_analysis_overview.htm
2. https://data-flair.training/blogs/data-analytics-tutorial/

MULTIMEDIA COMPUTING
III B.TECH., I SEMESTER
PROFESSIONAL ELECTIVE - I

Course Title: MULTIMEDIA COMPUTING	Course Code: AS20-05PE14
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: Algorithm, basic multimedia skills	

Course Overview:
After learning the course the students should be able to: Understand basics of multimedia computing, Different Audio-Video Compression Techniques and Application of Multimedia Networks.

Course Objective

- Identify the essential features of graphics/image data types, file formats, and colour models in images and video.
- Explain the technical details of multimedia data representations.
- Perform a comparative analysis of the major methods and algorithms for multimedia data compression.
- Explain the technical details of popular multimedia compression standards.

Course Outcomes(s)

CO#	Course Outcomes
C314.1	Understanding different forms of media and their digital representations.
C314.2	Gain knowledge of computer methods and tools for processing, recognizing, and creating different media.
C314.3	Gain knowledge of multimedia encoding and compression
C314.4	Understand different compression principles, techniques, and standards to design and develop multimedia systems according to the requirements of multimedia applications.
C314.5	Understand different data formats be able to take into considerations in multimedia system designs.
C314.6	Understand the Multimedia Networks basic and its applications

COURSE CONTENT

UNIT - I

Fundamental concepts in Text and Image: Multimedia and hypermedia, World Wide Web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video.

UNIT - II

Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.
Multimedia data compression I: Lossless compression algorithm: Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression,

UNIT - III

Multimedia data compression II: Lossy compression algorithm: Quantization, Transform Coding, Wavelet-Based Coding, Embedded Zerotree of Wavelet Coefficients Set Partitioning in Hierarchical Trees (SPIHT).

UNIT - IV

Basic Video Compression Techniques: Introduction to video compression, video compression based on motion compensation, search for motion vectors, MPEG, Basic Audio Compression Techniques.

UNIT - V

Multimedia Networks: Basics of Multimedia Networks, Multimedia Network Communications and Applications: Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG-4, Media-on-Demand (MOD).

TEXT BOOKS:

1. Fundamentals of Multimedia by Ze-Nian Li and Mark S. Drew Pearson Education.

REFERENCES BOOKS:

1. Digital Multimedia, Nigel chapman and jenny chapman, Wiley-Dreamtech
2. Multimedia Technology and Applications, David Hilman, Galgotia
3. Multimedia and communications Technology, Steve Heath, Elsevier (Focal Press).
4. Multimedia Applications, Steinmetz, Nahrstedt, Springer.
5. Macromedia Flash MX Professional 2004 Unleashed, Pearson.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://www.coursera.org/lecture/internet-of-things-multimedia/multimedia-computing-and-classification-KRa30

WEB REFERENCE/E-BOOKS:

1. https://www.tutorialspoint.com/multimedia/index.htm
2. http://eilat.sci.brooklyn.cuny.edu/cis52/index.php?q=pages&id=5

PRINCIPLES OF PROGRAMMING LANGUAGES
III B.TECH., I SEMESTER
PROFESSIONAL ELECTIVE - I

Course Title: PRINCIPLES OF PROGRAMMING LANGUAGES	Course Code: AS20-05PE15
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: Mathematical Foundations of Computer Science, Computer Programming and Data Structures	

Course Overview:
This course is an introduction to the theory and design of programming languages. To develop high-assurance software - software for which we can give strong evidence that the software will do what it is supposed to do and nothing more - a formal description of the 'meaning' and behavior of programs is required. Hence two fundamental aspects of the study of programming languages are their syntax, and their formal semantics. High-assurance software is not only needed for safety-critical software, but also for program transformations, such as carried out by optimizing compilers.

Course Objective

1. Introduce important paradigms of programming languages
2. To provide conceptual understanding of high-level language design and implementation
3. Topics include programming paradigms; syntax and semantics; data types, expressions and statements; subprograms and blocks; abstract data types; concurrency; functional and logic programming languages; and scripting languages

Course Outcomes(s)

CO#	Course Outcomes
C314.1	Understand fundamental concept of Studying Programming Languages
C314.2	Understand Syntax and Semantics of programming languages
C314.3	Understand on data types, binding, scope, expression and statement on programming languages
C314.4	Understand on subprograms and blocks, abstract data types in programming languages
C314.5	Analyse the concurrency and exception handling mechanism in programming languages
C314.6	Evaluate the functional programming language, logic programming language and scripting language

COURSE CONTENT

UNIT - I

Preliminary Concepts: Reasons for Studying Concepts of Programming Languages, Programming Domains, Language Evaluation Criteria, Influences on Language Design, Language Categories, Language Design Trade-Offs, Implementation Methods, Programming Environments

Syntax and Semantics: General Problem of Describing Syntax and Semantics, Formal Methods of Describing Syntax, Attribute Grammars, Describing the Meanings of Programs

UNIT - II

Names, Bindings, and Scopes: Introduction, Names, Variables, Concept of Binding, Scope, Scope and Lifetime, Referencing Environments, Named Constants

Data Types: Introduction, Primitive Data Types, Character String Types, User Defined Ordinal Types, Array, Associative Arrays, Record, Union, Tuple Types, List Types, Pointer and Reference Types, Type Checking, Strong Typing, Type Equivalence

Expressions and Statements: Arithmetic Expressions, Overloaded Operators, Type Conversions, Relational and Boolean Expressions, Short Circuit Evaluation, Assignment Statements, Mixed-Mode Assignment

Control Structures – Introduction, Selection Statements, Iterative Statements, Unconditional Branching, Guarded Commands.

UNIT - III

Subprograms and Blocks: Fundamentals of Sub-Programs, Design Issues for Subprograms, Local Referencing Environments, Parameter Passing Methods, Parameters that Are Subprograms, Calling Subprograms Indirectly, Overloaded Subprograms, Generic Subprograms, Design Issues for Functions, User Defined Overloaded Operators, Closures, Coroutines

Implementing Subprograms: General Semantics of Calls and Returns, Implementing Simple

Subprograms, Implementing Subprograms with Stack-Dynamic Local Variables, Nested Subprograms, Blocks, Implementing Dynamic Scoping

Abstract Data Types: The Concept of Abstraction, Introductions to Data Abstraction, Design Issues, Language Examples, Parameterized ADT, Encapsulation Constructs, Naming Encapsulations

UNIT - IV

Concurrency: Introduction, Introduction to Subprogram Level Concurrency, Semaphores, Monitors, Message Passing, Java Threads, Concurrency in Function Languages, Statement Level Concurrency.

Exception Handling and Event Handling: Introduction, Exception Handling in Ada, C++, Java, Introduction to Event Handling, Event Handling with Java and C#.

UNIT - V

Functional Programming Languages: Introduction, Mathematical Functions, Fundamentals of Functional Programming Language, LISP, Support for Functional Programming in Primarily Imperative Languages, Comparison of Functional and Imperative Languages

Logic Programming Language: Introduction, an Overview of Logic Programming, Basic Elements of Prolog, Applications of Logic Programming.
Scripting Language: Pragmatics, Key Concepts, Case Study: Python – Values and Types, Variables, Storage and Control, Bindings and Scope, Procedural Abstraction, Data Abstraction, Separate Compilation, Module Library. (Text Book 2)

TEXT BOOKS:

1. Concepts of Programming Languages Robert. W. Sebesta 10/E, Pearson Education.
2. Programming Language Design Concepts, D. A. Watt, Wiley Dreamtech, 2007.

REFERENCES BOOKS:

1. Programming Languages, 2nd Edition, A.B. Tucker, R. E. Noonan, TMH.
2. Programming Languages, K. C. Louden, 2nd Edition, Thomson, 2003

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://nptel.ac.in/courses/106/102/106102067/

WEB REFERENCE/E-BOOKS:

1. https://www.geeksforgeeks.org/principles-of-programming-languages-gq/

MATHEMATICAL FOUNDATIONS FOR COMPUTER SCIENCE
III B.TECH., I SEMESTER
OPEN ELECTIVE - I

Course Title: MATHEMATICAL FOUNDATIONS FOR COMPUTER SCIENCE	Course Code: AS20-05OE11
Teaching Scheme (L:T:P):3:0:0	Credits:3
Type of Course: Lecture + Assignment	Total Contact Periods: 48 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks

Course Overview:
This course will discuss fundamental concepts and tools in discrete mathematics with emphasis on their applications to computer science. Topics include logic and Boolean circuits, sets, functions, relations, deterministic algorithms and randomized algorithms, analysis techniques based on counting methods and recurrence relations, trees and graphs

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

Course Outcomes(s)

CO#	Course Outcomes
C315.1	Describes and solve problems related to connectives, predicates and quantifiers under different situations.
C315.2	Develops basic knowledge of matrices and to solve equations using Cramer's rule.
C315.3	Explains the concept of Eigen values.
C315.4	Describes derivatives and know various applications of differentiation.
C315.5	Explains the basic concepts of Mathematical reasoning, set and functions
C315.6	Describes the mathematical functions that lay the foundations of Computer Science

COURSE CONTENT

UNIT - I

Basic concepts of set theory: Mathematical logic, introduction-statements-connectives-negation, conjunction, disjunction- statement formulas and truth tables-conditional and bi-conditional statements, tautology, contradiction-equivalence of formulas, duality law-Predicates and Quantifiers, Arguments.

UNIT - II

Operations on sets : power set, venn diagram Cartesian product-relations, functions, types of functions, composition of functions.

UNIT - III

Matrix algebra: Introduction. Types of matrices, matrix operations, transpose of a matrix, determinant of matrix, inverse of a matrix, Cramer's rule

UNIT - IV

Matrix: finding rank of a matrix, normal form, echelon form, Cayley Hamilton theorem, Eigen values

UNIT - V

Differential calculus : Functions and limits, Simple Differentiation of Algebraic Functions, Evaluation of First and Second Order Derivatives, Maxima and Minima

TEXT BOOKS:

1. Discrete Mathematical Structures with Applications to Computer Science,J. P.Tremblay and P. Manohar,Tata McGraw Hill.
2. P.R.Vittal-Business Mathematics and Statistics,MarghamPublications,Chennai,
3. Elements of Discrete Mathematics-A Computer Oriented Approach, C. L. Liu and D. P. Mohapatra, 3rdEdition, Tata McGraw Hill.

REFERENCE BOOKS:

1. Discrete Mathematics for Computer Scientists and Mathematicians, J. L. Mott, A. Kandel, T.P. Baker, 2nd Edition, Prentice Hall of India.
2. Discrete Mathematical Structures, BernandKolman, Robert C. Busby, Sharon Cutler Ross, PHI.
3. Discrete Mathematics, S. K. Chakraborthy and B.K. Sarkar, Oxford, 2011.
4. B.S.Vatsa-Discrete Mathematics –New Age International Limited Publishers,New Delhi
5. Discrete Mathematics and its Applications with Combinatorics and Graph Theory, K. H. Rosen, 7th Edition, Tata McGraw Hill.

DATA BASE MANAGEMENT SYSTEMS
III B.TECH., I SEMESTER
OPEN ELECTIVE - I

Course Title: DATA BASE MANAGEMENT SYSTEMS	Course Code: AS20-05OE12
Teaching Scheme (L:T:P):3:0:0	Credits:3
Type of Course: Lecture + Assignment	Total Contact Periods: 48 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks

Course Overview:
Developing and managing efficient and effective database applications requires understanding the fundamentals of database management systems, techniques for the design of databases, and principles of database administration. This course emphasized database concepts, developments, use and management in three main sections: database concepts, practice, and emerging trends. Relational database systems are the main focus, but other types, including object- oriented databases, are studied.

Course Objective
- Understand the fundamentals of relational, object-oriented, and distributed database systems including: data models, database architectures, and database manipulations
- Understand the theories and techniques in developing database applications and be able to demonstrate the ability to build databases using enterprise DBMS products such as Oracle or SQL Server.
- Be familiar with managing database systems
- Understand new developments and trends in databases.

Course Outcomes(s)

CO#	Course Outcomes
C315.1	Demonstrates the basic elements of a relational database management system.
C315.2	Identifies the data models for relevant problems.
C315.3	Designs entity relationship model and converts entity relationship diagrams into RDBMS and formulates SQL queries on the data.
C315.4	Applies various DDL, DML instructions on a RDBMS
C315.5	Applies normalization for the development of application software.
C315.6	Describes storage and retrieval mechanisms of an RDBMS

COURSE CONTENT

UNIT - I

Database Management System Concepts: Introduction, Significance of Database, Database System Applications, Data Independence, Data Modeling for a Database, Entities and their Attributes, Entities, Attributes, Relationships and Relationships Types, Advantages and Disadvantages of Database Management System, DBMS Vs RDBMS.

UNIT - II

Database System Architecture: Three Level Architecture of DBMS, The External Level or Subschema, The Conceptual Level or Conceptual Schema, The Internal Level or Physical Schema, Data Definition Language, Data Manipulation Language, Database Management System Structure, Database Manager, Database Administrator, Data Dictionary

UNIT - III

Database Models and Implementation: Data Model and Types of Data Model, Relational Data Model, Hierarchical Model, Network Data Model, Object/Relational Model, Object-Oriented Model, Entity-Relationship Model, Modeling using E-R Diagrams, Notation used in E-R Model, Relationships and Relationship Types, Associative Database Model

UNIT - IV

SQL : Categories of SQL Commands; Data Definition; Data Manipulation Statements, SELECT - The Basic Form, Subqueries, Functions, GROUP BY Feature, Updating the Database, Data Definition Facilities.
Views; Embedded SQL, Declaring Variables and Exceptions, Embedding SQL Statements, Transaction Processing, Consistency and Isolation, Atomicity and Durability

UNIT - V

Normalization: Functional Dependency, Anomalies in a Database, Properties of Normalized Relations, First Normalization, Second Normal Form Relation, Third Normal Form, Boyce-Codd Normal Form (BNCF), Fourth and Fifth Normal Form

TEXT BOOKS:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, ―Database System Concepts‖, 6th Edition, Tata McGraw-Hill.
2. Raghu Rama Kirshna, Johannes Gehrk, ―Database Management System‖ Tata McGraw Hill 3rd Edition.

REFERENCES BOOKS:

1. Database Systems, 6th edition, R Elmasri, Shamkant B.Navathe, Pearson Education.

2. Database System Concepts, Peter Rob & Carlos Coronel, Cengage Learning.
3. Introduction to Database Management, M. L. Gillenson and others, Wiley Student Edition.
4. Database Development and Management, Lee Chao, Auerbach publications, Taylor & Francis Group.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. Data Base Management System - By Prof. Partha Pratim Das, Prof. Samiran Chattopadhyay - IIT Kharagpur
2. https://www.udemy.com/database-management-system/

WEB REFERENCE/E-BOOKS:

1. https://alison.com/courses/IT-Management-Software-and-Databases
2. https://mva.microsoft.com/en-us/training-courses/database-fundamentals 8243?l=TEBiexJy_5904984
3. http://www.sqlcourse.com/

COMPUTER ORGANIZATION AND ARCHITECTURE
III B.TECH., I SEMESTER
OPEN ELECTIVE - I

Course Title: COMPUTER ORGANIZATION AND ARCHITECTURE	Course Code: AS20-05OE13
Teaching Scheme (L:T:P):3:0:0	Credits:3
Type of Course: Lecture + Assignment	Total Contact Periods: 48 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks

Course Overview:
This course is an introduction to microprocessor and computer architecture. It covers topics in both the physical design of the computer (organization) and the logical design of the computer (architecture).

Course Objective
- To explain the microprocessor.
- To explain the assembly language programming,
- To explain the overview of computer organization.
- To explain the principle of CPU system.
- To explain the principle of memory system
- To explain the principle of data flow.

Course Outcomes(s)

CO#	Course Outcomes
C315.1	Describes the evolutions and basis of Computer Organization and Architecture
C315.2	Use of basic computer instructions
C315.3	Explains the fundamentals of microprocessor design and especially 8086
C315.4	Develops assembly language programs for execution on 8086 Microprocessors
C315.5	Explains multi-processor architectures and the uses of Pipelining
C315.6	Explains the various processor organization scenarios and the programs that can be executed on them

COURSE CONTENT

UNIT - I

Basic Computer Architecture Introduction: History of Computer architecture, Overview of computer organization, Memory Hierarchy and cache, Organization of hard disk.

Instruction Codes: Stored Program Organization-Indirect Address, Computer Registers, Common bus system, Instruction set, Timing and Control-Instruction Cycle

UNIT - II

Central Processing Unit

General Register Organization: Control Word, Stack Organization and Instruction; Formats-Addressing Models.

Data Transfer and Manipulation: Data Transfer Instruction, Data Manipulation Instructions, Arithmetic Instructions, Logical and Bit Manipulation Instruction, Shift Instructions.

Program Control: Status Bit Conditions, Conditional Branch Instruction, Subroutine Call and Return, Program Interrupt, Types of Interrupts

UNIT - III

Fundamental of Microprocessor :Introduction to Microprocessors, Microprocessor systems with bus organization, Microprocessor architecture and operation, 8085 Microprocessor and its operation, 8086 instruction cycle, machine cycle, T states, Addressing modes in 8086, Introduction to 8086.

UNIT - IV

Introduction To Assembly Language Programming : Assembly Language Programming Basics, Classification of Instructions and Addressing Mode, 8086 Instruction Sets, Assembling, Executing and Debugging the Programs, Developing Counters and Time Delay Routines, Interfacing Concepts

UNIT - V

Pipeline: Vector Processing and Multiprocessors, Parallel Processing, Pipeline Examples: Four Segment Instruction Pipeline, Data Dependency, Handling of Branch Instructions, Vector Processing, Vector operations, Matrix Multiplication

TEXT BOOKS:

1. Morris Mano.lvf.. Computer System architecture, PUT.
2. Gaonkar, Ramesh S., “Microprocessor Architecture, Programming, and Applications with the 8085”, Pen Ram International Publishing.

REFERENCES BOOKS:

1. B. Ram, “Fundamentals of microprocessor and microcontroller”, Dhanpat Rai Publishing Co Pvt Ltd.
2. Hamacher.V.C.,Vranesic.Z.G and Zaky.S.G., "*Computer Organisation*", McGraw Hill, New York.
3. 2. Hayes,"*Computer System Architecture*" Mc Gram Hill.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

- https://nptel.ac.in/courses/106/105/106105163/
- https://nptel.ac.in/courses/106/103/106103180/

WEB REFERENCE/E-BOOKS:

- http://www.gpkhutri.in/BOOK/COMPUTER/Computer%20Organization%20and%20Architecture%20Designing%20for%20Performance%20(8th%20Edition)%20-%20William%20Stallings.pdf
- https://ebooks.lpude.in/computer_application/bca/term_4/DCAP206_INTRODUCTION_TO_COMPUTER_ORGANIZATION_AND_ARCHITECTURE_DCAP502_COMPUTER_ORGANIZATION_AND_ARCHITECTURE.pdf
- https://ict.iitk.ac.in/wp-content/uploads/CS422-Computer-Architecture-ComputerOrganizationAndDesign5thEdition2014.pdf

OBJECT ORIENTED PROGRAMMING THROUGH C++
III B.TECH., I SEMESTER
OPEN ELECTIVE - I

Course Title: OBJECT ORIENTED PROGRAMMING THROUGH C++	Course Code: AS20-05OE14
Teaching Scheme (L:T:P):3:0:0	Credits:3
Type of Course: Lecture + Assignment	Total Contact Periods: 48 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks

Course Overview:
This course is a comprehensive hands-on introduction to object oriented programming in C++ for the students. Emphasis is placed on the features of C++ that support effective modelling of the problem domain and reuse of code. This course is also to learn class, object, inheritance, polymorphism, exception handling and files operation.

Course Objective

- To understand how C++ improves C with object-oriented features.
- To learn the syntax and semantics of the C++ programming language.
- To learn how to implement copy constructors and class member functions.
- To understand the concept of data abstraction and encapsulation.
- To learn how to overload functions and operators in C++.
- To learn how inheritance and virtual functions implement dynamic binding with polymorphism.
- To learn how to use exception handling in C++ programs.

Course Outcomes(s)

CO#	Course Outcomes
C315.1	Understand the object-oriented programming approach in connection with C++
C315.2	Understand to make use of class and objects classes for developing programs.
C315.3	Understand the concept of function overloading, operator overloading, virtual functions, constructor, destructor and polymorphism.
C315.4	Analyse and classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming.
C315.5	Apply virtual and pure virtual function & complex programming situations
C315.6	Develop applications using stream I/O and file I/O.

COURSE CONTENT

UNIT - I

Principles of Object Oriented Programming (OOP): Software Evaluation, a Look at Procedure Oriented Programming, OOP Paradigm, Basic Concepts of OOP, Benefits of OPP, Application of OOP.

Introduction to C++ What is C++, A simple C++ Program, More C++ statements, Structure of C++ Program.

Tokens, Expression and controls Structures Tokens, Keywords, Identifiers and Constants, C++ data types, Variables: Declaration, Dynamic initialization of variables, Reference variables, Operators in C++: Scope resolution operator, Member differencing Operators, Memory Management Operators, Manipulators, Type cast operators, Expressions and Control Structures.

UNIT - II

Functions: The main() function, Function Prototyping, Call by reference, Return by reference, Inline function, Function Overloading

Classes and Objects Introduction, Specifying a Class, Defining member Functions, C++ Program with Class, Nesting of Member functions, Private member functions, Memory Allocation for Objects, Static Data members, Static Member Functions, Arrays within a Class, Arrays of Objects, Objects as Function Arguments, Friendly Functions, Returning Objects.

UNIT - III

Pointers: Declaration and initializing, Manipulation of pointers, pointers Expression and Pointer Arithmetic, Pointer with Arrays, Arrays of Pointers, Pointers to objects, this pointers, Arrays of Pointers to Objects

Constructors and Destructors Constructors, Parameterized Constructors, Multiple Constructors in a class, Copy constructor, Destructors. Operator overloading Defining Operator Overloading, Overloading Unary Operators, Overloading Binary Operators, Type Conversions.

UNIT - IV

Inheritance and Polymorphisms: Introduction, Defining Derived Classes, Single inheritance, Multiple inheritance, Hierarchical inheritance, Multilevel inheritance, Hybrid inheritance, Virtual Base Classes, Polymorphism, static and dynamic binding, Constructor in Derived Classes, Pointers to Derived Classes, Virtual Functions, Pure Virtual Functions.

UNIT - V

I/O Operations and Files: C++ Stream Classes, Unformatted I/O Operations, Formatted I/O operations, Classes for File Streams, Opening and Closing a File : open() and close() functions, Manipulators of File Pointers : seekg(), seekp(), tellg(), tellp() functions, Sequential **Input and output Operations :** put (), get(), write(), read() functions, Error handling File Operations : eof(), fail(), bad(), good() .

TEXT BOOKS:

1. E. Balagurusamy - Object Oriented Programming with C++ - TMH.
2. Robert Lafore - Object Oriented Programming in Microsoft C++ - Galgotia

REFERENCES BOOKS:

1. Bjarne Stroustrup: The C++ programming language.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc19_cs38/preview
2. https://onlinecourses.nptel.ac.in/noc19_cs39/preview

WEB REFERENCE/E-BOOKS:

1. w3schools.com/cpp/cpp_oop.asp
2. https://www.javatpoint.com/cpp-oops-concepts
3. https://www.tutorialspoint.com/cplusplus/cpp_object_oriented.htm

ADVANCED ENGLISH COMMUNICATION SKILLS LAB
III B.TECH., I SEMESTER

Course Title: ADVANCED ENGLISH COMMUNICATION SKILLS LAB	Course Code:AS20-00HS05
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: 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:

A course on Advanced English Communication Skills (AECS) Lab is considered essential at the third year level of B. Tech courses. At this stage, the students need to prepare themselves for their career which requires them to listen to, read, speak and write in English both for their professional and interpersonal communication. The main purpose of this course is to prepare the students of Engineering for their placements. 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

- To improve students' fluency in spoken English
- To enable them to listen to English spoken at normal conversational speed
- To read and comprehend texts in different contexts
- To communicate their ideas relevantly and coherently in writing
- To make students industry-ready
- To help students acquire behavioural skills for their personal and professional life
- To respond appropriately in different socio-cultural and professional contexts

Course Outcomes(s)

CO	Course Outcomes
C316.1	Acquire vocabulary and use it contextually
C316.2	Listen and speak effectively
C316.3	Develop proficiency in academic reading and writing
C316.4	Increase possibilities of job prospects
C316.5	Communicate confidently in formal and informal contexts
C316.6	Acquire information from non-verbal to verbal texts and vice-versa

COURSE CONTENT

UNIT – I

Interpersonal communication : Self Introduction - Starting a Conversation – Indianisms- Responding Appropriately and Relevantly – Using Appropriate Body Language. Role Play in Different Situations. Reading Comprehension –General Vs. Local Comprehension- Techniques of Reading- Critical Reading- Reading Beyond the Lines and Between the lines- Comprehension on Data Interpretation.

UNIT – II

Writing Skills: Structure and Presentation of Different Types of Writing – Letter SOP- Letter of Recommendation- Resume Writing- e- correspondence- Abstract writing- Technical Report Writing.

UNIT - III

Presentation Skills: Oral Presentations through JAM Sessions- Seminars- PPTs and Written Presentations through Posters.

UNIT - IV

Group Discussion and Interview Skills : Dynamics of Group Discussion, Pre-interview Planning - Opening Strategies- Answering Strategies –Mock Interviews.

UNIT – V

Corporate Expectations: Grooming and etiquette - Mini Project General and Technical- Human Values and Professional Ethics- Team Building

TEXT BOOKS:

1. Kumar, Sanjay and PushpLata. English for Effective Communication, Oxford University Press, 2015.
2. Konar, Nira. English Language Laboratories – A Comprehensive Manual, PHI Learning Pvt. Ltd., 2011

REFERENCE BOOKS

1. Kumar, Sanjay and Pushp Lata. English for Effective Communication, Oxford University Press, 2015.
2. Konar, Nira. English Language Laboratories – A Comprehensive Manual, PHI Learning Pvt. Ltd., 2011
3. Learn Correct English – A Book of Grammar, Usage and Composition by Shiv K. Kumar and Hemalatha Nagarajan. Pearson 2007
4. Professional Communication by Aruna Koneru, McGraw Hill Education (India) Pvt. Ltd, 2016.
5. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.

6. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
7. English Vocabulary in Use series, Cambridge University Press 2008.
8. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
9. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
10. Job Hunting by Colm Downes, Cambridge University Press 2008.
11. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hill 2009.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc20_hs14/preview
2. https://onlinecourses.nptel.ac.in/noc20_hs19/preview
3. https://www.classcentral.com/course/swayam-better-spoken-english-12978
4. https://www.naukri.com/learning/technical-english-for-engineers-course-nptel62
5. https://www.britishcouncil.org.tr/en/english/mooc/english-for-the-workplace

WEB REFERENCE/E-BOOKS:

1. https://mrnussbaum.com/lang-arts/reading-comprehension-online
2. https://www.researchgate.net/publication/325093121_THE_USE_OF_EBOOK_TO_IMPROVE_READING_COMPREHENSION_AMONG_YEAR_4_PUPILS
3. https://englishlive.ef.com/en-gb/resources/english-language-ebook/english-vocabulary-tips/
4. https://www.sagepub.com/hi/nam/interpersonal-communication/book262976#contents
5. http://home.lu.lv/~s10178/interpersonalcommunication.pdf
6. http://toefl.uobabylon.edu.iq/papers/itp_2015_12653122.pdf
7. https://vulms.vu.edu.pk/Courses/ENG001/Downloads/The%20Complete%20Presentation%20Skills%20Handbook.pdf
8. https://www.sastra.edu/nptel/download/Prof%20GPRagini/pdf_New/Unit%2026.pdf
9. https://www.fip.org/files/ypg/Project%20Documents/career%20development/CareerDevelopment-Interviews.pdf
10. https://ccsuniversity.ac.in/bridge-library/magzine/Interview-Skills.pdf

SOFTWARE ENGINEERING LAB
III B.TECH., I SEMESTER

Course Title: SOFTWARE ENGINEERING LAB	Course Code:AS20-05PC13
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: Programming for Problem Solving	

Course Overview:
Software engineering is a detailed study of engineering to the design, development and maintenance of software. Software engineering was introduced to address the issues of low-quality software projects. The outcome of software engineering is an efficient and reliable software product. The candidates would learn about different process models, analysis and documentation of software requirement system. They will learn on different software analysis and design models and techniques.

Course Objectives:

To have hands on experience in developing a software project by using various software engineering principles and methods in each of the phases of software development.

Course Outcomes(s)

CO#	Course Outcomes
C317.1	Ability to translate end-user requirements into system and software requirements
C317.2	Apply the functional and non-functional requirements to model an effective software product.
C317.3	Analyze, design and implement an object oriented approach system.
C317.4	Ability to generate a high-level design of the system from the software requirements
C317.5	Analyze the metrics, risk and the quality issues for designing a process/ product.
C317.6	Will have experience and/or awareness of testing problems and will be able to develop a simple testing report

COURSE CONTENT

List of Experiments

Do the following 8 exercises for any two projects given in the list of sample projects or any other projects:

1. Development of problem statement.
2. Preparation of Software Requirement Specification Document, Design Documents and Testing Phase related documents.
3. Preparation of Software Configuration Management and Risk Management related documents.
4. Study and usage of any Design phase CASE tool
5. Performing the Design by using any Design phase CASE tools.
6. Develop test cases for unit testing and integration testing
7. Develop test cases for various white box and black box testing techniques.

Sample Projects:

1. Passport automation System
2. Book Bank
3. Online Exam Registration
4. Stock Maintenance System
5. Online course reservation system
6. E-ticketing
7. Software Personnel Management System
8. Credit Card Processing
9. E-book management System.
10. Recruitment system

TEXT BOOKS:

1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, Mc Graw Hill International Edition.
2. Software Engineering- Sommerville, 7th edition, Pearson Education.
3. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.

REFERENCES BOOKS:

1. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
2. Software Engineering1: Abstraction and modelling, Diner Bjorner, Springer International edition, 2006.
3. Software Engineering2: Specification of systems and languages, Diner Bjorner, Springer International edition 2006.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.swayam2.ac.in/cec20_cs07/preview
2. https://nptel.ac.in/courses/106/105/106105087/
3. https://onlinecourses.nptel.ac.in/noc19_cs69/preview

WEB REFERENCE/E-BOOKS:

1. https://www.javatpoint.com/software-engineering-tutorial
2. https://www.tutorialspoint.com/software_engineering/index.htm

COMPUTER NETWORKS LAB
III B.TECH., I SEMESTER

Course Title: COMPUTER NETWORKS LAB	Course Code:AS20-05PC14
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: Programming for Problem Solving	

Course Overview:
This course presents an in-depth discussion of the most important networking protocols comprising the TCP/IP protocol suite. Students will be able to understand state of the art in network protocols, architectures, and applications.

Course Objective

- Describe how computer networks are organized with the concept of layered approach.
- Implement a simple LAN with hubs, bridges and switches.
- Describe how packets in the Internet are delivered.
- Analyze the contents in a given Data Link layer packet, based on the layer concept.
- Design logical sub-address blocks with a given address block.
- Decide routing entries given a simple example of network topology
- Describe what classless addressing scheme is.
- Describe how routing protocols work.

Course Outcomes(s)

CO#	Course Outcomes
C318.1	Apply framing methods such as character, character-stuffing and bit stuffing.
C318.2	Apply the sliding window protocol, and loss recovery using the Go-Back-N mechanism.
C318.3	Understand and apply Dijsktra's algorithm, distance vector routing algorithm and subnet of networks
C318.4	Provides information regarding Leaky bucket algorithm and encryption & decryption
C318.5	Provides deep knowledge about the working of HTTP and DNS at application layer
C318.6	Apply various basic computer networking using NS2

COURSE CONTENT
LIST OF EXPERIMENTS

1. Implement the data link layer framing methods such as character, character-stuffing and bit stuffing.
2. Write a program to compute CRC code for the polynomials CRC-12, CRC-16 and CRC CCIP
3. Develop a simple data link layer that performs the flow control using the sliding window protocol, and loss recovery using the Go-Back-N mechanism.
4. Implement Dijsktra's algorithm to compute the shortest path through a network
5. Take an example subnet of hosts and obtain a broadcast tree for the subnet.
6. Implement distance vector routing algorithm for obtaining routing tables at each node.
7. Implement data encryption and data decryption
8. Write a program for congestion control using Leaky bucket algorithm.
9. Write a program for frame sorting technique used in buffers.
10. Wireshark
    i. Packet Capture Using Wire shark
    ii. Starting Wire shark
    iii. Viewing Captured Traffic
    iv. Analysis and Statistics & Filters.
11. How to run Nmap scan
12. Operating System Detection using Nmap
13. Do the following using NS2 Simulator
    i. NS2 Simulator-Introduction
    ii. Simulate to Find the Number of Packets Dropped
    iii. Simulate to Find the Number of Packets Dropped by TCP/UDP
    iv. Simulate to Find the Number of Packets Dropped due to Congestion
    v. Simulate to Compare Data Rate& Throughput.
    vi. Simulate to Plot Congestion for Different Source/Destination
    vii. Simulate to Determine the Performance with respect to Transmission of Packets

TEXT BOOK

1. Computer Networks -- Andrew S Tanenbaum, David. j. Wetherall, 5th Edition. Pearson Education/PHI

REFERENCE BOOKS:

1. An Engineering Approach to Computer Networks-S. Keshav, 2nd Edition, Pearson Education
2. Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.swayam2.ac.in/cec19_cs07/preview
2. https://nptel.ac.in/courses/106/105/106105081/

ARTIFICIAL INTELLIGENCE
III B.TECH., I SEMESTER
MANDATORY COURSE

Course Title: ARTIFICIAL INTELLIGENCE	Course Code: AS20-00MC05
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: Students should have knowledge on Statistics and Data Handling	

Course Overview:

AI a multidisciplinary field that requires a range of skills in statistics, mathematics, predictive modeling and business analysis. An AI professional should feel at ease to build the algorithms necessary, work with various data sources (often in disparate forms) and an innate ability to ask the right questions and find the right answer. This module helps layout the canvas on which the rest of the modules are built.

Course Objective: The objectives of the course is to

- To provide a strong foundation of fundamental concepts in Artificial Intelligence
- To provide a basic exposition to the goals and methods of Artificial Intelligence
- To enable the student to apply these techniques in applications which involve perception, reasoning and learning

Course Outcomes(s)

CO#	Course Outcomes
C319.1	Understand the various searching techniques, constraint satisfaction problem and example problems- game playing techniques.
C319.2	Apply these techniques in applications which involve perception, reasoning and learning.
C319.3	Explain the role of agents and how it is related to environment and the way of evaluating it and how agents can act by establishing goals.
C319.4	Acquire the knowledge of real world Knowledge representation.
C319.5	Analyze and design a real world problem for implementation and understand the dynamic behavior of a system.
C319.6	Use different machine learning techniques to design AI machine and enveloping applications for real world problems.

COURSE CONTENT

UNIT - I

Introduction: History and Definition of AI, Foundations Intelligent Agents - Agents and environments-Good behavior- the nature of environments, Structure of agents-Problem Solving agents, Example problems-Searching for solutions

Uninformed search strategies- Breadth- first, depth-first, depth limited search, Uninformed search strategies –Iterative deepening DFS, bi-directional search strategies, Avoiding repeated states, searching with partial information Example problems & Review

UNIT - II

Searching Techniques : Informed search and exploration- Informed search strategies, greedy best-first, A* Algorithm, Memory-bounded heuristic search, heuristic functions, Local search algorithms and optimization problems, searching in continuous space, CSP – backtracking search for CSPs, Backtracking search for CSPs, Local search for CSP-structure of problems, Adversarial search- Games-Optimal decisions in games-minimax algorithm, multiplayer games Alpha-beta pruning, Imperfect real time decision, Games that include an element of chance.

UNIT - III

Knowledge Representation : Introduction to Logic, Syntax and semantics of first order logic, Using first order logic, assertions and queries in first-order logic, kinship domain, Wumpus world problem, Knowledge engineering in first order logic, Inference in first order logic- Propositional vs. first-order inference, Unification and lifting, Storage and retrieval, Forward chaining, Backward chaining, Resolution, Knowledge representation - Ontological engineering, categories and objects, Action, situations and events, Mental events and mental objects.

UNIT - IV

Learning: Introduction, Learning from observations, Inductive learning, Learning decision trees, Ensemble learning, logical formulation of learning, Knowledge in learning, explanation based learning, Learning using relevance information, inductive logic programming, Statistics learning methods, learning with complete data, Learning with hidden variables – EM algorithm, Instance based learning, Introduction to Neural networks, Neural networks, learning neural network structures, Reinforcement learning, passive reinforcement learning, Active reinforcement learning Generalization in reinforcement learning.

UNIT - V

Applications : Communication - Communication as action, A formal grammar for a fragment of English, Syntactic analysis Augmented grammars, Semantic interpretation, Semantic interpretation, Ambiguity and disambiguation, Discourse understanding-Grammar induction, Probabilistic language processing - Probabilistic language models, Information Retrieval and implementation, Information Extraction, Machine translation systems.

TEXT BOOKS:

1. Elaine Rich and Kevin Knight, “Artificial Intelligence”, 2nd Edition, Tata McGraw-Hill, 2003.
2. Stewart Russell and Peter Norvig. " Artificial Intelligence-A Modern Approach ", 2nd Edition, Pearson Education/ Prentice Hall of India, 2004

REFERENCES BOOKS:

1. Nils J. Nilsson, “Artificial Intelligence: A new Synthesis”, Harcourt Asia Pvt. Ltd., 2000.
2. George F. Luger, “Artificial Intelligence-Structures and Strategies For Complex Problem Solving”, Pearson Education / PHI, 2002.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. Artificial Intelligence - By Prof. Bhushan Trivedi, GLS University
2. An Introduction to Artificial Intelligence - By Prof. Mausam, IIT Delhi

WEB REFERENCE/E-BOOKS:

1. https://stacks.stanford.edu/file/druid:qn160ck3308/qn160ck3308.pdf
2. https://web.cs.iastate.edu/~cs572/texts.html
3. https://www.mygreatlearning.com/blog/artificial-intelligence-tutorial/

INTELLECTUAL PROPERTY RIGHTS
III B.TECH., I SEMESTER
MANDATORY COURSE

Course Title: INTELLECTUAL PROPERTY RIGHTS	Course Code: AS20-00MC07
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

Course Overview:
The course is designed to provide comprehensive knowledge to the students regarding the general principles of IPR, Concept and Theories, Criticisms of Intellectual Property Rights, International Regime Relating to IPR

Course Objective:
The objectives of the course is to
- To introduce fundamental aspects of Intellectual property Rights to students who are going to play a major role in development and management of innovative projects in industries.
- To disseminate knowledge on patents, patent regime in India and abroad and registration aspects
- To disseminate knowledge on copyrights and its related rights and registration aspects
- To disseminate knowledge on trademarks and registration aspects

Course Outcomes(s)

CO#	Course Outcomes
C3110.1	Understand the fundamentals of Intellectual property and its rights
C3110.2	Understand the purpose, registration and usage of trade marks
C3110.3	Understand on Law of copy rights and Law of patents
C3110.4	Understand Trade secrete law and its determinations
C3110.5	Understand on copy right law, patent law, intellectual property audits.
C3110.6	Understand on international – trade mark law, copy right law, international patent law, and international development in trade secrets law

COURSE CONTENT

UNIT – I

Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II

Trade Marks: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting, and evaluating trade mark, trade mark registration processes.

UNIT – III

Law of copy rights: Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

Law of patents: Foundation of patent law, patent searching process, ownership rights and transfer

UNIT – IV

Trade Secrets: Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

Unfair competition: Misappropriation right of publicity, false advertising.

UNIT – V

New development of intellectual property: new developments in trade mark law; copy right law, patent law, intellectual property audits.

International overview on intellectual property, international : trade mark law, copy right law, international patent law, and international development in trade secrets law.

TEXT BOOKS:

1. Intellectual property right, Deborah. E. Bouchoux, Cengage learning.
2. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, Tata McGraw Hill Publishing company ltd

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.swayam2.ac.in/cec20_hs18/preview
2. https://onlinecourses.swayam2.ac.in/imb19_mg18/preview

WEB REFERENCE/E-BOOKS:

1. https://www.tutorialspoint.com/information_security_cyber_law/intellectual_property_right.htm
2. https://www.geeksforgeeks.org/intellectual-property-rights/

APTITUDE SKILLS
VALUE ADDED COURSE
III B.Tech. I SEM

Course Title: APTITUDE SKILLS	Course Code: AS20-00HS10
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical	Total Contact Periods:32hrs
Continuous Internal Evaluation:25 Marks	Semester End Exams-75 Marks
Prerequisites: Basic Mathematics	

Course Overview: Course include

- Various concepts equipped with subject knowledge
- Topics that provide good aptitude skills
- Topics that provide Verbal ability
- Concepts that give Numerical ability
- Concepts that give logical reasoning ability

Course Objective

- To build confidence among them
- To make students to improve their Analytical skills
- To gain knowledge to solve the problems with short cut techniques
- To attend the competitive and bank exams to have bright future in their career
- To enable the students to attend campus recruitment which first test their aptitude skills and then proceeds with interview.

Course Outcome(s)

CO#	Course Outcomes
C3111.1	Apply short cut techniques when appear for campus recruitment
C3111.2	Analyze the need for time management during competitive and bank exams
C3111.3	Understand Aptitude skills and analytical skills
C3111.4	Create own short cut techniques
C3111.5	Remember basic mathematics rulesand formulae
C3111.6	Evaluate mathematical problems in less time

COURSE CONTENT (SYLLABUS)

UNIT - I:
Analytical thinking
Direction Sense, Blood Relations and Averages

UNIT - II:
Intelligence test
Coding and Decoding, Odd Man Out

UNIT - III:
Series testing
Letter Series and Number Series

UNIT - IV:
Aptitude skills-I
Time -Work ,Time–Distance and Speed

UNIT - V:
Aptitude skills-II
Pipes and Cisterns and Problems on Trains and Boats-Streams

REFERENCE BOOKS:

1. Quantitative Aptitude For Competitive Examinationsby S CHAND PUBLICATION - R.S.Aggarwal,.
2. Quantitative Aptitude for Competitive Examinations | 7th Edition – 15 July 2020 by McGraw Hill –Abhijit Guha (Author)
3. 100 Shortcuts to Crack Quantitative Aptitude - One Shot (English, Paperback, CN Praga)

Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://www.udemy.com/course/quant_aptitud_tricks_and_shortcuts
2. https://www.greatlearning.in/academy/learn-for-free/courses/crash-course-on-quantitative-aptitude-and-logical-reasoning

Web Reference/E-Books:

1.Teach Yourself Quantitative Aptitude - ArunSharma ..
http://timesofindia.indiatimes.com/articleshow/70891786.cms+&cd=1&hl=en&ct=clnk&gl=in?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst
2.Wiley's Quantitative Aptitude Book - P.A. Anand
http://timesofindia.indiatimes.com/articleshow/70891786.cms+&cd=1&hl=en&ct=clnk&gl=in?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst

START-UP MANAGEMENT
VALUE ADDED COURSE
III B.Tech. I SEM

Course Title: START-UP MANAGEMENT	Course Code: AS20-00HS11
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical	Total Contact Periods:32 hrs
Continuous Internal Evaluation:25 Marks	Semester End Exams-75 Marks
Prerequisites: The course would not only be focused on building and evaluating new venture opportunities both as an entrepreneur and a manager inside a big company. The course treats Entrepreneurship as a form of Strategy. It would focus on identifying opportunities, developing opportunities, getting funding, and scaling up opportunities, both as a start-up and established company.	

Course Overview:

The objective of the course helps the students to design and develop a lean start-up either as entrepreneur or intrapreneur. The course is more practical and hands on rather than theoretical and text book based. At the end of the course, a student must demonstrate concrete business proposition, beyond idea stage, through some forms of proto-type/beta testing.

Course Objective

1. To understand the start-up opportunities and industrial revolution.
2. To learn the basic start up ideas, feasibility study, impact of the economy on Business and Firms specifically.
3. To prepare, analyze, interpret the financial funding issues for business decision making.
4. To understand the new venture for sustainable growth and reason for failure.
5. To analyse the failure and exit strategy.

Course Outcomes(s)

CO#	Course Outcomes
C3112.1	Understand Start-up opportunities and government initiatives.
C3112.2	Understand Basic idea for new venture legal requirement, feasibility study.
C3112.3	Analyse Financial funding issues of business
C3112.4	Evaluate the reason for failure
C3112.5	Analyse sustainable growth of the business.
C3112.6	Apply exit strategy method and find the reason for failure

COURSE CONTENT

UNIT – I

Startup opportunities: The New Industrial Revolution – The Big Idea- Generate Ideas with Brainstorming- Business Startup – Ideation- Venture Choices – The Rise of The startup Economy -The Six Forces of Change – The Startup Equation- The Entrepreneurial Ecosystem -Entrepreneurship in India. Government Initiatives.

UNIT – II

Start-up capital requirements and legal environment , identifying startup capital resource requirements – estimating startup cash requirement – develop financial assumptions – constructing a process map – positioning the venture in the value chain – launch strategy to reduce risks – startup financing metrics – the legal environment – approval for new ventures – taxes or duties payable for new ventures.

UNIT- III

Starting up Financial Issues: Feasibility Analysis – The cost and process of raising capital – Unique funding issues of a high-tech ventures – Funding with Equity – Financing with Debt- Funding startups with bootstrapping- crowd funding- strategic alliances.

UNIT - IV

Startup Survival and Growth: Stages of growth in a new venture- Growing with the market – Growing within the industry- Venture life patterns- Reasons for new venture failures- Scaling Ventures – preparing for change – Leadership succession. Support for growth and sustainability of the venture.

UNIT – V

Planning for harvest and exit: dealing with failure: bank ruptcy, exit stragegies – selling the business – cashing out but staying in being acquired – going public (ipo) liquidation.

Text Books

1. KATHLEEN R ALLEN, LAUCHING NEW VENTURES, AN ENTREPRENEURIAL APPROACH CENGAGE LEARNING, 2016.
2. ANJAN RAICHADHURI, MANAGING NEW VENTURES CONCEPTS AND CASES. PRENTICE HALL INTERNATIONAL, 2010
3. S.R.BHOWMIK AND M.BHOWMIK, ENTREPRENEURSHIP, NEW AGE INTERNATIONAL, 2007

Reference Books

1. STEVEN FISHER, JA – NAE DUANE, THE STARTUP EQUATION – A VISUAL GUIDEBOOK FOR BUIDING YOU STARTUP, INDIAN EDITION, MC GRAW HILL EDUCATION INDIA PVT LTD.
2. DONALD F KURATKO, JEFFREY S.HORNSBY, NEW VENTURE MANAGEMENT: THE ENTERPRENEURS RODS MAP 2E, ROUTLEDGE, 2017
3. VIJAY SATHE, CORPORATE ENTERPRENEURSHIP, 1E CAMBRIDE, 2009.
4. BRUCE R BARRINGER, R DUANE IRELAND, ENTERPRENEURSHIP SUCCESSFULLY, LAUNCHINGNEW VENTURES. PEARSON, 2019.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://nptel.ac.in/courses/110/107/110107094/#
2. https://youtu.be/Hgj_kRrvbhQ
3. https://youtu.be/c9ZENOt1j_w
4. https://youtu.be/ufD2sU85EiM

WEB REFERENCE/E-BOOKS:

1. https://medium.com/@alltopstartups/free-ebook-0ver-50-startup-founders-reveal-why-their-startups-failed-no-email-address-required-46b8e197bce2#.gzhm8emvi
2. http://www.risingabovethenoise.com/download/the-lucky-brand-ebook-from-david-brier/

ERP TOOLS
VALUE ADDED COURSE
III B.Tech. I SEM

Course Title: ERP TOOLS	Course Code: AS20-00HS12
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical	Total Contact Periods:32 hrs
Continuous Internal Evaluation:25 Marks	Semester End Exams-75 Marks
Prerequisites: Enterprises that seek to become proficient in advanced manufacturing must incorporate manufacturing management tools and integrate data throughout the supply chain to be successful. This course will make students aware of what a digitally connected enterprise is, as they learn about the operational complexity of enterprises, business process optimization and the concept of an integrated product-process-value chain. Students will become acquainted with the available tools, technologies and techniques for aggregation and integration of data throughout the manufacturing supply chain and entire product life-cycle.	

Course Overview:
The course will examine typical Enterprise Systems modules: materials management (MM), supply chain management (SCM), customer relationship management (CRM), financials, projects and human resource management (HRM). Enterprise systems use a single database to integrate business transactions along and between processes, leading to benefits such as efficient and error-free workflows plus accounting, management reporting and improved decision-making. The course will incorporate a laboratory component using SAP software.

Course Objective:

1) To understand the basic issues in enterprise systems,
2) To explain the scope of common enterprise systems (e.g., mm, scm, crm, hrm, procurement),
3) To understand the challenges associated with implementing enterprise systems and their impacts on organisations
4) To describe the selection, acquisition and implementation of enterprise systems
5) To understand the recent trends in erp

Course Outcomes(s)

CO#	Course Outcomes
C3113.1	Understand the basic structure of ERP.
C3113.2	Analyse implementation strategy used for ERP.
C3113.3	Understand design principles for various business modules in ERP.
C3113.4	Apply different emerging technologies for implementation of ERP.
C3113.5	Analyse security issues in ERP.
C3113.6	Remember ERP concepts for real world applications.

COURSE CONTENT (SYLLABUS)

UNIT I

INTRODUCTION

Overview of enterprise systems – Evolution - Risks and benefits - Fundamental technology - Issues to be consider in planning design and implementation of cross functional integrated ERP systems.

UNIT II

ERP SOLUTIONS AND FUNCTIONAL MODULES

Overview of ERP software solutions- Small, medium and large enterprise vendor solutions, BPR, and best business practices - Business process Management, Functional modules.

UNIT III

ERP IMPLEMENTATION

Planning Evaluation and selection of ERP systems - Implementation life cycle - ERP implementation, Methodology and Frame work- Training – Data Migration. People Organization in implementation-Consultants, Vendors and Employees.

UNIT IV

POST IMPLEMENTATION

Maintenance of ERP- Organizational and Industrial impact; Success and Failure factors of ERP Implementation.

UNIT V

EMERGING TRENDS ON ERP

Extended ERP systems and ERP add-ons -CRM, SCM, Business

Text Books

1. KATHLEEN R ALLEN, LAUCHING NEW VENTURES, AN ENTREPRENEURIAL APPROACH CENGAGE LEARNING, 2016.
2. ANJAN RAICHADHURI, MANAGING NEW VENTURES CONCEPTS AND CASES. PRENTICE HALL INTERNATIONAL, 2010
3. S.R.BHOWMIK AND M.BHOWMIK, ENTREPRENEURSHIP, NEW AGE INTERNATIONAL, 2007

Reference Books

1. STEVEN FISHER, JA – NAE DUANE, THE STARTUP EQUATION – A VISUAL GUIDEBOOK FOR BUIDING YOU STARTUP, INDIAN EDITION, MC GRAW HILL EDUCATION INDIA PVT LTD.
2. DONALD F KURATKO, JEFFREY S.HORNSBY, NEW VENTURE MANAGEMENT: THE ENTERPRENEURS RODS MAP 2E, ROUTLEDGE, 2017
3. VIJAY SATHE, CORPORATE ENTERPRENEURSHIP, 1E CAMBRIDE, 2009.
4. BRUCE R BARRINGER, R DUANE IRELAND, ENTERPRENEURSHIP SUCCESSFULLY, LAUNCHINGNEW VENTURES. PEARSON, 2019.

Resources (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://www.youtube.com/watch?v=y0FIMuhZ7BI
2. http://www.digimat.in/nptel/courses/video/110105083/L10.html
3. https://www.coursera.org/learn/advanced-manufacturing-enterprise

Web Reference/E-Books:

1. http://www.faadooengineers.com/threads/17441-Enterprise-resource-planning-ebook-free-download-pdf
2. https://www.softwaresuggest.com/blog/enterprise-resource-planning-erp-ebook/

B.TECH
THIRD YEAR
SECOND SEMESTER
SYLLABUS

BUSINESS ECONOMICS AND FINANCIAL ANALYSIS
III B.TECH., II SEMESTER

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

Course Overview:

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

Course Objective

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

Course Outcomes(s)

CO#	Course Outcomes
C321.1	Understand the Economic Principles in Business
C321.2	Analyse the Forecast Demand and Supply
C321.3	Understand Production and Cost Estimates
C321.4	Apply Market Structure and Pricing Practices.
C321.5	Understand the firm's financial position.
C321.6	Analyse the Financial Statements of a Company

COURSE CONTENT

UNIT – I

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

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

UNIT – II

Demand and Supply Analysis: Determinants of demand and supply, Demand and Supply Function, Law of Demand and supply, Elasticity of Demand and supply, Types of Elasticity, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making,

Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting. Case study.

UNIT- III

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

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

UNIT - IV

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

UNIT – V

Financial Analysis through Ratios: Concept of Ratio Analysis, importance of ratio Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios (simple problems). Introduction to Fund Flow and Cash Flow Analysis (simple problems).

TEXT BOOKS

1. Varshney and Maheshwari. Managerial Economics. Sultan Chand. New Delhi
2. Dornbusch, Fischer and Startz, Macroeconomics, McGraw Hill, 11th edition, 2010.
3. Samuelson, Managerial Economics, 6th edition, Wiley
4. I.M .Pandey, Financial Management, Vikas Publishing House. New Delhi.

REFERENCE BOOKS

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

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc19_hs28/preview
2. https://onlinecourses.nptel.ac.in/noc19_ma07/preview
3. https://onlinecourses.nptel.ac.in/noc19_mg01/preview

NPTEL Video Course:

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

WEB REFERENCE/E-BOOKS:

1. www.icsi.edu
2. https://www.inderscience.com/jhome.php?jcode=gber
3. https://www.googleadservices.com/pagead/aclk?sa=L&ai=DChcSEwj56O-Uu9XxAhWtISsKHTSdCYUYABAAGgJzZg&ae=2&ohost=www.google.com&cid=CAESQeD2u1_CESbm6r_whRhlZ_S92_IOpg_v9T1T1OU-oasT4bb3AxR39-4EH1Kh3R-ILPiEIt7Rm_TvoMTMUwkt98PF&sig=AOD64_03kddmVm1B9YjnAY04UV8Yst1sCg&q&adurl&ved=2ahUKEwjs-uWUu9XxAhVJzDgGHXDgDFAQ0Qx6BAgCEAE

MACHINE LEARNING
III B.TECH., II SEMESTER

Course Title: MACHINE LEARNING	Course Code: AS20-05PC15
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: Machine Learning is a mathematical discipline, probability, linear algebra and calculus.	

Course Overview:

Machine learning techniques enable us to automatically extract features from data so as to solve predictive tasks, such as speech recognition, object recognition, machine translation, question-answering, anomaly detection, medical diagnosis and prognosis, automatic algorithm configuration, personalisation, robot control, time series forecasting, and much more. Students will learn the algorithms which underpin many popular Machine Learning techniques, as well as developing an understanding of the theoretical relationships between these algorithms.

Course Objective

- To understand the fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.
- To understand the strengths and weaknesses of many popular machine learning approaches.
- Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.
- Be able to design and implement various machine learning algorithms in a range of real-world applications.

Course Outcomes(s)

CO#	Course Outcomes
C322.1	Explains the leaning system and issues in machine learning task.
C322.2	Understand the concepts of decision tree learning and analysis of its functionalities.
C322.3	Gain knowledge on Evaluating Hypotheses and Comparing Learning Algorithms.
C322.4	Understand the concepts of Computational Learning Theory and instance-based learning.
C322.5	Understand the genetic algorithms, genetic programming and Learning Sets Rules and Reinforcement Learning.
C322.6	Choose a suitable machine learning model, implement and examine the performance of the chosen model for a given real world problems.

COURSE CONTENT

UNIT - I

Introduction: Well defined learning problems, Designing a Learning System, Issues in Machine Learning

The Concept Learning Task: General-to-specific ordering of hypotheses, Find-S, List then eliminate algorithm, Candidate elimination algorithm, Inductive bias.

UNIT - II

Decision Tree Learning : Decision tree learning algorithm-Inductive bias- Issues in Decision tree learning.

Neural Networks: Perceptrons, Gradient descent and the Delta rule, Adaline, Multilayer networks, Derivation of backpropagation rule Backpropagation Algorithm Convergence, Generalization.

UNIT - III

Evaluating Hypotheses: Estimating Hypotheses Accuracy, Basics of sampling Theory, Comparing Learning Algorithms.

Bayesian Learning: Bayes theorem, Concept learning, Bayes Optimal Classifier, Naïve Bayes classifier, Bayesian belief networks, EM algorithm.

UNIT - IV

Computational Learning Theory: Sample Complexity for Finite Hypothesis spaces, Sample Complexity for Infinite Hypothesis spaces, The Mistake Bound Model of Learning.

Instance-Based Learning : k-Nearest Neighbour Learning, Locally Weighted Regression, Radial basis function networks, Case-based learning.

UNIT - V

Genetic Algorithms: An illustrative example, Hypothesis space search, Genetic Programming, Models of Evolution and Learning, Learning first order rules-sequential covering algorithms General to specific beam search-Foil, Reinforcement Learning, The Learning Task, Q Learning.

TEXT BOOKS:

1. Machine Learning – Tom M. Mitchell, McGraw-Hill Education (India) Private Limited, 2013.
2. Ethem Alpaydin, —Introduction to Machine Learning (Adaptive Computation and Machine Learning), The MIT Press 2004.
3. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis ,CRC Press, 2009.
4. Bishop, C., Pattern Recognition and Machine Learning. Berlin: Springer-Verlag.

REFERENCES BOOKS:

1. Introduction to Machine learning, Nils J.Nilsson.
2. Machine learning for dummies, IBM Limited ed, by Judith Hurwitz and Daniel Kirsch
3. Introduction to Machine Learning with Python A guide for data scientists, Andreas, C. Muller & Sarah Guido, O'Reilly.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://nptel.ac.in/courses/106/106/106106139/
2. https://nptel.ac.in/courses/106/105/106105152/
3. https://nptel.ac.in/courses/106/106/106106198/

WEB REFERENCE/E-BOOKS:

1. https://alex.smola.org/drafts/thebook.pdf
2. https://ai.stanford.edu/~nilsson/MLBOOK.pdf
3. https://www.cs.huji.ac.il/~shais/UnderstandingMachineLearning/understanding-machine-learning-theory-algorithms.pdf
4. http://guidetodatamining.com/assets/guideChapters/Guide2DataMining.pdf

COMPILER DESIGN
III B.TECH., II SEMESTER

Course Title: COMPILER DESIGN	Course Code:AS20-05PC16
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: Formal Languages and Automata Theory, Computer Organization and architecture, Computer Programming and Data Structures	

Course Overview:
This course deals with the basic techniques of Compiler Construction and tools that can used to perform Syntax-directed translation of a high-level programming language into an executable code. This will provide deeper insights into the more advanced semantics aspects of programming languages, code generation, machine independent optimizations, dynamic memory allocation, types and their inferences, object orientation. The course is presented to the students by using power point projections, lecture notes, subjective and objective tests, assignments, and laboratory

Course Objective
Introduce the major concepts of language translation and compiler design and impart the knowledge of practical skills necessary for constructing a compiler.
Topics include phases of compiler, parsing, syntax directd translation, type checking use of symbol tables, code optimization techniques, intermediate code generation, code generation and data flow analysis.

Course Outcomes(s)

CO#	Course Outcomes
C323.1	Demonstrate the ability to design a compiler given a set of language features
C323.2	Demonstrate the knowledge of patterns, tokens & regular expressions for lexical analysis.
C323.3	Acquire skills in using lex tool & yacc tool for developing a scanner and parser.
C323.4	Design and implement LL and LR parsers
C323.5	Design algorithms to do code optimization in order to improve the performance of a program in terms of space and time complexity.
C323.6	Design algorithms to generate machine code.

COURSE CONTENT

UNIT - I

Introduction: The structure of a compiler, the science of building a compiler, programming language basics

Lexical Analysis: The Role of the Lexical Analyzer, Input Buffering, Recognition of Tokens, The Lexical-Analyzer Generator Lex, Finite Automata, From Regular Expressions to Automata, Design of a Lexical-Analyzer Generator, Optimization of DFA-Based Pattern Matchers.

UNIT - II

Syntax Analysis: Introduction, Context-Free Grammars, Writing a Grammar, Top-Down Parsing, Bottom-Up Parsing, Introduction to LR Parsing: Simple LR, More Powerful LR Parsers, Using Ambiguous Grammars and Parser Generators.

UNIT - III

Syntax-Directed Translation: Syntax-Directed Definitions, Evaluation Orders for SDD's, Applications of Syntax-Directed Translation, Syntax-Directed Translation Schemes, Implementing L-Attributed SDD's.

Intermediate-Code Generation: Variants of Syntax Trees, Three-Address Code, Types and Declarations, Type Checking, Control Flow, Switch-Statements, Intermediate Code for Procedures.

UNIT - IV

Run-Time Environments: Stack Allocation of Space, Access to Nonlocal Data on the Stack, Heap Management, Introduction to Garbage Collection, Introduction to Trace-Based Collection.

Code Generation: Issues in the Design of a Code Generator, The Target Language, Addresses in the Target Code, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, A Simple Code Generator, Peephole Optimization, Register Allocation and Assignment, Dynamic Programming Code-Generation.

UNIT - V

Machine-Independent Optimization: The Principal Sources of Optimization, Introduction to Data-Flow Analysis, Foundations of Data-Flow Analysis, Constant Propagation, Partial-Redundancy Elimination, Loops in Flow Graphs.

TEXT BOOKS:

1. Compilers: Principles, Techniques and Tools, Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman.

REFERENCES BOOKS:

1. Lex & Yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
2. Compiler Construction, Louden, Thomson

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc20_cs13/preview
2. https://nptel.ac.in/courses/106/105/106105190/

WEB REFERENCE/E-BOOKS:

1. https://www.javatpoint.com/compiler-tutorial
2. https://www.tutorialspoint.com/compiler_design/index.htm

WEB TECHNOLOGIES
III B.TECH., II SEMESTER
PROFESSIONAL ELECTIVE - II

Course Title: WEB TECHNOLOGIES	Course Code: AS20-05PE21
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:
The wide spread use of the Internet and WWW by common people has made it compulsion to provide web based interface for the applications to access the application from anywhere, anytime, anyone. The subject covers the wide range of web technologies both client side and server side to provide the exposure to the students to develop Rich Internet Applications using them. It covers the basics WWW, client side technologies like HTML, CSS and DHTML including JavaScript, server side scripting with PHP and database connectivity using PHP and related technologies.

Course Objective

- To get familiar with basics of the Internet Programming.
- To acquire knowledge and skills for creation of web site considering both client and server side programming.
- To understand best technologies for solving web client/server problems.
- To analyse and design real time web applications using HTML, CSS, XML.
- To use Java script for dynamic effects and to validate form input entry.

Course Outcomes(s)

CO#	Course Outcomes
C324.1	Understand the fundamental concepts of WWW including browser and HTTP protocol.
C324.2	Understand the concept of web design to plan and publish website.
C324.3	Understand various HTML tags and apply them to develop the user friendly web pages.
C324.4	Define the CSS with its types and apply them to provide the styles to the web pages at various levels.
C324.5	Implement interactive web page(s) using JavaScript and XML.HTML, CSS and JavaScript.
C324.6	Develop the modern Web applications using PHP to generate the web pages dynamically using the database connectivity.

COURSE CONTENT

UNIT - I

Introduction: Concept of WWW, Internet and WWW, HTTP Protocol: Request and Response, Web browser and Web servers, Features of Web 2.0.

Web Design: Concepts of effective web design, Web design issues including Browser, Bandwidth and Cache, Display resolution, Look and Feel of the Website, Page Layout and linking, User centric design, Sitemap, Planning and publishing website, Designing effective navigation.

UNIT - II

HTML: Basics of HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, forms, XHTML, Meta tags, Character entities, frames and frame sets, Browser architecture and Web site structure. Overview and features of HTML5.

UNIT - III

Style Sheets: Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2, Overview and features of CSS3.

UNIT - IV

JavaScript : Client side scripting with JavaScript, variables, functions, conditions, loops and repetition, Pop up boxes, Advance JavaScript: JavaScript and objects, JavaScript own objects, the DOM and web browser environments, Manipulation using DOM, forms and validations, **DHTML :** Combining HTML, CSS and JavaScript, Events and buttons.

UNIT – V

XML: Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Using XML with application. Transforming XML using XSL and XSLT.

Introduction to PHP: Basics of PHP, Functions, Error Handling, Interaction between PHP and MySQL, Database using Forms, Using PHP to manipulate and Retrieve Data in MySQL.

TEXT BOOKS:

1. Ralph Moseley and M. T. Savaliya, Developing Web Applications, Wiley-India, 2nd edition.
2. Web Technologies, Black Book, DreamTech Press
3. HTML 5, Black Book, DreamTech Press

REFERENCES BOOKS:

1. Rajkamal, “Web Technology”, Tata McGraw-Hill, 2001
2. Robert W.Sebesta, "Programming with World Wide Web", Pearson Education, Eighth Edition, 2015.(Web Based Applications and its Technologies)

3. Jeffrey C. Jackson," Web Technologies: A Computer Science Perspective", Pearson Education, Second Edition 2007
4. Jon Duckett, “Beginning Web Programming”, WROX.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.swayam2.ac.in/aic20_sp11/preview
2. https://onlinecourses.swayam2.ac.in/aic20_sp32/preview
3. https://www.coursera.org/learn/html-css-javascript-for-web-developers

WEB REFERENCE/E-BOOKS:

1. https://www.w3schools.com/html/
2. https://html5andcss3.org/
3. https://www.tutorialspoint.com/html5/index.htm
4. https://www.tutorialrepublic.com/references.php

R PROGRAMMING
III B.TECH., II SEMESTER
PROFESSIONAL ELECTIVE - II

Course Title: R PROGRAMMING	Course Code: AS20-05PE22
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:
In this course, students will learn how to program in R and how to use R for effective data analysis and visualization. The course begins with developing a basic understanding of the R working environment. Next, students will be introduced the necessary arithmetic and logical operators, salient functions for manipulating data, and getting help using R. Next, the common data structures, variables, and data types used in R will be demonstrated and applied. Students will write R scripts and build R markdown documents to share their code others. Finally, students create interactive business applications that allow for data querying and data exploration.

Course Objective

- Learn Fundamentals of R.
- Covers how to use different functions in R, how to read data into R, accessing R packages, writing R functions, debugging, and organizing data using R functions.
- Cover the Basics of statistical data analysis with examples.
- The whole syllabus will give an idea to collect, compile and visualize data using statistical functions.

Course Outcomes(s)

CO#	Course Outcomes
C324.1	Understand the basics of Fundamentals of R.
C324.2	Understand how decision making and loops were applied in R.
C324.3	Understand how data is analysed and visualized using statistic functions.
C324.4	Understand and analyse the various Data frame methods used in R.
C324.5	Understand and analyse the loading and handling techniques using CSV and Excel file.
C324.6	Understand how functions, strings, vectors, list, matrices, arrays and factors were utilized in R.

COURSE CONTENT

UNIT - I

Introduction to R:What is R? – Why R? – Advantages of R over Other Programming Languages - R Studio: R command Prompt, R script file, comments – Handling Packages in R: Installing a R Package, Few commands to get started: installed.packages(), packageDescription(), help(), find.package(), library() - Input and Output – Entering Data from keyboard – Printing fewer digits or more digits – Special Values functions : NA, Inf and –inf.

UNIT - II

R Data Types: Vectors, Lists, Matrices, Arrays, Factors, Data Frame – **R - Variables**: Variable assignment, Data types of Variable, Finding Variable ls(), Deleting Variables **- R Operators**: Arithmetic Operators, Relational Operators, Logical Operator, Assignment Operators, Miscellaneous Operators - **R Decision Making**: if statement, if – else statement, if – else if statement, switch statement – **R Loops:** repeat loop, while loop, for loop - Loop control statement: break statement, next statement.

UNIT - III

R-Function : function definition, Built in functions: mean(), paste(), sum(), min(), max(), seq(), user-defined function, calling a function, calling a function without an argument, calling a function with argument values - **R-Strings** – Manipulating Text in Data: substr(), strsplit(), paste(), grep(), toupper(), tolower() - **R Vectors** – Sequence vector, rep function, vector access, vector names, vector math, vector recycling, vector element sorting - **R List** -Creating a List, List Tags and Values, Add/Delete Element to or from a List, Size of List, Merging Lists, Converting List to Vector - **R Matrices** – Accessing Elements of a Matrix, Matrix Computations: Addition, subtraction, Multiplication and Division- **R Arrays**: Naming Columns and Rows, Accessing Array Elements, Manipulating Array Elements, Calculation Across Array Elements - **R Factors** –creating factors, generating factor levels gl().

UNIT - IV

Data Frames –Create Data Frame, Data Frame Access, Understanding Data in Data Frames: dim(), nrow(), ncol(), str(), Summary(), names(), head(), tail(), edit() functions - Extract Data from Data Frame, **Expand Data Frame**: Add Column, Add Row - Joining columns and rows in a Data frame rbind() and cbind() – Merging Data frames merge() – Melting and Casting data melt(), cast().

Loading and handling Data in R: Getting and Setting the Working Directory – getwd(), setwd(), dir() - **R-CSV Files** - Input as a CSV file, Reading a CSV File, Analyzing the CSV File: summary(), min(), max(), range(), mean(), median(), apply() - Writing into a CSV File – **R -Excel File** – Reading the Excel file

UNIT - V

Descriptive Statistics: Data Range, Frequencies, Mode, Mean and Median: Mean Applying Trim Option, Applying NA Option, Median - Mode - **Standard Deviation – Correlation - Spotting Problems in Data with Visualization:** visually Checking Distributions for a single Variable - **R –Pie Charts**: Pie Chart title and Colors – Slice Percentages and Chart Legend, 3D Pie Chart – **R Histograms** – Density Plot - **R – Bar Charts**: Bar Chart Labels, Title and Colors.

TEXT BOOKS:

1. Sandip Rakshit, R Programming for Beginners, McGraw Hill Education (India), 2017.
2. Seema Acharya, Data Analytics using R, McGrawHill Education (India), 2018.
3. Tutorials Point (I) simply easy learning, Online Tutorial Library (2018), R Programming, Retrieved from https://www.tutorialspoint.com/r/r_tutorial.pdf.
4. Andrie de Vries, Joris Meys, R for Dummies A Wiley Brand, 2nd Edition, John Wiley and Sons, Inc, 2015.

REFERENCES BOOKS:

1. Norman Matloff, The Art of R Programming: A Tour of Statistical Software Design, No Starch Press, 2011.
2. Jared P. Lander, R for Everyone: Advanced Analytics and Graphics, Addison-Wesley Data & Analytics Series, 2013.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.swayam2.ac.in/aic20_sp35/preview
2. https://onlinecourses.nptel.ac.in/noc19_ma33/preview
3. https://www.coursera.org/learn/r-programming

WEB REFERENCE/E-BOOKS:

1. https://www.w3schools.com/r/default.asp
2. https://www.tutorialspoint.com/r/index.htm
3. https://www.javatpoint.com/r-tutorial

SCRIPTING LANGUAGES
III B.TECH., II SEMESTER
PROFESSIONAL ELECTIVE - II

Course Title: SCRIPTING LANGUAGES	Course Code: AS20-05PE23
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: PHP, MySQL, Java, CSS, HTML	

Course Overview:
Comprehensive course in Ruby, an open-source dynamic object-oriented scripting language. Covers variables, arrays and hashes, methods and procs, classes, objects, and writing server-side Ruby scripts for the Web. Also covered are exception handling, regular expressions, I/O objects, and modules. An introduction to SQL and the MySQL database, and advanced topics such as Model-View-Controller architecture and agile Web application development with the Ruby on Rails framework. Intended for students with previous programming experience.

Course Objective
1. Describe the fundamentals and main features of Ruby
2. Describe Ruby's built-in methods for manipulating strings, files, and hashes, etc.
3. Write object-oriented Ruby programs using classes and objects
4. Understand Model-View-Controller architecture and its relationship to Ruby on Rails applications.
5. Create useful stand-alone applications in Ruby

Course Outcomes(s)

CO#	Course Outcomes
C324.1	Develop server-side Ruby scripts for publishing on the Web.
C324.2	Employ control structures, methods, procs, arrays and hashes to create Ruby programs.
C324.3	Explain object-oriented programming and input/output processing and apply these concepts to develop dynamic interactive Ruby applications.
C324.4	Discuss Model-View-Controller architecture and its relationship to Ruby on Rails applications.
C324.5	Create Ruby Applications which use Ruby plugins and Protective measures
C324.6	Understand how to debugging, Test, Benchmarking your Application in Ruby on Rails framework.

COURSE CONTENT

UNIT - I

Introducing Ruby on Rails: History-Development Principles-Building the Example Web Application

Getting Started : What Does All this Cost? -Installing on Windows-Installing on Mac OS X-Installing on Linux -Building a Foundation -Starting our Application-Which Text Editor?

Introducing Ruby: Ruby is a Scripting Language-Ruby is an Object Oriented Language -Reading and Writing Ruby Code-Object Oriented Programming in Ruby-Standard Output -Ruby Core Classes -Running Ruby Files -Control Structures

UNIT - II

Rails Revealed: Three Environments-Database Configuration-The Model-view-controller Architecture-Code Generation-Action Mailer-Testing and Debugging-A GUI Tool for MySQL

Models, Views, and Controllers: Generating a Model-Generating a Controller-Creating a View

Helpers, Forms, and Layouts: Calling upon our Trusty Helpers-Story Submission-Testing the Form

UNIT - III

Ajax and Web 2.0: Generating a Vote Model, An Introduction to Relationships, Clean URLs and Permalinks, Ajax and Rails, Introducing Partials, Testing the Voting Functionality

Protective measures: Sessions and cookies, Modelling the user-Developing Login Functionality, Filters-Managing user logins-Adding a Navigation Menu-Restricting the Application, Testing User Authentication

UNIT - IV

Advanced Topics: Promoting Popular Stories, Auto generating Permalinks, xpanding the, submission Form, Adding user Pages, Testing the New Functionality

Rails Plugins: What is Plugins-Adding Tagging to Shovell, Testing the Tagging Functionality

UNIT - V

Debugging, Testing and Benchmarking: Debugging your Application, Testing your Application, Benchmarking your Application

Deployment and Production Use: The Implication of Production, Choosing a production Environment-Deployment Shovell ,Alternatives for session Storage, Further Reading

TEXT BOOKS:

1. Patrick Lenz - Build Your Own Ruby on Rails Web Applications (2007) - SitePoint Pty. Ltd.

REFERENCES BOOKS:

1. Michael Hartl, Ruby on Rails Tutorial, Addison-Wesley Professional Ruby Series
2. Max Beerbohm and Moaml Mohmmed, Ruby on Rails: The Ultimate Beginner's Guide to Learn Ruby on Rails Step by Step
3. Jarkko Laine and Christian Hellsten, Beginning Ruby on Rails E-Commerce: From Novice to Professional, APress

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.swayam2.ac.in/aic20_sp37/preview

WEB REFERENCE/E-BOOKS:

1. https://www.tutorialspoint.com/ruby-on-rails/index.htm
2. https://guides.rubyonrails.org/getting_started.html
3. https://www.javatpoint.com/ruby-on-rails-tutorial
4. https://gorails.com/
5. https://www.guru99.com/ruby-on-rails-tutorial.html

SOFTWARE TESTING METHODOLOGIES
III B.TECH., II SEMESTER
PROFESSIONAL ELECTIVE - II

Course Title: SOFTWARE TESTING METHODOLOGIES	Course Code: AS20-05PE24
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: Software Engineering	

Course Overview:

This course will examine fundamental software testing and program analysis techniques. In particular, the important phases of testing will be reviewed, emphasizing the significance of each phase when testing different types of software. Students will learn the state of the art in testing technology for object-oriented, component-based, concurrent, distributed, graphical-user interface, and web software. In addition, closely related concepts such as mutation testing and program analysis (e.g., program-flow and data-flow analysis) will also be studied.

Course Objective

- To study the fundamental concepts of software testing which includes objectives, process, criteria, strategies, and methods.
- To discuss various software testing types and levels of testing like black and white box testing along with levels unit test, integration, regression, and system testing.
- It also helps to learn the types of bugs, testing levels with which the student can very well identify a bug and correct as when it happens.
- It provides knowledge on transaction flow testing and data flow testing techniques so that the flow of the program is tested as well.
- To learn the domain testing, path testing and logic based testing to explore the testing process easier

Course Outcomes(s)

CO#	Course Outcomes
C324.1	Know the basic concepts of software testing and its essentials
C324.2	Able to apply the Transaction Flow Testing and Domain testing
C324.3	Understand the functionality of regular expression and logic based testing
C324.4	List a range of different software testing techniques and strategies and be able to apply specific (automated) unit testing method to the projects.
C324.5	Understand and apply State, State Graphs and Transition testing
C324.6	Understand the Graph Matrices and Application in testing a software

COURSE CONTENT

UNIT - I

Introduction: Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs

Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT - II

Transaction Flow Testing: transaction flows, transaction flow testing techniques. Dataflow testing: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.

Domain Testing: domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

UNIT - III

Paths, Path products and Regular expressions: path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

Logic Based Testing: overview, decision tables, path expressions, kv charts, specifications.

UNIT - IV

State, State Graphs and Transition testing: state graphs, good & bad state graphs, state testing, Testability tips.

UNIT - V

Graph Matrices and Application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm, building tools. (Student should be given an exposure to a tool like JMeter or Win-runner).

TEXT BOOKS:

1. Software Testing techniques - Baris Beizer, Dreamtech, second edition.
2. Software Testing Tools – Dr. K. V. K. K. Prasad, Dreamtech.

REFERENCES BOOKS:

1. The craft of software testing - Brian Marick, Pearson Education.
2. Software Testing Techniques – SPD(Oreille)
3. Software Testing in the Real World – Edward Kit, Pearson.
4. Effective methods of Software Testing, Perry, John Wiley.
5. Art of Software Testing – Meyers, John Wiley.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc19_cs71/preview

WEB REFERENCE/E-BOOKS:

1. https://www.tutorialspoint.com/software_testing/index.htm
2. https://www.javatpoint.com/software-testing-tutorial

MOBILE APPLICATION DEVELOPMENT
III B.TECH., II SEMESTER
PROFESSIONAL ELECTIVE - II

Course Title: MOBILE APPLICATION DEVELOPMENT	Course Code: AS20-05PE25
Teaching Scheme (L:T:P):3:1:0	Credits:3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48 Hours+ 16 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Operating System, Data Base Management System, Web Application	

Course Overview:
This course will cover the ideas like user interfaces, data storage, and front-end vs backend distinctions get reformulated in the new web aware distributed context. The student are able to discover how the assumption of multiple users via multiple access points adds new concerns such as identity management and security, and learn techniques for addressing them. At the end of this course the student are able to build a basic distributed web app and analyse constituent elements of the web and mobile applications that were used daily.

Course Objective
- Understand Android applications work, Life cycle, Manifest, Intents, and using external resources
- Demonstrate Activities, Layouts, Views, Widgets, Menus and Notifications
- Identify communication abilities including SMS, the telephony APIs, and network management with Data Storage
- Design and develop innovative applications with enhanced features.

Course Outcomes(s)

CO#	Course Outcomes
C324.1	Understand Android applications work, Life cycle, Manifest, Intents, and using external resources
C324.2	Demonstrate Activities, Layouts, Views, Widgets, Menus and Notifications
C324.3	Identify communication abilities including SMS, the telephony APIs, and network management with Data Storage
C324.4	Understand and Apply Geofencing tools to study the device location.
C324.5	Understand tools to measure PWA and its features
C324.6	Discuss on various PWA features with its level enhancement schemas.

COURSE CONTENT

UNIT - I

Activities: Declaring an activity, Starting a new activity with an intent object, Switching between activities, Passing data to another activity, Returning a result from an activity, Understanding the activity life cycle

Views, Widgets, and Styles: Inserting a widget into a layout, using graphics to show button state, creating a widget at runtime

UNIT - II

Menus and Action Mode: Creating and using a Fragment, Adding and removing Fragments during runtime, passing data between Fragments

Alerts and Notifications: Creating a Toast with a custom layout, displaying a message box with AlertDialog, Displaying a progress dialog.

UNIT - III

Data Storage: Storing simple data, Read and write a text file to internal storage and external storage, Creating and using a SQLite database

Location and Using Geofencing: How to get the device location, Creating and monitoring a Geofence.

UNIT - IV

Introduction to PWAs and Tooling: Introduction to Progressive Web Apps, Tools to Measure Progressive Web Apps

PWA Features: Service Workers, Caching and Offline Functionality with Service Workers, Background Sync for Offline Apps with Service Workers.

UNIT - V

PWA Features: Adding your App to the Home Screen with Web App Manifest, Notifications, App Shell Architecture and Loading Performance, Exploring HTTP/2 and Server Push

Putting the Features to Use: Turning a Real App into a PWA, PWAs from the Start.

Levelling Up Your PWA: Levelling Up Your PWA.

TEXT BOOKS:

1 Rick Boyer, Android 9 Development Cook book, 3rd Edition, 2018, Packt Publishing.
2 Dennis Sheppard, Beginning Progressive Web App Development: Creating a Native App Experience on the Web, 2017, Apress Publishing.
3 Mahesh Panhale, Beginning Hybrid Mobile Application Development, 2016, Apres publishing.
4 Wei-Meng Lee, Beginning Android Application Development, 2011, Wiley Publishing.

REFERENCES BOOKS:

1. Scott Guthery, Mary Cronin, Mobile application development with SMS and the SIM toolkit [1 ed.], McGraw-Hill Education.
2. Jeff McWherter, Scott Gowell, Professional Mobile Application Development [1 ed.], Wrox Publishing.

3. Leon Shklar, Richard Rosen, Web Application Architecture: Principles, Protocols and Practices [2nd ed.], Wiley Publishing.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc20_cs52/preview
2. https://nptel.ac.in/courses/106/106/106106156/
3. https://www.coursera.org/learn/web-app

WEB REFERENCE/E-BOOKS:

1. https://www.tutorialspoint.com/mobile_development_tutorials.htm
2. https://www.geeksforgeeks.org/welcome-to-the-modern-android-app-development/

COMPUTER NETWORKS
III B.TECH., II SEMESTER
OPEN ELECTIVE - II

Course Title: COMPUTER NETWORKS	Course Code: AS20-05OE21
Teaching Scheme (L:T:P):3:0:0	Credits:3
Type of Course: Lecture + Assignment	Total Contact Periods: 48 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks

Course Overview:
This course presents an in-depth discussion of the most important networking protocols comprising the TCP/IP protocol suite. Students will be able to understand state of the art in network protocols, architectures, and applications.

Course Objective

- Describe how computer networks are organized with the concept of layered approach.
- Implement a simple LAN with hubs, bridges and switches.
- Describe how packets in the Internet are delivered.
- Analyze the contents in a given Data Link layer packet, based on the layer concept.
- Design logical sub-address blocks with a given address block.
- Decide routing entries given a simple example of network topology
- Describe what classless addressing scheme is.
- Describe how routing protocols work.

Course Outcomes(s)

CO#	Course Outcomes
C325.1	Describes about the architecture of network topology and need for reference model
C325.2	Understand the error correction and detection methods used in DLL and goodness of frame structure
C325.3	An awareness about routing, IP addresses and subnetting
C325.4	Provides information regarding congestion control mechanism at transport layer
C325.6	Provides deep knowledge about the working of HTTP and DNS at application layer
C325.1	Describes the various basic computer networking

COURSE CONTENT

UNIT - I

Basics of Computer Network: Computer Network: Definition, Goals, Structure, Broadcast and Point-To- Point Networks, Network Topology and their various Types, Types of Network: LAN, MAN, WAN, Server Based LANs & Peer-to-Peer LANs, Communications Types: Synchronous, Asynchronous, Modes of Communication: Simplex, Half Duplex, Full Duplex, Protocols and Standards

UNIT - II

Network Models : Design Issues of the Layer, Protocol Hierarchy, ISO-OSI Reference Model : Functions of each Layer, Various Terminology used in Computer Network, Connection-Oriented & Connectionless Services, Internet (TCP/IP) Reference Model, Comparison of ISO-OSI and TCP/IP Model

UNIT - III

Transmission Media : Transmission Media, Guided Media (Wired) : Coaxial Cable: Physical Structure, Standards, BNC Connector, Applications, Twisted Pair : Physical Structure, UTP vs STP, Connectors, Applications, Fiber Optics Cable: Physical Structure, Propagation Modes (Single Mode & Multimode), Fiber Sizes, Connectors , Applications , Advantages & Disadvantages, Unguided Media(Wireless): Electromagnetic Spectrum for Wireless Communication, Propagation Methods, (Ground, Sky, Line-of-Sight)

Wireless Transmission: Radio Waves, Infrared, Micro-wave, Wireless LANs (IEEE 802.11), Architecture, MAC Sub Layer, Frame Format, Frame Types, Bluetooth, Architecture (Piconet, Scatternet, Bluetooth, Layers), Applications

UNIT - IV

Network Connectivity Devices: Categories of Connectivity Devices, Passive and Active Hubs, Repeaters, Bridges, Switches (2-Layer Switch, 3-Layer, Switch(Router), Gateways, Network Security Devices (Firewalls, Proxy Servers)

Components of LAN : Network Interface Card (NIC), Network Adapters, Components of NIC, Functions of NIC, Types of NIC, Ethernet : Basic Features, Types of Ethernet, Different Framer Format: IEEE 802.3, IEEE 802.4, IEEE 802.5

UNIT - V

Internet Basics: Internet:Growth, Architecture, Accessing, Internet Service Providers(ISP), Internet Addressing System:IP Address, DNS, URL, World Wide Web(WWW): Web Servers,Web Browsers, Search Engine; Concept of Intranet & Extranet.

TEXT BOOK

1. Tanenbaum, Andrew, Computer Networks, PHI
2. B. A. Forouzan, Data Communications and Networking, 5th Edition, McGraw Hill Education (India) Private Limited, 2013.
3. William Stallings, Data and Computer Communications, 10th Edition, Pearson, 2013

EFERENCE BOOKS:

1. Larry L. Peterson and Bruce S. David: Computer Networks – A Systems Approach, 5th Edition, Elsevier, 2011.
2. Andrew S. Tanenbaum, Computer Networks, Fourth Edition, PHI, 2008.
3. Fred Halsall, Data Communications, Computer Networks and Open Systems, 4th Edition, Pearson Education, 2005.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.swayam2.ac.in/cec19_cs07/preview
2. https://nptel.ac.in/courses/106/105/106105081/

WEB REFERENCE/E-BOOKS:

1. https://www.javatpoint.com/computer-network-tutorial
2. https://www.geeksforgeeks.org/computer-network-tutorials/
3. https://www.tutorialspoint.com/data_communication_computer_network/index.htm

OPERATING SYSTEMS
III B.TECH., II SEMESTER
OPEN ELECTIVE - II

Course Title: OPERATING SYSTEMS	Course Code: AS20-05OE22
Teaching Scheme (L:T:P):3:0:0	Credits:3
Type of Course: Lecture + Assignment	Total Contact Periods: 48 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks

Course Overview:
This is an introductory course which covers the classical internal algorithms and structures of operating systems, including CPU scheduling, memory management, and device management. Considers the unifying concept of the operating system as a collection of cooperating sequential processes. Covers topics including file systems, virtual memory, disk request scheduling, concurrent processes, deadlocks, security, and integrity.

Course Objective
1. To learn the fundamentals of Operating Systems.
2. To learn the mechanisms of OS to handle processes and threads and their communication
3. To learn the mechanisms involved in memory management in contemporary OS
4. To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols
5. To know the components and management aspects of concurrency management
6. To learn programmatically to implement simple OS mechanisms

Course Outcomes(s)

CO#	Course Outcomes
C325.1	Explains the basic concepts of operating systems
C325.2	Compares different process scheduling algorithms and interpret the concurrency problem to overcome it by using different solutions
C325.3	Estimates the memory allocated for a process
C325.4	Interprets the structure of a file system and disk and also able to manage them
C325.5	Analyze the sharing of resources among multiple processes in order to detect, prevent and avoid a deadlock
C325.1	Interprets the Inter process Communication Mechanisms along with Process Management and Synchronization.

COURSE CONTENT

UNIT - I

Introduction: Views ,Goals ,Types of system , OS Structure ,Components , Services ,System Structure, Layered Approach ,Virtual Machines , System Design and Implementation. Process Management: Process, Process Scheduling, Cooperating Process, Threads, Interprocess Communication. CPU Scheduling: CPU Schedulers, Scheduling criteria, Scheduling Algorithms

UNIT - II

Process Synchronization: Critical, Section problem, Synchronization Hardware, Semaphores, Classic Problems of Synchronization, Critical Region, Monitors. Deadlock: Characterization, Methods for handling Deadlocks – Prevention, Avoidance, and Detection of Deadlock, Recovery from deadlock.

UNIT - III

Memory Management: Address Binding, Dynamic Loading and Linking, Overlays, Logical and Physical Address Space, Contiguous Allocation, Internal & External Fragmentation. Non Contiguous Allocation: Paging and Segmentation schemes, Implementation, Hardware Protection, Sharing, Fragmentation.

UNIT - IV

Virtual Memory: Demand Paging, Page Replacement, Page Replacement Algorithms, Thrashing, File System: Concepts, Access methods, Directory Structure, Protection Consistency Semantics, File System Structures, Allocation methods, Free Space Management.

UNIT - V

I/O Systems: Overview, I/O Hardware, Application I/O Interface, Kernel I/O subsystem, Transforming I/O Requests to Hardware Operations, Performance. Secondary Storage Structures: Protection, Goals, Domain Access matrix, the security problem, Authentication, Threats, Threat Monitoring, Encryption.

TEXT BOOKS:

1. Silberschatz A., Galvin P.B., Gange, 2002, Operating System Principles, Sixth Edition, John Wiley & Sons.

REFERENCES BOOKS:

1. H.M. Deitel, An Introduction to Operating System, , Second Edition, Addison Wesley.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1) https://onlinecourses.swayam2.ac.in/cec20_cs06/preview
2) https://onlinecourses.nptel.ac.in/noc19_cs51/preview

WEB REFERENCE/E-BOOKS:

1. https://www.tutorialspoint.com/operating_system/index.htm
2. https://www.javatpoint.com/os,tutorial

DATA STRUCTURES
III B.TECH., II SEMESTER
OPEN ELECTIVE - II

Course Title: DATA STRUCTURES	Course Code: AS20 - 05OE23
Teaching Scheme (L:T:P):3:0:0	Credits:3
Type of Course: Lecture + Assignment	Total Contact Periods: 48 Hours
Continuous Internal Evaluation,30 Marks	Semester End Exams,70 Marks
Prerequisites: Programming Language, Maths	

Course Overview:

The purpose of this course is to provide basic concepts of data structures. The main goal of the course is to teach the students how to select and design data structures for problems that they might encounter. This course is also to learn abstracts data types, graphs, tree and its traversal, and different searching and sorting techniques.

Course Objective

1. Differentiate primitive and non,primitive structures
2. Design and apply appropriate data structures for solving computing problems.
3. Apply sorting and searching algorithms to the small and large data sets.
4. Design and analyze the time and space efficiency of the data structure ·
5. Identity the appropriate data structure for given problem ·
6. Have practical knowledge on the applications of data structures

Course Outcomes(s)

CO#	Course Outcomes
C325.1	Understand the basic concepts of data structures
C325.2	Understand concepts about searching and sorting techniques
C325.3	Understand basic concepts and its operations on stacks and queues
C325.4	Understand the working principles of lists, trees and graphs
C325.6	Understand the operation of Linked list concept
C325.1	Analyse to solve problem, step by step with the help of fundamental data structures

COURSE CONTENT

UNIT - I

Definition of a Data structure: primitive and composite Data Types, Arrays, Operations on Arrays, Ordered lists, Stacks, Operations, Applications of Stack, Infix to Postfix Conversion.

UNIT - II

Recursion : Queue, operations , Singly Linked List : Operations , Application , Representation of a Polynomial , Polynomial Addition , Doubly Linked List , Operations.

UNIT - III

Sorting Techniques: Introduction, Selection sort, Insertion sort, Bubble sort, Merge Sort, Radix sort, Shell sort, Quick sort.

UNIT - IV

Searching: Introduction, Linear search and Binary search

UNIT - V

Trees: Binary Trees, Operations, Graph, Definition, Types of Graphs, Graph Traversal, DFS and BFS.

TEXT BOOKS:

1. Ellis Horowitz, Sartaj Sahni and Anderson, "Fundamentals of Data Structure in C", University Press, 2nd edition, 2008.
2. SeyMour Lipschutz, Data Structures, Schaum's outlines, TMH Private Limited, New Delhi

REFERENCES BOOKS:

1. R.F.Gilberg and B.A.Forouzan, CengageLearning.
2. Data structures and Algorithm Analysis in C, 2nd edition, M.A.Weiss, Pearson.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://nptel.ac.in/courses/106/102/106102064/
2. https://onlinecourses.swayam2.ac.in/cec19_cs04/preview

WEB REFERENCE/E-BOOKS:

1. https://www.javatpoint.com/data,structure,tutorial
2. https://www.geeksforgeeks.org/data,structures/
3. https://www.tutorialspoint.com/data_structures_algorithms/index.htm

JAVA PROGRAMMING
III B.TECH., II SEMESTER
OPEN ELECTIVE - II

Course Title: JAVA PROGRAMMING	Course Code: AS20-05OE24
Teaching Scheme (L:T:P):3:0:0	Credits:3
Type of Course: Lecture + Assignment	Total Contact Periods: 48 Hours
Continuous Internal Evaluation,30 Marks	Semester End Exams,70 Marks
Prerequisites: OOPS Concept and C & C++	

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 introduce the implementation of packages and interfaces
- To introduce the concepts of exception handling.
- To introduce the design of Graphical User Interface using applets.

Course Outcomes(s)

CO#	Course Outcomes
C325.1	Solve real world problems using OOP techniques.
C325.2	Describes the use of abstract classes.
C325.3	Solves problems using java collection framework and I/O classes.
C325.4	Develops multithreaded applications with synchronization.
C325.6	Designs web applications using Applets
C325.1	Designs GUI based applications with Exception handling.

COURSE CONTENT

UNIT - I

Introduction : Introduction to java applications , Introduction to classes, objects, methods & Strings , Control statements ,Arrays.

UNIT - II

Class & Objects: constructor, function overloading & overriding, Inheritance, Polymorphism ,Interface, package , exception handling , Introduction to Multithreading.

UNIT - III

Exception Handling: GUI components, Introduction: Overview of Swing Components, Swing vs AWT –SWING: Displaying Text and Images in a Window , Text Fields and an Introduction to Event Handling with Nested Classes , Common GUI Event Types and Listener Interfaces , How Event Handling Works – various event handling – layout manager.

UNIT - IV

Files, Streams & Object Serialization: Introduction , Files & Streams , Sequential Access Text Files , Object Sterilization.

UNIT - V

Applets & Java Web Start : applet life, cycle ,sandbox security model, Java web start & Java Network Launch Protocol (JNLP) , Accessing databases with java database connectivity (JDBC).

TEXT BOOKS:

1. Paul Deital & Harvey Deital,"Java: How to Program", Pearson Education, 10th edition, 2015.
2. Java The complete reference, 9th edition, Herbert Schildt, McGraw Hill Education (India) Pvt. Ltd.
3. Understanding Object,Oriented Programming with Java, updated edition, T. Budd, Pearson Education.

REFERENCES BOOKS:

1. Object Oriented Programming through Java, P. Radha Krishna, University Press.
2. Programming in Java, S. Malhotra, S. Chudhary, 2nd edition, Oxford Univ. Press.
3. Java Programming and Object,oriented Application Development, R. A. Johnson, Cengage Learning.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.swayam2.ac.in/aic20_sp13/preview
2. https://onlinecourses.nptel.ac.in/noc19_cs84/preview
3. https://onlinecourses.nptel.ac.in/noc20_cs08/preview

WEB REFERENCE/E-BOOKS:

1. www.javavideotutorials.net
2. www.geeksforgeeks.org/java/
3. www.learnjavaonline.org
4. www.cs.utexas.edu
5. www.javavideotutorials.net

MACHINE LEARNING LAB
III B.TECH., II SEMESTER

Course Title: MACHINE LEARNING LAB	Course Code: AS20-05PC17
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:

Machine Learning is a key to develop intelligent systems and analyze data in science and engineering. It covers theoretical foundations as well as essential algorithms for supervised and unsupervised learning. Classes on theoretical and algorithmic aspects are complemented by practical lab sessions.

Course Objective:

- To introduce students to the basic concepts and techniques of Machine Learning.
- To become familiar with regression methods, classification methods, clustering methods.
- To become familiar with Dimensionality reduction Techniques.

Course Outcomes(s)

CO#	Course Outcomes
C326.1	Gain knowledge about basic concepts of Machine Learning
C326.2	Identify machine learning techniques suitable for a given problem
C326.3	Solve the problems using various machine learning techniques
C326.4	Apply Dimensionality reduction techniques.
C326.5	Draw inferences using machine learning algorithms
C326.6	Analyze the use of various machine learning algorithms

COURSE CONTENT

1. The probability that it is Friday and that a student is absent is 3 %. Since there are 5 school days in a week, the probability that it is Friday is 20 %. What is theprobability that a student is absent given that today is Friday? Apply Baye's rule in python to get the result. (Ans: 15%)
2. Extract the data from database using python
3. Implement k-nearest neighbours classification using python

4. Given the following data, which specify classifications for nine combinations of VAR1 and VAR2 predict a classification for a case where VAR1=0.906 and VAR2=0.606, using the result of k-means clustering with 3 means (i.e., 3 centroids)

VAR1	VAR2	CLASS
1.713	1.586	0
0.180	1.786	1
0.353	1.240	1
0.940	1.566	0
1.486	0.759	1
1.266	1.106	0
1.540	0.419	1
0.459	1.799	1
0.773	0.186	1

5. The following training examples map descriptions of individuals onto high, medium and low credit-worthiness.

medium skiing design single twenties no -> highRisk
high golf trading married forties yes -> lowRisk
low speedway transport married thirties yes -> medRisk
medium football banking single thirties yes -> lowRisk
high flying media married fifties yes -> highRisk
low football security single twenties no -> medRisk
medium golf media single thirties yes -> medRisk
medium golf transport married forties yes -> lowRisk
high skiing banking single thirties yes -> highRisk
low golf unemployed married forties yes -> highRisk

Input attributes are (from left to right) income, recreation, job, status, age-group, home-owner. Find the unconditional probability of `golf' and the conditional probability of `single' given `medRisk' in the dataset?

6. Implement linear regression using python.
7. Implement Naïve Bayes theorem to classify the English text
8. Implement an algorithm to demonstrate the significance of genetic algorithm
9. Implement the finite words classification system using Back-propagation algorithm

Additional Experiments

1. Implement and demonstrate the FIND-S algorithm
2. Demonstrate the Candidate-Elimination algorithm

TEXT BOOKS:

1. Machine Learning – Tom M. Mitchell, McGraw-Hill Education (India) Private Limited, 2013.
2. Ethem Alpaydin, —Introduction to Machine Learning (Adaptive Computation and Machine Learning), The MIT Press 2004.
3. Machine Learning: An Algorithmic Perspective, Stephen Marshland, Taylor & Francis ,CRC Press, 2009.
4. Bishop, C., Pattern Recognition and Machine Learning. Berlin: Springer-Verlag.

REFERENCES BOOKS:

1. Introduction to Machine learning, Nils J.Nilsson.
2. Machine learning for dummies, IBM Limited ed, by Judith Hurwitz and Daniel Kirsch
3. Introduction to Machine Learning with Python A guide for data scientists, Andreas, C. Muller & Sarah Guido, O'Reilly.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://nptel.ac.in/courses/106/106/106106139/
2. https://nptel.ac.in/courses/106/105/106105152/
3. https://nptel.ac.in/courses/106/106/106106198/

WEB REFERENCE/E-BOOKS:

1. https://alex.smola.org/drafts/thebook.pdf
2. https://ai.stanford.edu/~nilsson/MLBOOK.pdf
3. https://www.cs.huji.ac.il/~shais/UnderstandingMachineLearning/understanding-machine-learning-theory-algorithms.pdf
4. http://guidetodatamining.com/assets/guideChapters/Guide2DataMining.pdf

COMPILER DESIGN LAB
III B.TECH., II SEMESTER

Course Title: COMPILER DESIGN LAB	Course Code:AS20-05PC18
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 course deals with the Practical view basic techniques of Compiler Construction and tools that can used to perform Syntax-directed translation of a high-level programming language into an executable code. This will provide deeper insights into the more advanced semantics aspects of programming languages, code generation, machine independent optimizations, dynamic memory allocation, types and their inferences, object orientation. The course is presented to the students by using power point projections, Lab Manual and Guidelines for Executing Lab Experiments.

Course Objectives:

- To implement the different Phases of compiler.
- To implement and test simple optimization techniques.
- To give exposure to compiler writing tools.
- To apply the various Tools for Compiler design
- To construct LALR parser tools for verification

Course Outcomes(s)

CO#	Course Outcomes
C327.1	Implement the techniques of Lexical Analysis and Syntax Analysis.
C327.2	Construct various parsing techniques
C327.3	Implement the bottom – up parsing techniques
C327.4	Apply the knowledge of Lex & Yacc tools to develop programs.
C327.5	Generate intermediate code.
C327.6	Implement Optimization techniques and generate machine level code.

COURSE CONTENT

1. Design and implement a lexical analyzer for given language using C and the lexical analyzer should ignore redundant spaces, tabs and new lines.
2. Implementation of Lexical Analyzer using Lex Tool
3. Generate YACC specification for a few syntactic categories.
   a) Program to recognize a valid arithmetic expression that uses operator +, – , * and /.
   b) Program to recognize a valid variable which starts with a letter followed by any number of letters or digits.
   c) Implementation of Calculator using LEX and YACC
   d) Convert the BNF rules into YACC form and write code to generate abstract syntax tree
4. Write program to find ε – closure of all states of any given NFA with ε transition.
5. Write program to convert NFA with ε transition to NFA without ε transition.
6. Write program to convert NFA to DFA
7. Write program to minimize any given DFA.
8. Develop an operator precedence parser for a given language.
9. Write program to find Simulate First and Follow of any given grammar.
10. Construct a recursive descent parser for an expression.
11. Construct a Shift Reduce Parser for a given language.
12. Write a program to perform loop unrolling.
13. Write a program to perform constant propagation.
14. Implement Intermediate code generation for simple expressions.
15. Implement the back end of the compiler which takes the three address code and produces the 8086 assembly language instructions that can be assembled and run using an 8086 assembler. The target assembly instructions can be simple move, add, sub, jump etc.

TEXT BOOKS:

1. Hopcroft H.E. and Ullman J. D, "Introduction to Automata Theory Languages and Computation", 3rd Edition, Pearson Education, 2011.
2. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman (2007), Compilers Principles, Techniques and Tools, 2nd edition, Pearson Education, New Delhi, India.

REFERENCE BOOKS:

1. Alfred V. Aho, Jeffrey D. Ullman (2001), Principles of compiler design, Indian student edition, Pearson Education, New Delhi, India.
2. Kenneth C. Louden (1997), Compiler Construction– Principles and Practice, 1st edition, PWS Publishing.
3. K. L. P Mishra, N. Chandrashekaran (2003), Theory of computer science-Automata Languages and computation, 2nd edition, Prentice Hall of India, New Delhi, India.
4. Andrew W. Appel (2004), Modern Compiler Implementation C, Cambridge University Press, UK.

WEB REFERENCE:

1. http://nptel.iitm.c.in/courses/Webcourse-contents/IIT-%20Guwahati/afl/index.htm
2. http://nptel.ac.in/courses/106104123/
3. http://nptel.ac.in/courses/106104072/

WEB PROGRAMMING LAB
III B.TECH., II SEMESTER

Course Title: WEB PROGRAMMING LAB	Course Code: AS20-05PC19
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, HTML, JAVA	

Course Overview:

This course is intended to teach the basics involved in publishing content on the World Wide Web. This includes the 'language of the Web' – HTML, the fundamentals of how the Internet and the Web function, a basic understanding of graphic production with a specific stress on creating graphics for the Web, and a general grounding introduction to more advanced topics such as programming and scripting. This will also expose students to the basic tools and applications used in Web publishing.

Course Objective:

1. Able to develop a dynamic webpage by the use of java script and HTML.
2. Able to write a well-formed / valid XML document.
3. Able to connect a PHP web site to a MySQL and perform insert, update and delete operations on MySQL table.
4. Able to define the CSS with its types and apply them to provide the styles to the web pages at various levels.

Course Outcomes(s)

CO#	Course Outcomes
C328.1	Analyse a web page and identify its elements and attributes.
C328.2	Create web pages using HTML and Cascading Style Sheets
C328.3	Build dynamic web pages using JavaScript (Client side programming).
C328.4	Create XML documents and XML Schemas.
C328.5	Understand, analyze and build web applications using PHP.
C328.6	Develop the modern Web applications using PHP to generate the web pages dynamically using the database connectivity.

COURSE CONTENT

1. Create a simple webpage using HTML.
2. Use frames to Include Images and Videos.
3. Home page Development static pages (using Only HTML) of an online Book store. The website should consist the following pages.
   - Registration and user Login
   - User Profile Page
   - Books catalog
   - Shopping Cart
   - Payment By credit card
   - Order Conformation
4. Add a Cascading Style sheet for designing the web page.
5. Develop and demonstrate the usage of inline, internal and external style sheet using CSS
6. Design a dynamic web page to validate the Registration, user login and payment by credit card pages using JavaScript.
7. Design an HTML having a text box and four buttons viz Factorial, Fibonacci, Prime, and Palindrome. When a button is pressed an appropriate javascript function should be called to display
   a. Factorial of that number
   b. Fibonacci series up to that number
   c. Prime numbers up to that number
   d. Is it palindrome or not
8. Write java script programs to demonstrate
   a. Math Object with at least five methods.
   b. String Object with at least five methods.
   c. Array Object with at least five methods.
   d. Date Object with at least five methods.
9. Write JavaScript programs on Event Handling
   a. Validation of registration form
   b. Open a Window from the current window
   c. Change color of background at each click of button or refresh of a page
   d. Display calendar for the month and year selected from combo box
   e. On Mouse over event
10. Write a program which takes user id as input and displays the user details by taking the user information from the XML document.
11. Create a PHP web page so that it converts value of INR(Indian Rupees) into equivalent American/Canadian/Australian Dollar value.
12. Develop and demonstrate PHP Script for the following problems: a) Write a PHP Script to find out the Sum of the Individual Digits. b) Write a PHP Script to check whether the given number is Palindrome or not
13. a) Implement the web applications with Database using PHP
    b) Implement the web applications with XML(as Database) using PHP

TEXT BOOKS:

1. Jennifer Niederst, Robbins, “Learning Web Design”, 3rd ed., SPD O’REILLY Publications, 2010.
2. Firuza Aibara, “HTML for Beginners”, 2nd ed., SPD O’REILLY Publications, 2010.
3. Jeffrey C. Jackson," Web Technologies: A Computer Science Perspective", Pearson Education, Second Edition 2007
4. Jon Duckett, “Beginning Web Programming”, WROX

REFERENCES BOOKS:

1. Ralph Moseley and M. T. Savaliya, Developing Web Applications, Wiley-India, 2nd edition.
2. Web Technologies, Black Book, DreamTech Press
3. HTML 5, Black Book, DreamTech Press

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.swayam2.ac.in/aic20_sp11/preview
2. https://onlinecourses.swayam2.ac.in/aic20_sp32/preview
3. https://www.coursera.org/learn/html-css-javascript-for-web-developers

WEB REFERENCE/E-BOOKS:

1. https://www.w3schools.com/html/
2. https://html5andcss3.org/
3. https://www.tutorialspoint.com/html5/index.htm
4. https://www.tutorialrepublic.com/references.php

PROFESSIONAL ETHICS
III B.TECH., II SEMESTER
MANDATORY COURSE

Course Title: PROFESSIONAL ETHICS	Course Code: AS20-00MC04
Teaching Scheme (L:T:P) : 3:0:0	Credits:0
Type of Course: Lecture	Total Contact Periods: 48 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites 1. Understand the professional Rules of conduct for Engineers. 2. Appreciate codes of conduct, professional Rules of conduct. 3. Recognize the conflict of interest and Develop strategies 4. Understand the importance of communication with all stakeholders. 5. Apply practical strategies for handling ethical dilemmas.	

Course Overview:
To enable the students to imbibe and internalize the Values and Ethical Behavior in the personal and Professional lives.

Course Objective

- To enable the students to imbibe and internalize the Values and Ethical Behavior in the personal and Professional lives.
- To understand the importance of Values and Ethics in their Personal lives and professional careers.
- To know the basic theory of moral development and ethics
- To learn the rights and responsibilities of personal and professional life.
- To study the Responsibilities of employee, team member and a global citizen.
- To understand the professional practices in engineering

Course Outcomes(s)

CO#	Course Outcomes
C329.1	To enable the students to imbibe and internalize the Values and Ethical Behaviour in the personal and Professional lives.
C329.2	To understand the importance of Values in professional life.
C329.3	To understand Ethics in their Personal lives and professional careers.
C329.4	To learn the rights and responsibilities.
C329.5	To improve the Responsibilities of employee.
C329.6	To analyse the responsibilities of team member and a global citizen.

COURSE CONTENT

UNIT - I

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

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

UNIT - II

Demand and Supply Analysis: Determinants of demand and supply, Demand and Supply Function, Law of Demand and supply, Elasticity of Demand and supply, Types of Elasticity, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making,

Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting. Case study.

UNIT - III

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

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

UNIT - IV

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

UNIT - V

Financial Analysis through Ratios: Concept of Ratio Analysis, importance of ratio Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios (simple problems). Introduction to Fund Flow and Cash Flow Analysis (simple problems).

TEXT BOOKS

1. Varshney and Maheshwari. Managerial Economics. Sultan Chand. New Delhi
2. Dornbusch, Fischer and Startz, Macroeconomics, McGraw Hill, 11th edition, 2010.
3. Samuelson, Managerial Economics, 6th edition, Wiley
4. I.M .Pandey, Financial Management, Vikas Publishing House. New Delhi.

REFERENCE BOOKS

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

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

NPTEL Web Course:

1. https://onlinecourses.nptel.ac.in/noc19_hs28/preview
2. https://onlinecourses.nptel.ac.in/noc19_ma07/preview
3. https://onlinecourses.nptel.ac.in/noc19_mg01/preview

NPTEL Video Course:

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

WEB REFERENCE/E-BOOKS:

1. www.icsi.edu
2. https://www.inderscience.com/jhome.php?jcode=gber
3. https://www.googleadservices.com/pagead/aclk?sa=L&ai=DChcSEwj56O-Uu9XxAhWtISsKHTSdCYUYABAAGgJzZg&ae=2&ohost=www.google.com&cid=CAESQeD2u1_CESbm6r_whRhlZ_S92_IOpg_v9T1T1OU-oasT4bb3AxR39-4EH1Kh3R-ILPiEIt7Rm_TvoMTMUwkt98PF&sig=AOD64_03kddmVm1B9YjnAY04UV8Yst1sCg&q&adurl&ved=2ahUKEwjs-uWUu9XxAhVJzDgGHXDgDFAQ0Qx6BAgCEAE

CYBER SECURITY
III B.TECH., II SEMESTER
MANDATORY COURSE

Course Title: CYBER SECURITY	Course Code: AS20-00MC06
Teaching Scheme (L:T:P): 3:0:0	Credits: 0
Type of Course: Lecture	Total Contact Periods: 48 Hours
Continuous Internal Evaluation-30 Marks	Semester End Exams-70 Marks
Prerequisites: Students should have knowledge of Internet and its usage	

Course Overview:

This course aims at providing the attendee with a broad introduction to the profound concepts in Cyber Security and Ethical Hacking using forensic detection by exposing them to practical scenarios in order to make them industry ready. It's definitely beneficial to professionals looking for change/ advancement in their career as well as Budding Engineers to start their career as Ethical Hacking Data Scientist, Cyber Security Engineer, Anti Cyber Terrorism Scientist, etc.

Course Objective: The objectives of the course is to

- To learn foundations of Cyber Security and Ethical Hacking analysis using programming languages like python.
- To learn various types of algorithms and its applications of Cyber Security and Ethical Hacking using forensic detection
- To learn python toolkit for required for programming Cyber Security, Ethical Hacking concepts.
- To understand the concepts of Cyber Security, Ethical Hacking Forensic detection image processing ,pattern recognition, and natural language processing.
- To identify insights on how to apply Cyber Security, Ethical Hacking to solve a interdisciplinary problems.

Course Outcomes(s)

CO#	Course Outcomes
C3210.1	Gains the fundamental knowledge over cyber Security.
C3210.2	Discuss on Indian cyber space and cyber forensics.
C3210.3	Analyzes on cyber-crime over mobile and wireless devices.
C3210.4	Analyze the various phenomena of various cyber-crime and cyber terrorism.
C3210.5	Implications of organization towards cyber security
C3210.6	Discuss on privacy issues along with examples of cybercrimes.

COURSE CONTENT (SYLLABUS)

UNIT - I

Essential Terminologies: CIA, Risks, Breaches, Threats, Attacks, Exploits. Information Gathering (Social Engineering, Foot Printing & Scanning).Open Source/ Free/ Trial Tools: nmap, zenmap, Port Scanners, Network scanners

UNIT - II

Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography. Overview of Firewalls- Types of Firewalls, User Management, VPN Security, Security **Protocols:** security at the Application Layer- PGP and S/MIME, Security at Transport Layer: SSL and TLS, Security at Network Layer-IPSec.

UNIT - III

Internet Security, Cloud Computing &Security, Social Network sites security, Cyber Security Vulnerabilities-Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Authorization, Unprotected Broadband communications, Poor Cyber Security Awareness.

UNIT - IV

Explanation of Malware, Types of Malware: Virus, Worms, Trojans, Rootkits, Robots, Adware's, Spywares, Ransom wares, Zombies etc., OS Hardening (Process Management, Memory Management, Task Management, Windows Registry/ services another configuration), Malware Analysis.Open Source/ Free/ Trial Tools: Antivirus Protection, Anti Spywares, System tuning tools, Anti Phishing.

UNIT - V

Introduction, Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, National Cyber Security Policy 2013.

Introduction to Cyber Forensics: Need of Cyber Forensics, Cyber Evidence, Documentation and Management of Crime Sense, Image Capturing and its importance, Partial Volume Image, Web Attack Investigations, Denial of Service Investigations, Internet Crime Investigations, Internet Forensics, Steps for Investigating Internet Crime, Email Crime Investigations.

TEXT BOOKS:

1. William Stallings, "Cryptography and Network Security", Pearson Education/PHI, 2006.
2. V.K. Jain, "Cryptography and Network Security", Khanna Publishing House.
3. Gupta Sarika, "Information and Cyber Security", Khanna Publishing House, Delhi.

REFERENCES BOOKS:

1. Atul Kahate, “Cryptography and Network Security”, McGraw Hill.
2. V.K. Pachghare, “Cryptography and Information Security”, PHI Learning
3. Nina Godbole, “Information System Security”, Wiley
4. Bothra Harsh, “Hacking”, Khanna Publishing House, Delhi

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. INTRODUCTION TO CYBER SECURITY - By Dr. Jeetendra Pande, Uttarakhand Open University, Haldwani

WEB REFERENCE/E-BOOKS:

1. https://uou.ac.in/sites/default/files/slm/Introduction-cyber-security.pdf
2. https://heimdalsecurity.com/pdf/cyber_security_for_beginners_ebook.pdf

WEB PRODUCT DEVELOPMENT
III B.TECH., II SEMESTER
VALUE ADDED COURSE

Course Title: WEB PRODUCT DEVELOPMENT	Course Code: AS20-05PW05
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical	Total Contact Periods: 32 Hours
Continuous Internal Evaluation-25 Marks	Semester End Exams-75 Marks
Prerequisites: PHP, My SQL, HTML	

Course Overview:
Providing quality content on your website, regularly adding new information, establishing trust, marketing your site on other websites and social media. Understand the principles of creating an effective web page, including an in-depth consideration of information architecture. Become familiar with graphic design principles that relate to web design and learn how to implement theories into practice.

Course Objective:
The objective of this Course is:

- To learn techniques of responsive web design, including media queries.
- To familiar with graphic design and/or game theory and be able to apply this theory to real world projects
- To develop and understanding of information design and usability as it applies to interactive media projects.

Course Outcomes(s)

CO#	Course Outcomes
C3211.1	Understand the principles of creating an effective web page, including an in-depth consideration of information architecture
C3211.2	Understand with graphic design principles that relate to web design and learn how to implement theories into practice
C3211.3	Develop skills in analyzing the usability of a web site.
C3211.4	Understand how to plan and conduct user research related to web usability.
C3211.5	Develop basic programming skills using Zend framework and Wordpress.
C3211.6	Apply social media content into web pages using Zend framework

COURSE CONTENT (SYLLABUS)

UNIT - I

Introducing WordPress: What WordPress Can Do for You -WordPress Blogging Basics Using the WordPress Hosted Service-Getting Started with WordPress.com-Writing and Managing Your Blog-Enhancing Your Blog with Themes,Widgets, and Upgrades. -Setting Up Blogging Base Camp-Understanding the WordPress.org -Administration Panel.-Establishing Your Blog Routine

UNIT - II

Flexing and Extending WordPress:Media Management: Images, Audio, and Video, Making the Most of WordPress Plugins-Finding and Installing WordPress Themes Customizing WordPress, Understanding Themes and Templates-Tweaking WordPress **Themes-Beyond Blogging:** WordPress as a Content Management System

UNIT - III

Getting Started with Zend Framework:The Application-Writing Controllers Using Zend_Controller-Views, Forms, Filters, and Validators-Database Communication, Manipulation, and Display-Sending and Receiving E-mail

UNIT - IV

Web Services and Feeds: Creating a Search Engine Using Zend_Search_Lucene-Caching with Zend Framework-Creating a Basic MVC Application-The Zend Framework MVC Architecture-Storefront Basic Setup-Storefront Models

UNIT - V

Implementing the Catalog: Implementing User Accounts, The Shopping Cart, Authentication and Authorization, The Administration Area-Storefront Roundup, Storefront Optimization, Testing the Storefront

REFERENCE BOOKS:

1. Armando Padilla, Beginning Zend Framework (2009, Apress)
2. Lisa Sabin-Wilson, WordPress for DUMmIES, Wiley publication, 2nd edition
3. Keith Pope - Zend Framework 1.8 Web Application Development (2009, packt pub)

WEB REFERENCE/E-BOOKS:

1. https://www.sitepoint.com/rapid-enterprise-app-development-zend-expressive/
2. https://www.tutorialspoint.com/wordpress/index.htm
3. https://www.hostinger.in/tutorials/wordpress

3D PRINTING DESIGN
III B.TECH., II SEMESTER
VALUE ADDED COURSE

Course Title:3D PRINTING DESIGN	Course Code: AS20-12PW05
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical	Total Contact Periods: 32 Hours
Continuous Internal Evaluation-25 Marks	Semester End Exams-75 Marks
Prerequisites: Computer Aided Design & Drafting Engineering Materials	

Course Overview:
This course will demonstrate how to use 3D printing software to create digital designs that can be turned into physical objects. 3D printing has changed the manufacturing world for the better. 3D printing also provides many opportunities to aid visual and practical learning across the sciences. 3D-printed components are often used as test models for scientific experiments across different disciplines, including mechanical engineering, aerospace, and robotics. This course is hands-on in nature and will provide step-by-step instructions to guide you through popular 3D modeling programs, OpenSCAD and 123D Design.

Course Objective: The objective of this Course is:
1. To gain knowledge and skills related to 3D printing technologies.
2. To learn the selection of material, equipment and development of a product for Industry 4.0 environment.
3. To understand the various software tools, process and techniques for digital manufacturing.
4. To apply these techniques into various applications.

Course Outcomes(s)

CO#	Course Outcomes
C3211.1	Understand the fundamentals of 3D Printing design and its Technologies for engineering applications.
C3211.2	Understand and Analysis the 3D printing process with its working models.
C3211.3	Explorer the material and design applied for 3D printing design.
C3211.4	Design few 3D samples like box, simple shapes with modern 3D printing tools.
C3211.5	Understand various techniques, strategies and services applied in 3D printing.
C3211.6	Understand the advanced technique that were used for blending.

COURSE CONTENT

UNIT - I

What Is 3D Printing :The Goal of 3D Printing: The History and Future of 3D Printing: Manufacturing with 3D Printers and CNC Mills: Types of 3D Printers.

All About the Hardware-The Frame-Movement Components, The Extruder: The Build Platform-Choosing a 3D Printer

The 3D Printing Process: Making a 3D Model-Scanning a Model-Downloading and Modifying Existing Models, Creating a New Model-Design Considerations. Slicing a 3D Model-Tools and Techniques, Getting Started: How to Slice an Object.

UNIT - II

Driving Your Printer: G-code-Controlling Your 3D Printer -Understanding G-code-Using Host Programs-When a Print Starts-During a Print-When a Print Finishes Normally-Manually Controlling Your Printer-Running from an SD Card.

Material Considerations: Filament Quality Control-Filament Materials-Multiple Extruders.

Exploring Design Techniques for 3D Printing: You Become the Factory-Reviewing Your Design Options-Generating Ideas for 3D Printing: Where to Begin-Getting Started with Free 3D Modeling Software-A Summary of the 3D Software-Additional Skills Needed for 3D Printing.

UNIT - III

Begin with a Box: Tools of the Trade-Beginning with Essential Building Blocks: Boxes, Spheres, and Cylinders-Designing a Basic Box in Tinkercad-Building the Box in Tinkercad, Designing a Basic Box in OpenSCAD-Building the Box in OpenSCAD.

Preparing the Box for 3D Printing: The 3D-Printing Production Pipeline-Four Paths to 3D Printer Access-Ensuring That 3D Models Are 3D Print Ready-Final Design Considerations to Ensure 3D Printing Success-Testing, Exploration, and Experimentation-Software Tools to Validate 3D Models for Printability-Getting the Box Ready to 3D Print in Meshmixer, Getting the Box Ready to 3D Print in Cura-Getting the Box Ready to 3D Print in MatterControl, Getting the Box Ready to 3D Print in Slic3r-Using Netfabb to Correct Mesh Errors.

UNIT - IV

Creative Applications for Simple Shapes: Begin with Base Shapes-Shape Generators-Creating Your Own Shape Generators-Importing Your Own Shapes-Additional Ideas.

Design Strategies for 3D Printing: Design Guidelines for Successful 3D Printing.

Basic Solid Modeling Techniques: The Benefits of Solid Modeling-Discovering 123D Design for Solid Modeling Techniques-Using 123D Design-Projects Using 123D Design.

Organic Modeling Techniques: Organic Modeling with Sculptris-Combining Parts in Meshmixer.

UNIT - V

Customization Techniques: Adding Variation-Combining Hard-Edge and Organic Modeling Techniques. **3D-Scanning Techniques:** Getting Started-How to Use 123D Catch.

Intermediate Solid-Modeling Techniques: Designing Articulated and Mechanical Objects in 123D Design-Solid Modeling in FreeCAD.
Advanced Techniques Using Blender: Exploring New Ideas with Blender-Blender: Getting Started.
Working with 3D-Printing Service Bureaus: What Is a 3D-Printing Service Bureau?-Checklist When Submitting Files-General Best Practices-

REFERENCE BOOKS:

1. Cameron Coward, 3D printing(Idiots guide), Alpha books, 2015
2. Joan Horvath, Mastering 3D Printing, Apress.
3. Joe Micallef, Beginning Design for 3D Printing, Apress.

RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://www.coursera.org/courses?query=3d%20printing

WEB REFERENCE/E-BOOKS:

1. https://www.sculpteo.com/en/tutorial/
2. https://www.youtube.com/watch?v=3LBTkLsjHGQ

DRONE APPLICATIONS
III B.TECH., II SEMESTER
VALUE ADDED COURSE

Course Title: DRONE APPLICATIONS	Course Code: AS20-66PW04
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical	Total Contact Periods: 32 Hours
Continuous Internal Evaluation-25 Marks	Semester End Exams-75 Marks
Prerequisites: Introduction to Aerodynamics, Flight Mechanics	

Course Overview:
This course provides hands on experience on design, fabrication and flying of UAV category drones. Students will get in-depth skill set on design and fabrication techniques of UAV. And also they will learn various Drone applications.

Course Objective: The objective of this Course is:
1. To understand the preliminary concepts of UAV
2. To impart practical skill on fabrication and flying of UAV /Drone
3. To understand Drone Applications with environment.

Course Outcomes(s)

CO#	Course Outcomes
C3211.1	Understand the history and Fundamentals of UAV
C3211.2	Express the parts of Drones with its functionality
C3211.3	Analysis the working principle and usage of Drone
C3211.4	Understand various steps in assembling of Drones
C3211.5	Understand the various applications of UAV
C3211.6	Analysis various UAV Interaction with the Environment

COURSE CONTENT

UNIT - I
Historical Aspects of Unmanned Aerial Vehicles : Introduction, Typical Physical Parameters of UAVs for Commercial Applications, Various Categories of Unmanned Vehicles, UAVs for Border Patrol Operations, Chronological History of UAVs and Drones, UAVs Operated by Various Countries for Surveillance and Reconnaissance, Deployment Restriction on UAVs Small Unmanned Aerial Vehicle, Civilian Applications of UAVs, Drones for Oil, Gas, and Mineral Exploration and Production, UAVs for Disaster Relief Activities, Drones for Scientific Research in Atmospheric Environments, UAVs or Drones

for Animal Conservation Functions, Drones for Maritime Patrol Activities, Drones for Cooperative Forest Fire Surveillance Missions Cooperative Forest Fire Surveillance Using a Team of Micro-UAVs.

UNIT - II

Things to Know before You Build a Drone: Drone, Types of motors used for drones, Radio transmitter and receiver, Battery, Battery adapters/chargers, Connectors, Some modules to make the drone smarter.

Assembling Your Drone: Assembling the frame, Connecting the RC receiver and transmitter, Connecting the battery, Binding transmitter to the receiver, Know the aerodynamics needed for flying a drone-Saving your drone from crashing, Check things before flying, Check the security protocols for flying a drone outside.

UNIT - III

Unmanned Aerial Vehicles for Military Applications: Electro-Optical, Radio-Frequency, and Electronic Components for Unmanned Aerial Vehicles, UAV Navigation System and Flight Control System Critical Requirements.

UNIT - IV

Propulsion Systems and Electrical: sources for Drones and UAVs, Unmanned Autonomous vehicle technology, Survivability of Unmanned Autonomous Vehicles.

UNIT - V

UAV Applications: Introduction: Survey of Unmanned Aerial Vehicles (UAVs) for Traffic Monitoring-Measurement and Exploration in Volcanic Environments-Cooperative Unmanned Aerial Systems for Fire Detection, Monitoring, and Extinguishing-Selection of Appropriate Class UAS/Sensors to Support Fire Monitoring: Experiences in the United States

Unmanned Aerial Systems Physically Interacting with the Environment: Load Transportation, Deployment, and Aerial Manipulation-Unmanned Aircraft Systems for Maritime Operations-Autonomous Remote Sensing of Invasive Species from Robotic Aircraft Cyber-Physical Systems Enabled by Small Unmanned Aerial Vehicles.

REFERENCE BOOKS:

1. Kimon P. Valavanis and George J. Vachtsevanos, "Handbook of Unmanned Aerial Vehicles", Springer Reference
2. Syed Omar Faruk Towaha, "Building Smart Drones with ESP8266 and Arduino", Packt pub, 2018
3. A. R. Jha, "Theory, Design, and Applications of Unmanned Aerial Vehicles", CRC Press, 2017

RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc20_ae04/preview
2. https://www.coursera.org/lecture/robotics-flight/unmanned-aerial-vehicles-V136S
3. https://www.coursera.org/courses?query=drone

WEB REFERENCE/E-BOOKS:

1. https://ieeexplore.ieee.org/document/8660516
2. https://uavcoach.com/how-to-fly-a-quadcopter-guide/

AI APPLICATION IN HEALTH CARE
III B.TECH., II SEMESTER
VALUE ADDED COURSE

Course Title: AI APPLICATION IN HEALTH CARE	Course Code: AS20-66PW05
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical	Total Contact Periods: 32 Hours
Continuous Internal Evaluation-25 Marks	Semester End Exams-75 Marks
Prerequisites: Linear Algebra, Discrete Mathematics, Probability and Statistics, and Data Structures	

Course Overview:
This course explores the principles of AI deployment in healthcare and the framework used to evaluate downstream effects of AI healthcare solutions. With Artificial Intelligence applications proliferating throughout the healthcare system, stakeholders are faced with both opportunities and challenges of these evolving technologies.

Course Objective: The objective of this Course is:
1. Understand the fundamentals of Artificial Intelligence.
2. Understand the fundamentals, process of Big Data.
3. Evaluate the ethics and learning procedure of Intelligence.
4. Understand and compare the various AI models and Algorithms.

Course Outcomes(s)

CO#	Course Outcomes
C3211.1	Understand the fundamentals of Artificial Intelligence
C3211.2	Understand the fundamentals, process of Big Data
C3211.3	Comprehend a collection of machine learning models with its Algorithms
C3211.4	Analysis and evaluate the learning, ethics of Intelligence.
C3211.5	Identify, understand, and interpret the future of AI in Healthcare
C3211.6	Understand the AI techniques and its applications towards Healthcare

COURSE CONTENT (SYLLABUS)

UNIT - I

What Is Artificial Intelligence?: A Multifaceted Discipline, Examining Artificial Intelligence, What Is Machine Learning?, What Is Data Science? , Learning from Real-Time, Big Data, Applications of AI in Healthcare, Realizing the Potential of AI in Healthcare, What Is Data? Types of Data , Big Data , Small Data , Metadata, Healthcare Data—Little and Big Use Cases, Evolution of Data and Its Analytics, Turning Data into Information: Using Big Data, Reasoning, Challenges of Big Data, Resistance, Policies and Governance, Fragmentation, Lack of Data Strategy, Visualization , Timeliness of Analysis , Ethics , Data and Information Governance, Deploying a Big Data Project , Big Data Tools.

UNIT - II

What Is Machine Learning: Basics, What Is Machine Learning? How Is Machine Learning Different from Traditional Software Engineering?, Machine Learning Basics, How Machine Learning Algorithms Work, How to Perform Machine Learning, Machine Learning Algorithms: Defining Your Machine Learning Project, Common Libraries for Machine Learning, Supervised Learning Algorithms , Decision trees, Ensembles, Linear Regression, Logistic Regression, SVM, Naive Bayes, kNN: k-nearest neighbour, Neural Networks, Deep Learning, Unsupervised Learning, Dimensionality Reduction Algorithms, Dimension Reduction Techniques, Natural Language Processing (NLP), Getting Started with NLP, Preprocessing: Lexical Analysis, Syntactic Analysis, Semantic analysis, Techniques Used Within NLP, Genetic Algorithms, Best Practices and Considerations.

UNIT - III

Evaluating Learning for Intelligence: Model Development and Workflow, Skewed Datasets, Anomalies, and Rare Data, Parameters and Hyper parameters, Tuning Hyperparameters, Hyperparameter Tuning Algorithms, and Multivariate Testing.

Ethics of Intelligence: What Is Ethics?, Informed Consent, Freedom of Choice, Should a Person's Data Consent Ever Be Overturned?, Public Understanding, Who Owns the Data?, What Can the Data Be Used For?, Privacy: Who Can See My Data?, How Will Data Affect the Future?, Optimizing Pathways Through Connectivity—Is There a Limit?, Security, Ethics of Artificial Intelligence and Machine Learning, Prediction Ethics, How Does Humanity Stay in Control of a Complex and Intelligent System? , Intelligence, Health Intelligence, How Do Machines Affect Our Behaviour and Interaction, Affecting the future, Overhype and Scaremongering, Stakeholder Buy-In and Alignment, Policy, Law, and Regulation, Data and Information Governance, Is There Such a Thing as Too Much Policy?, Global standards and schemas, Do We Need to Treat AI with Humanity?, Employing Data Ethics Within Your Organization.

UNIT - IV

Future of Healthcare: Shifting from Volume to Value, Evidence-Based Medicine, Personalized Medicine, Vision of the Future, Connected Medicine, Medication Adherence, Accessible Diagnostic Tests, Smart Implantables, Digital Health and Therapeutics, Education, Incentivized Wellness, AI, Virtual and Augmented Reality, Blockchain, Robots, Smart Places.

UNIT - V

Artificial Intelligence Technologies and Applications for Health and Medicine: AI Technologies for Mobile Health of Stroke Monitoring & Rehabilitation Robotics Control, Artificial Intelligence for Smart Cancer Diagnosis, Mobile Doctor Brain AI App: Artificial Intelligence for IoT Healthcare, An Artificial Intelligence Mobile Cloud Computing Tool, Advanced Intelligent Robot Control Interfaces for The VR Simulation, Analysis of Telemedicine Technologies.

REFERENCE BOOKS:

1. Arjun Panesar, Machine Learning and AI for Healthcare Big Data for Improved Health Outcomes, Apress (1st edition).
2. Dac-Nhuong Le, Chung Van Le, Jolanda G. Tromp, Emerging Technologies for Health and Medicine: Virtual Reality, Augmented Reality, Artificial Intelligence, Internet of Things, Robotics, Industry 4.0, Wiley publication, 2018.

RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://www.coursera.org/specializations/ai-healthcare
2. https://onlinecourses.swayam2.ac.in/cec20_cs10/preview

WEB REFERENCE/E-BOOKS:

1. https://www.youtube.com/watch?v=j6EB9HO6acE&t=85s
2. https://www.youtube.com/watch?v=j6EB9HO6acE

ETHICAL HACKING
III B.TECH., II SEMESTER
VALUE ADDED COURSE

Course Title: ETHICAL HACKING	Course Code: AS20-05PW06
Teaching Scheme (L:T:P): 0:0:2	Credits: 1
Type of Course: Practical	Total Contact Periods: 32 Hours
Continuous Internal Evaluation-25 Marks	Semester End Exams-75 Marks
Prerequisites: Computer Networking, Cryptography.	

Course Overview:
The security of digital infrastructure is an utmost need for an organization. The variety of security attacks makes it compulsion to analyse the way newer attacks are formed and their understanding is important to prevent or detect such attacks. The ethical hacking covers the theory and practices of finding the vulnerabilities through forming the different attacks and then defining the appropriate security policy including the action to detect or prevent the attacks and thus reduce the damages.

Course Objective: The objective of this Course is:
1. Critically evaluate the potential countermeasures to advanced hacking techniques.
2. Analyze and critically evaluate techniques used to break into an insecure web application and identify relevant countermeasures.
3. Demonstrate a critical evaluation of an advanced security topic with an independent project.

Course Outcomes(s)

CO#	Course Outcomes
C3211.1	Describe and understand the basics of the ethical hacking
C3211.2	Perform the foot printing and scanning
C3211.3	Demonstrate the techniques for system hacking
C3211.4	Characterize the malware and their attacks and detect and prevent them
C3211.5	Determine the signature of different attacks and prevent them
C3211.6	Analyse the security attacks in different environments

COURSE CONTENT

UNIT - I

An Introduction to ethical Hacking: Security Fundamental, Security testing, Hacker and Cracker, Descriptions, Test Plans-keeping It legal, Ethical and Legality

The Technical Foundations of Hacking: The Attacker's Process, The Ethical Hacker's Process, Security and the Stack

UNIT - II

Footprinting and scanning: Information Gathering, Determining the Network Range, Identifying Active Machines, Finding Open Ports and Access Points, OS Fingerprinting Services, Mapping the Network Attack Surface.

Enumeration and System Hacking: Enumeration, System Hacking.

Malware Threats: Viruses and Worms, Trojans, Covert Communication, Keystroke Logging and Spyware, Malware Counter measures

UNIT - III

Sniffers, Session Hijacking and Denial of Service : Sniffers, Session Hijacking, Denial of Service and Distributed Denial of Service, Sniffing countermeasures.

SQL Injection: Attacking SQL Servers, Sniffing, Brute Forcing and finding Application Configuration Files, Input validation attacks. Preventive Measures. Web Application Threats, Web Application Hacking, Cross Site Scripting / XSS Flaws / Countermeasures Correct Web Application Set-up.

UNIT - IV

Web Server Hacking, Web Applications and Database Attacks: Web Server Hacking, Web Application Hacking, Database Hacking

Wireless Technologies, Mobile Security and Attacks : Wireless Technologies, Mobile Device Operation and Security, Wireless LANs.

IDS, Firewalls and Honeypots : Intrusion Detection Systems, Firewalls, Honeypots.

UNIT - V

Physical Security and Social Engineering: Physical Security, Social Engineering.

Cloud Computing and Botnets: Cloud Computing, Botnets.

Attacking other users: Reflected XSS Vulnerabilities, Stored XSS Vulnerabilities, DOM-Based XSS Vulnerabilities, HTTP Header Injection. Countermeasures to XSS.

REFERENCE BOOKS:

1. "Certified Ethical Hacker", Version 9, Second Edition, Michael Gregg, Pearson IT Certification
2. "Hacking the Hacker", Roger Grimes, Wiley
3. "The Unofficial Guide to Ethical Hacking", Ankit Fadia, Premier Press
4. "The Basics of Hacking and Penetration Testing", Patrick Engebretson, Elsevier, 2013.
5. "Network Security and Ethical Hacking", Rajat Khare, Luniver Press, 2006.

RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc19_cs68/preview
2. https://nptel.ac.in/courses/106/105/106105217/
3. https://www.coursera.org/courses?query=ethical%20hacking

WEB REFERENCE/E-BOOKS:

1. https://hackaday.com/
2. https://breakthesecurity.cysecurity.org/
3. https://www.eccouncil.org/programs/certified-ethical-hacker-ceh/
4. https://www.hackthissite.org/

B.TECH
FINAL YEAR
FIRST SEMESTER
SYLLABUS

COMPUTER AND NETWORK SECURITY
IV B.TECH., I SEMESTER

Course Title: COMPUTER AND NETWORK SECURITY	Course Code: AS20-05PC20
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: Basics of Network	

Course Overview:
After learning the course the students should be able to: Understand basics of system and network security, different encryption and decryption algorithm.

Course Objective

- Explain the objectives of information security
- Explain the importance and application of each of confidentiality, integrity, authentication and availability
- Understand various cryptographic algorithms.
- Understand the basic categories of threats to computers and networks
- Describe public ,key cryptosystem.
- Describe the enhancements made to IPv4 by IPSec
- Understand Intrusions and intrusion detection
- Discuss the fundamental ideas of public ,key cryptography.
- Generate and distribute a PGP key pair and use the PGP package to send an encrypted email message.
- Discuss Web security and Firewalls

Course Outcomes(s)

CO#	Course Outcomes
C411.1	Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.
C411.2	Ability to identify information system requirements for both of them such as client and server.
C411.3	Ability to understand the current legal issues towards information security.
C411.4	Understand on Symmetric key Ciphers and asymmetric key Ciphers
C411.5	Understand Various Encryption mechanisms for secure transmission of data and management of key required for required for encryption
C411.6	Understand authentication requirements and security mechanism applied for network transmission in email

COURSE CONTENT

UNIT - I

Security Concepts: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security

Cryptography Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, key range and key size, possible types of attacks.

UNIT - II

Symmetric key Ciphers: Block Cipher principles, DES, AES, Blowfish, RC5, IDEA, Block cipher operation, Stream ciphers, RC4.

Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Elgamal Cryptography, Diffie, Hellman Key Exchange, Knapsack Algorithm.

UNIT - III

Cryptographic Hash Functions: Message Authentication, Secure Hash Algorithm (SHA,512),

Message authentication codes: Authentication requirements, HMAC, CMAC, Digital signatures, Elgamal Digital Signature Scheme.

Key Management and Distribution: Symmetric Key Distribution Using Symmetric & Asymmetric Encryption, Distribution of Public Keys, Kerberos, X.509 Authentication Service, Public – Key Infrastructure

UNIT - IV

Transport,level Security: Web security considerations, Secure Socket Layer and Transport Layer Security, HTTPS, Secure Shell (SSH)

Wireless Network Security: Wireless Security, Mobile Device Security, IEEE 802.11 Wireless LAN, IEEE 802.11i Wireless LAN Security

UNIT - V

E,Mail Security: Pretty Good Privacy, S/MIME **IP Security:** IP Security overview, IP Security architecture, Authentication Header, Encapsulating security payload, Combining security associations, Internet Key Exchange

Case Studies on Cryptography and security: Secure Multiparty Calculation, Virtual Elections, Single sign On, Secure Inter, branch Payment Transactions, Cross site Scripting Vulnerability.

TEXT BOOKS:

1. Cryptography and Network Security , Principles and Practice: William Stallings, Pearson
Education, 6th Edition
2. Cryptography and Network Security: Atul Kahate, Mc Graw Hill, 3rd Edition

REFERENCES BOOKS:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.
2. Cryptography and Network Security: Forouzan Mukhopadhyay, Mc Graw Hill, 3rd Edition
3. Information Security, Principles, and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM. Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.swayam2.ac.in/cec21_cs04/preview
2. https://onlinecourses.nptel.ac.in/noc20_cs21/preview

WEB REFERENCE/E-BOOKS:

1. https://www.javatpoint.com/computer,network,security
2. https://www.tutorialspoint.com/network_security/index.htm

DATA MINING
IV B.TECH., I SEMESTER

Course Title: DATA MINING	Course Code: AS20-05PC21
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 Base Management System, Probability and Statistics	

Course Overview:
This course is an introductory course on data mining. This course discusses techniques for pre-processing data before mining and presents the concepts related to data warehousing, online analytical processing (OLAP), and data generalization. It presents methods for mining frequent patterns, associations, and correlations. It also presents methods for data classification and prediction, data, clustering approaches, and outlier analysis.

Course Objective
- Identify the key processes of data mining, data warehousing and knowledge discovery process.
- Understand the basic principles and algorithms used in practical data mining and their strengths and weaknesses.
- Apply data mining techniques to solve problems in other disciplines in a mathematical way.

Course Outcomes(s)

CO#	Course Outcomes
C412.1	Understand Data Warehouse fundamentals, Data Mining Principles.
C412.2	Design data warehouse with dimensional modelling and apply OLAP operations.
C412.3	Able to understand the various Data pre-processing techniques.
C412.4	Identify appropriate data mining algorithms to solve real world problems.
C412.5	Compare and evaluate different data mining techniques like classification, prediction, Data cube, clustering and association rule mining.
C412.6	Evaluate different outlier detection for Data Mining.

COURSE CONTENT

UNIT - I
Introduction: Why Data Mining, What Is Data Mining, What Kinds of Data Can Be Mined, What Kinds of Patterns Can Be Mined, Which Technologies Are Used, Which Kinds of Applications Are Targeted, Major Issues in Data Mining. Data Objects and Attribute Types, Basic Statistical Descriptions of Data, Data Visualization, Measuring Data Similarity and Dissimilarity.

UNIT - II

Data Pre-processing: Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization.

Data Warehousing and OLAP: Basic Concepts, Data Cube and OLAP, Data Warehouse Design and Usage, Data Warehouse Implementation, Data Generalization by Attribute, Oriented Induction.

UNIT - III

Data Cube Technology: Preliminary Concepts, Data Cube Computation Methods, Multidimensional Data Analysis in Cube Space.

Mining Frequent Patterns, Associations, and Correlations: Basic Concepts, Frequent Itemset Mining Methods, —Pattern Evaluation Methods, Pattern Mining in Multilevel, Multidimensional Space, Constraint, Based Frequent Pattern Mining, Mining High, Dimensional Data and Colossal Patterns, Mining Compressed or Approximate Patterns, Pattern Exploration and Application.

UNIT - IV

Classification: Basic Concepts, Decision Tree Induction, Bayes Classification Methods, Rule, Based Classification, Model Evaluation and Selection, Techniques to Improve Classification Accuracy, Bayesian Belief Networks, Classification by Backpropogation, Support Vector Machines, Classification Using Frequent Patterns, Lazy Learners, Other Classification Methods, Multiclass Classification, Semi, Supervised Classification, Active Learning, Transfer Learning.

UNIT - V

Cluster Analysis: Partitioning Methods, Hierarchical Methods, Density, Based Methods, Grid, Based Methods, Evaluation of Clustering, Probabilistic Model, Based Clustering, Clustering High, Dimensional Data, Clustering Graph and Network Data, Clustering with Constraints.

Outlier Detection: Outliers and Outlier Analysis, Outlier Detection Methods, Statistical Approaches, Proximity, Based Approaches, Clustering, Based Approaches, Classification, Based Approaches, Mining Contextual and Collective Outliers, Outlier Detection in High, Dimensional Data.

TEXT BOOKS:

1. Jiawei Han & Micheline Kamber and Jain Pei, Data Mining Concepts and Techniques, Third Edition (2011), India.
2. Pang,Ning Tan, "Introduction to Data Mining", Addison Wesley, 2006.

REFERENCES BOOKS:

1. Ville, "Decision Trees for Business Intelligence and Data Mining: Using SAS Enterpris e,Miner", SAS, 2006.
2. J. Han and M. Kamber, "Data Mining: Concepts and Techniques", Morgan Kaufman, 2001.
3. Tom Soukup, Davidson, "Visual Data Mining: Techniques and Tools for Data Visualization and Mining", 1/E, Wiley, 2002.

4. Alex Berson, Stephen J. Smith, "Data Warehousing, Data Mining, and OLAP", MGH, 1998.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.swayam2.ac.in/cec19_cs01/preview
2. https://onlinecourses.nptel.ac.in/noc20_cs12/preview
3. https://www.coursera.org/specializations/data,mining

WEB REFERENCE/E-BOOKS:

1. https://www.javatpoint.com/data,mining
2. https://www.tutorialspoint.com/data_mining/index.htm
3. https://www.tutorialride.com/data,mining/data,mining,tutorial.htm

MODERN SOFTWARE ENGINEERING
IV B.TECH., I SEMESTER

Course Title: MODERN SOFTWARE ENGINEERING	Course Code: AS20-05PC22
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:

Traditional software engineering methodologies are process oriented and take long project duration involving very large teams. Applications of a smaller scale does not require those methodologies and their development process becomes inefficient when traditional software engineering methodologies are used. To cater to such group of applications a more flexible optimized and faster software engineering methods are introduced. This subject deals with such approach mainly focusing on Agile approach using Extreme Programming and Scrum.

Course Objective

- To provide students with a theoretical as well as practical understanding of agile software development practices and how small teams can apply them to create high, quality software.
- To provide a good understanding of software design and a set of software technologies and APIs.
- To do a detailed examination and demonstration of Agile development and testing techniques.
- To understand the benefits and pitfalls of working in an Agile team.
- To understand Agile development and testing.

Course Outcomes(s)

CO#	Course Outcomes
C413.1	Realize the importance of interacting with business stakeholders in determining the requirements for a software system
C413.2	Perform iterative software development processes: how to plan them, how to execute them.
C413.3	Point out the impact of social aspects on software development success.
C413.4	Develop techniques and tools for improving team collaboration and software quality.
C413.5	Perform Software process improvement as an ongoing task for development teams.
C413.6	Show how agile approaches can be scaled up to the enterprise level.

COURSE CONTENT

UNIT - I

AGILE METHODOLOGY: Theories for Agile Management , Agile Software Development ,Traditional Model vs. Agile Model , Classification of Agile Methods ,Agile Manifesto and Principles ,Agile Project Management , Agile Team Interactions, Ethics in Agile Teams , **Agility in Design, Testing** :Agile Documentations , Agile Drivers, Capabilities and Values

UNIT - II

AGILE PROCESSES: Lean Production , SCRUM, Crystal, Feature Driven Development, Adaptive Software Development , Extreme Programming: Method Overview, Lifecycle, Work Products, Roles and Practices.

UNIT - III

AGILITY AND KNOWLEDGE MANAGEMENT: Agile Information Systems, Agile Decision Making , Earl_S Schools of KM, Institutional Knowledge Evolution Cycle, Development, Acquisition, Refinement, Distribution, Deployment , Leveraging, KM in Software Engineering, Managing Software Knowledge, Challenges of Migrating to Agile Methodologies, Agile Knowledge Sharing, Role of Story,Cards, Story,Card Maturity Model (SMM).

UNIT - IV

AGILITY AND REQUIREMENTS ENGINEERING: Impact of Agile Processes in RE– Current Agile Practices, Variance, Overview of RE Using Agile, Managing Unstable Requirements, Requirements Elicitation, Agile Requirements Abstraction Model, Requirements Management in Agile Environment, Agile Requirements Prioritization – Agile Requirements Modeling and Generation, Concurrency in Agile Requirements Generation.

UNIT - V

AGILITY AND QUALITY ASSURANCE: Agile Product Development, Agile Metrics, Feature Driven Development (FDD), Financial and Production Metrics in FDD, Agile Approach to Quality Assurance , Test Driven Development, Agile Approach in Global Software Development.

TEXT BOOKS:

1. David J. Anderson and Eli Schragenheim, —"Agile Management for Software Engineering: Applying the Theory of Constraints for Business Results", Prentice Hall, 2003.
2. Hazza and Dubinsky, —"Agile Software Engineering, Series: Undergraduate Topics in Computer Science", Springer, 2009.

REFERENCES BOOKS:

1. Craig Larman, —Agile and Iterative Development: A Manager_s Guide‖, Addison,Wesley, 2004.
2. Kevin C. Desouza, —Agile Information Systems: Conceptualization, Construction, and Management‖, Butterworth,Heinemann, 2007.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://nptel.ac.in/courses/106/105/106105182/
2. https://nptel.ac.in/courses/106/105/106105087/
3. https://www.coursera.org/learn/agile,software,development

WEB REFERENCE/E-BOOKS:

1. https://arxiv.org/pdf/1709.08439.pdf
2. http://agilehandbook.com/agile,handbook.pdf

SOFTWARE PROCESS AND PROJECT MANAGEMENT
IV B.TECH., I SEMESTER
PROFESSIONAL ELECTIVE - III

Course Title: SOFTWARE PROCESS AND PROJECT MANAGEMENT	Course Code: AS20-05PE31
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: Software Engineering	

Course Overview:
This course is aimed at introducing the primary important concepts of project management related to managing software development projects. They will also get familiar with the different activities involved in Software Project Management. Further, they will also come to know how to successfully plan and implement a software project management activity, and to complete a specific project in time with the available budget.

Course Objective

- To understand the Software Project Planning and Evaluation techniques.
- To plan and manage projects at each stage of the software development life cycle (SDLC).
- To learn about the activity planning and risk management principles.
- To manage software projects and control software deliverables.
- To develop skills to manage the various phases involved in project management and people management.
- To deliver successful software projects that support organization‘s strategic goals.

Course Outcomes(s)

CO#	Course Outcomes
C414.1	Understand Project Management principles while developing software.
C414.2	Gain extensive knowledge about the basic project management concepts, framework and the process models.
C414.3	Obtain adequate knowledge about software process models and software effort estimation techniques.
C414.4	Estimate the risks involved in various project activities.
C414.5	Define the checkpoints, project reporting structure, project progress and tracking mechanisms using project management principles.
C414.6	Learn staff selection process and the issues related to people management.

COURSE CONTENT

UNIT - I

PROJECT EVALUATION AND PROJECT PLANNING: Importance of Software Project Management, Activities, Methodologies, Categorization of Software Projects, Setting Objectives, Management Principles, Management Control, Project portfolio Management:

Cost, benefit evaluation technology, Risk evaluation, Strategic program Management, Stepwise Project Planning.

UNIT - II

PROJECT LIFE CYCLE AND EFFORT ESTIMATION: Software process and Process Models , Choice of Process models , Rapid Application development ,Agile methods , Dynamic System Development Method, Extreme Programming, Managing interactive processes, Basics of Software estimation , Effort and Cost estimation techniques , COSMIC Full function points , COCOMO II , a Parametric Productivity Mode.

UNIT - III

ACTIVITY PLANNING AND RISK MANAGEMENT: Objectives of Activity planning , Project schedules, Activities, Sequencing and scheduling, Network Planning models, Formulating Network Model, Forward Pass & Backward Pass techniques ,Critical path (CRM) method , Risk identification , Assessment , Risk Planning ,Risk Management , PERT technique ,Monte Carlo simulation , Resource Allocation , Creation of critical paths , Cost schedules.

UNIT - IV

PROJECT MANAGEMENT AND CONTROL: Framework for Management and control , Collection of data, Visualizing progress, Cost monitoring, Earned Value Analysis ,Prioritizing Monitoring, Project tracking, Change control, Software Configuration Management, Managing contracts, Contract Management.

UNIT – V

STAFFING IN SOFTWARE PROJECTS: Managing people, Organizational behavior ,Best methods of staff selection, Motivation ,The Oldham , Hackman job characteristic model ,Stress, Health and Safety, Ethical and Professional concerns , Working in teams ,Decision making , Organizational structures, Dispersed and Virtual teams, Communications genres , Communication plans , Leadership.

TEXT BOOKS:

1. Bob Hughes, Mike Cotterell and Rajib Mall: Software Project Management – Fifth Edition, Tata McGraw Hill, New Delhi, 2012.

REFERENCES BOOKS:

1. Robert K. Wysocki ―Effective Software Project Management‖ – Wiley Publication, 2011. 2. Walker Royce: ―Software Project Management‖, Addison,Wesley, 1998.
3. Gopalaswamy Ramesh, ―Managing Global Software Projects‖ – McGraw Hill Education (India), Fourteenth Reprint 2013.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://nptel.ac.in/courses/106/105/106105218/

WEB REFERENCE/E-BOOKS

1. https://london.ac.uk/sites/default/files/study,guides/software,engineering,project,management.pdf
2. https://bin95.com/software,engineering,poject,sample.pdf

SOFT COMPUTING
IV B.TECH., I SEMESTER
PROFESSIONAL ELECTIVE - III

Course Title: SOFT COMPUTING	Course Code: AS20-05PE32
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:

The main objective of the Soft Computing Techniques to Improve Data Analysis Solutions is to strengthen the dialogue between the statistics and soft computing research communities in order to cross, pollinate both fields and generate mutual improvement activities. Soft Computing is a consortia of methodologies which collectively provide a body of concepts and techniques for designing intelligent systems.

Course Objective.

- Familiarize with soft computing concepts
- Introduce and use the idea of fuzzy logic and use of heuristics based on human experience
- Familiarize the Neuro,Fuzzy modeling using Classification and Clustering techniques
- Learn the concepts of Genetic algorithm and its applications
- Acquire the knowledge of Rough Sets.

Course Outcomes(s)

CO#	Course Outcomes
C414.1	Identify the difference between Conventional Artificial Intelligence to Computational Intelligence.
C414.2	Understand fuzzy logic and reasoning to handle and solve engineering problems
C414.3	Apply the Classification and clustering techniques on various applications
C414.4	Understand the advanced neural networks and its applications
C414.5	Perform various operations of genetic algorithms, Rough Sets.
C414.6	Comprehend various techniques to build model for various applications

COURSE CONTENT

UNIT - I

Introduction to Soft Computing: Evolutionary Computing, "Soft" computing versus "Hard" computing, Soft Computing Methods, Recent Trends in Soft Computing, Characteristics of Soft computing, Applications of Soft Computing Techniques.

UNIT - II
Fuzzy Systems: Fuzzy Sets, Fuzzy Relations, Fuzzy Logic, Fuzzy Rule, Based Systems

UNIT - III
Fuzzy Decision Making: Fuzzy Decision Making, Particle Swarm Optimization

UNIT - IV
Genetic Algorithms: Basic Concepts, Basic Operators for Genetic Algorithms, Crossover and Mutation Properties, Genetic Algorithm Cycle, Fitness Function, Applications of Genetic Algorithm.

UNIT - V
Rough Sets: Rough Sets, Rule Induction, and Discernibility Matrix, Integration of Soft Computing Techniques.

TEXT BOOKS:

1. Soft Computing – Advances and Applications , Jan 2015 by B.K. Tripathy and J. Anuradha –
   Cengage Learning

REFERENCES BOOKS:

1. S. N. Sivanandam & S. N. Deepa, "Principles of Soft Computing", 2nd edition, Wiley India, 2008.
2. David E. Goldberg, "Genetic Algorithms,In Search, optimization and Machine learning",
Pearson Education.
3. J. S. R. Jang, C.T. Sun and E.Mizutani, "Neuro,Fuzzy and Soft Computing", Pearson Education, 2004.
4. G.J. Klir & B. Yuan, "Fuzzy Sets & Fuzzy Logic", PHI, 1995.
5. Melanie Mitchell, "An Introduction to Genetic Algorithm", PHI, 1998.
6. Timothy J. Ross, "Fuzzy Logic with Engineering Applications", McGraw, Hill International editions, 1995

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):
1. https://onlinecourses.nptel.ac.in/noc20_cs17/preview

WEB REFERENCE/E-BOOKS
2. https://www.javatpoint.com/what,is,soft,computing

CLOUD COMPUTING
IV B.TECH., I SEMESTER
PROFESSIONAL ELECTIVE - III

Course Title: CLOUD COMPUTING	Course Code: AS20-05PE33
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 introduces the core concepts of cloud computing. The students can gain the foundational knowledge required for understanding cloud computing from a business perspective as also for becoming a cloud practitioner. The student will also learn about the various cloud service models (IaaS, PaaS, SaaS) and deployment models and the key components of a cloud infrastructure.

Course Objective

- To explain the evolving computer model called cloud computing.
- To introduce the various levels of services that can be achieved by cloud.
- To describe the security aspects in cloud.

Course Outcomes(s)

CO#	Course Outcomes
C414.1	Understand virtualization over clouding computing
C414.2	Design applications for Cloud environment
C414.3	Analyze the various foundation of cloud computing
C414.4	Understand various services of cloud computing
C414.5	Understand the Monitoring, Management and Applications of cloud computing
C414.6	Analysis the level of governance under cloud computing

COURSE CONTENT

UNIT- I

Systems Modelling, Clustering and Virtualization: Distributed System Models and Enabling Technologies, Computer Clusters for Scalable Parallel Computing, Virtual Machines and Virtualization of Clusters and Data centers.

UNIT - II

Foundations: Introduction to Cloud Computing, Migrating into a Cloud, Enriching the 'Integration as a Service' Paradigm for the Cloud Era, The Enterprise Cloud Computing Paradigm.

UNIT - III

Infrastructure as a Service (IAAS) & Platform and Software as a Service (PAAS/ SAAS): Virtual machines provisioning and Migration services, On the Management of Virtual machines for Cloud Infrastructures, Enhancing Cloud Computing Environments

using a cluster as a Service, Secure Distributed Data Storage in Cloud Computing. Aneka, Comet Cloud, Workflow Engine for Clouds, Understanding Scientific Applications for Cloud Environments.

UNIT - IV

Monitoring, Management and Applications: An Architecture for Federated Cloud Computing, SLA Management in Cloud Computing, Performance Prediction for HPC on Clouds, Best Practices in Architecting Cloud Applications in the AWS cloud, Building Content Delivery networks using Clouds, Resource Cloud Mashups.

UNIT - V

Governance and Case Studies: Organizational Readiness and Change management in the Cloud age, Data Security in the Cloud, Legal Issues in Cloud computing, Achieving Production Readiness for Cloud Services.

TEXT BOOKS

1. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, 2011, Wiley.
2. Distributed and Cloud Computing. Kai Hwang, Geoffery C.Fox, Jack .I.Dongarra, 2012, Elsevier.

REFERENCES

1. Cloud Computing : A Practical Approach, Anthony T.Velte, Toby J.Velte, Robert Elsenpeter, Tata McGraw Hill, rp2011.
2. Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press, 2010.
3. Cloud Computing: Implementation, Management and Security, John W. Rittinghouse, James F.Ransome, CRC Press, rp2012.
4. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese, O'Reilly, SPD, rp2011.
5. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp2011.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc17_cs23/preview
2. https://www.coursera.org/specializations/cloud,computing

WEB REFERENCE/E-BOOKS:

1. https://www.tutorialspoint.com/cloud_computing/index.htm
2. https://www.guru99.com/cloud,computing,for,beginners.html

INTERNET OF THINGS
IV B.TECH., I SEMESTER
PROFESSIONAL ELECTIVE - III

Course Title: INTERNET OF THINGS	Course Code: AS20-05PE34
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: Electronic Devices and Circuits	

Course Overview:
This course is paced to understand IoT concepts, methodologies, and protocols used for communication. This includes next, generation, IoT, friendly applications, physical, layer protocols, and widely accepted IoT frameworks and standards. The program covers popular, service, rich cloud platforms and focuses on how to build and deploy IoT solutions. Practical use, cases and case studies are included to ensure that the participant develops an ability to work through real, life scenarios.

Course Objective
- To apprise students with basic knowledge of IoT that paves a platform to understand physical, logical design and business models
- To teach a student how to analyze requirements of various communication models and protocols for cost, effective design of IoT applications on different IoT platforms.
- To explain the students how to code for an IoT application and deploy for real, time scenario.

Course Outcomes(s)

CO#	Course Outcomes
C414.1	Describe various layers of IoT protocol stack and describe protocol functionalities.
C414.2	Evaluate efficiency trade, offs among alternative communication models for an efficient IoT application design.
C414.3	Comprehend advanced IoT applications and technologies from the basics of IoT.
C414.4	Understand working principles of various sensor for different IoT platforms.
C414.5	Estimate the cost of hardware and software for low cost design IoT applications. Compare various application business models of different domains.
C414.6	Solve real, time problems and demonstrate IoT applications in various domains using prototype models.

COURSE CONTENT

UNIT - I

Introduction To Internet of Things: Definition & Characteristics of IoT, Challenges and Issues , Physical Design of IoT, Logical Design of IoT , IoT Functional Blocks, Security.

UNIT - II

Components In Internet of Things: Control Units Communication modules Bluetooth Zigbee Wifi GPS, IOT Protocols (IPv6, 6LoWPAN, RPL, CoAP etc), MQTT, Wired Communication, Power Sources.

UNIT - III

Technologies Behind IoT: Four pillars of IOT paradigm, , RFID, Wireless Sensor Networks, SCADA (Supervisory Control and Data Acquisition), M2M , IOT Enabling Technologies , Bigdata Analytics, Cloud Computing, Embedded Systems.

Resource Management in IoT: Clustering, Clustering for Scalability, Clustering Protocols for IOT.

UNIT - IV

Programming The Microcontroller For IoT: Working principles of sensors IOT deployment for Raspberry Pi /Arduino /Equivalent platform Reading from Sensors, Communication: Connecting microcontroller with mobile devices, communication through Bluetooth, wifi and USB , Contiki OS, Cooja Simulator.

UNIT - V

From The Internet Of Things To The Web Of Things: The Future Web of Things Set up cloud environment Cloud access from sensors Data Analytics for IOT, Case studies, Open Source e,Health sensor platform Be Close Elderly monitoring Other recent projects.

IoT Applications: Business models for the internet of things, Smart city, smart mobility and transport, smart buildings and infrastructure, smart health, environment monitoring and surveillance.

TEXT BOOKS:

1. Dieter Uckelmann et.al, Architecting the Internet of Things, Springer, 2011
2. Arshdeep Bahga and Vijay Madisetti, 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

ADHOC SENSOR NETWORKS
IV B.TECH., I SEMESTER
PROFESSIONAL ELECTIVE - III

Course Title: AD HOC SENSOR NETWORKS	Course Code: AS20-05PE35
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 Networks, Mobile Computing	

Course Objective

- To understand the concepts of sensor networks
- To understand the MAC and transport protocols for ad hoc networks
- To understand the security of sensor networks
- To understand the applications of adhoc and sensor networks

Course Outcomes(s)

CO#	Course Outcomes
C414.1	Ability to understand the state of the art research in the emerging subject of Ad Hoc and Wireless Sensor Networks
C414.2	Ability to solve the issues in real-time application development based on ASN.
C414.3	Ability to conduct further research in the domain of ASN
C414.4	Understand various Geocasting algorithm in ASN
C414.5	Understand the Basics of Wireless, Sensors and Lower Layer Issues
C414.6	Understand various Upper Layer Issues of WSN

COURSE CONTENT

UNIT - I

Introduction to Ad Hoc Networks: Characteristics of MANETs, Applications of MANETs and Challenges of MANETs.

Routing in MANETs , Criteria for classification, Taxonomy of MANET routing algorithms, Topology based routing algorithms, Proactive: DSDV; Reactive: DSR, AODV, Hybrid: ZRP,Position,based routing algorithms, Location Services, DREAM, Quorum, based; Forwarding Strategies: Greedy Packet, Restricted Directional Flooding, DREAM, LAR.

UNIT - II

Data Transmission: Broadcast Storm Problem, Rebroadcasting Schemes, Simple, flooding,

Probability, based Methods, Area, based Methods, Neighbour Knowledge, based: SBA, Multipoint Relaying, AHBP. Multicasting: Tree, based: AMRIS, MAODV; Mesh based, ODMRP, CAMP; Hybrid: AMRoute, MCEDAR.

UNIT - III

Geocasting: Data, transmission Oriented, LBM, Route Creation Oriented, GeoTORA, MGR**.**

TCP over Ad Hoc TCP protocol overview, TCP and MANETs, Solutions for TCP over Ad hoc

UNIT - IV

Basics of Wireless, Sensors and Lower Layer Issues: Applications, Classification of sensor networks, Architecture of sensor network, Physical layer, MAC layer, Link layer, Routing Layer.

UNIT - V

Upper Layer Issues of WSN: Transport layer, High, level application layer support, Adapting to the inherent dynamic nature of WSNs, Sensor Networks and mobile robots.

TEXT BOOKS:

1. Ad Hoc and Sensor Networks – Theory and Applications, Carlos Corderio Dharma P. Aggarwal, World Scientific Publications, March 2006, ISBN – 981–256–681–3.
2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science, ISBN – 978,1,55860,914,3 (Morgan Kauffman).

REFERENCES BOOKS:

1. World Scientific Publications / Cambridge University Press, March 2006
2. Wireless Sensor Networks – Principles and Practice, Fei Hu, Xiaojun Cao, An Auerbach book, CRC Press, Taylor & Francis Group, 2010

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://nptel.ac.in/courses/106/105/106105160/

WEB REFERENCE/E-BOOKS:

1. https://www.tutorialspoint.com/what,is,ad,hoc,network
2. https://www.javatpoint.com/mobile,adhoc,network

ADVANCED COMPUTER ARCHITECTURE
IV B.TECH., I SEMESTER
OPEN ELECTIVE III (MOOCS)

Course Title: ADVANCED COMPUTER ARCHITECTURE	Course Code: AS20-05OE31
Teaching Scheme (L:T:P): 3:0:0	Credits: 3
Type of Course: Lecture + Assignment	Total Contact Periods: 48 Hours
Continuous Internal Evaluation: 30 Marks	Semester End Exams: 70 Marks
Prerequisites: Computer Organization	

Course Overview:
Applications and handheld devices play a major role in ensuring comfort in our day, today life. These applications run on handheld ele5ctronic gadgets with high, end microprocessor support. Modern CPU designers handle challenges imposed by these applications with cost effective architectural enhancements. This course provides a deeper insight into the design of high, end microprocessors that will support the future applications.

Course Objective
- Understand the Concept of Parallel Processing and its applications.
- Implement the Hardware for Arithmetic Operations.
- Analyze the performance of different scalar Computers.
- Develop the Pipelining Concept for a given set of Instructions.
- Distinguish the performance of pipelining and non-pipelining environment in a processor.

Course Outcomes(s)

CO#	Course Outcomes
C415.1	Understand the Concept of Parallel Processing and its applications
C415.2	Implement the Hardware for Arithmetic Operations
C415.3	Understand the concept of parallel computer models
C415.4	Analyze the performance of different scalar Computers
C415.5	Develop the Pipelining Concept for a given set of Instructions
C415.6	Distinguish the performance of pipelining and non-pipelining environment in a processor

COURSE CONTENT

UNIT - I

Pipeline and vector processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline, Vector Processing, Array Processors.

UNIT - II

Computer Arithmetic: Addition and Subtraction, Hardware Implementation, Multiplication Algorithms and Hardware Implementation, Division Algorithms and Hardware Implementation, Floating Point Arithmetic Operations.

UNIT - III

Parallel Computer Models: Evolution of Computer Architecture, System Attributes to Performance, Shared Memory Multiprocessors, Distributed Memory Multicomputer, Vector Super Computers, SIMD Super Computers.

UNIT - IV

Processors and Memory Hierarchy : Advanced Processor Technology: Design Space of Processors, Instruction, Set Architectures, CISC scalar Processors, RISC scalar Processors, Super Scalar and Vector Processors: Superscalar Processors.

UNIT - V

Pipelining and Superscalar Techniques : Linear Pipeline Processors: Asynchronous and Synchronous models, Clocking and Timing Control, Speedup, Efficiency and Throughput, Pipeline Schedule Optimization, Instruction Pipeline Design: Instruction Execution Phases, Mechanisms for Instruction Pipelining, Dynamic Instruction Scheduling, Branch Handling Techniques.

TEXT BOOKS:

1. Computer System Architecture, Morris M. Mano, 3rd edition, Pearson/Prentice Hall India. 2. Advanced Computer Architecture, Kai Hwang, McGraw,Hill, India.

REFERENCES BOOKS:

1. Computer Organization and Achitecture, William Stallings ,8th edition,PHI
2. Computer Organization, Carl Hamachar, Vranesic,Zaky, 5th edition, McGraw Hill

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc19_cs62/preview
2. https://onlinecourses.nptel.ac.in/noc21_cs47/preview
3. https://nptel.ac.in/courses/106/103/106103206/

WEB REFERENCE/E-BOOKS:

1. https://freevideolectures.com/course/4089/nptel,advanced,computer,architecture
2. https://www.javatpoint.com/computer,organization,and,architecture,tutorial
3. https://www.studytonight.com/computer,architecture/
4. https://www.youtube.com/playlist?list=PLwdnzlV3ogoWJhBxBYu,K4l,q,nNHd24D

PHP and MySQL
IV B.TECH., I SEMESTER
OPEN ELECTIVE III (MOOCS)

Course Title: PHP and MySQL	Course Code: AS20-05OE32
Teaching Scheme (L:T:P):3:0:0	Credits: 3
Type of Course: Lecture + Assignment	Total Contact Periods: 48 Hours
Continuous Internal Evaluation:30 Marks	Semester End Exams:70 Marks
Prerequisites: HTML, C, Database Management System	

Course Overview:

PHP is a powerful tool for making dynamic and interactive database driven web pages. PHP is the widely, used as efficient open source technology. The students of engineering in Computer Science and Engineering web developers would be able to write dynamic interactive web based applications such as for online banking, ticket/hotels booking sites, Ecommerce using PHP and MYSQL database. After mastering this course they may work as self, employed web page developer.

Course Objective

- Understand the Concept of PHP and MySQL.
- Apply Built-in and Create User defined functions in PHP.
- Design and develop a Web site using form controls for presenting web based content.
- Debug the Programmes by applying error handling techniques of PHP.
- Create dynamic Web based Applications, using PHP, MySQL database.

Course Outcomes(s)

CO#	Course Outcomes
C415.1	Create small programs using basic PHP concepts
C415.2	Apply In,Built and Create User defined functions in PHP programming
C415.3	Design and develop a Web site using form controls with Object oriented concept for presenting web based content
C415.4	Debug the Programmes by applying concepts and error handling techniques of PHP
C415.5	Create dynamic Website/ Web based Applications, using PHP, MySQL database
C415.6	Understand and Apply the Advanced PHP programming for modern web application development.

COURSE CONTENT

UNIT - I

Introduction to PHP: Configuration of PHP, Apache Web Server, MySQL and Open Source, Relationship between Apache, MySQL and PHP(AMP Module), Installing PHP for (Windows, Wamp server , XAMP server), PHP Structure and Syntax, Creating PHP pages, Rules of PHP syntax, Integrating HTML with PHP, Constants , Variables: Static and Global Variable, Conditional Structure and Looping, PHP operators, Arrays, constructs, User Defined function, argument function, variable function, Return function, default argument, variable length argument.

UNIT - II

Working with In Built Functions: Variable Function, string function, MATH functions, Date function, Array Function, File function.

Working with data and forms: Reading data using Form Controls, Submitting form values, using $_Get and $_Post Methods, $_REQUEST, Accessing form inputs with Get/Post functions, Combining HTML and PHP codes together on single page, Redirecting the user.

UNIT - III

Session, Cookies and Error Handling: Setting a cookie with PHP, Deleting a cookie, Creating session cookie, Working with the query string Creating query string, Session, Starting and Destroying session, Working with session variables , Passing session IDs, Error Types in PHP, Exception Handling in PHP.

Object, Oriented PHP: Understanding Object, Oriented Concepts, Creating Classes, Attributes, and Operations in PHP, Instantiating Classes, Using Class Attributes, Controlling Access with private and public, calling Class Operations, Implementing Inheritance in PHP, Designing Classes, Writing the Code for your Class, Understanding Advanced and New Object Oriented Functionality in PHP.

UNIT - IV

Database Connectivity using MYSQL: Concepts and Installation of MySQL, MySQL structure and syntax, Types of MySQL tables and Storage engines, MySQL commands, Integration of PHP with MySQL, Connection to the MySQL Database, Creating and Deleting MySQL database using PHP, Updating, Inserting, Deleting records in the MySQL database, Using functions, Performing Joins, Grouping Selected Results, Creating Indexes, Views, Using Different Table Types, Performing FULLTEXT Searches, Performing Transactions.

UNIT - V

ADVANCED PHP PROGRAMMING: PHP and Web Forms, Files, PHP Authentication and Methodologies ,Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World, Hosting Website (Using 'C' panel, Using Filezilla Software)

TEXT BOOKS:

1. W. Jason Gilmore, Beginning PHP and MySQL, 4th Edition Apress, 2010
2. Robin Nixon, Learning PHP, MySQL, JavaScript, CSS & HTML5, Third Edition O'reilly Media, 2014
3. Larry Ullman , PHP 6 and MySQL 5 for Dynamic Web Sites_ Visual QuickPro Guide (2007, Peachpit Press)
4. Luke Welling and Laura Thomson, PHP and My SQL Web Development, Sams publication, Third Edition.

REFERENCES BOOKS:

1. Michael K. Glass, Yann Le Scouarnec, Elizabeth Naramore, Gary Mailer, Jeremy Stolz, Jason Gerner , Beginning PHP, Apache, MySQL web development (2004, Wiley)
2. Jay Greenspan, Brad Bulger , MySQL_PHP Database Applications (2001, M&T Books)
3. Steven Holzner, PHP: The Complete Reference, McGraw,Hill, 2008
4. Julie C. Meloni, Teach yourself PHP, MySQL and Apache All in One, 5th Edition, Pearson Education, 2012

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.swayam2.ac.in/aic20_sp32/preview
2. https://nptel.ac.in/courses/106/106/106106093/
3. https://www.coursera.org/lecture/web,applications,php/php,basics,UhOlH

WEB REFERENCE/E-BOOKS:

1. http://www.nptelvideos.com/php/php_video_tutorials.php
2. https://www.w3schools.com/php/php_mysql_intro.asp
3. https://www.tutorialspoint.com/php/php_and_mysql.htm
4. https://www.mysqltutorial.org/php,mysql/

MODERN APPLICATION DEVELOPMENT
IV B.TECH., I SEMESTER
OPEN ELECTIVE III (MOOCS)

Course Title: MODERN APPLICATION DEVELOPMENT	Course Code: AS20-05OE33
Teaching Scheme (L:T:P):3:0:0	Credits:3
Type of Course: Lecture + Assignment	Total Contact Periods: 48 Hours
Continuous Internal Evaluation:30 Marks	Semester End Exams:70 Marks
Prerequisites: Operating System, Data Base Management System, Web Application	

Course Overview:
This course will cover the ideas like user interfaces, data storage, and front-end vs backend distinctions get reformulated in the new web aware distributed context. The student are able to discover how the assumption of multiple users via multiple access points adds new concerns such as identity management and security, and learn techniques for addressing them. At the end of this course the student are able to build a basic distributed web app and analyse constituent elements of the web and mobile applications that were used daily.

Course Objective
- Understand Android applications work, Life cycle, Manifest, Intents, and using external resources
- Demonstrate Activities, Layouts, Views, Widgets, Menus and Notifications
- Identify communication abilities including SMS, the telephony APIs, and network management with Data Storage
- Design and develop innovative applications with enhanced features.

Course Outcomes(s)

CO#	Course Outcomes
C415.1	Understand Android applications work, Life cycle, Manifest, Intents, and using external resources
C415.2	Demonstrate Activities, Layouts, Views, Widgets, Menus and Notifications
C415.3	Identify communication abilities including SMS, the telephony APIs, and network management with Data Storage
C415.4	Understand and Apply Geofencing tools to study the device location.
C415.5	Understand tools to measure PWA and its features
C415.6	Discuss on various PWA features with its level enhancement schemas.

COURSE CONTENT

UNIT - I

Activities: Declaring an activity, Starting a new activity with an intent object, Switching between activities, Passing data to another activity, Returning a result from an activity, Understanding the activity life cycle

Views, Widgets, and Styles: Inserting a widget into a layout, using graphics to show button state, Creating a widget at runtime

UNIT - II

Menus and Action Mode: Creating and using a Fragment, Adding and removing Fragments during runtime, passing data between Fragments

Alerts and Notifications: Creating a Toast with a custom layout, displaying a message box with AlertDialog, Displaying a progress dialog.

UNIT - III

Data Storage: Storing simple data, Read and write a text file to internal storage and external storage, Creating and using a SQLite database

Location and Using Geofencing: How to get the device location, Creating and monitoring a Geofence.

UNIT - IV

Introduction to PWAs and Tooling: Introduction to Progressive Web Apps, Tools to Measure Progressive Web Apps

PWA Features: Service Workers, Caching and Offline Functionality with Service Workers, Background Sync for Offline Apps with Service Workers.

UNIT - V

PWA Features: Adding your App to the Home Screen with Web App Manifest, Notifications, App Shell Architecture and Loading Performance, Exploring HTTP/2 and Server Push

Putting the Features to Use: Turning a Real App into a PWA, PWAs from the Start.

Levelling Up Your PWA: Levelling Up Your PWA.

TEXT BOOKS:

1 Rick Boyer, Android 9 Development Cook book, 3rd Edition, 2018, Packt Publishing.
2 Dennis Sheppard, Beginning Progressive Web App Development: Creating a Native App Experience on the Web, 2017, Apress Publishing.
3 Mahesh Panhale, Beginning Hybrid Mobile Application Development, 2016, Apres publishing.
4 Wei,Meng Lee, Beginning Android Application Development, 2011, Wiley Publishing.

REFERENCES BOOKS:

1. Scott Guthery, Mary Cronin, Mobile application development with SMS and the SIM toolkit, McGraw,Hill Education.
2. Jeff McWherter, Scott Gowell, Professional Mobile Application Development [1 ed.], Wrox Publishing.
3. Leon Shklar, Richard Rosen, Web Application Architecture: Principles, Protocols and Practices [2nd ed.], Wiley Publishing.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc20_cs52/preview
2. https://nptel.ac.in/courses/106/106/106106156/
3. https://www.coursera.org/learn/web,app

WEB REFERENCE/E-BOOKS:

1. https://www.tutorialspoint.com/mobile_development_tutorials.htm
2. https://www.geeksforgeeks.org/welcome,to,the,modern,android,app,development/

FOUNDATIONS OF CRYPTOGRAPHY
IV B.TECH., I SEMESTER
OPEN ELECTIVE III (MOOCS)

Course Title: FOUNDATIONS OF CRYPTOGRAPHY	Course Code: AS20-05OE34
Teaching Scheme (L:T:P):3:0:0	Credits:3
Type of Course: Lecture + Assignment	Total Contact Periods: 48 Hours
Continuous Internal Evaluation:30 Marks	Semester End Exams:70 Marks
Prerequisites: General knowledge of programming. Background in combinatory and discrete mathematics.	

Course Overview:

Cryptography is becoming increasingly important to enhance security in connection with data storage and communication and various kinds of electronic transactions.

Course Objective

- Build a solid mathematical basis to understand foundations of cryptography.
- Formally understand an overview of basic cryptographic concepts and methods.
- To know about various encryption techniques.
- To understand the concept of Public key cryptography.
- To study about message authentication and hash functions

Course Outcomes(s)

CO#	Course Outcomes
C415.1	Understand the fundamental concept of security and various Classical Encryption Techniques.
C415.2	Classify the symmetric and asymmetric encryption techniques.
C415.3	Understand the logic and methods behind the major proofs in Number Theory.
C415.4	Illustrate various Public key cryptographic techniques.
C415.5	Evaluate the authentication and hash algorithms.
C415.6	Discuss on various Digital Signatures and authentication protocols along with its applications.

COURSE CONTENT

UNIT - I

Introduction: The OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms, A Model for Network Security.

Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines, Steganography.

UNIT - II

Symmetric key Ciphers: Block Cipher principles, DES, AES, Blowfish, RC5, IDEA, Block cipher operation, Stream ciphers, RC4.

Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Elgamal
Cryptography, Diffie,Hellman Key Exchange, Knapsack Algorithm.

UNIT - III

Introduction to Number Theory: Prime Numbers, Fermat's and Euler's Theorems, Testing for Primality, The Chinese Remainder Theorem, Discrete Logarithm.

Public key and RSA: Principles of Public –Key Cryptosystems, the RSA algorithm.

Key Management: Key Management, Diffie- Hellman Key Exchange, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.

UNIT - IV

Message Authentication and Hash function: Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security Hash Functions, and
MACs.

Hash Algorithms: Secure Hash Algorithm, HMAC, CMAC.

UNIT - V

Digital Signatures and authentication protocols: Digital Signatures, Authentication Protocols, Digital Signature Standard, Elgamal Digital Signature Scheme.

Authentication Application: Symmetric Key Distribution Using Symmetric & Asymmetric
Encryption, Distribution of Public Keys, Kerberos, X- 509 Authentication Service.

TEXT BOOKS:

1. William Stallings "CRYPTOGRAPHY AND NETWORK SECURITY" 6th Edition, (Pearson Education/PHI).
2. Neal Koblitz, Number theory and cryptography, Springer, 2007.
3. Hans Delfs, Helmut Knebl, Introduction to Cryptography: Principles and Applications, Springer, 2002.
4. Alfred J. Menezes, Paul C. van Oorschot, Scott A. Vanstone, Handbook of Applied Cryptography, CRC Press, 1996.

REFERENCES BOOKS:

1. Forouzan Mukhopadhyay, Cryptography and Network Security, McGraw Hill, 3rd Edition

2. Kaufman, Perlman, Speciner, “NETWORK SECURITY”, 2nd Edition, (PHI / Eastern Economy Edition)
3. Trappe & Washington, “Introduction to Cryptography with Coding Theory”, 2/e, Pearson.
4. Rudolf Lidl, Herald Niederreiter, Introduction to Finite Fields and their Applications, Cambridge University Press, 1994.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc20_cs02/preview
2. https://onlinecourses.nptel.ac.in/noc20_cs21/preview
3. https://www.coursera.org/learn/crypto

WEB REFERENCE/E-BOOKS:

1. https://www.tutorialspoint.com/cryptography/index.htm
2. https://www.guru99.com/how,to,make,your,data,safe,using,cryptography.html
3. https://www.geeksforgeeks.org/cryptography,introduction/

COMPUTER AND NETWORK SECURITY LAB
IV B.TECH., I SEMESTER

Course Title: COMPUTER AND NETWORK SECURITY LAB	Course Code: AS20-05PC23
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:
After learning the course the students should be able to understand basics of system and network security, different encryption and decryption algorithm.

Course Objective

- Explain the objectives of information security
- Explain the importance and application of each of confidentiality, integrity, authentication and availability
- Understand various cryptographic algorithms.
- Understand the basic categories of threats to computers and networks
- Describe public,key cryptosystem.
- Describe the enhancements made to IPv4 by IPSec
- Understand Intrusions and intrusion detection
- Discuss the fundamental ideas of public,key cryptography.
- Generate and distribute a PGP key pair and use the PGP package to send an encrypted email message.
- Discuss Web security and Firewalls

Course Outcomes(s)

CO#	Course Outcomes
C416.1	Student will be able to understand basic cryptographic algorithms, message and web authentication and security issues.
C416.2	Ability to identify information system requirements for both of them such as client and server.
C416.3	Ability to understand the current legal issues towards information security.
C416.4	Understand on Symmetric key Ciphers and asymmetric key Ciphers
C416.5	Understand Various Encryption mechanisms for secure transmission of data and management of key required for required for encryption
C416.6	Understand authentication requirements and security mechanism applied for network transmission

COURSE CONTENT

1. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should XOR each character in this string with 0 and displays the result.
2. Write a C program that contains a string (char pointer) with a value 'Hello world'. The program should AND or and XOR each character in this string with 127 and display the result.
3. Write a Java program to perform encryption and decryption using the following algorithms
   a. Ceaser cipher b. Substitution cipher c. Hill Cipher
4. Write a C/JAVA program to implement the DES algorithm logic.
5. Write a C/JAVA program to implement the Blowfish algorithm logic.
6. Write a C/JAVA program to implement the Rijndael algorithm logic.
7. Write the RC4 logic in Java Using Java cryptography; encrypt the text "Hello world" using Blowfish. Create your own key using Java key tool.
8. Write a Java program to implement RSA algorithm.
9. Implement the Diffie,Hellman Key Exchange mechanism using HTML and JavaScript.
10. Calculate the message digest of a text using the SHA,1 algorithm in JAVA.
11. Calculate the message digest of a text using the MD5 algorithm in JAVA.

TEXT BOOKS:

1. Cryptography and Network Security , Principles and Practice: William Stallings, Pearson
Education, 6th Edition
2. Cryptography and Network Security: Atul Kahate, Mc Graw Hill, 3rd Edition

REFERENCES BOOKS:

1. Cryptography and Network Security: C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, 1st Edition.
2. Cryptography and Network Security: Forouzan Mukhopadhyay, Mc Graw Hill, 3rd Edition
3. Information Security, Principles, and Practice: Mark Stamp, Wiley India.
4. Principles of Computer Security: WM. Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes, CENGAGE Learning

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.swayam2.ac.in/cec21_cs04/preview
2. https://onlinecourses.nptel.ac.in/noc20_cs21/preview

WEB REFERENCE/E-BOOKS:

1. https://www.javatpoint.com/computer,network,security
2. https://www.tutorialspoint.com/network_security/index.htm

DATA MINING LAB
IV B.TECH., I SEMESTER

Course Title: DATA MINING LAB	Course Code: AS20-05PC24
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 Base Management System, Data Structure	

Course Overview:
This course helps the students to practically understand a data mining, techniques and methods for data gathering and data pre,processing using OLAP tools. The different data mining models and techniques will be discussed in this course

Course Objective
1. Practical exposure on implementation of well,known data mining tasks.
2. Exposure to real life data sets for analysis and prediction.
3. Learning performance evaluation of data mining algorithms in a supervised and an unsupervised setting.
4. Handling a small data mining project for a given practical domain.
5. To compare and contrast different conceptions of data mining.

Course Outcomes(s)

CO#	Course Outcomes
C417.1	Understand the principles, concepts and applications of data warehousing and data mining
C417.2	Apply data mining tasks using a data mining toolkit (such as WEKA) and visualize the results.
C417.3	Analyze the use of classification algorithms on labelled data
C417.4	Demonstrate the working of algorithms for data mining tasks such association rule mining and clustering
C417.5	Understand the principle algorithms and techniques used in data mining, like classification and prediction.
C417.6	Apply data mining techniques and methods to large data sets se data mining tools

COURSE CONTENT

Week 1: Introduction to WEKA.
Week 2: Implementation of measures of proximity.
Week 3: Implementation of pre,processing using WEKA.
Week 4: Learning of Remove Attributes from Pre,processing Using REMOVE Filter.
Week 5: Implementation of Apriori Algorithm for Association rule Mining.
Week 6: Learning and implementing k,means clustering
Week 7: Learning Naïve and Decision Tress classifier in WEKA
Week 8: Learning Bayesian modelling and Inference in Netica
Week 9: Learning About Attribute Discritization.
Week 10: Simple Project on Data Preprocessing

Beyond the Syllabus

c) Hospital Management System
d) ATM Management System

TEXT BOOKS:

1. Pang,Ning Tan, Michael Steinbach, Vipin Kumar, “Introduction to Data Mining”, Pearson Education (Addison Wesley), 0,321,32136,7, 2006.
2. J. Han and M. Kamber, "Data Mining: Concepts and Techniques", Morgan Kaufman, 2001.
3. Alex Berson, Stephen J. Smith, "Data Warehousing, Data Mining, and OLAP", MGH, 1998.

REFERENCES BOOKS:

1. Ville, "Decision Trees for Business Intelligence and Data Mining: Using SAS Enterprise e,Miner", SAS, 2006.
2. Tom Soukup, Davidson, "Visual Data Mining: Techniques and Tools for Data Visualization and Mining", 1/E, Wiley, 2002.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.swayam2.ac.in/cec19_cs01/preview
2. https://onlinecourses.nptel.ac.in/noc20_cs12/preview
3. https://www.coursera.org/specializations/data,mining

WEB REFERENCE/E-BOOKS:

1. https://www.javatpoint.com/data,mining
2. https://www.tutorialspoint.com/data_mining/index.htm
3. https://www.tutorialride.com/data,mining/data,mining,tutorial.htm

INTERVIEW SKILLS
IV B.TECH., I SEMESTER
VALUE ADDED COURSE

Course Title: INTERVIEW SKILLS	Course Code: AS20-00HS13
Teaching Scheme (L:T:P):0:0:2	Credits:1
Type of Course: Practical	Total Contact Periods: 32 Hours
Continuous Internal Evaluation:25 Marks	Semester End Exams:75 Marks
Prerequisites: Good communication skills, Body language skills, Analytical skills	

Course Overview:

In this course, we cover the life cycle of an interview from the beginning to the end, while explaining pre and post interview activity and processes. This course introduces the delegates to the objective of the interview, the necessary preparation before attending the interview, interviewer's mentality and purpose, different types of interview questions and the effect of applicant's image, behaviour and body language during the interview. Essential interview skills such as communication skills, effective listening skills, how to handle salary questions, responding to common interview questions, reducing anxiety and making the best impression are also covered in the course. Effective tactics and strategies accompany question examples in every stage and enhance the process of learning new techniques.

Course Objective

- To learn and use effective strategies and to handle interviews and understand what interviews are all about
- To look at the interview from the interviewer's position to better formulate the responses
- To use body language and first impressions to get through interviews successfully
- To learn how to make the best use of words and apply established tactics to get maximum results in interview conversations
- To learn how to make effective interview conversation and use the best strategies to get maximum results
- To answer interview questions confidently using the most effective strategies

Course Outcomes(s)

CO#	Course Outcomes
C419.1	Understand the purpose of interviews.
C419.2	Discuss the reliability, validity, fairness and effectiveness of interviews.
C419.3	Identify the different types of interviews.
C419.4	Obtain important tips on preparing for the interview.
C419.5	Articulate the importance of self, presentation.
C419.6	Describe some of the theoretical and practical problems associated with the interview as a selection tool.

COURSE CONTENT

UNIT - I

Preparing for the interview: Introduction, Purpose of interview, language skills, Physical preparation, Mental Preparation, Written Preparation, Types of interview, face to face, panel, group interview, telephonic and online interviews

UNIT - II

Effective strategies for answering interview questions: Presentation of oneself, Dress code, Importance of Non, Verbal communication and Intonation, Mirroring techniques, Common interview questions, Tips to answer the interview questions.

UNIT - III

Strategies of Interviews: General strategies, Opening, Answering and listening strategies, Overcoming Nervousness, Know your attitude and efforts that employers are looking for, Do's and Don'ts of interview.

UNIT - IV

Closing the job interview effectively: Questions about the organization, Take notes, Ending the interview, Tips for best closing interview questions, Remind the interviewer of your key skills, Thank the interviewer

UNIT - V

Mock Interviews: Purpose, Preparation (preparing for mock, interview in 60 minutes), Practice interview skills, Develop interview strategies, Semi structured interviews

TEXT BOOKS:

1. Group discussion and Interview skills –Priyadarshi Patnaik
2. Power Interviews: Job – Winning tactics from fortune500 recruiters – Neil M.Yeager, Lee Hough, John Wiley and Sons Inc

REFERENCES BOOKS:

1. Competency – Based Interviews –Kessler Robin
2. Keys for a successful job interview – ME Brandon

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://www.coursera.org/projects/preparation,for,job,interviews
2. https://www.coursera.org/learn/lesson,get,ready,for,the,interview

3. https://www.coursera.org/specializations/english,interview,resume
4. https://www.coursera.org/learn/interview,techniques
5. https://www.coursera.org/learn/successful,interviewing
6. https://www.coursera.org/learn/interview,preparation

WEB REFERENCE/E-BOOKS:

1. https://www.mindtools.com/pages/article/interview_skills.htm
2. https://www.thebalancecareers.com/job,interview,skills,to,get,hired,4138625
3. https://www.inc.com/suzanne,lucas/10,interview,skills,you,need,to,get,hired,and,how,to,improve,at,them.html
4. https://www.skillsyouneed.com/ips/interview,skills.html

B.TECH
FINAL YEAR
SECOND SEMESTER
SYLLABUS

ORGANIZATIONAL BEHAVIOR
IV B.TECH., II SEMESTER
PROFESSIONAL ELECTIVE - IV

Course Title: ORGANIZATIONAL BEHAVIOR	Course Code: AS20-05PE41
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:
A study of behavior of individuals and groups within organizations and of the organization itself. Intended to develop in managers a greater awareness of the problems and opportunities in managing human resource in organizations. Specific emphasis is placed on the development of managerial skills.

Course Objective
The objective of the course is to provide the students with the conceptual framework and the theories underlying Organizational Behaviour.

Course Outcomes(s)

CO#	Course Outcomes
C421.1	Understand the introduction to OB
C421.2	Understand the Cognitive Processes- II over OB
C421.3	Understand the Dynamics of OB,I
C421.4	Understand the Dynamics of OB,II
C421.5	Understand the Dynamics of OB –III Power and Politics
C421.6	Understand the Leading High performance in OB

COURSE CONTENT

UNIT - I
Introduction to OB: Definition, Nature and Scope, Environmental and organizational context, Impact of IT, globalization, Diversity, Ethics, culture, reward systems and organizational design on Organizational Behaviour. Cognitive Processes, I: Perception and Attribution: Nature and importance of Perception, Perceptual selectivity and organization, Social perception , Attribution Theories , Locus of control ,Attribution Errors ,Impression Management.

UNIT - II
Cognitive Processes: Personality and Attitudes, Personality as a continuum, Meaning of personality , Johari Window and Transactional Analysis , Nature and Dimension of Attitudes , Job satisfaction and organizational commitment, Motivational needs and processes, Work, Motivation Approaches Theories of Motivation, Motivation across cultures , Positive organizational behaviour: Optimism ,Emotional intelligence ,Self, Efficacy.

UNIT - III

Dynamics of OB,I: Communication , types : interactive communication in organizations ,barriers to communication and strategies to improve the follow of communication , Decision Making: Participative decision, making techniques : creativity and group decision making. Dynamics of OB –II Stress and Conflict: Meaning and types of stress – Meaning and types of conflict, Effect of stress and intraindividual conflict, strategies to cope with stress and conflict.

UNIT - IV

Dynamics of OB –III Power and Politics: Meaning and types of power, empowerment, Groups Vs. Teams, Nature of groups, dynamics of informal groups, dysfunctions of groups and teams, teams in modern work place.

UNIT - V

Leading High performance: Job design and Goal setting for High performance, Quality of Work Life, Socio technical Design and High, performance work practices , Behavioural performance management: reinforcement and punishment as principles of Learning – Process of Behavioural modification , Leadership theories , Styles, Activities and skills of Great leaders.

TEXT BOOKS:

1. Luthans, Fred: Organizational Behaviour 10/e, McGraw,Hill, 2009
2. McShane: Organizational Behaviour, 3e, TMH, 2008
3. Nelson: Organizational Behaviour, 3/e, Thomson, 2008.
4. Newstrom W. John & Davis Keith, Organisational Behaviour,, Human Behaviour at Work, 12/e, TMH, New Delhi, 2009.
5. Pierce and Gardner: Management and Organisational Behaviour: An Integrated perspective, Thomson, 2009. 6. Robbins, P. Stephen, Timothy A. Judge: Organisational Behaviour, 12/e, PHI/Pearson, New Delhi, 2009.

REFERENCES BOOKS:

1. Pareek Udai: Behavioural Process at Work: Oxford & IBH, New Delhi, 2009.
2. Schermerhorn: Organizational Behaviour 9/e, Wiley, 2008.
3. Hitt: Organizational Behaviour, Wiley, 2008
4. Aswathappa: Organisational Behaviour, 7/e, Himalaya, 2009
5. Mullins: Management and Organisational Behaviour, Pearson, 2008.
6. McShane, Glinow: Organisational Behaviour,,Essentials, TMH, 2009.
7. Ivancevich: Organisational Behaviour and Management, 7/e, TMH, 2008.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1.https://onlinecourses.swayam2.ac.in/cec20_mg03/preview#:~:text=It%20seeks%20to%20
achieve%20the,of%20Individual%2C%20Group%20and%20Organizations.
2. https://onlinecourses.nptel.ac.in/noc20_mg51/preview

WEB REFERENCE/E-BOOKS:

1. https://www.tutorialspoint.com/organizational_behavior/index.htm

NEURAL NETWORKS & DEEP LEARNING
IV B.TECH., II SEMESTER
PROFESSIONAL ELECTIVE - IV

Course Title: NEURAL NETWORKS & DEEP LEARNING	Course Code: AS20-05PE42
Teaching Scheme (L:T:P): 3:1:0	Credits: 3
Type of Course: Lecture + Tutorial	Total Contact Periods: 48 + 16 Hours
Continuous Internal Evaluation:25 Marks	Semester End Exams:75 Marks

Course Overview:
In this course, student will learn about exciting applications of deep learning and why now is the perfect time to learn deep learning. Students will also learn about neural networks and how most of the deep learning algorithms are inspired by the way our brain functions and the neurons process data. Finally, you will learn about how neural networks feed data forward through the network. Students will learn about the gradient descent algorithm and how variables are optimized with respect to a defined function. Students will also learn about backpropagation and how neural networks learn and update their weights and biases.

Course Objective

- To introduce the foundations of Artificial Neural Networks
- To acquire the knowledge on Deep Learning Concepts
- To learn various types of Artificial Neural Networks
- To gain knowledge to apply optimization strategies

Course Outcomes(s)

CO#	Course Outcomes
C421.1	Understand the concepts of Neural Networks
C421.2	Understand the various technique in Unsupervised Learning Network
C421.3	Ability to apply optimization strategies for large scale applications
C421.4	Ability to select the Learning Networks in modelling real world systems
C421.5	Ability to use an efficient algorithm for Deep Models
C421.6	Understand the various Optimization for Train Deep Models

COURSE CONTENT

UNIT - I

Artificial Neural Networks Introduction, Basic models of ANN, important terminologies, Supervised Learning Networks, Perceptron Networks, Adaptive Linear Neuron, Back, propagation Network. Associative Memory Networks. Training Algorithms for pattern association, BAM and Hopfield Networks.

UNIT - II

Unsupervised Learning Network: Introduction, Fixed Weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self, Organizing Feature Maps, Learning Vector Quantization, Counter Propagation Networks, Adaptive Resonance Theory Networks. Special Networks, Introduction to various networks.

UNIT - III

Introduction to Deep Learning: Historical Trends in Deep learning, Deep Feed , forward networks, Gradient, Based learning, Hidden Units, Architecture Design, Back, Propagation and Other Differentiation Algorithms

UNIT - IV

Regularization for Deep Learning: Parameter norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under, Constrained Problems, Dataset Augmentation, Noise Robustness, Semi, Supervised learning, Multitask learning, Early Stopping, Parameter Typing and Parameter Sharing, Sparse Representations, Bagging and other Ensemble Methods, Dropout, Adversarial Training, Tangent Distance, tangent Prop and Manifold, Tangent Classifier

UNIT - V

Optimization for Train Deep Models: Challenges in Neural Network Optimization, Basic Algorithms, Parameter Initialization Strategies, Algorithms with Adaptive Learning Rates, Approximate Second, Order Methods, Optimization Strategies and Meta,Algorithms

Applications: Large,Scale Deep Learning, Computer Vision, Speech Recognition, Natural Language Processing

TEXT BOOKS:

1. Deep Learning: An MIT Press Book By Ian Goodfellow and Yoshua Bengio and Aaron Courville
2. Neural Networks and Learning Machines, Simon Haykin, 3rd Edition, Pearson Prentice Hall.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.nptel.ac.in/noc20_cs11/preview

WEB REFERENCE/E-BOOKS:

1. https://www.javatpoint.com/deep,learning
2. ttps://www.tutorialspoint.com/artificial_neural_network/index.htm

HUMAN COMPUTER INTERACTION
IV B.TECH., II SEMESTER
PROFESSIONAL ELECTIVE - IV

Course Title: HUMAN COMPUTER INTERACTION	Course Code: AS20-05PE43
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 covers the principles of human, computer interaction and the design and evaluation of user interfaces. Topics include an overview of human information processing subsystems (perception, memory, attention, and problem solving); how the properties of these systems affect the design of user interfaces; the principles, guidelines, and specification languages for designing good user interfaces, with emphasis on tool kits and libraries of standard graphical user interface objects; and a variety of interface evaluation methodologies that can be used to measure the usability of software. Other topics may include World Wide Web design principles and tools, computer, supported cooperative work, multimodal and "next generation" interfaces, speech and natural language interfaces, and virtual reality interfaces. Course work includes both the creation and implementation of original user interface designs, and the evaluation of user interfaces created by others.

Course Objective
- To provide the basic knowledge on the levels of interaction, design models, techniques and validations focusing on the different aspects of human, computer interface and interactions.
- To make the learners to think in design perspective and to evaluate interactive design.
- To use the concepts and principles of HCI to analyze and propose solution for real, life applications.
- To become familiar with recent technology trends and challenges in HCI domain.

Course Outcomes(s)

CO#	Course Outcomes
C421.1	Enumerate the basic concepts of human, computer interactions.
C421.2	Demonstrate the principles of human computer interactions through the prototype modelling and Create the processes of human computer interaction life cycle.
C421.3	Analyze and design the various interaction design models.
C421.4	Apply the interface design standards/guidelines for evaluating the developed interactions.
C421.5	Establish the different levels of communication across the application stakeholders.
C421.6	Apply product usability evaluations and testing methods.

COURSE CONTENT

UNIT - I

HCI FOUNDATIONS: Input–output channels, Human memory, Thinking: reasoning and problem solving, Emotion, Individual differences, Psychology and the design of interactive systems, Text entry devices, Positioning, pointing and drawing, Display devices, Devices for virtual reality and 3D interaction, Physical controls, sensors and special devices, Paper: printing and scanning.

UNIT - II

DESIGNING INTERACTION: Overview of Interaction Design Models, Discovery, Framework, Collection, Observation, Elicitation, Interpretation, Task Analysis, Storyboarding, Use Cases, Primary Stakeholder Profiles, Project Management Document.

UNIT - III

INTERACTION DESIGN MODELS: Model Human Processor , Working Memory, Long, Term Memory, Processor Timing, Keyboard Level Model , Operators, Encoding Methods, Heuristics for M Operator Placement, What the Keyboard Level Model Does Not Model, Application of the Keyboard Level Model, GOMS , CMN,GOMS Analysis, Modelling Structure, State Transition Networks , Three, State Model, Glimpse Model, Physical Models, Fitts‟ Law.

UNIT - IV

GUIDELINES IN HCI: Shneideman's eight golden rules, Norman's Sever principles, Norman's model of interaction, Nielsen's ten heuristics, Heuristic evaluation, contextual evaluation, Cognitive walk-through.

COLLABORATION AND COMMUNICATION: Face-to-face Communication, Conversation, Text, based Communication, Group working, Dialog design notations, Diagrammatic notations, Textual dialog notations, Dialog semantics, Dialog analysis and design.

UNIT - V

HUMAN FACTORS AND SECURITY: Groupware, Meeting and decision support systems, Shared applications and artifacts, Frameworks for groupware Implementing synchronous groupware, Mixed, Augmented and virtual reality.

VALIDATION AND ADVANCED CONCEPTS: Validations , Usability testing, Interface Testing, User Acceptance Testing Past and future of HCI: the past, present and future, perceptual interfaces, context, awareness and perception.

TEXT BOOKS:

1. A Dix, Janet Finlay, G D Abowd, R Beale., Human Computer Interaction, 3rd Edition, Pearson Publishers,2008.

REFERENCES BOOKS:

1. Shneiderman, Plaisant, Cohen and Jacobs, Designing the User Interface: Strategies for Effective Human Computer Interaction, 5th Edition, Pearson Publishers, 2010.
2. Hans,Jorg Bullinger," Human Computer Interaction", Lawrence Erlbaum Associates, Publishers.
3. Jakob Nielsen," Advances in Human computer Interaction",Ablex Publishing Corporation. 4. Thomas S. Huang," Real,Time Vision for Human Computer Interaction", Springer.
5. Preece et al, Human Computer Interaction, Addison,Wesley, 1994.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://nptel.ac.in/courses/106/103/106103115/
2. https://nptel.ac.in/courses/106/106/106106177/

WEB REFERENCE/E-BOOKS:

1. https://arl.human.cornell.edu/879Readings/Interaction%20Design%20,%20Beyond%20Human,Computer%20Interaction.pdf
2. https://paragnachaliya.in/wp,content/uploads/2017/08/HCI_Alan_Dix.pdf

CYBER FORENSICS
IV B.TECH., II SEMESTER
PROFESSIONAL ELECTIVE - IV

Course Title: CYBER FORENSICS	Course Code: AS20-05PE44
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: Network Security	

Course Objective

- A brief explanation of the objective is to provide digital evidences which are obtained from digital media.
- In order to understand the objectives of computer forensics, first of all, people have to recognize the different roles computer plays in a certain crime.
- According to a snippet from the United States Security Service, the functions computer has in different kinds of crimes.

Course Outcomes(s)

CO#	Course Outcomes
C421.1	understand the usage of computers in forensic, and how to use various forensic tools for a wide variety of investigations
C421.2	It gives an opportunity to students to continue their zeal in research in computer forensics
C421.3	Understand the Forensics analysis and validation
C421.4	Understand various tools available in CF
C421.5	Understand Cell phone and mobile device forensics
C421.6	Understand Windows and DOS Systems towards CF

COURSE CONTENT

UNIT - I
Introduction of Cybercrime: Types, The Internet spawns crime, Worms versus viruses, Computers' roles in crimes, Introduction to digital forensics, Introduction to Incident , Incident Response Methodology – Steps , Activities in Initial Response, Phase after detection of an incident

UNIT- II
Initial Response and forensic duplication: Initial Response & Volatile Data Collection from Windows system ,Initial Response & Volatile Data Collection from Unix system – Forensic Duplication: Forensic duplication: Forensic Duplicates as Admissible Evidence, Forensic Duplication Tool Requirements, Creating a Forensic. Duplicate/Qualified Forensic Duplicate of a Hard Drive

UNIT - III

Forensics analysis and validation: Determining what data to collect and analyse, validating forensic data, addressing data, hiding techniques, performing remote acquisitions

Network Forensics: Network forensics overview, performing live acquisitions, developing standard procedures for network forensics, using network tools, examining the honeynet project.

UNIT - IV

Current Forensic tools: evaluating computer forensic tool needs, computer forensics software tools, computer forensics hardware tools, validating and testing forensics software Email Investigations: Exploring the role of e-mail in investigation, exploring the roles of the client and server in e-mail, investigating e-mail crimes and violations, understanding e-mail servers, using specialized e-mail forensic tools.

Cell phone and mobile device forensics: Understanding mobile device forensics, understanding acquisition procedures for cell phones and mobile devices.

UNIT - V

Working with Windows and DOS Systems: understanding file systems, exploring Microsoft File Structures, Examining NTFS disks, Understanding whole disk encryption, windows registry, Microsoft startup tasks, MS,DOS startup tasks, virtual machines.

TEXT BOOKS:

1. Kevin Mandia, Chris Prosise, "Incident Response and computer forensics", Tata McGraw Hill, 2006.
2. Computer Forensics, Computer Crime Investigation by John R. Vacca, Firewall Media, New Delhi.
3. Computer Forensics and Investigations by Nelson, Phillips Enfinger, Steuart, CENGAGE
Learning

REFERENCES BOOKS:

1. Real Digital Forensics by Keith J. Jones, Richard Bejtiich, Curtis W. Rose, Addison, Wesley Pearson Education
2. Forensic Compiling, A Tractitioneris Guide by Tony Sammes and Brian Jenkinson, Springer International edition.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.swayam2.ac.in/cec21_ge10/preview
2. https://onlinecourses.swayam2.ac.in/cec20_lb06/preview

WEB REFERENCE/E-BOOKS:

1. https://www.w3schools.in/cyber,security/cyber,forensics,and,incident,handling/

INFORMATION RETRIEVAL SYSTEMS
IV B.TECH., II SEMESTER
PROFESSIONAL ELECTIVE - IV

Course Title: INFORMATION RETRIEVAL SYSTEMS	Course Code: AS20-05PE45
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:
The main objective of this course is to present the scientific support in the field of information search and retrieval. This course explores the fundamental relationship between information retrieval, hypermedia architectures, and semantic models, thus deploying and testing several important retrieval models such as vector space, Boolean and query expansion.

Course Objective
- Giving idea about the existing problems and potentials of current IR systems.
- Learn and use different retrieval algorithms and systems.
- Giving idea about k-gram indexes for spelling correction.
- Giving idea about Dictionary compression.
- Giving idea about Parametric and zone indexes.

Course Outcomes(s)

CO#	Course Outcomes
C421.1	Understand the retrieval of relevant information from a text database.
C421.2	Understand the Term Vocabulary And Postings Lists.
C421.3	Understand the Index Construction and its other types.
C421.4	Understand the Index Compression with Zipf's law.
C421.5	Understand the Vector Space Model.
C421.6	Understand the various analysis schemes to evaluate Information Retrieval

COURSE CONTENT

UNIT - I
BOOLEAN RETRIEVAL: An example information retrieval problem, A first take at building an inverted index, Processing Boolean queries, The extended Boolean model versus ranked retrieval.
THE TERM VOCABULARY AND POSTINGS LISTS : Document delineation and character sequence decoding, Obtaining the character sequence in a document, Choosing a document unit, Determining the vocabulary of terms ,Tokenization,

Dropping common terms: stop words, Normalization (equivalence classing of terms) stemming and lemmatization, Faster postings list intersection via skip pointers, Positional postings and phrase queries , Biword indexes , Positional indexes , Combination schemes

UNIT - II

DICTIONARIES AND TOLERANT RETRIEVAL : Search structures for dictionaries ,Wildcard queries, General wildcard queries, k,gram indexes for wildcard queries, Spelling correction , Implementing spelling correction, Forms of spelling correction , Edit distance , k-gram indexes for spelling correction, Context sensitive spelling correction , Phonetic correction.

INDEX CONSTRUCTION : Hardware basics , Blocked sort, based indexing , Single, pass in, memory indexing , Distributed indexing , Dynamic indexing , Other types of indexes

UNIT - III

INDEX COMPRESSION: Statistical properties of terms in information retrieval, Heaps' law: Estimating the number of terms, Zipf's law: Modeling the distribution of terms, Dictionary compression , Dictionary as a string , Blocked storage , Postings file compression, Variable byte codes , ā codes. SCORING, TERM WEIGHTING : Parametric and zone indexes, Weighted zone scoring, Learning weights, The optimal weight g, Term frequency and weighting , Inverse document frequency, Tf,idf weighting

UNIT - IV

THE VECTOR SPACE MODEL: The vector space model for scoring, Dot products, Queries as vectors, Computing vector scores, Variant tf,idf functions , Sublinear tf scaling, Maximum tf normalization, Document and query weighting schemes , Pivoted normalized document length

UNIT - V

EVALUATION IN INFORMATION RETRIEVAL : Information retrieval system evaluation, Standard test collections , Evaluation of unranked retrieval sets , Evaluation of ranked retrieval results, Assessing relevance , Critiques and justifications of the concept of Relevance, A broader perspective: System quality and user utility ,System issues , User utility , Refining a deployed system, Results snippets.

TEXT BOOKS:

1. Christopher D. Manning, Prabhakar Raghavan, Hinrich Schütze, "An Introduction to Information Retrieval", 1st Edition, Cambridge University Press, 2008.

REFERENCES:

1. G.G. Chowdhury, "Introduction to Modern Information Retrieval", 3rd Edition, neal,schuman publishers, 2010.
2. Gerald J.Kowalski, Mark T.Maybury, "Information storage and Retrieval systems: theory and implementation", 2nd Edition, kluwer academic publishers, 2009.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://nptel.ac.in/courses/106/101/106101007/

WEB REFERENCE/E-BOOKS:

1. https://theswissbay.ch/pdf/Gentoomen%20Library/Information%20Retrieval/Information%20Storage%20And%20Retrieval%20Systems,Theory%20And%20Impl%202e_Kowalski%20GJ%20%282002%29.pdf
2. https://mitmecsept.files.wordpress.com/2018/05/stefan,bc3bcttcher,charles,l,a,clarke,gordon,v,cormack,information,retrieval,implementing,and,evaluating,search,engines,2010,mit.pdf
3. https://nlp.stanford.edu/IR,book/pdf/irbookonlinereading.pdf
4. http://openlib.org/home/krichel/courses/lis618/readings/rijsbergen79_infor_retriev.pdf
5. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.120.6095&rep=rep1&type=pdf

DESIGN PATTERNS
IV B.TECH., II SEMESTER
PROFESSIONAL ELECTIVE - V

Course Title: DESIGN PATTERNS	Course Code: AS20-05PE51
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: Database Management Systems	

Course Objective

- Understand the concept of Design patterns and its importance.
- Understand the behavioural knowledge of the problem and solutions.
- Relate the Creational, Structural, behavioural Design patterns.
- Apply the suitable design patterns to refine the basic design for given context.

Course Outcomes(s)

CO#	Course Outcomes
C422.1	Identify the appropriate design patterns to solve object oriented design problems.
C422.2	Develop design solutions using creational patterns.
C422.3	Apply structural patterns to solve design problems
C422.4	Construct design solutions by using behavioural patterns.
C422.5	Understand the creation and structure of patterns
C422.6	Understand behavioral pattern

COURSE CONTENT

UNIT - I

Introduction: What Is a Design Pattern?, Design Patterns in Smalltalk MVC, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern.

UNIT - II

A Case Study: Designing a Document Editor: Design Problems, Document Structure, Formatting, Embellishing the User Interface, Supporting Multiple Look and Feel Standards, Supporting Multiple Window Systems, User Operations Spelling Checking and Hyphenation.

UNIT - III

Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton.

UNIT - IV
Structural Patterns: Adapter, Bridge, Composite, Decorator, Façade, Flyweight, Proxy

UNIT - V
Behavioral Patterns: Chain of Responsibility, Command, Interpreter, Iterator, Mediator, Memento, Observer, Strategy, Template Method, Visitor. Conclusion: What to Expect from Design Patterns, the Pattern Community.

TEXT BOOKS:
1. Design Patterns By Erich Gamma, Pearson Education
2. Design Patterns Explained By Alan Shalloway,Pearson Education..
3. Meta Patterns designed by Wolf gang , Pearson.

REFERENCES:
1. Head First Design Patterns By Eric Freeman,Oreilly,spd
2. JAVA Enterprise Design Patterns Vol,III By Mark Grand ,Wiley DreamTech.
3. Pattern‟s in JAVA Vol,I By Mark Grand ,Wiley DreamTech.
4. Pattern‟s in JAVA Vol,II By Mark Grand ,Wiley DreamTech.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):
1. https://onlinecourses.nptel.ac.in/noc20_cs59/preview

WEB REFERENCE/E-BOOKS:
1.https://www.tutorialspoint.com/design_pattern/index.htm
2.https://www.javatpoint.com/design,patterns,in,java

DISTRIBUTED SYSTEMS
IV B.TECH., II SEMESTER
PROFESSIONAL ELECTIVE - V

Course Title: DISTRIBUTED SYSTEMS	Course Code: AS20-05PE52
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: Operating Systems, Computer Organization & Architecture	

Course Objective

- This course provides an insight into Distributed systems.
- Topics include, Peer to Peer Systems, Transactions and Concurrency control, Security and Distributed shared memory

Course Outcomes(s)

CO#	Course Outcomes
C422.1	Ability to understand Transactions and Concurrency control
C422.2	Ability to understand Security issues
C422.3	Understanding Distributed shared memory
C422.4	Understand Peer to Peer Systems concepts
C422.5	Understand Transactions and Concurrency Control and replication management in DS
C422.6	Ability to design distributed systems for basic level applications

COURSE CONTENT

UNIT - I

Characterization of Distributed Systems: Introduction, Examples of Distributed systems, Resource sharing and web, challenges, System models ,Introduction, Architectural and Fundamental models, Networking and Internetworking, Interprocess Communication, Distributed objects and Remote Invocation, Introduction, Communication between distributed objects, RPC, Events and notifications, Case study, Java RMI.

UNIT - II

Operating System Support: Introduction, OS layer, Protection, Processes and Threads, Communication and Invocation, Operating system architecture, Distributed File Systems, Introduction, File Service architecture.

UNIT - III

Peer to Peer Systems: Introduction, Napster and its legacy, Peer to Peer middleware, Routing overlays, Overlay case studies, Pastry, Tapestry, Application case studies,

Squirrel, OceanStore.
Time and Global States, Introduction, Clocks, events and Process states, Synchronizing physical clocks, logical time and logical clocks, global states, distributed debugging.
Coordination and Agreement, Introduction, Distributed mutual exclusion, Elections, Multicast
Communication, consensus and related problems.

UNIT - IV
Transactions and Concurrency Control: Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering. Distributed Transactions, Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.

UNIT - V
Replication: Introduction, System model and group communication, Fault tolerant services,
Transactions with replicated data.
Distributed shared memory, Design and Implementation issues, Consistency models.

TEXT BOOKS:
1. Distributed Systems Concepts and Design, G Coulouris, J Dollimore and T Kindberg, Fourth Edition, Pearson Education.
2. Distributed Systems, S.Ghosh, Chapman & Hall/CRC, Taylor & Francis Group, 2010.

REFERENCES:
1. Distributed Systems – Principles and Paradigms, A.S. Tanenbaum and M.V. Steen, Pearson
Education.
2. Distributed Computing, Principles, Algorithms and Systems, Ajay D. Kshemakalyani and
Mukesh Singhal, Cambridge, rp 2010.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):
1. https://onlinecourses.nptel.ac.in/noc20_cs48/preview

WEB REFERENCE/E-BOOKS:
1 https://www.tutorialspoint.com/Distributed,Systems

HIGH PERFORMANCE COMPUTING
IV B.TECH., II SEMESTER
PROFESSIONAL ELECTIVE - V

Course Title: HIGH PERFORMANCE COMPUTING	Course Code: AS20-05PE53
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:

High-performance computing refers to a specialized use and programming of (parallel) supercomputers, computer clusters, and everything from software to hardware to speed up computations. This course will focus on current practices in high performance computing technologies, including systems, architectures, programming models, languages and software tools.

Course Objective

- Introduce students the design, analysis, and implementation, of high-performance computational science and engineering applications.
- Provide systematic and comprehensive treatment of the hardware and the software high performance techniques involved in current day computing.
- To know Emerging trends in computing technology.

Course Outcomes(s)

CO#	Course Outcomes
C422.1	Explain the Grid Computing Principles and protocols
C422.2	Describe different Grid service architectures
C422.3	Explain Grid Cluster components and applications
C422.4	Describe different Grid models, architectures and practices
C422.5	Explain service-oriented architecture and Cloud
C422.6	Describe different Grid computing architectures

COURSE CONTENT

UNIT - I

Overview of Grid Computing Technology: History of Grid Computing, High Performance Computing, Cluster Computing. Peer,to,Peer Computing, Internet Computing, Grid Computing Model and Protocols, Types of Grids: Desktop Grids, Cluster Grids, Data Grids, High,performance Grids, Applications and Architectures of High Performance Grids, High Performance Application Development Environment.

UNIT - II

Open Grid Services Architecture: Introduction, Requirements, Capabilities, Security Considerations, GLOBUS Toolkit.

UNIT - III

Overview of Cluster Computing: Cluster Computer and its Architecture, Clusters Classifications, Components for Clusters, Cluster Middleware and SSI, Resource Management and Scheduling, Programming, Environments and Tools, Cluster Applications, Cluster Systems.

UNIT - IV

Beowulf Cluster: The Beowulf Model, Application Domains, Beowulf System Architecture, Software Practices, Parallel Programming with MPL, Parallel Virtual Machine (PVM).

UNIT - V

Overview of Cloud Computing: Types of Cloud, Cyber infrastructure, Service Oriented Architecture Cloud Computing Components: Infrastructure, Storage, Platform, Application, Services, Clients, Cloud Computing Architecture.

TEXT BOOKS:

1. Laurence T.Yang, Minyi Guo – High Performance Computing Paradigm and Infrastructure John Wiley
2. Ahmar Abbas, "Grid Computing: Practical Guide to Technology & Applications", Firewall Media, 2004.
3. Joshy Joseph and Craig Fellenstein , "Grid Computing" Pearson Education, 2004.

REFERENCES BOOKS:

1. lan Foster, et al.,"The Open Grid Services Architecture", Version 1. 5 (GFD.80). Open Grid Forum, 2006.
2. RajkumarBuyya. High Performance Cluster Computing: Architectures and Systems. PrenticeHall India, 1999.
3. Introduction to High Performance Computing for Scientists and Engineers, G. Hager and G. Wellein, CRC Press, Taylor & Francis Group.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://nptel.ac.in/courses/106/108/106108055/

WEB REFERENCE/E-BOOKS:

1. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwifoevT1PbxAhVGILcAHcccAMYQFjAEegQIHxAD&url=https%3A%2F%2Fcnx.org%2Fexports%2Fbb821554,7f76,44b1,89e7,8a2a759d1347%405.2.pdf%2Fhigh,performance,computing,5.2.pdf&usg=AOvVaw157rH_dDioTgoosFaPogQx

BLOCKCHAIN AND CRYPTOCURRENCY
IV B.TECH., II SEMESTER
PROFESSIONAL ELECTIVE - V

Course Title: BLOCKCHAIN AND CRYPTOCURRENCY	Course Code: AS20-05PE54
Teaching Scheme (L:T:P):3:1:0	Credits:3
Type of Course: Lecture + Assignment	Total Contact Periods: 48 + 16 Hours
Continuous Internal Evaluation:30 Marks	Semester End Exams:70 Marks

Course Overview:
Decentralized blockchain, based systems, such as Bitcoin and Ethereum, are successful beyond all expectations. Although still in their infancy, they promise to revolutionize how we think of financial, information, and other infrastructures. This course covers the technical aspects of public distributed ledgers, blockchain systems, cryptocurrencies, and smart contracts. Students will learn how these systems are built, how to interact with them, how to design and build secure distributed applications.

Course Objective

- Understand how blockchain systems (mainly Bitcoin and Ethereum) work,
- To securely interact with them,
- Design, build, and deploy smart contracts and distributed applications,
- Integrate ideas from blockchain technology into their own projects.

Course Outcomes(s)

CO#	Course Outcomes
C422.1	Explain design principles of Bitcoin and Ethereum and Nakamoto consensus.
C422.2	Explain the Simplified Payment Verification protocol.
C422.3	List and describe differences between proof,of,work and proof,of,stake consensus.
C422.4	Interact with a blockchain system by sending and reading transactions.
C422.5	Design, build, and deploy a distributed application.
C422.6	Evaluate security, privacy, and efficiency of a given blockchain system.

COURSE CONTENT

UNIT - I

Introduction: Need for Distributed Record Keeping, Modeling faults and adversaries, Byzantine Generals problem, Consensus algorithms and their scalability problems, Nakamoto's concept with Blockchain based cryptocurrency, Technologies Borrowed in Blockchain – hash pointers, consensus, byzantine fault,tolerant distributed computing, digital cash etc.

UNIT - II

Basic Distributed Computing & Crypto primitives: Atomic Broadcast, Consensus, Byzantine Models of fault tolerance, Hash functions, Puzzle friendly Hash, Collison

resistant hash, digital signatures, public key crypto, verifiable random functions, Zero,knowledge systems

UNIT - III

Bitcoin basics: Bitcoin blockchain, Challenges and solutions, proof of work, Proof of stake, alternatives to Bitcoin consensus, Bitcoin scripting language and their use

UNIT - IV

Ethereum basics: Ethereum and Smart Contracts, The Turing Completeness of Smart Contract Languages and verification challenges, Using smart contracts to enforce legal contracts, comparing Bitcoin scripting vs. Ethereum Smart Contracts, Writing smart contracts using Solidity & JavaScript

UNIT - V

Privacy, Security issues in Blockchain: Pseudo,anonymity vs. anonymity, Zcash and Zk,SNARKS for anonymity preservation, attacks on Blockchains: Sybil attacks, selfish mining, 51% attacks advent of algorand; Sharding based consensus algorithms to prevent these attacks.

Case Studies: Block chain in Financial Service, Supply Chain Management and Government Services

TEXT BOOKS:

1. Narayanan, Bonneau, Felten, Miller and Goldfeder, “Bitcoin and Cryptocurrency Technologies – A Comprehensive Introduction”, Princeton University Press.
2. Josh Thompson, ‘Blockchain: The Blockchain for Beginnings, Guild to Blockchain Technology and Blockchain Programming’, Create Space Independent Publishing Platform, 2017.

REFERENCES BOOKS:

1. Imran Bashir, “Mastering Blockchain: Distributed ledger technology, decentralization, and smart contracts explained”, Packt Publishing.
2. Merunas Grincalaitis, “Mastering Ethereum: Implement Advanced Blockchain Applications Using Ethereum, supported Tools, Services, and Protocols”, Packt Publishing.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://nptel.ac.in/courses/106/105/106105184/

WEB REFERENCE/E-BOOKS:

1. https://www.ramonmillan.com/documentos/bibliografia/BlockchainForDummies_Wiley.pdf
2. https://www.blockchainexpert.uk/book/blockchain,book.pdf
3. https://scet.berkeley.edu/wp,content/uploads/BlockchainPaper.pdf

MIDDLEWARE TECHNOLOGIES
IV B.TECH., II SEMESTER
PROFESSIONAL ELECTIVE - V

Course Title: MIDDLEWARE TECHNOLOGIES	Course Code: AS20-05PE55
Teaching Scheme (L:T:P):3:1:0	Credits:3
Type of Course: Lecture + Assignment	Total Contact Periods: 48 + 16 Hours
Continuous Internal Evaluation:30 Marks	Semester End Exams:70 Marks

Course Overview:
The main objective of the course is to create a practical, wide, ranging discussion on Middleware Technologies to help students understand what is going on so they can pick out the real issues from the imaginary issues and start building complex distributed systems with confidence.

Course Objective

- Understand Distributed systems design and implementation
- Understand existing Distributed Technologies
- Use Middleware to Build Distributed Applications
- Understand Middleware Interoperability
- Understand Web services architectures

Course Outcomes(s)

CO#	Course Outcomes
C422.1	Learn how to use Middleware to Build Distributed Applications
C422.2	Implement Business Processes
C422.3	Learn about Middleware Technologies summary
C422.4	Understand on a technical summary of middleware
C422.5	Understand middleware to build distributed applications
C422.6	Learn application design and IT architecture

COURSE CONTENT

UNIT - I

Introduction: Moving to e-business, what is IT architecture? Why is this different from what we did before? Rewrite or evolve? , Who develops the architecture? Early days, Preliminaries, Remote procedure calls, Remote database access, Distributed transaction processing, Message queuing, Message queuing versus distributed transaction processing, what happened to all this technology?

Objects, Components, And The Web: Using object middleware, Transactional component middleware, COM, EJB, Final comments on TCM, Internet Applications. WEB SERVICES: Service concepts, Web services, and Using Web services: A pragmatic approach.

UNIT - II

A Technical Summary Of Middleware: Middleware elements, The communications link, The middleware protocol, The programmatic interface, Data presentation, Server control, Naming and directory services, Security, System management, Comments on Web services, Vendor architectures, Vendor platform architectures, Vendor distributed architectures, Using vendor architectures, Positioning, Strawman for user target architecture, Marketing, Implicit architectures, Middleware interoperability.

UNIT - III

Using Middleware To Build Distributed Applications: What is middleware for? Support for business processes, Information retrieval, Collaboration, Tiers, The presentation tier, The processing tier, The data tier, Services versus tiers, Architectural choices, Middleware bus architectures, Hub architectures, Web services architectures, Loosely coupled versus tightly coupled.

UNIT - IV

Security: What security is needed, Traditional distributed system security, Web services security, Architecture and security.

Application Design And It Architecture: Problems with today's design approaches, Design up front or as needed?, The role of business rules, Existing systems, Reuse, Silo and monolithic development, The role of architecture, Levels of design, Reconciling design approaches.

UNIT - V

Implementing Business Processes: What is a process? Business processes, Information and processes, Architecture process patterns, Clarification and analysis, Error Handling, Timing, Migration, Flexibility.

TEXT BOOKS:

1. Chris Britton and Peter Eye, "IT Architectures and Middleware: Strategies for Building Large, Integrated Systems", 2nd Edition, Pearson Education, 2004.

REFERENCES BOOKS:

1.Qusay H. Mahmoud, "Middleware for Communications", 1st Edition, John Wiley and Sons,2004.
2. Michah Lerner, "Middleware Networks: Concept, Design and Deployment of Internet Infrastructure", 1st Edition, Kluwer Academic Publishers, 2000.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://nptel.ac.in/content/storage2/courses/106105087/pdf/m17L41.pdf

WEB REFERENCE/E-BOOKS:

1. https://www.coursera.org/lecture/web,app/video,1,what,is,middleware,FUnIX

SOFTWARE ENGINEERING
IV B.TECH., II SEMESTER
OPEN ELECTIVE IV

Course Title: SOFTWARE ENGINEERING	Course Code: AS20-05OE41
Teaching Scheme (L:T:P):3:0:0	Credits:3
Type of Course: Lecture + Assignment	Total Contact Periods: 48 Hours
Continuous Internal Evaluation:30 Marks	Semester End Exams:70 Marks
Prerequisites: Data Structure, Programming in C	

Course Overview:
Software engineering is a detailed study of engineering to the design, development and maintenance of software. Software engineering was introduced to address the issues of low,quality software projects. The outcome of software engineering is an efficient and reliable software product. The candidates would learn about different process models, analysis and documentation of software requirement system. They will learn on different software analysis and design models and techniques. They will also learn on software project management fundamentals and various testing, debugging and validation techniques of software development.

Course Objective

- To understand the software life cycle system and the different software architectural views.
- To understand the software requirement engineering and SRS document.
- A general understanding of software process models.
- To aware of Software Engineering methods and practices, and their appropriate application.
- To understand the V and V techniques, design of software product.
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Course Outcomes(s)

CO#	Course Outcomes
C423.1	Understand Generic view of process & its model process towards software engineering
C423.2	Apply the functional and non-functional requirements to model an effective software product.
C423.3	Analyze, design and implement an object-oriented approach system.
C423.4	Enhance the testing tools for effective debugging.
C423.5	Analyze the metrics, risk and the quality issues for designing a process/ product.
C423.6	Test security levels of a software and mange security software's.

COURSE CONTENT

UNIT – I

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, Legacy Software, Software myths.

A Generic view of process: Software engineering, a layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

Process models: The waterfall model, Incremental process models, Evolutionary process models, The Unified process.

UNIT - II

Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

System models: Context Models, Behavioural models, Data models, Object models, structured methods.

UNIT – III

Design Engineering: Design process and Design quality, Design concepts, the design model.

Creating an architectural design: Software architecture, Data design, Architectural styles and patterns, Architectural Design.

Object, Oriented Design: Objects and object classes, An Object, Oriented design process, Design evolution.

Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

UNIT - IV

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black Box and White Box testing, Validation testing, System testing, the art of Debugging.

Product metrics: Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Metrics for Process and Products: Software Measurement, Metrics for software quality.

UNIT – V

Risk Management: Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

Quality Management : Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

TEXT BOOKS:

1. Software engineering A practitioner's Approach, Roger S Pressman, 6th edition. McGraw Hill International Edition.

2. Software Engineering, Ian Sommerville, 7th edition, Pearson education.

REFERENCES BOOKS:

1. Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India, 2010.
2. Software Engineering: A Primer, Waman S Jawadekar, Tata McGraw,Hill, 2008.
3. Fundamentals of Software Engineering, Rajib Mall, PHI, 2005.
4. Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.swayam2.ac.in/cec20_cs07/preview
2. https://nptel.ac.in/courses/106/105/106105087/
3. https://onlinecourses.nptel.ac.in/noc19_cs69/preview

WEB REFERENCE/E-BOOKS:

1. https://www.javatpoint.com/software,engineering,tutorial
2. https://www.tutorialspoint.com/software_engineering/index.htm
3. https://www.geeksforgeeks.org/software,engineering/
4. https://www.tutorialandexample.com/software,engineering,tutorial/

CYBER SECURITY
IV B.TECH., II SEMESTER
OPEN ELECTIVE IV

Course Title: CYBER SECURITY	Course Code: AS20-05OE42
Teaching Scheme (L:T:P):3::0	Credits:3
Type of Course: Lecture + Assignment	Total Contact Periods: 48 Hours
Continuous Internal Evaluation:30 Marks	Semester End Exams:70 Marks
Prerequisites: Operating System, Computer Network	

Course Overview:

It is imperative to safe guard the individual, society, organization and the government from the dangers of cyber frauds, scams, threats and attacks. A complete and Comprehensive course can achieve this. This course is an inclusive course that covers all the aspects essential for understanding and for further exploration in Cyber Security Domain.

Course Objective

- To Identify and present indicators that a cybercrime has occurred and understand methods and tools used in cybercrimes.
- To collect, Process, Analyze and Present Computer Forensics Evidence.
- To understand the legal perspectives and Organizational implications of Cyber Security

Course Outcomes(s)

CO#	Course Outcomes
C423.1	Discuss different types of cybercrimes and analyze legal frameworks to deal with these cybercrimes.
C423.2	Describe Tools used in cybercrimes and laws governing cyberspace.
C423.3	Understand various cyber offenses mechanism towards cyber security.
C423.4	Analyze and resolve cyber security issues.
C423.5	Recognize the importance of digital evidence in prosecution.
C423.6	Analyze the commercial activities in the event of significant information security incidents in the Organization.

COURSE CONTENT

UNIT – I

Introduction to Cyber Crime: Cyber Crime: Definition and Origins of the Word, Cybercrime and Information Security, Classification of Cyber Crimes, Cyber Crime: The Legal Perspective, Cyber Crime: An Indian Perspective, A Global Perspective of Cyber Crime.

UNIT - II

Cyber Offenses: Introduction, How Criminals plan the Attacks, Social Engineering, Cyber stalking, Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector; **Tools and Methods Used in Cybercrime**: Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horse and Backdoors, Steganography, DoS and DDoS attacks, SQL Injection, Buffer Overflow.

UNIT – III

Cyber Security: The Legal Perspectives: Cyber Crime and the Legal Landscape around the World, Need of Cyber laws: the Indian Context, The Indian IT Act, Challenges to Indian Law and Cyber Crime Scenario in India, Digital Signatures and the Indian IT Act, Cyber Crime and Punishment, Cyber Law, Technology and Students: The Indian Scenario.

UNIT - IV

Understanding Cyber Forensics: Introduction ,Digital Forensics Science, Need for Computer Forensics, Cyber Forensics and Digital Evidence, Forensics Analysis of Email, Digital Forensics Life Cycle, Chain of Custody Concept, Network Forensics, Approaching a Cyber Forensics Investigation, Challenges in Computer Forensics.

UNIT – V

Cyber Security: Organizational Implications: Introduction, Cost of Cybercrimes and IPR issues, Web threats for Organizations, Security and Privacy Implications, Social media marketing: Security Risks and Perils for Organizations, Social Computing and the associated challenges for Organizations.

TEXT BOOKS:

1. Sunit Belpre and Nina Godbole, “Cyber Security: Understanding Cyber Crimes, Computer Forensics And Legal Perspectives”, Wiley India Pvt.Ltd, 2011.
2. Kevin Mandia, Chris Prosise, “Incident Response and computer forensics”, Tata McGraw Hill, 2006.

REFERENCES BOOKS:

1. Alfred Basta, Nadine Basta, Mary Brown, Ravinder Kumar, “Cyber Security and Cyber Laws”, Paperback – 2018.
2. Mark F Grady, FransescoParisi, “The Law and Economics of Cyber Security”,

Cambridge university press, 2006.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.swayam2.ac.in/cec20_cs15/preview
2. https://onlinecourses.swayam2.ac.in/nou19_cs08/preview
3. https://www.coursera.org/specializations/cyber,security
4. https://www.coursera.org/courses?query=cybersecurity&page=1

WEB REFERENCE/E-BOOKS:

1. https://www.javatpoint.com/cyber,security,tutorial
2. https://www.simplilearn.com/tutorials/cyber,security,tutorial
3. https://www.w3schools.in/category/cyber,security/

MOBILE COMPUTING
IV B.TECH., II SEMESTER
OPEN ELECTIVE IV

Course Title: MOBILE COMPUTING	Course Code: AS20-05OE43
Teaching Scheme (L:T:P):3:0:0	Credits:3
Type of Course: Lecture + Assignment	Total Contact Periods: 48 Hours
Continuous Internal Evaluation:30 Marks	Semester End Exams:70 Marks
Prerequisites: Computer networks, Operating System	

Course Overview:
To impart fundamental concepts in the area of mobile computing, to provide a computer systems perspective on the converging areas of wireless networking, embedded systems, and software, and to introduce selected topics of current research interest in the field.

Course Objective

- Understand and identify the GSM, GPRS and Bluetooth software model for mobile computing.
- Understand, analyze and explain problems associated to localization and movements, the wireless and wired communication architecture, handling of data and business application over slow wireless networks.
- Understand and identify business data management and security issues over slow wireless media.
- Understand, analyze and explain working of software mobile agents over long distances, transaction processing over wire and wireless media.
- Understand CDMA, communication protocols and QoS over wire and wireless channels.

Course Outcomes(s)

CO#	Course Outcomes
C423.1	Understand working, characteristics and limitations of mobile hardware devices including their user, interface modalities.
C423.2	Understand and learn frequency band, spectrum, air interface and channel structure.
C423.3	Understand the necessary knowledge of cellular communication, infrastructure, less networks.
C423.4	Understand DHCP and various routing protocols of MANET for Mobile computing.
C423.5	Analyze TCP, MAC protocols and their technical feasibility.
C423.6	Understand and implement the hardware components/architectures/ databases/operating system of mobile networks that is necessary to build self,confidence to develop novel products and solutions for real world.

COURSE CONTENT

UNIT – I

Introduction: History of wireless communication, Applications, Wireless transmission. Frequencies for radio transmission, Regulations, Signals, Antennas, Signal propagation, Multiplexing, Spread spectrum, Cellular Systems

UNIT - II

Medium access control: motivation for a specialized MAC, SDMA, FDMA, TDMA, CDMA

Telecommunication Systems: GSM, GPRS, DECT.

Satellite Networks: Applications, Basics, Routing, Localization, Handover, Examples.

UNIT – III

Broadcast Systems: DAB, DVB.

Wireless LAN: IEEE 802.11, Architecture, services, MAC, Physical layer.IEEE 802.11a, 802.11 b standards, HIPERLAN, Bluetooth.

UNIT - IV

Mobile IP: Dynamic Host Configuration Protocol, Routing in MANETs – Routing, DSDV, DSR, Alternative metrics, Overview ad-hoc routing protocols.

UNIT – V

Traditional TCP: Classical TCP improvements – WAP, and WAP 2.0., File Systems and Mobility Management, Windows CE, Palm OS, Symbian OS.

TEXT BOOKS:

1. Jochen H. Schiller, “Mobile Communications”, Addison Wesley, Second Edition, 2003.
2. William Stallings, “Wireless Communications and Networks”, PHI/Pearson Education, 2002.

REFERENCES BOOKS:

1. Asoke K Talukder, et al, “Mobile Computing”, Tata McGraw Hill, 2008.
2. Raj Kamal, “Mobile Computing”, Oxford University press.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://nptel.ac.in/courses/106/106/106106147/
2. https://nptel.ac.in/noc/courses/noc16/SEM2/noc16,cs13/
3. https://nptelmooc2013.appspot.com/noc16_cs13/preview

WEB REFERENCE/E-BOOKS:

1. https://www.javatpoint.com/mobile,computing
2. https://www.tutorialspoint.com/mobile_computing/index.htm
3. phptpoint.com/mobile,computing,tutorial/
4. https://www.simplilearn.com/mobile,technology,platforms,applications,tutorial,video

DATA MINING
IV B.TECH., II SEMESTER
OPEN ELECTIVE IV

Course Title: DATA MINING	Course Code: AS20-05OE44
Teaching Scheme (L:T:P):3:0:0	Credits:3
Type of Course: Lecture +Assignment	Total Contact Periods: 48 Hours
Continuous Internal Evaluation:30 Marks	Semester End Exams:70 Marks
Prerequisites: Database Management Systems and Knowledge of probability and statistics.	

Course Overview:
Data mining is study of algorithms for finding patterns in large data sets. It is an integral part of modern industry, where data from its operations and customers are mined for gaining business insight. It is also important in modern scientific endeavors. Data mining is an interdisciplinary topic involving, databases, machine learning and algorithms. The course will cover the fundamentals of data mining. It will explain the basic algorithms like data preprocessing, association rules, classification, clustering, sequence mining and visualization.

Course Objective

- Understand data mining principles and techniques: Introduce DM as a cutting edge business intelligence method and acquaint the students with the DM techniques for building competitive advantage through proactive analysis, predictive modeling, and identifying new trends and behaviors.
- Learn how to gather and analyze large sets of data to gain useful business understanding.
- Learn how to produce a quantitative analysis report/memo with the necessary information to make decisions.
- Describing and demonstrating basic data mining algorithms, methods, and tools.
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Course Outcomes(s)

CO#	Course Outcomes
C423.1	Understand operational database, warehousing and multidimensional need of data base to meet industrial needs.
C423.2	Understand data warehouse architecture and implementation, OLAP technique with cube computation for data mining.
C423.3	Apply the association rules for mining the data.
C423.4	Design and deploy appropriate classification techniques.
C423.5	Cluster the high dimensional data for better organization of the data.
C423.6	Compare and contrast the dominant data mining algorithms.

COURSE CONTENT

UNIT – I

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining Systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or a Data Warehouse System, Issues in Data Mining.

UNIT - II

Data Warehouse and OLAP Technology for Data Mining: Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Usage of Data Warehousing Online Analytical Processing and Mining Data Efficient Methods

UNIT – III

Mining Frequent Patterns, Associations and Correlations: Basic Concepts, The Apriori algorithm for finding frequent itemsets using candidate generation, Generating association rules from frequent itemsets, Mining frequent itemsets without candidate generation

UNIT - IV

Classification and Prediction: Description and comparison of classification and prediction, preparing data for Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Rule,Based Classification, Classification by Back propagation Prediction, linear and non,linear regression, evaluating accuracy of a Classifier or a Predictor.

UNIT – V

Cluster Analysis: Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, k,means and k,mediod methods, CLARANS, Agglomerative and divisive hierarchical clustering, chameleon dynamic modeling, Constraint,Based Cluster Analysis, Outlier Analysis.

TEXT BOOKS:

1. Jiawei Han, Micheline Kamber and Jian Pei, “Data Mining – Concepts and Techniques” , 3rd edition, Morgan Kaufmann Publishers, ELSEVIER,2012.
2. Pang,Ning Tan, Michael Steinbach and Vipin Kumar “Introduction to Data Mining”, Pearson Education, 2005.

REFERENCES BOOKS:

1. Sam Aanhory & Dennis Murray “Data Warehousing in the Real World”, Pearson Edn Asia.
2. K.P.Soman, S.Diwakar, V.Ajay ,”Insight into Data Mining”, PHI, 2008.
3. Ralph Kimball Wiley “The Data Warehouse Life cycle Tool kit”, student edition.
4. William H Inmon, John Wiley & Sons Inc “Building the Data Warehouse”, 2005.
5. Margaret H Dunham “Data Mining Introductory and advanced topics”, Pearson education.
6. Arun K Pujari “Data Mining Techniques”, 2nd edition, Universities Press.

ONLINE RESOURCES (SWAYAM/NPTEL/MOOCS/COURSERA):

1. https://onlinecourses.swayam2.ac.in/cec19_cs01/preview
2. https://onlinecourses.nptel.ac.in/noc20_cs12/preview
3. https://www.coursera.org/specializations/data,mining

WEB REFERENCE/E-BOOKS:

1. https://www.tutorialspoint.com/data_mining/index.htm
2. https://www.javatpoint.com/data,mining
3. https://data,flair.training/blogs/data,mining,tutorial/