B.TECH I SEMESTER

ESC	L	T	P	C
	3	0	3	3

20CE1T04 BUILDING MATERIALS AND CONSTRUCTION

Course Objectives:

- To learn about the nature, properties, classification and manufacturing process of building materials and familiarize with various methods of masonry construction.
- To understand the knowledge of building components, finishings.

SYLLABUS

UNIT - I: Stones, Bricks and Masonry Stones and Bricks

Properties of building stones, Relation to their structural requirements; Classification of stones, Stone quarrying, Precautions in blasting; Dressing of stone; Composition of good brick earth, various methods of manufacture of bricks; Comparison between clamp burning and kiln burning; Qualities of a good brick.

Masonry: Types of Masonry, Rubble and Ashlar masonry; English Bond, Flemish Bond and Rat Trap Bond; Cavity walls and Partition walls.

UNIT - II: Wood, Lime and Cement

Wood: Classification of various types of wood used in buildings, Structure of wood, Properties - Seasoning and Defects in timber.

Lime and Cement: Various ingredients of lime, Constituents of lime, Classification of lime.

Cement: composition, cement manufacturing process, various types of cements, their properties and uses; Various field and laboratory tests for Cement.

UNIT - III: Aggregates

Classification of aggregate, Coarse and Fine aggregates; Particle shape and Texture, Bond and Strength of Aggregate; Specific gravity; Bulk density

; Porosity and Absorption, Moisture content of Aggregate– Bulking of sand.

UNIT - IV: Building Components

Lintels, Arches, Vaults, Types of Stair cases; Different types of floors - Concrete, Mosaic and Terrazzo floors. Pitched, Flat and curved Roofs, Lean-to-Roof ; Coupled roofs, Trussed roofs- King and Queen Post Trusses, RCC flat and Shell roofs.

UNIT - V: Finishings

Damp proofing and Water proofing- materials used; Plastering, Pointing, Whitewashing and Distempering; Painting – Constituents of paints – Types of paints; Painting of new/old Wood Surface – Varnish – Form work and scaffolding.

Text books

1. Building materials,S K Duggal,third Edition – New Age International Publishers.
2. Building Construction,B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, third Edition - Laxmi Publications (P) ltd., New Delhi.

Reference Books

1. Construction Technology,R.Chudly– Volumes I and II 2nd Edition, Longman,UK, 1987.
2. Engineering Materials, S.C.Rangwala, Fourth Edition, Charotar Publications.
3. Building Construction,P.C.Varghese,SecondEdition, Prentice-Hall of India private Ltd,New Delhi.
4. The Text Book of Building Construction,S.P.Arora and S.P.Bindra, Dhanapati Rai, second Edition Publishers.
5. SP-7:2016 National Building Code of India 2016 (NBC 2016).

				L	T	P	C
B.TECH	I SEMESTER		ESC	0	0	3	1.5

20CE1L08 CIVIL ENGINEERING WORKSHOP

Course objectives:

- To outline the process of identification of various building components and their estimation
- To provide knowledge on operation of the various survey instruments used for linear and angular measurements.
- To explain the concept of measurement of discharge and velocity in a pipe and density of water
- To demonstrate automatic weather station

LIST OF EXPERIMENTS

1. Demonstration on usage of chain
2. Ranging – offsets – chain-age
3. To find the area of an irregular polygon using chain by using horizontal measurements
4. Determination of bearings and included angles with prismatic compass.
5. Demonstration on various Building materials used in construction
6. Estimation of quantity of bricks, concrete, wood, paint for the given single room building
7. Masonry work hands – on practice work deferent types of bonds in brick masonry
8. Identification of quality of brick through physical tests
9. Identification of soil based on their physical properties

10. Setting out of building: The student is required to set out a building (Single room only) as per the given building plan using tape and cross staff.
11. Demonstration on Installation of simple sanitary fittings and fixtures like Tap, T-joint, Elbow, bend, threading etc.
12. Finding the discharge velocity in a water pipe line also find density of water
13. Computation of Centre of gravity and moment of inertial of (i) I-section and (ii) Channel section.
14. Welding (arc welding and gas welding)
15. Carpentry (Demonstration)
16. Identify deferent types of roads in the campus and write the physical characteristics of layers
17. Demonstration on making of cement mortar/concrete for the given nominal mix
18. Study of given Topo -sheet

REFERENCE BOOKS:

1. Laboratory Manual for Basic Civil Engineering workshops

B.TECH II SEMESTER	BSC	L	T	P	C
		3	0	0	3

20CE2T01 TRANSFORM TECHNIQUES

Pre-requisite: Linear Algebra and Differential Equations

Course Objective: Objective of the course is to impart

- Learning the techniques of Laplace transforms to solve ordinary differential equations
- knowledge of Fourier series & Fourier transforms for piecewise continuous functions
- knowledge of solving boundary valued problems

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

CO1: Able to analyze a class of integrals in terms of beta and gamma functions

CO2: Provide the techniques of Laplace transformations and able to solve problems related to digital signal processing

CO3: Analyze the general periodic functions in the form of an infinite convergent sine and cosine series

CO4: Illustrate the methods to solve the boundary value problems

CO5: Determine a solution of a discrete system using Z- transforms

SYLLABUS

UNIT-I: Special functions:

Beta function, Properties & problems, Gamma function, properties & problems, Relation between Beta and Gamma functions, Evaluation of improper integrals.

UNIT-II: Laplace Transforms (all properties without proofs):

Definition, Transforms of elementary functions, properties of Laplace transforms, Transforms of periodic functions, Transforms of derivatives and integrals, Multiplication by t^n, Division by t, Evaluation of improper integrals.

Inverse Laplace transforms–Method of partial fractions, other methods of finding inverse transforms, Convolution theorem (without proof). Application: Application to differential equations

UNIT-III: Fourier Series & Fourier Transforms:

Euler's formulae (without proof), Conditions of Fourier expansion, Functions having points of discontinuity, Change of inerval, Even and odd functions, Half-range series.

Fourier Integral theorem (without proof), Fourier cosine & sine integral, complex form of Fourier integral, Fourier transform, Fourier sine & cosine transforms, properties of Fourier transforms (without proof), Convolution theorem(without proof), finite & infinite Fourier sine & cosine transforms.

UNIT-IV: Partial Differential Equations:

Formation of partial differential equations by eliminating arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and nonlinear (standard type) equations. Method of separation of Variables, Applications: One-dimensional wave and heat equations, two-dimensional heat equation.

UNIT-V: Z-Transforms: (all properties without proofs)

Introduction, definition, some standard z-transforms, linearity property, damping rule, some standard results, shifting U_n to the right, multiplication by n, initial and final value theorems, Inverse z-transforms, convolution theorem, evaluation of inverse z-transforms by partial fractions, applications to difference equations.

Text Books:

1. B. S. GREWAL, Higher Engineering Mathematics, Khanna Publishers, 43rd Edition, 2014.

2. B. V. RAMANA, Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:

3. ERWIN KREYSZIG, Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.

4. N. P. BALI & Dr. MANISH GOYAL, A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition, 2014.

B.TECH II SEMESTER **ESC**

L	T	P	C
3	0	0	3

20CE2T03 ENGINEERING MECHANICS

Objectives: The students completing this course are expected to understand the concepts of forces and its resolution in different planes, resultant of force system, forces acting on a body, their free body diagrams using graphical methods. They are required to understand the concepts of centre of gravity and moments of inertia and their application, Analysis of frames and trusses, different types of motion, friction and application of work - energy method.

Course outcomes:

1. The student should be able to draw free body diagrams for FBDs for particles and rigid bodies in plane and space and problems to solve the unknown forces, orientations and geometric parameters.
2. The student should be able to determine centroid for lines, areas and center of gravity for volumes and their composites.
3. The student should be able to determine area and mass movement of inertia for composite sections
4. The student should be able to analyze motion of particles and rigid bodies and apply the principles of motion, work energy and impulse – momentum.

SYLLABUS

UNIT – I

Objectives: The students are to be exposed to application of free body diagrams. Solution to problems using graphical methods and law of triangle of forces.

Introduction to Engg. Mechanics – Basic Concepts.

Systems of Forces: Coplanar Concurrent Forces – Components in Space – Resultant – Moment of Force and its Application – Couples and Resultant of Force Systems.

Equilibrium of Systems of Forces: Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, Spatial Systems for concurrent forces.

Lamis Theorm, Graphical method for the equilibrium of coplanar forces, Converse of the law of Triangle of forces, converse of the law of polygon of forces condition of equilibrium.

UNIT II

Objectives: The students are to be exposed to the concepts of force and friction, direction and its application.

Friction: Introduction**,** limiting friction and impending motion, coulomb's laws of dry friction, coefficient of friction, cone of friction, Wedges.

Analysis of plane trusses-Method of Joints, Method of Sections.

UNIT – III

Objectives : The students are to be exposed to concepts of centre of gravity.

Centroid: Centroids of simple figures (from basic principles) – Centroids of Composite Figures

Centre of Gravity: Centre of gravity of simple body (from basic principles), centre of gravity of composite bodies, Pappus theorems.

UNIT – IV

Objectives: The students are to be exposed to concepts of moment of inertia and polar moment of inertia including transfer methods and their applications.

Area moments of Inertia: Definition – Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product of Inertia.

Mass Moment of Inertia: Moment of Inertia of Masses, Transfer Formula for Mass Moments of Inertia, mass moment of inertia of composite bodies.

UNIT – V

Objectives: The students are to be exposed to rigid motion kinematics and

kinetics

Kinematics: Rectilinear and Curvilinear motions – Velocity and Acceleration

– Motion of Rigid Body – Types and their Analysis in Planar Motion

Kinetics: Analysis as a Particle and Analysis as a Rigid Body in Translation– Central Force Motion – Equations of Plane Motion – Fixed Axis Rotation – Rolling Bodies.

Work – Energy Method: Equations for Translation, Work-Energy Applications to Particle Motion, Connected System-Fixed Axis Rotation and Plane Motion. Impulse momentum method.

TEXT BOOKS :

1. Engineering Mechanics - S.Timoshenko & D.H.Young., 4th Edn - , Mc Graw Hill publications.
2. Engineering Mechanics- S S Bhavikati –New Age International Publishers

REFERENCES :

3. Engineering Mechanics, statics and dynamics – I.H.Shames, – Pearson Publ.
4. Engineering Mechanics, Fedinand . L. Singer, Harper – Collins.
5. Engineering Mechanics statics and dynamics , A Nelson , Mc Graw Hill publications
6. Engineering Mechanics- A K Tayal
7. Engieering Mechanics , R.K.Bansal, Laxmi Publications
8. Engg. Mechanics- KL Kumar-Tata McGraw Hill publications

B.TECH II SEMESTER	ESC	L	T	P	C
		3	0	0	3

20CE2T04 BUILDING PLANNING AND DRAWING

Course Objectives:

- Initiating the student to different building bye-laws and regulations.
- Imparting the planning aspects of residential buildings and public buildings.
- Giving training exercises on various signs and bonds and different building units.
- Imparting the skills and methods of planning of various buildings.

SYLLABUS

UNIT I: Building Byelaws and Regulations

Introduction- terminology- objectives of building byelaws- floor area ratio- floor space index- principles under laying building bye laws- classification of buildings- open space requirements – built up area limitations height of buildings- wall thickness – lightening and ventilation requirements.

Sign Conventions and Bonds

Brick, stone, plaster, sand filling, concrete, glass, steel, cast iron, copper alloys, aluminum alloys etc., lead, zinc, tin etc., earth, rock, timber and marbles. English bond and Flemish bond - odd and even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner.

UNIT II: Residential Buildings

Minimum standards for various parts of buildings requirements of different rooms and their grouping.

Characteristics of various types of residential buildings and relationship between plan, elevation and forms and functions

UNIT III: Public Buildings

Planning of educational institutions, hospitals, dispensaries, office

buildings, banks.

Industrial buildings, hotels and motels, buildings for recreation, Landscaping requirements.

UNIT IV: Doors, Windows, Ventilators And Roofs

Panelled door, panelled and glazed door, glazed windows, panelled windows, swing ventilators, fixed ventilators.

Coupled roof, collar roof, King Post truss, Queen Post truss Sloped and flat roof .

UNIT V: Planning and Designing Of Buildings.

Draw the Plan, Elevation and Sections of a Residential Buildings from the given line diagram.

Draw the Plan, Elevation and Sections of a Public Buildings from the given line diagram.

Text Books:

1. Planning, designing and Scheduling, Gurucharan Singh and Jagadish Singh
2. Building planning and drawing by M. Chakravarthi.
3. 3. 'A' Series & 'B' Series of JNTU Engineering College, Anantapur,

References:

1. Building drawing, M G Shah, C M Kale and S Y Patki, Tata McGraw Hill, New Delhi.
2. Principles of Building Drawing, M G Shah and C M Kale, Trinity Publications, New Delhi.
3. Civil Engineering drawing and House planning, B. P. Verma, Khanna publishers, New Delhi.
4. Civil Engineering Building practice, Suraj Singh: CBS Publications, New Delhi, and Chennai.
5. Building Materials and Construction, G. C Saha and Joy Gopal Jana, Mcgraw Hill Education (P) India Ltd. New Delhi.

B.TECH II SEMESTER	ESC	L	T	P	C
		0	0	3	1.5

20CE2L07: COMPUTER AIDED BUILDING DRAWING LAB

Course Objectives:

- The objective of this lab is to teach the student basic drawing fundamentals in various civil engineering applications, specially in building drawing.

Course Outcomes:

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

- Master the usage of Auto cad commands for drawing 2D & 3D building drawings required for different civil engineering applications.

LIST OF EXPERIMRNTS

1. Introduction to computer aided drafting .
2. Software for CAD – Introduction to different softwares.
3. Practice exercises on CAD software .
4. Drawing of plans of buildings using software a) Single storied buildings b) Multi storied buildings .
5. Developing sections and elevations for a) Single storied buildings b) Multi storied buildings.
6. Detailing of building components like Doors, Windows, Roof Trusses etc. using CAD softwares .
7. 7. Exercises on Development of working drawings of buildings (Residential ,Industrial ,Public buildings).

TEXT BOOKS:

1. Computer Aided Design Laboratory by M. N. Sesha Praksh & Dr. G. S. Servesh – Laxmi Publications.
2. Engineering Graphics by P. J. Sha – S. Chand & Co.

GEOTECHNICAL ENGINEERING

V SEMESTER

Lecture:2 Tutorial:1		Internal Marks	30
Credits:3		External Marks	70

Course Learning Objectives:

The objective of this course is:

- To enable the student to find out the index properties of the soil and classify it.
- To impart the concept of seepage of water through soils and determine the seepage discharge.
- To enable the students to differentiate between compaction and consolidation of soils and to determine the magnitude and the rate of consolidation settlement.
- To enable the student to understand the concept of shear strength of soils, assessment of the shear parameters of sands and clays and the areas of their application.

Course Outcomes:

Upon the successful completion of this course

- The student must know the definition of the various parameters related to soil mechanics and establish their inter-relationships.
- The student should be able to know the methods of determination of the various index properties of the soils and classify the soils.
- The student should be able to know the importance of the different engineering properties of the soil such as compaction, permeability, consolidation and shear strength and determine them in the laboratory.
- The student should be able to apply the above concepts in day-to-day civil engineering practice.

SYLLABUS:

UNIT – I Introduction: Soil formation – soil structure and clay mineralogy – Adsorbed water – Mass- volume relationship –Relative density, Mechanism of compaction – factors affecting – effects of compaction on soil properties - compaction control.

UNIT – II Index Properties Of Soils: Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices – Various Types of soil Classifications – Unified soil classification and I.S. Soil classification.

UNIT –III Permeability: Soil water – capillary rise – One dimensioned flow of water through soils – Darcy's law- permeability – Factors affecting –laboratory determination of coefficient of permeability –Permeability of layered systems. Total, neutral and effective stresses –quick sand condition.

Seepage through soils: 2-D flow and Laplace's equation - Seepage through soils – Flow nets: Characteristics and Uses.

UNIT – IV Consolidation: Compressibility of soils – e-p and e-log p curves – Stress history – Concept of consolidation - Spring Analogy - Terzaghi's theory of one-dimensional Consolidation – Time rate of consolidation and degree of consolidation – Determination of coefficient of consolidation (c_v) - Over consolidated and normally consolidated clays.

UNIT – V
Stress Distribution in Soils: Stresses induced by applied loads - Boussinesq's and Westerguard's theories for point loads and areas of different shapes– Newmark's influence chart – 2:1 stress distribution method.
Shear Strength of Soils: Basic mechanism of shear strength - Mohr – Coulomb Failure theories – Stress-Strain behavior of Sands - Critical Void Ratio – Stress-Strain behavior of clays – Shear Strength determination- various drainage conditions.

Text Books:

1. Basic and Applied Soil Mechanics, Gopal Ranjan and A. S. R. Rao, New Age International Publishers.
2. Soil Mechanics and Foundation Engineering, V. N. S. Murthy, CBS publishers

References:

1. Fundamentals of Soil Mechanics, D. W. Taylor, Wiley.
2. An introduction to Geotechnical Engineering, Holtz and Kovacs; Prentice Hall.
3. Fundamentals of Geotechnical Engineering, B M Das, Cengage Learning, New Delhi.
4. Craig's Soil Mechanics by J.A. Knappet & R. F. Craig, 8th Edition.

HYDROLOGY AND WATER RESOURCES ENGINEERING

V SEMESTER

Lecture:2 Tutorial:1		Internal Marks	30
Credits:3		External Marks	70

Course Learning Objectives:

The course is designed to

- Introduce hydrologic cycle and its relevance to Civil engineering
- Appreciate the water resources of India
- Make the students understand physical processes in hydrology and, components of the hydrologic cycle and estimation
- Provide an overview and understanding of Unit Hydrograph theory and its analysis
- Understand flood frequency analysis, design flood, flood routing
- Appreciate the concepts of groundwater movement and well hydraulics

Course Outcomes

At the end of the course the students are expected to

- Be able to quantify major hydrologic components and apply key concepts to several practical areas of engineering hydrology
- Develop Unit hydrograph, Intensity-Duration-Frequency to design hydraulic structures.
- Be able to develop design storms and carry out frequency analysis
- Be able to estimate flood magnitude and carry out flood routing.
- Be able to determine aquifer parameters and yield of wells.

SYLLABUS:

UNIT I Introduction: Engineering hydrology and its applications, Hydrologic cycle, Water resources of India, AP and Telangana, Water resources terminology, Hydrological data-Sources of data in India – Study on Srisailam, Nagarjuna Sagar , Polavaram and Kaleswaram Projects.

Precipitation: Types and forms, measurement, rain gauge network, presentation of rainfall data, average rainfall, continuity and consistency of rainfall data, frequency of rainfall, Intensity-Duration-Frequency (IDF) curves.

UNIT-II Abstractions from Precipitation: Initial abstractions.
Evaporation: factors affecting, measurement, reduction
Evapotranspiration: factors affecting, measurement, control
Infiltration: factors affecting, Infiltration capacity curve, measurement, infiltration indices.

UNIT-III Runoff: Catchment characteristics**,** Factors affecting runoff, components, computation- empirical formulae.
Hydrograph analysis: Components of hydrograph, effective rainfall hyetograph and direct runoff hydrograph, unit hydrograph, assumptions, construction of a flood hydrograph resulting from rainfall of unit duration; Application of unit hydrograph to construction of a flood hydrograph resulting from two or more periods of rainfall; Construction of unit hydrograph of different unit duration from a unit hydrograph of some given unit duration, S- hydrograph methods, limitations of unit hydrograph

UNIT-IV Floods: Causes and effects, frequency analysis- Gumbel's and Log-Pearson type III distribution methods; Terminology of flood - Standard Project Flood (SPF), Probable Maximum Precipitation (PMP), Probable Maximum Flood (MPF),Design storm and Design flood; Flood control methods and management.
Flood Routing: Methods, Muskingum method of flood routing.

UNIT-V Well Hydrology: Introduction; Aquifer; Aquicludes; Aquifuge; Specific yield; Specific retention; Divisions of sub–surface water; Water table; types of aquifers; Darcy's law; Dupit's theory for confined and unconfined aquifers; Constant level pumping test, Recuperation test.

Rainfall-runoff Modelling: Introduction to runoff models, Clark and Nash models

Text Books:

1. Engineering Hydrology, Jayarami Reddy, P., Laxmi Publications Pvt. Ltd., (2013), NewDelhi
2. Irrigation and Water Power Engineering, B. C. Punmia, Pande B. B. Lal, Ashok Kumar Jain and Arun Kumar Jain, Lakshmi Publications (P)Ltd.

References:

1. Engineering Hydrology Subramanya, K, Tata McGraw-Hill Education Pvt Ltd, (2013), New Delhi.
2. Irrigation Engineering and Hydraulic Structure, Santosh Kumar Garg, Khanna Publishers.
3. Applied hydrology, Chow V. T., D. R Maidment and L.W. Mays, Tata McGraw Hill Education Pvt Ltd, (2011), New Delhi.
4. Water Resources Engineering, Mays L.W, Wiley India Pvt. Ltd,(2013).

GEOTECHNICAL ENGINEERING LAB
V SEMESTER

Lecture: 0 Practical: 3	Internal Marks : 40
Credits:1.5	External Marks : 60

Course Objectives: To obtain index and engineering properties of locally available soils, and to understand the behavior of these soil under various loads.

LIST OF EXPERIMENTS

1. Grain size distribution by sieve analysis
2. Determination of Specific gravity of soil by pycnometer
3. Atterberg Limits (Liquid Limit, Plastic Limit, and shrinkage limit), Differential free swell index (DFSI)test
4. a) Field density by core cutter method and
   b) Field density by sand replacement method
5. Permeability of soil by constant and variable head test methods
6. Standard Proctor's Compaction Test
7. Determination of Coefficient of consolidation (square root time fitting method)
8. Unconfined compression test
9. Direct shear test
10. Vane shear test
11. Tri-Axial Test (unconsolidated and undrained)

Course Outcomes: At the end of the course, the student will be able to classify and evaluate the behavior of the soils subjected to various loads.

REFERENCE:

1. Measurement of Engineering Properties of Soils by. E. Saibaba Reddy & K. Rama Sastri, New Age International

CONSTITUTION OF INDIA

V Semester

Lecture: 2 Tutorial: 0 Internal Marks : 00
Credits: 0 External Marks : 00

Course Objectives:

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

Course Outcomes:

At the end of the semester/course, the student will be able to have a clear knowledge on the following:

- Understand historical background of the constitution making and its importance for building a democratic India.
- Understand the functioning of three wings of the government ie., executive, legislative and judiciary.
- Understand the value of the fundamental rights and duties for becoming good citizen of India.
- Analyze the decentralization of power between central, state and local self-government.
- Apply the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.

UNIT-I

Introduction to Indian Constitution: Constitution' meaning of the term, Indian Constitution - Sources and constitutional history, Features - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

UNIT-II

Union Government and its Administration Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha, The Supreme Court and High Court: Powers and Functions;

UNIT-III

State Government and its Administration Governor - Role and Position - CM and Council of ministers, State Secretariat: Organisation, Structure and Functions.

UNIT-IV

A Local Administration - District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation Pachayati Raj: Functions PRI: Zila Panchayat, Elected officials and their roles, CEO Zila Panchayat: Block level Organizational Hierarchy - (Different departments), Village level - Role of Elected and Appointed officials - Importance of grass root democracy.

UNIT-V

Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissionerate State Election Commission, Functions of Commissions for the welfare of SC/ST/OBC and women.

REFERENCES:

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt. Ltd.. New Delhi
2. Subash Kashyap, Indian Constitution, National Book Trust
3. J.A. Siwach, Dynamics of Indian Government & Politics
4. D.C. Gupta, Indian Government and Politics
5. H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)
6. J.C. Johari, Indian Government and Politics Hans
7. J. Raj Indian Government and Politics
8. M.V. Pylee, Indian Constitution Durga Das Basu, Human Rights in Constitutional Law, Prentice – Hall of India Pvt. Ltd. New Delhi
9. Noorani, A.G., (South Asia Human Rights Documentation Centre), Challenges to Civil Right), Challenges to Civil Rights Guarantees in India, Oxford University Press 2012

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

QUANTITATIVE APTITUDE AND REASONING
(Open Elective-I)

B.Tech V Semester

L	T	P	C
3	0	0	3

Course Objective:

- 1 .To study various concepts of athematic reasoning.
- To understand various concepts of Quantitative aptitude.

Course outcomes:

- Able to solve problems on number series, profit and loss ,ratio and proportion etc.
- Able to solve problems on time and work, pipes and cisterns, boats and streams etc.

Syllabus:

Unit-I

Divisibility and remainder rules of numbers: Unit digit , square root, cube root and simplification of numbers, HCF and LCM of numbers, Averages and Percentages. Alphabetical and miscellaneous series, Coding and decoding and Blood Relations.

Unit-II

Profit & loss, Simple interest and Compound interest: Direction, Order and Ranking, Sitting arrangement and Puzzle

Unit-III

Ratio & proportions, Partnership, Alligation and mixtures and Ages: Data sufficiency, Inequalities and Decision making.

Unit-IV

Time and work, Pipes & cisterns and Time and distance. Syllogism, Statement and course of action and Statement and Assumption.

Unit-V

Boats and streams, Areas, Volume and surface areas. Statement and argument, Cause and effect and Drawing inference.

Text Books:

1. "Objective Arithmetic" by R.S. Agarwal, S. Chand Publications.
2. Verbal and non-verbal Reasoning, R.S. Agarwal, S. Chand Publications

Reference Books:

1. Quantitative Aptitude by Dinesh Khattar, Pearson Education.
2. Quantitative Aptitude by Abhjit Guha.
3. Fast Track objective Arithmetic, Rajesh Verma, Arihant publications.

OPEN ELECTIVE – II

B) LOW COST HOUSING

VI SEMESTER

Lecture: 3	Practical: 0	Internal Marks:30
Credits: 3	Tutorial: 0	External Marks: 70

Course Objectives:

The objective of this course is:

1. To learn about Urban housing and Rural housing scenarios in India
2. To learn about Living conditions and planning for housing in urban Land
3. To learn about prefabrication technologies and its adaptation in India
4. To know about Low infrastructure services and Rural Housing.
5. To look over the housing techniques in disaster prone areas.

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

1. Able to analyze various Urban housing and Rural housing scenarios in India.
2. Able to plan housing conditions in urban and rural housing scenarios.
3. Application of prefabrication technologies for efficient housing in India.
4. Efficient construction of Earthquake resistant buildings

SYLLABUS

UNIT – I

Housing Scenario: Introduction, Status of urban housing, Status of Rural Housing

Housing Finance: Introduction, Existing finance system in India, Government role as facilitator, Status at Rural Housing Finance.

UNIT - II

Land use and planning for housing: Introduction, Planning of urban land, Urban land ceiling and regulation act, Efficiency of building bye laws, Residential Densities

Housing of the urban poor: Introduction, Living conditions in slums, Approaches and strategies for housing urban poor.

UNIT – III

Development and Adopt on Low Cost Housing Technology

Adoption of innovative cost effective construction techniques, Adoption of precast elements in partial prefabrication, Adopting of total prefabrication of mass housing in India, General remarks on pre cast rooting/flooring systems, Economical wall system, Single Brick thick loading bearing wall, Fly ash & gypsum for masonry, Adoption of precast R.C. plank and join system for roof/floor in the building.

UNIT – IV

Alternative Building Materials for Low Cost Housing: Substitution for scarce materials, Ferro cement, Gypsum boards, Timber substitutions, Industrial wastes, Agricultural wastes.

Low Cost Infrastructure Services Current status, Technological options, Low cost sanitation's, Domestic wall, Water supply energy.

Rural Housing: Introduction, traditional practice of rural housing continuous, Mud Housing technology, Mud roofs, Characteristics of mud, Fire resistant treatment for thatched roof, Soil stabilization, Rural Housing programs.

UNIT – V

Housing in Disaster Prone Areas: Earthquake- Damages to houses, Traditional Houses in disaster prone areas- Type of Damages in non-engineered buildings, Repair and restore action of earthquake Damaged non-engineered buildings recommendations for future constructions, Requirements of structural safety of thin precast roofing units against, Earthquake forces, Status of R&D in earthquake strengthening measures, Floods, cyclone, future safety.

TEXTBOOKS

1. Building materials for low –income houses – International council for building research studies and documentation.
2. Hand book of low cost housing by A.K.Lal – Newage international publishers.
3. Low cost Housing – G.C. Mathur.

REFERENCES

1. Modern trends in housing in developing countries – A.G. Madhava Rao, D.S. Ramachandra Murthy & G.Annamalai.
2. Light weight concrete, Academic Kiado, Rudhai.G – Publishing home of Hungarian Academy of Sciences 1963.

B.TECH I SEMESTER **BSC**

L	T	P	C
3	0	0	3

20EE1T02 APPLIED PHYSICS

Pre-requisite: Knowledge of basic concepts of waves, Optics, Electricity and Magnetism

Course Objective: Objective of the course is to impart

- ***Knowledge*** of fundamentals of Physics which helps them in the study of advanced topics of Engineering.
- ***Develop*** analytical capability and understand various Engineering concepts.

Course Outcomes:

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

CO1: ***Impart*** knowledge of Physical Optics phenomenon Polarization and identify these phenomenon in natural processes

CO2: ***Gain*** knowledge of applications of lasers and optical fibers in various fields .

CO3: ***Classify*** magnetic and dielectric materials and their Engineering applications.

CO4: ***Understand*** basic quantum mechanics and free electron theories.

CO5: ***Obtain*** the concept of concept of holes and electrons in semiconductors.

SYLLABUS

UNIT-I: Wave Optics:

Interference*:* Introduction-Principle of Superposition – Coherent Sources – Interference in thin films (reflection geometry) – Colors in thin films-Newton's rings-Determination of wave length nd refractive index.

Diffraction: C Introduction- Fresnel and Fraunhofer diffraction - Fraunhofer Diffraction due to Single slit, Double slit, N –slits(Qualitative) - Diffraction Grating – Resolving Power of Grating(Qualitative).

Polarizations: Introduction- Types of polarization-polarization by reflection, refraction and Double refraction-Nicol's prism –Half and Quarter wave plates.

UNIT-II: Lasers and Fiber Optics:

Lasers:: Introduction – Characteristics of laser – Spontaneous and Stimulated emissions of radiation – Einstein's coefficients – Population inversion – Lasing action - Pumping Schemes – Ruby laser – He-Ne laser - Applications of lasers.

***Fiber optics*:** Introduction –Principle of optical fiber-Construction- - Acceptance Angle - Numerical Aperture -Classification of optical fibers based on refractive index profile and modes .

UNIT-III: Magnetic and Dielectric Materials:

***Magnetic Materials*:** Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr magneton – Classification of magnetic materials: Dia, para ferro, anti ferro & ferri – Domain concept of Ferromagnetism(Qualitative) - Hysteresis – soft and hard magnetic materials .

***Dielectric Materials*:** Introduction - Dielectic polarization **–** Dielectric Polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative) – Lorentz Internal field – Claussius-Mossoti equation.

UNIT-IV: Quantum Mechanics,Free Electron Theory:

***Quantum Mechanics*:** Dual nature of matter – Heisenberg's Uncertainty Principle – Significance and properties of wave function – Schrodinger's time independent and dependent wave equations– Particle in a one-dimensional infinite potential well.

***Free Electron Theory*:** Classical free electron theory (Qualitative with discussion of merits and demerits) – Quantum free electron theory– Equation for electrical conductivity based on quantum free electron theory- Fermi-Dirac distribution-Density of States(3D),Fermi energy.

UNIT-V: Band Theory of Solids and Semiconductors:

Band theory of Solids: Introduction- Bloch's Theorem (Qualitative) - Kronig - Penney model (Qualitative)- E vs K diagram - V vs K diagram - effective mass of electron – Classification of crystalline solids–concept of hole.

***Semiconductors:*:**Introduction– Intrinsic semi conductors - density of charge carriers - Electrical conductivity – Fermi level – extrinsic semiconductors - p-type & n-type - Density of charge carriers - Dependence of Fermi energy on

carrier concentration and temperature – Drift and Diffusion currents – Einstein's equation-Hall effect- Hall coefficient - Applications of Hall effect.

Text Books

1. "A Text book of Engineering Physics" by M.N. Avadhanulu, P.G. Kshirsagar - S. Chand Publications, 2019.
2. "Engineering Physics" by D.K. Bhattacharya and Poonam Tandon, Oxford press (2015).
3. "Engineering Physics" by R.K Gaur. and S.L Gupta., - Dhanpat Rai publishers, 2012.

Reference Books

1. Applied Physics by P.K. Palanisamy, Scitech publications (2014).
2. Engineering Physics by M. Arumugam, Anuradha Publication (2014).
3. Physics for Engineers by M.R. Srinivasan, New Age international publishers (2009).

B.TECH I SEMESTER	ESC	L	T	P	C
		3	0	0	3

20EE1T04 BASIC MECHANICAL ENGINEERING

Course objectives:

- To make the student familiar with systems of forces
- To create awareness on various pumps, turbines and their working principles
- To make the student understand the concept of hydroelectric power plant, its components and principle
- To induce knowledge about thermodynamics, laws and applications
- To make the student familiar with power cycle and refrigeration cycles

Course outcomes: at the end of the course, the student will be able to

CO1: Understand the concept of systems of forces

CO2: Learn about various pumps, turbines and their working principles

CO3: understand the concept of hydroelectric power plant, its components and principle

CO4: learn about thermodynamics, laws and applications

CO5: know with power cycle and refrigeration cycles

SYLLABUS

UNIT-I

Introduction to Engg. Mechanics – Basic Concepts. Systems of Forces: Coplanar Concurrent Forces– Resultant – Moment of Force and its Application – Couples and Resultant of Force Systems.

Equilibrium of Systems of Forces: Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, Spatial Systems for concurrent forces. Lamis Theorm, analysis of plane trusses.

UNIT-II

Pumps: Types of pumps, Main components, working principle

Hydro Prime Movers: Hydraulic Turbines: Classification, Principles and operations of Pelton wheel, Francis turbine and Kaplan turbine, Performance and characteristic curves.

Unit-III

Hydro Power: Components of hydro-electric power plant, Estimation of water power potential, Estimation of load on turbines: load curve, load factor, capacity factor, utilization factor, diversity factor, load-duration curve, firm power, secondary power, prediction of load.

UNIT-IV

Heat and Work: Heat and Work, Point and Path function. Zeroth Law of Thermodynamics – Concept of Temperature – Principles of Thermometry – Reference Points – Const. Volume gas Thermometer – Scales of Temperature, Ideal Gas Scale – PMM I, Problems on heat and work for various processes.

First law of thermodynamics, application of steady flow energy equation to various components of a power plant (boiler, turbine, condenser and pump), Carnot engine.

UNIT-V

Introduction to cycles: Power cycle: Introduction to 2 stroke and 4 stroke engine, Otto cycle, Diesel cycle, problems on Otto and Diesel cycle

Refrigeration cycle: Refrigerant, Vapour compression refrigeration (VCR) cycle, Problems on VCR cycle, vapour absorption refrigeration cycle, domestic refrigerator, window and split AC.

Text books:

1. Engineering Thermodynamics, PK Nag 4th Edn , TMH.
2. Hydraulics & Fluid Mechanics Including Hydraulics Machines, Dr. P.N. Modi & Dr. S.M. Seth, Rajsons Publ, 21st Ed., 2017.
3. Engg. Mechanics - S.Timoshenko & D.H.Young., 4th Edn - , Mc Graw Hill publications
4. Strength of materials by Bhavikatti, Lakshmi publications.

References:

1. A Textbook of Elements of Mechanical Engineering", S Trymbaka Murthy, University Press (India) Pvt Ltd, 4th Edition, 2006.6

B.TECH I SEMESTER	BSC	L	T	P	C
		0	0	3	1.5

20EE1L07 APPLIED PHYSICS LAB

Pre-requisite: Fundamental understanding of usage of an instrument with proper care.

Course Objective: Objective of the course is to impart

- Training Engineering graduates to handle instruments and their usage methods to improve the accuracy of measurements.

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

CO1: **Outcomes**: The student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

CO2: Implement the basic principles of Mechanics to measure different physical parameters.

CO3: Enhance the knowledge of Usage of electronic devices in various applications

SYLLABUS

1. Newton's rings –Determination of radius of curvature of Plano Convex Lens.
2. Determination of wavelength of spectral lines -Diffraction Grating
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Determination of wavelength of laser source using diffraction grating
5. Determination of Numerical Aperture and bending loss of a given Optical Fiber.
6. Determination of dispersive power of prism.
7. Determination of Rigidity modulus of a material- Torsional Pendulum.
8. Determination of Acceleration due to Gravity and Radius of Gyration-Compound Pendulum.
9. Determination of Young's modulus by method of single cantilever oscillations
10. Verification of laws of vibrations in stretched strings – Sonometer.
11. Estimation of Planck's Constant using Photo electric Effect

12. Study of I /V Characteristics of Semiconductor diode.
13. I/V characteristics of Zener diode.
14. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus
15. Energy Band gap of a Semiconductor using p - n junction diode

Reference Books

1. A Text book of Practical Physics, Balasubramanian S, Srinivasan M.N, S Chand Publishers, 2017.

B.TECH I SEMESTER **ESC**

L	T	P	C
0	0	3	1.5

20EE1L08 ELECTRICAL ENGINEERING WORKSHOP

Course Objectives:

- To demonstrate the usage of measuring equipment
- To train the students in setting up simple wiring circuits
- To impart methods in electrical machine wiring

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

CO 1: Explain the limitations, tolerances, safety aspects of electrical systems and wiring.

CO 2: Select wires/cables and other accessories used in different types of wiring.

CO 3: Measure current, voltage and power in a circuit.

CO 4: Make simple lighting and power circuits.

LIST OF EXPERIMENTS

1 Study of various supply systems, electrical symbols, tools and safety aspects.

2 Study of different switches, MCBs, measuring instruments (Ammeter, Voltmeter Wattmeter and Multimeter), wires and cables.

3 Identification and measurement of resistance, inductance & capacitance.

4 Practice house wiring with MCB, 3 pin socket, 2 way control of lamp.

5 Wiring of backup power supply for domestic installations including inverter, battery and load.

6 Practice soldering with simple electronic components on PCB

7 Estimation of Power loads

8 Maintenance /Charging of the Batteries.

9 Testing of Refrigerator and Geyser

10 Understanding the concept of earth pit, importance of earth resistance and it's measurement.

B.TECH II SEMESTER	BSC	L	T	P	C
		3	0	0	3

20EE2T01 TRANSFORM TECHNIQUES

Pre-requisite: Linear Algebra and Differential Equations

Course Objective: Objective of the course is to impart

- Learning the techniques of Laplace transforms to solve ordinary differential equations
- knowledge of Fourier series & Fourier transforms for piecewise continuous functions
- knowledge of solving boundary valued problems

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

CO1: Able to analyze a class of integrals in terms of beta and gamma functions

CO2: Provide the techniques of Laplace transformations and able to solve problems related to digital signal processing

CO3: Analyze the general periodic functions in the form of an infinite convergent sine and cosine series

CO4: Illustrate the methods to solve the boundary value problems

CO5: Determine a solution of a discrete system using Z- transforms

SYLLABUS

UNIT-I: Special functions:

Beta function, Properties & problems, Gamma function, properties & problems, Relation between Beta and Gamma functions, Evaluation of improper integrals.

UNIT-II: Laplace Transforms (all properties without proofs):

Definition, Transforms of elementary functions, properties of Laplace transforms, Transforms of periodic functions, Transforms of derivatives and integrals, Multiplication by t^n, Division by t, Evaluation of improper integrals.

Inverse Laplace transforms–Method of partial fractions, other methods of finding inverse transforms, Convolution theorem (without proof). **Application:**

Application to differential equations.

UNIT-III: Fourier Series & Fourier Transforms:

Euler's formulae (without proof), Conditions of Fourier expansion, Functions having points of discontinuity, Change of inerval, Even and odd functions, Half-range series.

Fourier Integral theorem (without proof), Fourier cosine & sine integral, complex form of Fourier integral, Fourier transform, Fourier sine & cosine transforms, properties of Fourier transforms (without proof), Convolution theorem(without proof), finite & infinite Fourier sine & cosine transforms.

UNIT-IV: Partial Differential Equations:

Formation of partial differential equations by eliminating arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and nonlinear (standard type) equations. Method of separation of Variables, Applications: One-dimensional wave and heat equations, two-dimensional heat equation.

UNIT-V: Z-Transforms: (all properties without proofs)

Introduction, definition, some standard z-transforms, linearity property, damping rule, some standard results, shifting U_n to the right, multiplication by n, initial and final value theorems, Inverse z-transforms, convolution theorem, evaluation of inverse z-transforms by partial fractions, applications to difference equations.

Text Books:

1. B. S. GREWAL, Higher Engineering Mathematics, Khanna Publishers, 43rd Edition, 2014.
2. B. V. RAMANA, Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:

1. ERWIN KREYSZIG, Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.
2. N. P. BALI & Dr. MANISH GOYAL, A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition, 2014.

B.TECH II SEMESTER	BSC	L	T	P	C
		3	0	0	3

20EE2T02 APPLIED CHEMISTRY

Pre-requisite: Knowledge of basic concepts of Chemistry for Engineering students will help them as professional engineers later in design and material selection, as well as utilizing the available resources

Course Objective: Objective of the course is to impart

- Importance of usage of plastics in household appliances and composites (FRP) in aerospace and automotive industries.
- Outline the basics for the construction of electrochemical cells, batteries and fuel cells. Understand the mechanism of corrosion and how it can be prevented.
- Explain the preparation of semiconductors and nanomaterials, engineering applications of nanomaterials, superconductors and liquid crystals.
- Recall the increase in demand for power and hence alternative sources of power are studied due to depleting sources of fossil fuels. Advanced instrumental techniques are introduced.
- Outline the basics of green chemistry and molecular switches

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

CO1: Analyze the different types of composite plastic materials and interpret the mechanism of conduction in conducting polymers.

CO2: Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning new engineering products and categorize the reasons for corrosion and study methods to control corrosion.

CO3: Synthesize nanomaterials for modern advances of engineering technology. Summarize the preparation of semiconductors; analyze the applications of liquid crystals and superconductors.

CO4: Design models for energy by different natural sources.
Analyze the principles of different analytical instruments and their applications.

CO5: Obtain the knowledge of green chemistry and molecular machines

SYLLABUS

UNIT-I: Polymer Technology

Polymerisation: Introduction, methods of polymerization (addition and Condensation), Physical and mechanical properties.

Plastics: Compounding, fabrication (compression, injection, blown film and extrusion), preparation, properties and applications (PVC, polycarbonates and Bakelite), mention some examples of plastic materials used in electronic gadgets.

Elastomers: Natural rubber-Drawbacks-vulcanization, preparation, properties and applications (Buna S, thiokol and polyurethanes).

Composite materials: Fiber reinforced plastics – GFRP and Aramid FRP

Conducting polymers: Intrinsic and extrinsic conducting polymers

Biodegradable polymers: preparation and applications

UNIT-II: Electrochemical Cells And Corrosion

Part I: ELECTROCHEMICAL CELLS: Single electrode potential, electrochemical series and uses of series, standard hydrogen electrode,calomel electrode, batteries (Dry cell, Li ion battery and zinc air cells), fuel cells (H_2-O_2, CH_3OH-O_2, phosphoric acid and molten carbonate).

Part II: Corrosion: Definition, theories of corrosion (chemical and electrochemical), galvanic corrosion, differential aeration corrosion, stress corrosion, galvanic series, factors influencing rate of corrosion, corrosion control (cathodic protection), Protective coatings (cathodic coatings, anodic coatings, electroplating and electroless plating)

UNIT-III: Material Chemistry

Part I: Non-elemental semiconducting materials: Stoichiometric, controlled valency & chalcogen photo/semiconductors-preparation of semiconductors (distillation, zone refining, Czochralski crystal pulling technique) - Semiconductor devices (p-n junction diode as rectifier, junction transistor).

Super conductors:-Type –I, Type II-characteristics and applications

Part II: Nano materials: Introduction, sol-gel method, characterization by (Brunauer Emmet Teller [BET]), (scanning electron microscopy [SEM]) and (transmission electron microscopy [TEM]),applications of graphene and

fullerenes, carbon nanotubes (types, preparation and applications)

Liquid crystals: Introduction-types-applications.

UNIT-IV: Non-Conventional Energy Sources & Spectroscopy

Part I: NON-CONVENTIONAL ENERGY SOURCES

Design, working, schematic diagram, advantages and disadvantages of photovoltaic cell, hydropower, geothermal power, tidal and wave power, ocean thermal energy conversion.

Part II: **SPECTROSCOPY**

UV spectroscopy- Basic principle-Instrumentation-Applications

IR spectroscopy- Basic principle-Instrumentation-Applications

NMR spectroscopy- Basic principle-Instrumentation-Applications

UNIT-V: Advanced Concepts/Topics In Chemistry

Part-I: Green chemistry: Introduction, Principles of green chemistry, Green synthesis-Aquaeous Phase method-Microwave method-Phase transfer catalysis method, R4M4 principles (Econoburette).

PART-II: Molecular switches: characteristics of molecular motors and machines, Rotaxanes and Catenanes as artificial molecular machines, prototypes – linear motions in rotaxanes, an acid- base controlled molecular shuttle, a molecular elevator, an autonomous light-powered molecular motor.

Text Books:

1. P.C. Jain and M. Jain “Engineering Chemistry”, 15/e, Dhanpat Rai & Sons, Delhi,(Latest edition).
2. Shikha Agarwal, “Engineering Chemistry”, Cambridge University Press, New Delhi,(2019).
3. S.S. Dara, “A Textbook of Engineering Chemistry”, S.Chand & Co, (2010).
4. Shashi Chawla, “Engineering Chemistry”, Dhanpat Rai Publicating Co. (Latest edition).

References:

1. K. Sesha Maheshwaramma and Mridula Chugh, "Engineering Chemistry", Pearson India
2. O.G. Palana, "Engineering Chemistry", Tata McGraw Hill Education Private Limited,(2009).
3. CNR Rao and JM Honig (Eds) "Preparation and characterization of materials"Academic press, New York (latest edition)
4. B. S. Murthy, P. Shankar and others, "Textbook of Nanoscience and Nanotechnology",University press (latest edition)

B.TECH II SEMESTER **ESC**

L	T	P	C
3	0	0	3

20EE2T05 PROBLEM SOLVING THROUGH C

Pre-requisite:

Course Objective:

- To learn about the computer systems, computing environments, developing of a computer program and Structure of a C Program
- To gain knowledge of the operators, selection, control statements and repetition in C. To learn about the design concepts of arrays, strings, enumerated structure and union types and their usage. To assimilate about pointers, dynamic memory allocation and know the significance of Preprocessor. To assimilate about File I/O and significance of functions

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

CO1: Understand the basic concepts of programming

CO2: Understand and Apply loop construct for a given problem

CO3: Demonstrate the use pointers

CO4: Understand the use of functions and develop modular reusable code

CO5: Understand File I/O operations

SYLLABUS

UNIT-I:

INTRODUCTION TO COMPUTERS: Functional Components of computer, computer software, categories of memory, types of programming languages, Development of algorithms, flow charts, software development process, Computer Numbering system

BASICS OF C PROGRAMMING: Introduction to programming paradigms, Structure of C program, Data Types, C Tokens, Operators: Precedence and Associativity, Expressions Input/output statements, Assignment statements

UNIT-II:

Decision making statements: if, if else, nester if. Multi way decision making statements: else if, Switch statement. **Loop statements**: while, do while, for, Compilation process.

UNIT-III:

Introduction to Arrays: Declaration, Initialization, One dimensional array, Example Programs on one dimensional array, Selection sort, linear and binary search, two dimensional arrays, Matrix Operations, Multi-dimensional Arrays

Strings: Declaration, String operations: length, compare, concatenate, copy, String handling functions.

UNIT-IV:

FUNCTIONS: Introduction to functions: Function prototype, function definition, function call, Built-in functions, Recursion, Storage classes, Passing Arrays & Strings to the functions, Preprocessor directives

POINTERS: Pointers, Pointer operators, Pointer arithmetic, Arrays and pointers, Array of pointers, Parameter passing: Pass by value, Pass by reference, Dynamic Memory Allocation

UNIT-V:

STRUCTURES AND UNIONS: Structure, Nested structures, Pointer and Structures, Array of structures, Example Program using structures and pointers, Self-referential structures, Unions.

FILE PROCESSING: Files, Types of file processing: Sequential access, Random access, Sequential access file, Random access file, Command line arguments

Text Books:

1. Krnighan. B.W and Ritche, D.M, “The C Programming Language”, Second Edition, Pearson Education, 2006
2. ReemaThareja, “Programming in C”, Oxford University Press, Second Edition, 2016.

References:

1. Pradepdey, Manas Ghosh, “Fundamentals of Computing and programming in C”, First Edition, Oxford University Press, 2009.
2. Paul Deitel and Harvey Deitel, “C How to Program”, Seventh Edition, Pearson Publication.
3. E Balagursamy, “Programming in C, Sixth Edition, Tata McGraw Hill.
4. Ajay Mittal, “Programming in C A practical Approach”, Pearson education

B.TECH II SEMESTER	BSC	L	T	P	C
		0	0	3	1.5

20EE2L06 APPLIED CHEMISTRYLAB

Pre-requisite: Acquire some experimental skills.

Course Objective: Objective of the course is to impart

- The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations.
- A few instrumental methods of chemical analysis.

Course Outcomes:

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

CO1: The student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

LIST OF EXPERIMENTS

1 Determination of HCl using standard Na2CO3 solution.

2 Determination of alkalinity of a sample containing Na2CO3 and NaOH.

3 Determination of Mn+2 using standard oxalic acid solution.

4 Determination of ferrous iron using standard K2Cr2O7 solution.

5 Determination of Cu+2 using standard hypo solution.

6 Determination of temporary and permanent hardness of water using standard EDTA solution.

7 Determination of Fe+3 by a colorimetric method.

8 Determination of the concentration of acetic acid using sodium hydroxide (pH-metry method).

9 Determination of iso-electric point of amino acids using pH-metry method/conductometric method

10 Determination of the concentration of strong acid vs strong base (by

conductometric method).

11 Determination of strong acid vs strong base (by potentiometric method).

12 Determination of Mg+2 present in an antacid.

13 Determination of CaCO3 present in an egg shell.

14 Estimation of Vitamin C.

15 Determination of phosphoric content in soft drinks.

16 Adsorption of acetic acid by charcoal.

17 Preparation of nylon-6, 6 and Bakelite (demonstration only).

B.TECH II SEMESTER **ESC**

L	T	P	C
0	0	3	1.5

20EE2L08 PROBLEM SOLVING THROUGH C LAB

Course Objectives:

- Apply the principles of C language in problem solving.
- To design flowcharts, algorithms and knowing how to debug programs.
- To design & develop of C programs using arrays, strings pointers &functions.
- To review the file operations, preprocessor commands.

Course Outcomes:

- Demonstrate Knowledge on various concepts of a C language.
- Able to draw flowcharts and write algorithms.
- Able design and development of C problem solving skills.
- Able to design and develop modular programming skills.
- Able to trace and debug a program

Exercise 1:

1. Write a C program to print a block F using hash (#), where the F has a height of six characters and width of five and four characters.
2. Write a C program to compute the perimeter and area of a rectangle with a height of 7 inches and width of 5inches.
3. Write a C program to display multiple variables.

Exercise 2:

1. Write a C program to calculate the distance between the two points.
2. Write a C program that accepts 4 integers p, q, r, s from the user where r and s are positive and p is even. If q is greater than r and s is greater than p and if the sum of r and s is greater than the sum of p and q print "Correct values", otherwise print "Wrong values".

Exercise 3:

1. Write a C program to convert a string to a long integer.
2. Write a program in C which is a Menu-Driven Program to compute the area of the various geometrical shape.
3. Write a C program to calculate the factorial of a given number.

Exercise 4:

1. Write a program in C to display the n terms of even natural number and their sum.
2. Write a program in C to display the n terms of harmonic series and their sum. 1 + 1/2 + 1/3 + 1/4 + 1/5 ... 1/n terms.
3. Write a C program to check whether a given number is an Armstrong number or not.

Exercise 5:

1. Write a program in C to print all unique elements in an array.
2. Write a program in C to separate odd and even integers in separate arrays.
3. Write a program in C to sort elements of array in ascending order.

Exercise 6:

1. Write a program in C for multiplication of two square Matrices.
2. Write a program in C to find transpose of a given matrix.

Exercise 7:

1. Write a program in C to search an element in a row wise and column wise sorted matrix.
2. Write a program in C to print individual characters of string in reverse order.

Exercise 8:

1. Write a program in C to compare two strings without using string library functions.
2. Write a program in C to copy one string to another string.

Exercise 9:

1. Write a C Program to Store Information Using Structures with Dynamically Memory Allocation
2. Write a program in C to demonstrate how to handle the pointers in the program.

Exercise 10:

1. Write a program in C to demonstrate the use of & (address of) and *(value at address) operator.
2. Write a program in C to add two numbers using pointers.

Exercise 11:

1. Write a program in C to add numbers using call by reference.
2. Write a program in C to find the largest element using Dynamic Memory Allocation.

Exercise 12:

1. Write a program in C to swap elements using call by reference.
2. Write a program in C to count the number of vowels and consonants in a string using a pointer.

Exercise 13:

1. Write a program in C to show how a function returning pointer.
2. Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc( )function.

Exercise 14:

1. Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc( ) function. Understand the difference between the above two programs
2. Write a program in C to convert decimal number to binary number using the function.

Exercise 15:

1. Write a program in C to check whether a number is a prime number or not using function.
2. Write a program in C to get the largest element of an array using the function.

Exercise 16:

1. Write a program in C to append multiple lines at the end of a text file.
2. Write a program in C to copy a file in another name
3. Write a program in C to remove a file from the disk.

SWITCH GEAR AND PROTECTION

B.Tech VI Semester

L	T	P	C
3	0	0	3

Course Objective:

- To provide the basic principles and operation of various types of circuit breakers.
- To study the classification, operation and application of different types of electromagnetic protective relays.
- To explain protective schemes, for generator and transformers, various protective schemes used for feeders and bus bars.
- To explain the principle and operation of different types of static relays.
- To study different types of over voltages in a power system and principles of different protective schemes for insulation co–ordination.

Course Outcome:

- Able to understand the principles of arc interruption for application to high voltage circuit breakers of air, oil, vacuum, SF6 gas type.
- Ability to understand the working principle and operation of different types of electromagnetic protective relays.
- Students acquire knowledge of faults and protective schemes for high power generator and transformers and understand various types of protective schemes used for feeders and bus bar protection.
- Able to understand different types of static relays and their applications.
- Able to understand different types of over voltages and protective schemes required for insulation co–ordination.

SYLLABUS

UNIT-I

Circuit Breakers: Miniature Circuit Breaker(MCB)– Elementary principles of arc interruption– Restriking Voltage and Recovery voltages– Restriking phenomenon - RRRV– Average and Max.RRRV– Current chopping and Resistance switching– Introduction to oil circuit breakers–Description and operation of Air Blast– Vacuum and SF6 circuit breakers– CB ratings and specifications.

UNIT-II

Electromagnetic Protection: Relay connection – Balanced beam type attracted armature relay - induction disc and induction cup relays–Torque equation - Relays classification–Instantaneous– DMT and IDMT types– Applications of relays**:** Over current and under voltage relays– Directional relays– Differential relays and percentage differential relays– Universal torque equation–Distance relays**:** Impedance– Reactance– Mho and offset mho relays– Characteristics of Distance relays and comparison

UNIT-III

Static relays: Introduction to static relays and Static relay components

Generator Protection: Protection of generators against stator faults– Rotor faults and abnormal conditions– restricted earth fault and inter turn fault protection

UNIT IV

Transformer Protection: Protection of transformers**:** Percentage differential protection– Design of CT's ratio– Buchholz relay protection

Feeder and Bus bar Protection: Protection of lines**:** Over current Protection schemes – PSM,TMS - Numerical examples - Carrier current and three zone distance relay using impedance relays–Protection of bus bars by using Differential protection

UNIT-V

Protection against over voltage and grounding: Generation of over voltages in power systems– Protection against lightning over voltages– Valve type and zinc oxide lighting arresters– Insulation coordination– BIL– impulse ratio–Standard impulse test wave– volt-time characteristics– Grounded and ungrounded neutral systems–Effects of ungrounded neutral on system performance– Methods of neutral grounding**:** Solid– resistance–Reactance–Arcing grounds and grounding Practices.

Text Books:

1. Power System Protection and Switchgear by Badari Ram and D.N Viswakarma, TMH Publications
2. M.L.Soni, P.V.Gupta, U. S. Bhatnagar and A. Chakraborti,‖Power System Engineering‖, Dhanpat Rai& co. Pvt. Ltd., 2016.

Reference Books:

1. Sunil S Rao, ―Switchgear and Protection‖, Khanna Publishers, Latest Edition
2. C.L.Wadhwa, ―Electrical Power Systems‖, New Age international (P) Ltd, 2012.

MANAGEMENT SCIENCE

B.Tech VI Semester

L	T	P	C
3	0	0	3

Course Objectives:

- To familiarize with the process of management and to provide basic insight into select contemporary management practices
- To provide conceptual knowledge on functional management and strategic management.

Course Outcome:

- After completion of the Course the student will acquire the knowledge on management functions, global leadership and organizational behavior.
- The student will acquire insight on the concepts of Project management , strategic management and Contemporary management practices.

Unit I

Introduction to Management: Concept –nature and importance of Management – Functions of Management – Evaluation of Management thought- Theories of Motivation – Decision making process-Designing organization structure- Principles of organization - Types of organization structure- International Management: Global Leadership and Organizational behavior Effectiveness(GLOBE) structure

Unit II

Operations Management: Principles and Types of Management – Work study- Statistical Quality Control- Control charts (P-chart, R-chart, and C-chart) Simple problems- Material Management: Need for Inventory control EOQ, ABC analysis (simple problems) and Types of ABC analysis (HML, SDE, VED, and FSN analysis).

Unit III

Functional Management: Concept of HRM, HRD and PMIR- Functions of HR Manager-Wage payment plans (Simple Problems) – Job Evaluation and Merit Rating - Marketing Management- Functions of Marketing – Marketing strategies based on product Life Cycle, Channels of distributions.

Unit IV

Project Management: (PERT/CPM): Development of Network – Difference between PERT and CPM Identifying Critical Path- Probability- Project Crashing (Simple Problems).
Strategic Management: Vision, Mission, Goals, Strategy – Elements of Corporate Planning Process – Environmental Scanning – SWOT analysis.

Unit V

Contemporary Management Practice: Basic concepts of MIS, MRP, Just in Time(JIT) system, Total Quality Management(TQM), Six sigma and Capability Maturity Model(CMM) Levies, Supply Chain Management ,Enterprise Resource Planning (ERP), Business Process outsourcing (BPO), Business process Re-engineering and Bench Marking, Balanced Score Card.

Text Books

1. Dr. P. Vijaya Kumar & Dr. N. Appa Rao, 'Management Science' Cengage, Delhi, 2012.
2. Dr. A. R. Aryasri, Management Science' TMH 2011.

References

1. Koontz & Weihrich: 'Essentials of management' TMH 2011
2. Seth & Rastogi: Global Management Systems, Cengage learning , Delhi, 2011
3. Robbins: Organizational Behaviour, Pearson publications, 2011
4. Kanishka Bedi: Production & Operations Management, Oxford Publications, 2011
5. Philip Kotler & Armstrong: Principles of Marketing, Pearson Publications
6. Biswajit Patnaik: Human Resource Management, PHI, 2011
7. Hitt and Vijaya Kumar: Starategic Management, Cengage learning
8. Prem Chadha: Performance Management, Trinity Press(An imprint of Laxmi Publications Pvt. Ltd.)
Delhi 2015.
9. Anil Bhat& Arya Kumar : Principles of Management, Oxford University Press, New Delhi, 2015.

Sl.NO	Name of the programme	Name of the Course	Course Code	Year of introduction (during the last five years)
1	B.Tech Mechanical Engineering	Complex Variables and Statistical Methods	18ME3T01	2019-20
2	B.Tech Mechanical Engineering	Proficiency Through Reading & Writing Lab	18ME3L09	2019-20
3	B.Tech Mechanical Engineering	Probability and statistics	18ME4T01	2019-20
4	B.Tech Mechanical Engineering	IC Engines & Air Compressors	18ME4T04	2019-20
5	B.Tech Mechanical Engineering	Computer Aided Machine Drawing	18ME4T05	2019-20
6	B.Tech Mechanical Engineering	Thermal engineering Lab	18ME4L10	2019-20
7	B.Tech Mechanical Engineering	Indian constitution	18ME4T11	2019-20
8	B.Tech Mechanical Engineering	Summer Internship	18ME4I12	2019-20
9	B.Tech Mechanical Engineering	Mechatronics	R1641031	2019-20
10	B.Tech Mechanical Engineering	Additive Manufacturing	R164103C	2019-20
11	B.Tech Mechanical Engineering	Design for Manufacture	R164103E	2019-20
12	B.Tech Mechanical Engineering	CAD/CAM Lab	R1641037	2019-20
13	B.Tech Mechanical Engineering	Mechatronics Lab	R1641038	2019-20

III Semester

L	T	P	C
3	0	0	3

COMPLEX VARIABLES & NUMERICAL METHODS (CVNM) (18ME3T01)

(Common to EEE & ME)

UNIT-I: Analytic Functions

Introduction, Complex function, Limit and continuity of a complex function, Derivative of f(z), Analytic functions, Harmonic functions & orthogonal system, Milne-Thomson method.

Applications: Applications to flow problems.

UNIT-II: Integration and Series Expansions

Complex integration, Cauchy's theorem and Cauchy's integral formula (without proofs), Series of complex terms, Taylor's series and Laurent's series (without proofs).

UNIT-III: Integration using Residues

Zeros & singularities of an analytic function, Residues, Residue theorem (without proof), Calculation of residues. Evaluation of integrals of the type (a) Improper real integrals $\int_{-\infty}^{\infty} f(x)dx$ (b) $\int_{c}^{c+2\pi} f(\cos\theta, \sin\theta)d\theta$ $\int_{-\infty}^{\infty} e^{imx} f(x)dx$ (d) Integrals by indentation

UNIT IV: Numerical Solution of Equations:

Solution of Algebraic and transcendental equations: Bisection method, Method of false position and Newton-Raphson method (one variable and non-linear simultaneous equations).

Iterative methods of solution of linear simultaneous equations: Jacobi's and Gauss-Seidel iteration methods.

UNIT V: Numerical Integration & Numerical Solution of ODE:

Numerical Integration: Trapezoidal rule, Simpson's 1/3rd and 3/8th rules.

Numerical Solution of ODE: Picard's method, Taylor's series method, Euler's method, Modified Euler's method, Runge-Kutta method of 4^{th} order.

Text Books:

3. **B. S. GREWAL,** Higher Engineering Mathematics, Khanna Publishers**,** 43rdEdition, 2014.
4. **B. V. RAMANA,** Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:

3. **N. P. BALI & Dr. MANISH GOYAL,** A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition, 2014.
4. **ERWIN KREYSZIG,** Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.

III Semester	L	T	P	C
	0	0	2	1

PROFICIENCY THROUGH READING AND WRITING (18ME3L09)

Unit I Vocabulary Building

1.1 The concept of word formation

1.2. Root words from foreign languages and their use in English

1.3 Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives

1.4 Synonyms, antonyms, and standard abbreviations

Unit II Writing Skills

2.1 Organizing principles of paragraphs in documents

2.2 Creative writing

2.3 Essay writing

Unit III Identifying Common Errors in Writing

3.1 Subject-verb agreement

3.2 Noun-pronoun agreement

3.3 Misplaced modifiers

3.4 Articles

3.5 Prepositions

3.6 Redundancies

3.7 Clichés

Unit IV Comprehension

4.1 Scanning

4.2 Skimming

4.3 Identifying the main ideas

Unit V Reading for Pleasure

5.1 Review of an autobiography/biography

5.2 Review of a novel

5.3 Review of a self help book

Suggested Readings:

1. Practical English Usage. Michael Swan. OUP. 1995.
2. Remedial English Grammar. F.T. Wood. Macmillan.2007.
3. On Writing Well. William Zinsser. Harper Resource Book. 2001.
4. Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
5. Communication Skills. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.

IV Semester	L	T	P	C
	2	1	0	3

PROBABILITY & STATISTICS (P & S) (18ME4T01)

UNIT I: Discrete Random variables and Distributions:

Introduction-Random variables- Discrete Random variable-Distribution function- Expectation-Moment Generating function-Moments and properties. Discrete distributions: Binomial and Poisson distributions.

UNIT II: Continuous Random variable and distributions:

Introduction-Continuous Random variable-Distribution function- Expectation-Moment Generating function-Moments and properties.

Continuous distribution: Normal distributions, Normal approximation to Binomial distribution.

UNIT III: Sampling Theory:

Introduction - Population and samples- Sampling distribution of means (s known)-Central limit theorem- t-distribution- Sampling distribution of means (s unknown)- Sampling distribution of variances -χ^2 and F-distributions- Point estimation- Maximum error of estimate - Interval estimation.

UNIT IV: Tests of Hypothesis:

Introduction –Hypothesis-Null and Alternative Hypothesis- Type I and Type II errors –Level of significance - One tail and two-tail tests- Tests concerning one mean and proportion, two means-Proportions and their differences- ANOVA for one-way and two-way classified data.

UNIT V: Curve fitting and Correlation:

Introduction - Fitting a straight line –Second degree curve-exponential curve-power curve by method of least squares-Goodness of fit. Correlation and Regression – Properties.

Text Books:

1. Richards A Johnson, Irvin Miller and Johnson E Freund. Probability and Statistics for Engineering, 9th Edition, PHI.
2. Jay l.devore, Probability and Statistics for Engineering and the Sciences, 8th edition, Cengage.

Reference Books:

1. ShronL.Myers, Keying Ye, Ronald E Walpole, Probability and Statistics Engineers and the Scientists,8th Edition, Pearson 2007.
2. William Menden Hall, Robert J. Bever and Barbara Bever, Introduction to probability and statistics, Cengage learning, 2009.

IV Semester

L	T	P	C
2	1	0	3

I.C.ENGINES & AIR COMPRESSORS (18ME4T04)

UNIT – I

I.B. Engines: Classification - Working principles, Valve and Port Timing Diagrams, - Engine systems – Fuel, Carburetor, Fuel Injection System, Ignition, Cooling and Lubrication, principle of Wankle engine, Principles of supercharging and turbo charging.

Actual Cycles and their Analysis: Introduction, Comparison of Air Standard and Actual Cycles, Time Loss Factor, Heat Loss Factor, Exhaust Blow down-Loss due to Gas exchange process, Volumetric Efficiency. Loss due to Rubbing Friction, Actual and Fuel-Air Cycles of CI Engines.

UNIT – II

Combustion in S.I. Engines: Normal Combustion and abnormal combustion – Importance of flame speed and effect of engine variables – Types of Abnormal combustion, pre-ignition and knocking (explanation of) – Fuel requirements and fuel rating, antiknock additives – combustion chamber – requirements, types.

Combustion in C.I. Engines: Four stages of combustion – Delay period and its importance – Effect of engine variables – Diesel Knock– open and divided combustion chambers and nozzles used – fuel requirements and fuel rating.

UNIT – III

Measurement, Testing and Performance: Parameters of performance - measurement of cylinder pressure, fuel consumption, air intake, exhaust gas composition, Brake power – Determination of frictional losses and indicated power – Performance test – Heat balance sheet and chart.

UNIT – IV

Compressors: Classification – positive displacement and roto dynamic machinery – Power producing and power is absorbing machines, fan, blower and compressor.

Reciprocating Compressor: Principle of operation, work required Isothermal efficiency, volumetric efficiency and effect of clearance, multi stage compression, under cooling, minimum work condition for two stage compression.

UNIT V

Rotary (Positive displacement type): Roots Blower, vane sealed compressor, Lysholm compressor – Mechanical details and principle of working – efficiency considerations.

Dynamic Compressors: Centrifugal compressors: Mechanical details and principle of operation – velocity and pressure variation. Slip factor, power input factor, pressure coefficient and adiabatic coefficient.

Axial Flow Compressors: Mechanical details and principle of operation and degree of reaction, work done factor - isentropic efficiency– Polytropic efficiency.

Text Books:

1 Internal Combustion Engines, V. Ganesan, Tata McGraw Hill, 4th Ed., 2017.
2 Internal Combustion Engine Fundamentals,John B. Heywood,McGraw-Hill, 2nd Ed., 2018.

References:

1 Thermal Engineering, R.K. Rajput, Lakshmi Publications, 8th Ed., 2010
2 Internal Combustion Engines, M.L. Mathur & R.P. Sharma, Dhanpath Rai & Sons Publications.
3 Thermal Engineering, R.S. Khurmi& J.S. Gupta, S.Chand Publications, 15th Ed., 2015

IV Semester	L	T	P	C
	1	0	4	3

COMPUTER AIDED MACHINE DRAWING
(18ME4T05)

The following contents are to be done by any 2D CAD software package Conventional representation of materials and components:

Detachable joints: Drawing of thread profiles, hexagonal and square-headed bolts and nuts, bolted joint, bolted joint with washer and locknut, stud joint, screw joint.

Riveted joints: Drawing of rivet, lap joint, butt joint with single strap, single riveted, double riveted double strap joints.

Welded joints: Lap joint and T joint with fillet, butt joint with conventions.

Keys: Taper key, sunk taper key, round key, saddle key, feather key, woodruff key.
Shaft coupling, bushed pin-type flange coupling, universal coupling, Oldhams' coupling.

The following contents to be done by any 3D CAD software package Sectional views

Creating solid models of complex machine parts and create sectional views.

Assembly drawings: (Any four of the following using solid model software)

Lathe tool post, tool head of shaping machine, tail stock, machine vice, gate valve, carburettor, piston, connecting rod, excentric, screw jack, plumber block, axle bearing, pipe vice, clamping device, Geneva cam, universal coupling,

Manufacturing drawing:

Representation of limits, fits and tolerances for mating parts. Use any four parts of above assembly drawings and prepare manufacturing drawing with dimensional and geometric tolerances.

Text Books:

1. K.L.Narayana, P.Kannaiah, A text book on Engineering Drawing, SciTech Publications, 2014

Reference Books:

1. Cecil Jensen, Jay Helsel and Donald D.Voisinet, Computer Aided Engineering Drawing, Tata

Mcgraw-Hill, NY, 2000.

2. James Barclay, Brain Griffiths, Engineering Drawing for Manufacture, Kogan Page Science, 2003.
3. N.D.Bhatt, Machine Drawing, Charotar, 50/e, 2014.
4. K.L.Narayana, Production Drawing, NewAge International Publishers, 3/e, 2014

IV Semester

L	T	P	C
0	0	3	1.5

THERMAL ENGINEERING LAB (18ME4L10)

1. I.C. Engines valve / Port timing diagrams.
2. I.C. Engines performance test and Exhaust emission measurements (4 -stroke diesel engine).
3. I.C. Engines performance test and Exhaust emission measurements (2-stroke petrol engine).
4. Evaluation of engine friction by conducting Morse test on 4-stroke multi cylinder petrol engine.
5. Determination of FP by retardation and motoring test on IC engine.
6. I.C. Engines heat balance at different loads and show the heat distribution curve.
7. Performance test on variable compression ratio engines.
8. Performance test on reciprocating air compressor unit.
9. Performance Test on Refrigeration Tutor.
10. Economical speed test of an IC engine.
11. Disassembly/assembly of Engines.
12. Study of boilers, mountings and accessories.

IV Semester

L	T	P	C
2	0	0	0

INDIAN CONSTITUTION (18ME4T11)

UNIT-I

Introduction to Indian Constitution: Constitution' meaning of the term, Indian Constitution - Sources and constitutional history, Features - Citizenship, Preamble, Fundamental Rights and Duties, Directive Principles of State Policy.

UNIT-II

Union Government and its Administration Structure of the Indian Union: Federalism, Centre- State relationship, President: Role, power and position, PM and Council of ministers, Cabinet and Central Secretariat, Lok Sabha, Rajya Sabha, The Supreme Court and High Court: Powers and Functions;

UNIT-III

State Government and its Administration Governor - Role and Position - CM and Council of ministers, State Secretariat: Organisation, Structure and Functions

UNIT-IV

A.Local Administration - District's Administration Head - Role and Importance, Municipalities - Mayor and role of Elected Representative - CEO of Municipal Corporation PachayatiRaj: Functions PRI: Zila Panchayat, Elected officials and their roles, CEO Zila Panchayat: Block level Organizational Hierarchy
- (Different departments), Village level - Role of Elected and Appointed officials - Importance of grass root democracy

UNIT-V

Election Commission: Election Commission- Role of Chief Election Commissioner and Election Commissionerate State Election Commission:, Functions of Commissions for the welfare of SC/ST/OBC and women

REFERENCES:

1. Durga Das Basu, Introduction to the Constitution of India, Prentice – Hall of India Pvt. Ltd.. New Delhi
2. Subash Kashyap, Indian Constitution, National Book Trust
3. J.A. Siwach, Dynamics of Indian Government & Politics
4. D.C. Gupta, Indian Government and Politics
5. H.M.Sreevai, Constitutional Law of India, 4th edition in 3 volumes (Universal Law Publication)
6. J.C. Johari, Indian Government and Politics Hans

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

IV Semester

L	T	P	C
0	0	0	1

SUMMER INTERNSHIP (18ME4I12)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
KAKINADA - 533 003, Andhra Pradesh, India

IV Year - I Semester

L	T	P	C
4	0	0	3

MECHATRONICS
(R1641031)

Course Objective

The main objective of this course is to introduce the integrative nature of Mechatronics. To describe the different components and devices of mechatronics systems.

UNIT-I

Mechatronics systems – elements & levels of mechatronics system, Mechatronics design process, system, measurement systems, control systems, microprocessor-based controllers, advantages and disadvantages of mechatronics systems. Sensors and transducers, types, displacement, position, proximity, velocity, motion, force, acceleration, torque, fluid pressure, liquid flow, liquid level, temperature and light sensors.

UNIT-II

Solid state electronic devices - PN junction diode, BJT, FET, DIAC, TRIAC and LEDs. Analog signal conditioning, operational amplifiers, noise reduction, filtering.

UNIT-III

Hydraulic and pneumatic actuating systems - Fluid systems, Hydraulic systems, and pneumatic systems, components, control valves, electro-pneumatic, hydro-pneumatic, electro-hydraulic servo systems. Mechanical actuating systems and electrical actuating systems – basic principles and elements.

UNIT-IV

Digital electronics and systems, digital logic control, micro processors and micro controllers, programming, process controllers, programmable logic controllers, PLCs versus computers, application of PLCs for control.

UNIT-V

System and interfacing and data acquisition – Data Acquisition Systems, Analog to Digital and Digital to Analog conversions; Digital Signal Processing – data flow in DSPs, block diagrams, typical layouts, Interfacing motor drives.

UNIT -VI

Dynamic models and analogies, System response. Process Controllers – Digital Controllers, Programmable Logic Controllers, Design of mechatronics systems & future trends.

Text Books:

1. MECHATRONICS Integrated Mechanical Electronics Systems/KP Ramachandran, GK Vijaya Raghavan & MS Balasundaram/WILEY India Edition

References:

1 Mechatronics /Smaili A, Mrad F/ Oxford Higher Education, Oxford University Press
2 Mechatronics Source Book / Newton C Braga/Thomson Publications,Chennai.
3 Mechatronics – N. Shanmugam / Anuradha Agencies Publishers.
4 Mechatronics System Design / Devdas shetty/Richard/Thomson.
5 Mechatronics/M.D.Singh/J.G.Joshi/PHI.
6 Mechatronics – Electronic Control Systems in Mechanical and Electrical Engg. 4th Edition / W. Bolton/ Pearson, 2012
7 Mechatronics – Principles and Application / Godfrey C. Onwubolu/Elsevier, Indian print

Course outcomes:

After completion of this course, the student shall be able to use the various mechatronics systems devices and components in the design of electro mechanical systems.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
KAKINADA - 533 003, Andhra Pradesh, India

ADDITIVE MANUFACTURING

(R164103C)

Course Objectives:

The course aims at the importance of Additive Manufacturing, classifications, models, specifications of various Additive Manufacturing Techniques. To learn the different tools, soft-wares required and the applications of Additive Manufacturing.

UNIT – I

INTRODUCTION: Prototyping fundamentals, historical development, fundamentals of rapid prototyping, advantages and limitations of rapid prototyping, commonly used terms, classification of RP process.

LIQUID-BASED RAPID PROTOTYPING SYSTEMS: Stereo lithography Apparatus (SLA): models and specifications, process, working principle, photopolymers, photo polymerization, layering technology, laser and laser scanning, applications, advantages and disadvantages, case studies. Solid Ground Curing (SGC): models and specifications, process, working principle, applications, advantages and disadvantages, case studies.

UNIT-II

SOLID-BASED RAPID PROTOTYPING SYSTEMS: Laminated object manufacturing (LOM) - models and specifications, process, working principle, applications, advantages and disadvantages, case studies. Fused deposition modelling (FDM) - models and specifications, process, working principle, applications, advantages and disadvantages, case studies.

UNIT – III

POWDER BASED RAPID PROTOTYPING SYSTEMS: Selective laser sintering (SLS): models and specifications, process, working principle, applications, advantages and disadvantages, case studies. three dimensional printing (3DP): models and specifications, process, working principle, applications, advantages and disadvantages, case studies.

UNIT-IV

RAPID TOOLING: Introduction to rapid tooling (RT), conventional tooling Vs RT, Need for RT. rapid tooling classification: indirect rapid tooling methods: spray metal deposition, RTV epoxy tools, Ceramic tools, investment casting, spin casting, die casting, sand casting, 3D Keltool process. Direct rapid tooling: direct AIM, LOM Tools, DTM Rapid Tool Process, EOS Direct Tool Process and Direct Metal Tooling using 3DP.

UNIT – V

RAPID PROTOTYPING DATA FORMATS: STL Format, STL File Problems, consequence of building valid and invalid tessellated models, STL file Repairs: Generic Solution, other Translators, Newly Proposed Formats.

RAPID PROTOTYPING SOFTWARE'S: Features of various RP software's like Magics, Mimics, Solid View, View Expert, 3 D View, Velocity 2, Rhino, STL View 3 Data Expert and 3 D doctor.

UNIT –VI

RP APPLICATIONS: Application in engineering, analysis and planning, aerospace industry, automotive industry, jewelry industry, coin industry, GIS application, arts and architecture. RP medical and bioengineering applications: planning and simulation of complex surgery, customized implants & prosthesis, design and production of medical devices, forensic science and anthropology, visualization of bimolecular.

Text Books:

1. Rapid prototyping: Principles and Applications /Chua C.K., Leong K.F. and LIM C.S/World Scientific publications

References:

1. Rapid Manufacturing / D.T. Pham and S.S. Dimov/Springer

2. Wohlers Report 2000 /Terry T Wohlers/Wohlers Associates

3. Rapid Prototyping & Manufacturing / Paul F.Jacobs/ASME Press

4. Rapid Prototyping / Chua & Liou

Course Outcomes:

The student shall be able to identify the use of Rapid Prototyping Techniques in the manufacturing of complex components that are otherwise very difficult to manufacture.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
KAKINADA - 533 003, Andhra Pradesh, India

DESIGN FOR MANUFACTURE
(R164103E)

Course Objectives:

1. Understand the design rules and considerations with reference to various manufacturing processes
2. To discusses capabilities and limitations of each manufacturing process in relation to part design and cost
3. To examine DFM principles including how the design affects manufacturing cost, lean manufacturing, six sigma, etc.

UNIT - I

Introduction: Design philosophy-steps in design process-general design rules for manufacturability-basic principles of designing for economical production-creativity in design. Design for the life cycle total product life of consumer goods-design considerations.

UNIT – II

Machining processes: Overview of various machining processes-general design rules for machining-dimensional tolerance and surface roughness-Design for machining – ease –redesigning of components for machining ease with suitable examples. General design recommendations for machined parts.

UNIT - III

Metal casting: Appraisal of various casting processes, selection of casting process,-general design considerations for casting-casting tolerance-use of solidification, simulation in casting design-product design rules for sand casting.

UNIT – IV

Metal joining: Appraisal of various welding processes, factors in design of weldments – general design guidelines-pre and post treatment of welds-effects of thermal stresses in weld joints-design of brazed joints. Forging: Design factors for forging – closed die forging design – parting lines of dies – drop forging die design – general design recommendations.

UNIT – V

Extrusion & Sheet metal work: Design guide lines extruded sections-design principles for punching, blanking, bending, deep drawing-Keeler Goodman forging line diagram – component design for blanking.

UNIT – VI

Plastics: Visco elastic and creep behavior in plastics-design guidelines for plastic components-design considerations for injection moulding – design guidelines for machining and joining of plastics.

Text Books:

1. Design for manufacture / John cobert / Adisson Wesley. 1995
2. Design for Manufacture / Boothroyd/CRC Press
3. Design for manufacture/ James Bralla/McGrawHill Edition

Reference:

1. ASM Hand book Vol.20

Course outcomes:

Upon completion of the course, the student will be able to:

1. Design components for machining
2. Simulate the casting design and choose the best casting process for a specific product.
3. Evaluate the effect of thermal stresses in weld joints
4. Design components for sheet metal work by understanding in depth the sheet metal processes and their formation mechanisms
5. Design plastic components for machining and joining and selecting a proper processes for different joining cases

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
KAKINADA - 533 003, Andhra Pradesh, India

IV Year - I Semester

L	T	P	C
0	0	2	2

CAD/CAM LAB
(R1641037)

Course Objectives:

1. To impart the fundamental knowledge on using various analytical tools like ANSYS, FLUENT, etc., for Engineering Simulation
2. To know various fields of engineering where these tools can be effectively used to improve the output of a product.
3. To impart knowledge on how these tools are used in Industries by solving some real time problems using these tools..

1. **DRAFTING:** Development of part drawings for various components in the form of orthographic and isometric representation of dimensioning and tolerances scanning and plotting. study of script, DXE and IGES files.

2. **PART MODELING:** Generation of various 3D models through protrusion, revolve, shell sweep. creation of various features. study of parent child relation. feature based and boolean based modelling surface and assembly modelling. study of various standard translators. design simple components.

3. a). Determination of deflection and stresses in 2D and 3D trusses and beams.
   b). Determination of deflections component and principal and Von-mises stresses in plane stress, plane strain and Axisymmetric components.
   c). Determination of stresses in 3D and shell structures (at least one example in each case)
   d). Estimation of natural frequencies and mode shapes, Harmonic response of 2D beam.
   e). Steady state heat transfer Analysis of plane and Axisymmetric components.
4. a). Study of various post processors used in NC Machines.
   b). Machining of simple components on NC lathe and Mill by transferring NC Code / from a CAM package. Through RS 232.
   a) Practice on CNC Sinutrain Turning
   b) Practice on CNC Sinutrain Milling
   c) CNC programming for turned components using FANUC Controller
   d) CNC programming for milled components using FANUC Controller
   e) Automated CNC Tool path & G-Code generation using Pro/E/MasterCAM

Packages to be provided to cater to drafting, modeling & analysis from the following:

CATIA, Pro-E, I-DEAS, ANSYS, NISA, CAEFEM, Gibbs CAM, Master CAM etc.

Course outcomes:

Upon successful completion of this course student should be able to:

1. The student will be able to appreciate the utility of the tools like ANSYS or FLUENT in solving real time problems and day to day problems.
2. Use of these tools for any engineering and real time applications

3. Acquire knowledge on utilizing these tools for a better project in their curriculum as well as they will be prepared to handle industry problems with confidence when it matters to use these tools in their Employment

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
KAKINADA - 533 003, Andhra Pradesh, India

IV Year - I Semester

L	T	P	C
0	0	3	2

MECHATRONICS LAB
(R1641038)

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

1 Measure load, displacement and temperature using analogue and digital sensors.
2 Develop PLC programs for control of traffic lights, water level, lifts and conveyor belts.
3 Simulate and analyse PID controllers for a physical system using MATLAB.
4 Develop pneumatic and hydraulic circuits using Automaton studio.

List of Experiments

1. DYNA 1750 Transducers Kit :-
   a. Characteristics of LVDT
   b. Principle & Characteristics of Strain Gauge
   c. Characteristics of Summing Amplifier
   d. Characteristics of Reflective Opto Transducer

2. PLC PROGRAMMING
   a. Ladder programming on Logic gates ,Timers & counters
   b. Ladder Programming for digital & Analogy sensors
   c. Ladder programming for Traffic Light control, Water level control and Lift control Modules

3. AUTOMATION STUDIO software
   a. Introduction to Automation studio & its control
   b. Draw & Simulate the Hydraulic circuit for series & parallel cylinders connection
   c. Draw & Simulate Meter-in, Meter-out and hydraulic press and clamping.

4. MATLAB Programming
   a. Sample programmes on Matlab
   b. Simulation and analysis of PID controller using SIMULNK

B.TECH II SEMESTER	ESC	L	T	P	C
		1	0	4	3

20EC2T05 ENGINEERING DRAWING

Course Objective: Engineering drawing being the principal method of communication for engineers, the objective is to introduce the students, the techniques of constructing the various types of polygons and curves. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scalingetc.

Course Outcomes:

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

1. Understand the techniques of constructing various polygons and curves
2. Understand the concepts of projections and draw projections for simple entities such as points and lines.
3. Draw orthographic projections of planes and simple solids
4. Analyze the 2D drawings and convert to 3D isometric views

UNIT I

Polygons: Constructing regular polygons by general methods, inscribing and describing polygons on circles.

Curves: Parabola, Ellipse and Hyperbola by general and special methods, cycloids, involutes, tangents & normal for the curves.

UNIT II

Orthographic Projections: Reference plane, importance of reference lines, projections of points in various quadrants, projections of lines, line parallel to both the planes, line parallel to one plane and inclined to other plane. Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclination and traces.

UNIT III

Projections of planes: regular planes perpendicular/parallel to one reference plane and inclined to the other reference plane; inclined to both the reference planes.

UNIT IV

Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis

inclined to one plane

UNITV

Conversion of orthographic views to isometric view for Simple Solids such as prism, pyramid, cylinder and cone; Conversion of isometric view to orthographic views.

Text books:

1. Engineering Drawing by N.D. Butt, Chariot Publications
2. Engineering Drawing by K.L. Narayana& P. Kannaiah, Scitech Publishers

Reference books:

1. Engineering Graphics for Degree by K.C. John, PHI Publishers
2. Engineering Graphics by PI Varghese, McGraw Hill Publishers
3. Engineering Drawing + Auto Cad – K Venugopal, V. Prabhu Raja, NewAge
4. Engineering Drawing by Agarwal & Agarwal, Tata McGraw HillPublishers

B.TECH II SEMESTER **BSC**

L	T	P	C
3	0	0	3

20EC2T01 TRANSFORM TECHNIQUES

Pre-requisite: Linear Algebra and Differential Equations

Course Objective: Objective of the course is to impart

- Learning the techniques of Laplace transforms to solve ordinary differential equations
- knowledge of Fourier series & Fourier transforms for piecewise continuous functions
- knowledge of solving boundary valued problems

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

CO1: Able to analyze a class of integrals in terms of beta and gamma functions

CO2: Provide the techniques of Laplace transformations and able to solve problems related to digital signal processing

CO3: Analyze the general periodic functions in the form of an infinite convergent sine and cosine series

CO4: Illustrate the methods to solve the boundary value problems

CO5: Determine a solution of a discrete system using Z- transforms

SYLLABUS

UNIT-I: Special functions:

Beta function, Properties & problems, Gamma function, properties & problems, Relation between Beta and Gamma functions, Evaluation of improper integrals.

UNIT-II: Laplace Transforms (all properties without proofs):

Definition, Transforms of elementary functions, properties of Laplace transforms, Transforms of periodic functions, Transforms of derivatives and integrals, Multiplication by t^n, Division by t, Evaluation of improper integrals. Inverse Laplace transforms–Method of partial fractions, other methods of finding inverse transforms, Convolution theorem (without proof). Application: Application to differential equations.

UNIT-III: Fourier Series &Fourier Transforms:

Euler's formulae (without proof), Conditions of Fourier expansion, Functions having points of discontinuity, Change of inerval, Even and odd functions, Half-range series.

Fourier Integral theorem (without proof), Fourier cosine & sine integral, complex form of Fourier integral, Fourier transform, Fourier sine & cosine transforms, properties of Fourier transforms (without proof), Convolution theorem(without proof), finite & infinite Fourier sine & cosine transforms.

UNIT-IV: Partial Differential Equations:

Formation of partial differential equations by eliminating arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and nonlinear (standard type) equations. Method of separation of Variables, Applications: One-dimensional wave and heat equations, two-dimensional heat equation.

UNIT-V: Z-Transforms: (all properties without proofs)

Introduction, definition, some standard z-transforms, linearity property, damping rule, some standard results, shifting U_n to the right, multiplication by n, initial and final value theorems, Inverse z-transforms, convolution theorem, evaluation of inverse z-transforms by partial fractions, applications to difference equations.

Text Books:

1. B. S. GREWAL, Higher Engineering Mathematics, Khanna Publishers, 43rd Edition, 2014.
2. B. V. RAMANA, Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:

3. ERWIN KREYSZIG, Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.
4. N. P. BALI &Dr. MANISH GOYAL, A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition, 2014.

B.TECH II SEMESTER	ESC	L	T	P	C
		0	0	3	1.5

20EC2L07: ENGINEERING & IT WORKSHOP

Course Objective: To impart hands-on practice on basic engineering trades and skills.

Trade:

1. **Carpentry**
   a. T-Lap Joint
   b. Cross Lap Joint
   c. Dovetail Joint
   d. Mortise and Tenon Joint
2. **Fitting**
   a. Vee Fit
   b. Square Fit
   c. Half Round Fit
   d. Dovetail Fit
3. **House Wiring**
   a. Parallel / Series Connection of three bulbs
   b. Stair Case wiring
   c. Florescent Lamp Fitting
   d. Measurement of Earth Resistance
4. **Tin Smithy**
   a. Taper Tray
   b. Square Box without lid
   c. Opens coop
   d. Funnel
5. **Product prototyping using 3D Printing**
6. **IT Workshop**

Task 1: Identification of the peripherals of a computer - Prepare a report containing the block diagram of the computer along with the configuration of each component and its functionality. Describe about various I/O Devices and its usage.

Task 2: Practicing disassembling and assembling components of a PC

Note: At least two exercises to be done from each trade.

B. Tech V Semester	L	T	P	C
	3	0	0	3

18EC5T01 - Analog and Digital Communication

Course Objectives: Students undergoing this course, are expected to
1. Familiarize with the fundamentals of analog communication systems
2. Familiarize with various techniques for analog modulation and demodulation of signals
3. Distinguish the figure of merits of various analog modulation methods
4. Familiarize with the fundamentals of digital communication systems
5. Familiarize with various techniques for digital modulation and demodulation of signals

Course Outcomes: After undergoing the course, students will be able to
1. Differentiate various Analog modulation schemes
2. Analyze demodulation schemes and their spectral characteristics
3. Analyze noise characteristics of various analog modulation methods
4. Differentiate various Digital modulation schemes
5. Analyze demodulation schemes and their spectral characteristics

UNIT I: AMPLITUDE MODULATION
Introduction to communication system, need for modulation, , Amplitude Modulation, Definition, Time domain and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves, square law Modulator, Detection of AM Waves;, Envelope detector, SNR Calculations of AM waves.

UNIT II: DSB & SSB MODULATION
DSB SC (Double side band suppressed carrier) modulators, time domain and frequency domain description, Generation of DSBSC Waves, Balanced Modulators, Coherent detection of DSB-SC Modulated waves, SNR Calculations of DSB SC.

SSB Modulated Wave, Time domain description, Phase discrimination method for generating AM SSB Modulated waves. Demodulation of SSB Waves. SNR of SSB.

UNIT III: ANGLE MODULATION
Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Transmission bandwidth of FM Wave - Generation of FM Waves, Direct FM, Detection of FM Waves: Balanced Frequency discriminator, zero crossing detector, Phase locked loop, SNR Caluculations.

UNIT IV: PULSE DIGITAL MODULATION
Elements of digital communication systems, advantages of digital communication systems, Elements of PCM, Quantization error, Companding in PCM systems. Differential PCM systems (DPCM). Delta modulation, its draw backs, adaptive delta modulation, comparison of PCM and DM systems, noise in PCM and DM systems.

UNIT V: DIGITAL MODULATION TECHNIQUES
Introduction, ASK, FSK, PSK, DPSK, QPSK Transmitter and receivers Probability of error calculations.

TEXT BOOKS:

1. Principles of Communication Systems – H Taub& D. Schilling, GautamSahe, TMH, 2007 3rd Edition.
2. Communication Systems – B.P. Lathi, BS Publication, 2006.

REFERENCES:

1. Principles of Communication Systems - Simon Haykin, John Wiley, 2nd Ed.,.
2. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004.

B. Tech V Semester

L	T	P	C
3	0	0	3

18EC5T05-Quantitative Aptitude & Reasoning
(OPEN ELECTIVE-I)

Syllabus:

Unit-I: Divisibility and remainder rules of numbers, Unit digit , square root, cube root and simplification of numbers, HCF and LCM of numbers, Averages and Percentages Alphabetical and miscellaneous series, Coding and decoding and Blood Relations

Unit-II: Profit & loss, Simple interest and Compound interest Direction, Order and Ranking, Sitting arrangement and Puzzle

Unit-III: Ratio & proportions, Partnership, Alligation and mixtures and Ages. Data sufficiency, Inequalities and Decision making .

Unit-IV: Time and work, Pipes & cisterns and Time and distance . Syllogism, Statement and course of action and Statement and Assumption.

Unit-V: Boats and streams, Areas, Volume and surface areas. Statement and argument, Cause and effect and Drawing inference.

Text Books: 1. “Objective Arithmetic” by R.S. Agarwal, S. Chand Publications. 2. Verbal and non-verbal Reasoning, R.S. Agarwal, S. Chand Publications

Reference Books: 1.Quantitative Aptitude by Dinesh Khattar, Pearson Education. 2.Quantitative Aptitude by Abhjit Guha. 3.Fast Track objective Arithmetic, Rajesh Verma, Arihant publications.

B. Tech V Semester	L	T	P	C
	3	0	0	3

18EC5T06-SOLID STATE DEVICES AND CIRCUITS
(OPEN ELECTIVE-I)

Course Objectives: Students undergoing this course, are expected to
1. Familiarize with the fundamentals of Semiconductor physics
2. Familiarize with various diodes and characteristics.
3. Familiarize with the transistors and their configurations.
4. Disseminate Amplifications with transistors
5. Understand the operation and working of Oscillators

Course Outcomes: After undergoing the course, students will be able to
1. Understand importance of semiconductors.
2. Analyze Diodes characteristics.
3. Differentiate various configurations.
4. Design amplifiers at different applications using transistor.
5. Analyze different oscillators design.

Unit I: Basics Concepts of Semiconductor Physics
Charged Particles, Field Intensity, Potential, Energy, the eV unit of energy, Energy Band theory of Crystals, Insulators, Semiconductors and metals, Mobility and Conductivity, Electrons and Holes, Donor and Acceptor impurities, Charge Densities in a Semiconductor, Electrical properties of Ge and Si, Hall Effect, Diffusion and Drift Currents, Mass action Law, Fermi-Dirac distribution.

Unit II: Diodes
PN junction diode- Energy band diagram of PN junction Diode- V-I Characteristics –Currentcomponents in PN junction Diode- Diode equation- Diode resistance and capacitance Characteristics of Zener Diode, Varactor Diode- SCR and UJT.

Unit III: Transistors
Bipolar Junction Transistor: Transistor current components- Transistor equation- Transistor configurations- Characteristics of a transistor in CB,CC& CE configurations- Transistor as a Switch- Transistor as an amplifier.
Field Effect Transistors (FET): Junction Field Effect Transistor construction & operation- characteristics CS, CD & CG

Unit IV:Small Signal Transistor Amplifier models:
Low Frequency Transistor Amplifier Models: Two port network, Transistor hybrid model, determination of h- parameters, generalized analysis of transistor amplifier model using h-parameters

Unit V: Feedback Amplifiers and Oscillators
Negative Feedback: Feedback principle and concept, types of feedback, classification of amplifiers, feedback topologies, Characteristics of negative feedback amplifiers
Oscillators: Oscillator principle, condition for oscillations, types of oscillators, RC-phase shift and Wein bridge oscillators with BJT and their analysis. Generalized analysis of LC Oscillators, Hartley and Colpitt‘s oscillators with BJT and their analysis.

Text Books:

1) Millman, Halkias, ―Integrated Electronics- Analog and Digital Circuits and Systems‖, TMH.
2).Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, Mothiki S Prakash Rao McGraw-Hill,Second Edition.

Reference Books:

1) Electronic Devices and Circuits Theory – Robert L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, Tenth Edition.
2) . Basic Electronic Circuits -V.K.Mehta,S-chand Publications,2008.

B. Tech V Semester	L	T	P	C
	3	0	0	3

18EC5T07-PRINCIPLES OF COMMUNICATION
(OPEN ELECTIVE-I)

Course Objectives: Students undergoing this course, are expected to
1. Familiarize with the fundamentals of analog communication systems
2. Familiarize with various techniques for analog modulation and demodulation of signals
3. Familiarize with the fundamentals of digital communication systems
4. Familiarize with various techniques for digital modulation and demodulation of signals
5. Distinguish the figure of merits of various analog modulation methods

Course Outcomes: After undergoing the course, students will be able to
1. Differentiate various Analog modulation schemes
2. Analyze demodulation schemes and their spectral characteristics
3. Differentiate various Digital modulation schemes
4. Analyze demodulation schemes and their spectral characteristics
5. Analyze noise characteristics of various analog modulation methods

UNIT I
Introduction: Overview of Communication system, Communication channels, Need for modulation, Baseband and Pass band signals, Amplitude Modulation: Double sideband with Carrier (DSB-C), Double side band without Carrier DSB-SC, Single Side Band Modulation SSB, Modulators and Demodulators, Vestigial Side Band (VSB), Quadrature Amplitude Modulator, Radio Transmitter and Receiver

UNIT II
Angle Modulation, Frequency and Phase modulation, frequency deviation, Bandwidth, FM Modulators and Demodulators, Narrow band and wide band FM, FM Broadcasting.

UNIT III
Pulse digital Transmission of Analog Signals: Sampling Theorem and its applications, Pulse Amplitude Modulation (PAM), Pulse Width Modulation, Pulse Position Modulation, Generation and Demodulation, PCM System Issues in digital transmission: Frequency Division Multiplexing Time Division Multiplexing

UNIT IV
Digital Representation of Analog Signals Pulse Code Modulation (PCM), Differential Pulse Code Modulation, Delta Modulation. Adaptive Delta Modulation, Sources of Noises, Frequency domain representation of Noise, Super position of Noises, Linear filtering of Noises, Mathematical Representation of Noise.

UNIT V
Noise in Amplitude Modulation: Analysis, Signal to Noise Ratio, Figure of Merit. Noise in Frequency Modulation: Pre-emphasis, De-Emphasis and SNR Improvement, Phase Locked Loops Analog and Digital.

Text Book:
1. Herbert Taub and Donald L. Schilling, ―Principles of Communication Systems‖, Tata McGrawHill.
2. RishabhAnand, Communication Systems, Khanna

Reference Books:

1. B.P.Lathi,–ModernDigitalandAnalogcommunicationSystems‖,3rd Edition, Oxford University Press.
2. Simon Haykin, ―Communication Systems‖, 4th Edition, Wiley India.

B. Tech VI Semester

L	T	P	C
3	0	0	3

18EC6T03-CELLULAR AND MOBILE COMMUNICATIONS (PROFESSIONAL ELECTIVE 1)

COURSE OBJECTIVE: Students should familiarize with different cellular systems, channel allocations with bandwidth utilizations, signal traffic in cellular systems, frequency management and handoffs.

COURSE OUTCOMES:

The student will be introduced to:

1. Understand the basic cellular concepts like frequency reuse, cell splitting, cell sectoring etc., and various cellular systems.
2. Understand the different types of interference s influencing cellular and mobile communications.
3. Understand the frequency management, channel assignment and various propagation effects in cellular environment.
4. Understand the different types antennas used at cell site and mobile.
5. Understand the concepts of handoff and types of handoffs.

UNIT I

CELLULAR SYSTEMS:

Limitations of Conventional System , Basic Cellular Mobile System ,First, second ,third and fourth Generation cellular wireless systems .Operation of Cellular System .

Fundamentals of cellular Radio System Design: concept of frequency reuse channels, Co-channel Interference, Co-channel Interference Reduction Factor, desired C/I from a normal case in a Omni directional Antenna system

UNIT II

CO-CHANNEL & NON CO-CHANNEL INTERFERENCE: Measurement of Real Time Co-Channel Interference, design of Antenna system, Antenna parameters and their effects

Non-cochannel interference-adjacent channel interference, Near End far end interference,

UNIT III

CELL COVERAGE FOR SIGNAL AND TRAFFIC: Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, and general formula for mobile propagation over water and flat open area, near and long distance propagation.

UNIT IV

CELL SITE AND MOBILE ANTENNAS: Space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, Mobile Antennas.

Frequency Management And Channel Assignment : Numbering and grouping, setup access and paging channels ,channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells

UNIT V

HANDOFFS: Handoff Initiation, types of handoff, delaying handoff, advantages of Handoff, power difference handoff, forced handoff, mobile assisted and soft handoff. Intersystem handoff

TEXTBOOKS:

1. Mobile Cellular Telecommunications – W.C.Y. Lee, Tata McGraw Hill, 2rd Edn.,2006.
2. Wireless Communications - Theodore. S. Rapport, Pearson education, 2nd Edn.,2002.

REFERENCES:

1. Principles of Mobile Communications – Gordon L. Stuber, Springer International 2nd Edition,2001.
2. Modern Wireless Communication –Simon Haykin Michael Moher, Persons Eduction,2005.

B. Tech VI Semester

L	T	P	C
3	0	0	3

18EC6T04-INTERNET OF THINGS
(PROFESSIONAL ELECTIVE 1)

Prerequisites :Fundamentals of Computer Network, Computer Network Course

Objectives :
1. To understand what Internet of Things is.
2. To get basic knowledge of RFID Technology, Sensor Technology and Satellite Technology.
3. To make students aware of resource management and security issues in Internet of Things.

Course Outcomes : At the end of this course, students will be able to:

1. Explain what Internet of Thins is.
2. Describe key technologies in Internet of Things.
3. Understand wireless sensor network architecture and its framework along with WSN applications.
4. Explain resource management in the Internet of Things.
5. Explain Internet Of Things Privacy, Security And Governance

UNIT - I INTRODUCTION
What is the Internet of Things? : History of IoT, About IoT, Overview and Motivations, Examples of Applications, Internet of Things Definitions and Frameworks : IoT Definitions, IoT Architecture, General Observations, ITU-T Views, Working Definition, IoT Frameworks, Basic Nodal Capabilities

UNIT - II FUNDAMENTAL IoT MECHANISMS AND KEY TECHNOLOGIES
Identification of IoT Objects and Services, Structural Aspects of the IoT, Environment Characteristics, Traffic Characteristics, Scalability, Interoperability, Security and Privacy, Open Architecture, Key IoT Technologies, Device Intelligence, Communication Capabilities, Mobility Support, Device Power, Sensor Technology, RFID Technology, Satellite Technology.

UNIT - III RADIO FREQUENCY IDENTIFICATION TECHNOLOGY RFID:
Introduction, Principle of RFID, Components of an RFID system, Issues EPCGlobal Architecture Framework: EPCIS & ONS, Design issues, Technological challenges, Security challenges, IP for IoT, Web of Things. Wireless Sensor Networks: History and context, WSN Architecture, the node, Connecting nodes, Networking Nodes, Securing Communication WSN specific IoT applications, challenges: Security, QoS, Configuration, Various integration approaches, Data link layer protocols, routing protocols and infrastructure establishment.

UNIT - IV RESOURCE MANAGEMENT IN THE INTERNET OF THINGS
Clustering, Software Agents, Clustering Principles in an Internet of ThingsArchitecture, Design Guidelines, and Software Agents for Object Representation, Data Synchronization. Identity portrayal, Identity management, various identity management models: Local, Network, Federated and global web identity, user-centric identity management, device centric identity management and hybrid-identity management, Identity and trust.

UNIT - V INTERNET OF THINGS PRIVACY, SECURITY AND GOVERNANCE
Vulnerabilities of IoT, Security requirements, Threat analysis, Use cases and misuse cases, IoT security

tomography and layered attacker model, Identity establishment, Access control, Message integrity, Non-repudiation and availability, Security model for IoT.

Text Books

1. Daniel Minoli, ―Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications‖, ISBN: 978-1-118-47347-4, Willy Publications
2. Bernd Scholz-Reiter, Florian Michahelles, ―Architecting the Internet of Things‖, ISBN 978-3- 642-19156-5 e- ISBN 978-3-642-19157-2, Springer

Reference Books

1. HakimaChaouchi, ― The Internet of Things Connecting Objects to the Web‖ ISBN : 978-1- 84821-140-7, Willy Publications
2. Olivier Hersent, David Boswarthick, Omar Elloumi, The Internet of Things: Key Applications and Protocols, ISBN: 978-1-119-99435-0, 2 nd Edition, Willy Publications

B. Tech VI Semester

L	T	P	C
3	0	0	3

18EC6T05-DSP PROCESSORS AND ARCHITECTURE
(PROFESSIONAL ELECTIVE 1)

COURSE OBJECTIVE: Students able to familiarize with DSP systems, Discrete transforms, digital filters design procedures, Computations and accuracy with DSP systems, programmable DSP systems and different DSP processors and architectures.

COURSE OUTCOMES: After completion of the course students able to
1. Evaluate the transformations and design of filters
2. Compute the accuracy and errors in DSP implementations
3. Analyze the Architectures of DSP systems
4. Write program for DSP and able to distinguish with GPP
5. Distinguish different DSP families.

UNIT-I

Introduction to Digital Signal Processing Introduction, a Digital signal processing system, the sampling process, discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), Linear time-invariant systems, Digital filters, Decimation and interpolation.

UNIT-II

Computational Accuracy in DSP Implementations Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT-III

Architectures for Programmable DSP Devices Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation UNIT, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT-IV

Programmable Digital Signal Processors Commercial Digital signal processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX Instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX Processors, Pipeline Operation of TMS320C54XX Processors.

UNIT-V

Analog Devices Family of DSP Devices Analog Devices Family of DSP Devices – ALU and MAC block diagram, Shifter Instruction, Base Architecture of ADSP 2100, ADSP-2181 high performance Processor. Introduction to Black fin Processor - The Black fin Processor, Introduction to Micro Signal Architecture, Overview of Hardware Processing Units and Register files

TEXT BOOKS:

1. Digital Signal Processing – Avtar Singh and S. Srinivasan, Thomson Publications, 2004.
2. A Practical Approach To Digital Signal Processing - K Padmanabhan, R. Vijayarajeswaran, Ananthi. S, New Age International, 2006/2009

REFERENCE BOOKS:

1. Digital Signal Processors, Architecture, Programming and Applications- B. Venkataramani and M. Bhaskar, 2002, TMH.
2. DSP Processor Fundamentals, Architectures & Features – Lapsley et al. 2000, S. Chand & Co.

B. Tech VI Semester	L	T	P	C
	3	0	0	3

18EC6T07-Employability skills 2
(OPEN ELECTIVE-II)

COURSE OBJECTIVES:

COURSE OUTCOMES:

SYLLABUS:

Unit-I:
Divisibility and remainder rules of numbers,Unit digit , square root, cube root and simplification of numbers, HCF and LCM of numbers, Averages and Percentages Alphabetical and miscellaneous series, Coding and decoding and Blood Relations

Unit-II:
Profit & loss, Simple interest and Compound interest Direction, Order and Ranking, Sitting arrangement and Puzzle

Unit-III:
Ratio & proportions, Partnership, Alligation and mixtures and Ages.Data sufficiency, Inequalities and Decision making .

Unit-IV:
Time and work, Pipes & cisterns and Time and distance .Syllogism, Statement and course of action and Statement and Assumption.

Unit-V:
Boats and streams, Areas, Volume and surface areas.Statement and argument, Cause and effect and Drawing inference.

Text Books:
1) ―Objective Arithmetic‖ by R.S. Agarwal, S. Chand Publications.
2) Verbal and non-verbal Reasoning, R.S. Agarwal, S. Chand Publications

REFERENCES:
1) Quantitative Aptitude by Dinesh Khattar, Pearson Education.
2) .Quantitative Aptitude by Abhjit Guha.
3) Fast Track objective Arithmetic, Rajesh Verma, Arihant publications.

B. Tech VI Semester

L	T	P	C
3	0	0	3

18EC6T08-Computer Networks
(OPEN ELECTIVE-II)

OBJECTIVES:

- Understand state-of-the-art in network protocols, architectures, and applications.
- Process of networking research
- Constraints and thought processes for networking research
- Problem Formulation—Approach—Analysis—

OUTCOMES:

1. Understand OSI and TCP/IP models
2. Analyze MAC layer protocols and LAN technologies
3. Design applications using internet protocols
4. Understand routing and congestion control algorithms
5. Understand how internet works

UNIT – I

Introduction: Network Topologies WAN, LAN, MAN. Reference models- The OSI Reference Model- the TCP/IP Reference Model - A Comparison of the OSI and TCP/IP Reference Models

UNIT– II

Physical Layer – Fourier Analysis – Bandwidth Limited Signals – The Maximum Data Rate of a Channel - Guided Transmission Media, Digital Modulation and Multiplexing: Frequency Division Multiplexing, Time Division Multiplexing, Code Division Multiplexing,Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window
Protocols

UNIT – III

The Data Link Layer - Services Provided to the Network Layer – Framing – Error Control – Flow Control, Error Detection and Correction – Error-Correcting Codes – Error Detecting Codes, Elementary Data Link Protocols- A Utopian Simplex Protocol-A Simplex Stop and Wait Protocol for an Error free channel-A Simplex Stop and Wait Protocol for a Noisy Channel, Sliding Window Protocols-A One Bit Sliding Window Protocol-A Protocol Using Go-Back-N- A Protocol Using Selective Repeat

UNIT – IV

The Medium Access Control Sublayer-The Channel Allocation Problem-Static Channel Allocation-Assumptions for Dynamic Channel Allocation, Multiple Access Protocols-Aloha-Carrier Sense Multiple Multiple Access Protocols- Collision-Free Protocols-Limited Contention Protocols-Wireless LAN Protocols, Ethernet-Classic Ethernet Physical Layer-Classic Ethernet MAC Sublayer Protocol-Ethernet Performance-Fast Ethernet Gigabit Ethernet-10-Gigabit Ethernet-Retrospective on Ethernet, Wireless Lans-The 802.11 Architecture and Protocol Stack-The 802.11 Physical Layer-The802.11 MAC Sublayer Protocol-The 805.11 Frame Structure-Services

UNIT – V

Design Issues-The Network Layer Design Issues – Store and Forward Packet Switching-Services Provided to the Transport layer- Implementation of Connectionless Service-Implementation of Connection Oriented Service- Comparison of Virtual Circuit and Datagram Networks, Routing Algorithms-The Optimality principle-Shortest path Algorithm, Congestion Control Algorithms-Approaches to Congestion Control-Traffic Aware Routing- Admission Control-Traffic Throttling-Load Shedding.

Transport Layer – The Internet Transport Protocols: Udp, the Internet Transport Protocols: Tcp Application Layer –The Domain Name System: The DNS Name Space, Resource Records, Name Servers,

Electronic Mail: Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery

TEXT BOOKS:

1. Computer Networks, Tanenbaum and David J Wetherall, 5th Edition, Pearson Edu, 2010
2. Computer Networks: A Top Down Approach, Behrouz A. Forouzan, FirouzMosharraf, McGraw Hill Education

REFERENCE BOOKS:

1. Larry L. Peterson and Bruce S. Davie, ―Computer Networks - A Systems Approach‖ (5th ed), Morgan Kaufmann/ Elsevier, 2011
2. An Introduction to Computer Networks - Second Edition, Peter Lars Dordal, Loyola University of Chicago Copyright Year: 2014

B. Tech VI Semester

L	T	P	C
3	0	0	3

18EC6T09-EMBEDDED STSTEMS
(OPEN ELECTIVE-II)

OBJECTIVES:

1. Technology capabilities and limitations of the hardware, software components
2. Methods to evaluate design tradeoffs between different technology choices.
3. Design Methodologies

OUTCOMES:

Understand the basics of an embedded system
1. Program an embedded system
2. Design, implement and test an embedded system.
3. Identify the unique characteristics of real-time systems
4. Explain the general structure of a real-time system
5. Define the unique design problems and challenges of real-time systems

Syllabus

UNIT-I:

Introduction to Embedded systems:What is an embedded system Vs. General Computing system, history, classification, major application areas, Purpose of embedded systems, Core of embedded system, Characteristics and Quality Attributes of Embedded Systems, Application Specific and Domain specific embedded systems-Examples

UNIT-II:

Factors to be considered in selecting a controller, 8051 architecture, RTOS and Scheduling, Operating basics, types, RTOS, tasks, process and threads, multiprocessing and multitasking, types of multitasking, non preemptive, preemptive scheduling.

UNIT-III:

Task communication of RTOS, Shared memory, pipes, memory mapped objects, message passing, message queue, mailbox, signaling, RPC and sockets, task communication/synchronization issues, racing, deadlock, live lock, the dining philosopher‘s problem.

UNIT-IV:

The producer-consumer problem, Reader writers problem, Priority Inversion, Priority ceiling, Task Synchronization techniques, busy waiting, sleep and wakery, semaphore, mutex, critical section objects, events, device, device drivers, how to clause an RTOS, Integration and testing of embedded hardware and fire ware.

UNIT-V:

Simulators, Emulators, Debuggers, Embedded Product Development life cycle (EDLC), Trends in embedded Industry, Introduction to ARM family of processor.

TEXT BOOK:

1. Introduction to embedded systems Shibu. K.V, TMH, 2009
2. Embedded Systems: A Contemporary Design Tool Paperback by James K. Peckol

REFERENCE BOOKS:

1. Ayala &Gadre: The 8051 Microcontroller & Embedded Systems using Assembly and C, CENGAGE
2. Embedded Systems, Rajkamal, TMH, 2009.

B. Tech VI Semester	L	T	P	C
	0	0	3	1.5

18EC6L11- OOPS through JAVA lab

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

1. Understand the behavior of primitive data types, object references, and arrays.
2. Implement Java classes from specifications
3. Implement interfaces, inheritance, and polymorphism as programming techniques
4. Apply exceptions handling.

LIST OF LAB EXPERIMENTS:

Exercise - 1 (Basics)

a). Write a JAVA program to display default value of all primitive data type of JAVA

b). Write a java program that display the roots of a quadratic equation ax2+bx=0. Calculate the discriminate D and basing on value of D, describe the nature of root.

Exercise - 2 (Operations, Expressions, Control-flow, Strings)

a). Write a JAVA program to search for an element in a given list of elements using binary search mechanism.

b). Write a JAVA program to sort for an element in a given list of elements using bubble sort

(c). Write a JAVA program to sort for an element in a given list of elements using merge sort.

(d) Write a JAVA program using StringBuffer to delete, remove character.

Exercise - 3 (Class, Objects)

a). Write a JAVA program to implement class mechanism. – Create a class, methods and invoke them inside main method.

b). Write a JAVA program to implement constructor.

Exercise - 4 (Methods)

a). Write a JAVA program to implement constructor overloading.

b). Write a JAVA program implement method overloading.

Exercise - 5 (Inheritance)

a). Write a JAVA program to implement Single Inheritance.

b). Write a JAVA program to implement multi level Inheritance.

c). Write a java program showing the usage of abstract class.

Exercise - 6 (Inheritance - Continued)

a). Write a JAVA program give example for ―super‖ keyword. b). Write a JAVA program to implement Interface.

Exercise - 7 (Exception)

a).Write a JAVA program that describes exception handling mechanism b).Write a JAVA program Illustrating Multiple catch clauses.

Exercise – 8 (Runtime Polymorphism)

a). Write a JAVA program that implements Runtime polymorphism

Exercise – 9 (Exception)

a). Write a JAVA program Illustrating exception handling keywords. b). Write a JAVA program for creation of Java Built-in Exceptions c).Write a JAVA program for creation of User Defined Exception

Exercise – 10 (Threads)

a). Write a JAVA program that creates threads by extending Thread class. b). Write a program illustrating **isAlive** and **join ()**

c). Write a Program illustrating Daemon Threads.

Exercise - 11 (Threads continuity)

a).Write a JAVA program Producer Consumer Problem

b).Write a case study on thread Synchronization after solving the above producer consumer problem.

Exercise – 12 (Packages)

a). Write a JAVA program illustrate class path

b). Write a case study on including in class path in your os environment of your package. c). Write a JAVA program that import and use your package in the previous Problem.

Exercise - 13 (Applet)

a).Write a JAVA program to paint like paint brush in applet.

b). Write a JAVA program to create different shapes and fill colors using Applet.

Exercise - 14 (Event Handling)

a).Write a JAVA program that display the x and y position of the cursor movement using Mouse. b).Write a JAVA program that identifies key-up key-down event user entering text in a Applet.

B. Tech VI Semester

L	T	P	C
1	0	0	1

18EC6L12-Technical Seminar

The students are required to select current challenges and develop orientation skills relevant to the Electronics and Communication. The technical seminar should be given by individual student. The seminar topic should be innovative in development; student should give presentation and demonstration of seminar work study. The students are required to submit document of seminar report at the end.

COURSE OUTCOMES:

After going through this course the student will be able to

- Define the real world problems
- Acquire knowledge to solve and address the problem
- Improve presentation skills and writing skills
- Involve in both theoretical and practical survey work

The evaluation of Technical Seminar is done based on

1. Relevance of the Topic
2. Literature Survey
3. New Information involved in the Topic
4. Current age Acceptance of Seminar
5. Presentation and Communication skill of student
6. Seminar Report given by the Student

B. Tech V Semester	L	T	P	C
	0	0	3	1.5

18EC5L09-Digital Signal Processing Laboratory

List of Experiments

1. Generation of basic sequences like impulse,unit step, ramp. Sinusoidal, co-sinusoidal, exponentially growing and decaying sequences.
2. Verification of linear convolution.
3. Verification of circular convolution.
4. DFT of an N-point sequence
5. IDFT of an N-point sequence
6. Frequency response of IIR low pass and high pass Butterworth filters
7. Frequency response of IIR lowpass and high pass Chebyshev filters
8. Frequency response of FIR low pass filter using Rectangular and Hamming Windows
9. Decimation.
10. Interpolation

Software needed: MATLAB

B. Tech V Semester	L	T	P	C
	1	0	2	2

18EC5L10-Communication Systems Laboratory

List of Experiments

All the experiments should be performed in Hardware and software (MATLAB)

1. Amplitude modulation(AM)- Modulation and demodulation
2. DSB-SC Modulation and demodulation
3. SSB-SC Modulation and demodulation
4. Frequency Modulation and demodulation
5. PCM Modulation and demodulation
6. DPCM Modulation and demodulation
7. DM Modulation and demodulation
8. ASK Modulation and demodulation
9. FSK Modulation and demodulation
10. PSK Modulation and demodulation
11. Sampling theorem
12. Time division Multiplexing

Equipment required for Laboratories:

1. RPS – 0 – 30 V
2. CRO – 0 – 20 M Hz.
3. Function Generators – 0 – 1 M Hz
4. RF Generators – 0 – 1000 M Hz./0 – 100 M Hz.
5. Multimeters
6. Lab Experimental kits for analog and Digital Communication
7. Components

B. Tech V Semester	L	T	P	C
	3	0	0	0

18EC5N11-Essence of Indian Traditional Knowledge

Objectives:
To facilitate the students with the concepts of Indian traditional knowledge and to make them understand the Importance of roots of knowledge system.

1. The course aim of the importing basic principle of third process reasoning and inference sustainability is at the course of Indian traditional knowledge system
2. To understand the legal framework and traditional knowledge and biological diversity act 2002 and geographical indication act 2003.
3. The courses focus on traditional knowledge and intellectual property mechanism of traditional knowledge and protection.
4. To know the student traditional knowledge in different sector.

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

1. understand the concept of Traditional knowledge and its importance
2. know the need and importance of protecting traditional knowledge
3. know the various enactments related to the protection of traditional knowledge.
4. understand the concepts of Intellectual property to protect the traditional knowledge

Unit-I:
Introduction to traditional knowledge: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge

Unit-II:
Protection of traditional knowledge: the need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

Unit-III:
Legal framework and TK: A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmers Rights Act, 2001 (PPVFR Act);B:The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indications act 2003.

Unit-IV:
Traditional knowledge and intellectual property: Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

Unit-V:
Traditional knowledge in different sectors: Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

Reference Books:

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012.
3. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002
4. "Knowledge Traditions and Practices of India" Kapil Kapoor, Michel Danino

E-Resources:

1. https://www.youtube.com/watch?v=LZP1StpYEPM 2.http://nptel.ac.in/courses/121106003/

B. Tech V Semester	L	T	P	C
	3	0	0	3

18EC5T01 - Analog and Digital Communication

Course Objectives: Students undergoing this course, are expected to
1. Familiarize with the fundamentals of analog communication systems
2. Familiarize with various techniques for analog modulation and demodulation of signals
3. Distinguish the figure of merits of various analog modulation methods
4. Familiarize with the fundamentals of digital communication systems
5. Familiarize with various techniques for digital modulation and demodulation of signals

Course Outcomes: After undergoing the course, students will be able to
1. Differentiate various Analog modulation schemes
2. Analyze demodulation schemes and their spectral characteristics
3. Analyze noise characteristics of various analog modulation methods
4. Differentiate various Digital modulation schemes
5. Analyze demodulation schemes and their spectral characteristics

UNIT I: AMPLITUDE MODULATION
Introduction to communication system, need for modulation, , Amplitude Modulation, Definition, Time domain and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves, square law Modulator, Detection of AM Waves;, Envelope detector, SNR Calculations of AM waves.

UNIT II: DSB & SSB MODULATION
DSB SC (Double side band suppressed carrier) modulators, time domain and frequency domain description, Generation of DSBSC Waves, Balanced Modulators, Coherent detection of DSB-SC Modulated waves, SNR Calculations of DSB SC.

SSB Modulated Wave, Time domain description, Phase discrimination method for generating AM SSB Modulated waves. Demodulation of SSB Waves. SNR of SSB.

UNIT III: ANGLE MODULATION
Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Transmission bandwidth of FM Wave - Generation of FM Waves, Direct FM, Detection of FM Waves: Balanced Frequency discriminator, zero crossing detector, Phase locked loop, SNR Caluculations.

UNIT IV: PULSE DIGITAL MODULATION
Elements of digital communication systems, advantages of digital communication systems, Elements of PCM, Quantization error, Companding in PCM systems. Differential PCM systems (DPCM). Delta modulation, its draw backs, adaptive delta modulation, comparison of PCM and DM systems, noise in PCM and DM systems.

UNIT V: DIGITAL MODULATION TECHNIQUES
Introduction, ASK, FSK, PSK, DPSK, QPSK Transmitter and receivers Probability of error calculations.

TEXT BOOKS:

1. Principles of Communication Systems – H Taub& D. Schilling, GautamSahe, TMH, 2007 3rd Edition.
2. Communication Systems – B.P. Lathi, BS Publication, 2006.

REFERENCES:

1. Principles of Communication Systems - Simon Haykin, John Wiley, 2nd Ed.,.
2. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004.

B. Tech V Semester

L	T	P	C
3	0	0	3

18EC5T05-Quantitative Aptitude & Reasoning
(OPEN ELECTIVE-I)

Syllabus:

Unit-I: Divisibility and remainder rules of numbers, Unit digit , square root, cube root and simplification of numbers, HCF and LCM of numbers, Averages and Percentages Alphabetical and miscellaneous series, Coding and decoding and Blood Relations

Unit-II: Profit & loss, Simple interest and Compound interest Direction, Order and Ranking, Sitting arrangement and Puzzle

Unit-III: Ratio & proportions, Partnership, Alligation and mixtures and Ages. Data sufficiency, Inequalities and Decision making .

Unit-IV: Time and work, Pipes & cisterns and Time and distance . Syllogism, Statement and course of action and Statement and Assumption.

Unit-V: Boats and streams, Areas, Volume and surface areas. Statement and argument, Cause and effect and Drawing inference.

Text Books: 1. “Objective Arithmetic” by R.S. Agarwal, S. Chand Publications. 2. Verbal and non-verbal Reasoning, R.S. Agarwal, S. Chand Publications

Reference Books: 1.Quantitative Aptitude by Dinesh Khattar, Pearson Education. 2.Quantitative Aptitude by Abhjit Guha. 3.Fast Track objective Arithmetic, Rajesh Verma, Arihant publications.

B. Tech V Semester	L	T	P	C
	3	0	0	3

18EC5T06-SOLID STATE DEVICES AND CIRCUITS
(OPEN ELECTIVE-I)

Course Objectives: Students undergoing this course, are expected to
1. Familiarize with the fundamentals of Semiconductor physics
2. Familiarize with various diodes and characteristics.
3. Familiarize with the transistors and their configurations.
4. Disseminate Amplifications with transistors
5. Understand the operation and working of Oscillators

Course Outcomes: After undergoing the course, students will be able to
1. Understand importance of semiconductors.
2. Analyze Diodes characteristics.
3. Differentiate various configurations.
4. Design amplifiers at different applications using transistor.
5. Analyze different oscillators design.

Unit I: Basics Concepts of Semiconductor Physics
Charged Particles, Field Intensity, Potential, Energy, the eV unit of energy, Energy Band theory of Crystals, Insulators, Semiconductors and metals, Mobility and Conductivity, Electrons and Holes, Donor and Acceptor impurities, Charge Densities in a Semiconductor, Electrical properties of Ge and Si, Hall Effect, Diffusion and Drift Currents, Mass action Law, Fermi-Dirac distribution.

Unit II: Diodes
PN junction diode- Energy band diagram of PN junction Diode- V-I Characteristics –Currentcomponents in PN junction Diode- Diode equation- Diode resistance and capacitance Characteristics of Zener Diode, Varactor Diode- SCR and UJT.

Unit III: Transistors
Bipolar Junction Transistor: Transistor current components- Transistor equation- Transistor configurations- Characteristics of a transistor in CB,CC& CE configurations- Transistor as a Switch- Transistor as an amplifier.
Field Effect Transistors (FET): Junction Field Effect Transistor construction & operation- characteristics CS, CD & CG

Unit IV:Small Signal Transistor Amplifier models:
Low Frequency Transistor Amplifier Models: Two port network, Transistor hybrid model, determination of h- parameters, generalized analysis of transistor amplifier model using h-parameters

Unit V: Feedback Amplifiers and Oscillators
Negative Feedback: Feedback principle and concept, types of feedback, classification of amplifiers, feedback topologies, Characteristics of negative feedback amplifiers
Oscillators: Oscillator principle, condition for oscillations, types of oscillators, RC-phase shift and Wein bridge oscillators with BJT and their analysis. Generalized analysis of LC Oscillators, Hartley and Colpitt‘s oscillators with BJT and their analysis.

Text Books:

1) Millman, Halkias, ―Integrated Electronics- Analog and Digital Circuits and Systems‖, TMH.
2).Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, Mothiki S Prakash Rao McGraw-Hill,Second Edition.

Reference Books:

1) Electronic Devices and Circuits Theory – Robert L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall, Tenth Edition.
2) . Basic Electronic Circuits -V.K.Mehta,S-chand Publications,2008.

B. Tech V Semester	L	T	P	C
	3	0	0	3

18EC5T07-PRINCIPLES OF COMMUNICATION
(OPEN ELECTIVE-I)

Course Objectives: Students undergoing this course, are expected to
1. Familiarize with the fundamentals of analog communication systems
2. Familiarize with various techniques for analog modulation and demodulation of signals
3. Familiarize with the fundamentals of digital communication systems
4. Familiarize with various techniques for digital modulation and demodulation of signals
5. Distinguish the figure of merits of various analog modulation methods

Course Outcomes: After undergoing the course, students will be able to
1. Differentiate various Analog modulation schemes
2. Analyze demodulation schemes and their spectral characteristics
3. Differentiate various Digital modulation schemes
4. Analyze demodulation schemes and their spectral characteristics
5. Analyze noise characteristics of various analog modulation methods

UNIT I
Introduction: Overview of Communication system, Communication channels, Need for modulation, Baseband and Pass band signals, Amplitude Modulation: Double sideband with Carrier (DSB-C), Double side band without Carrier DSB-SC, Single Side Band Modulation SSB, Modulators and Demodulators, Vestigial Side Band (VSB), Quadrature Amplitude Modulator, Radio Transmitter and Receiver

UNIT II
Angle Modulation, Frequency and Phase modulation, frequency deviation, Bandwidth, FM Modulators and Demodulators, Narrow band and wide band FM, FM Broadcasting.

UNIT III
Pulse digital Transmission of Analog Signals: Sampling Theorem and its applications, Pulse Amplitude Modulation (PAM), Pulse Width Modulation, Pulse Position Modulation, Generation and Demodulation, PCM System Issues in digital transmission: Frequency Division Multiplexing Time Division Multiplexing

UNIT IV
Digital Representation of Analog Signals Pulse Code Modulation (PCM), Differential Pulse Code Modulation, Delta Modulation. Adaptive Delta Modulation, Sources of Noises, Frequency domain representation of Noise, Super position of Noises, Linear filtering of Noises, Mathematical Representation of Noise.

UNIT V
Noise in Amplitude Modulation: Analysis, Signal to Noise Ratio, Figure of Merit. Noise in Frequency Modulation: Pre-emphasis, De-Emphasis and SNR Improvement, Phase Locked Loops Analog and Digital.

Text Book:
1. Herbert Taub and Donald L. Schilling, ―Principles of Communication Systems‖, Tata McGrawHill.
2. RishabhAnand, Communication Systems, Khanna

Reference Books:

1. B.P.Lathi,–ModernDigitalandAnalogcommunicationSystems‖,3rd Edition, Oxford University Press.
2. Simon Haykin, ―Communication Systems‖, 4th Edition, Wiley India.

B. Tech VI Semester

L	T	P	C
3	0	0	3

18EC6T03-CELLULAR AND MOBILE COMMUNICATIONS (PROFESSIONAL ELECTIVE 1)

COURSE OBJECTIVE: Students should familiarize with different cellular systems, channel allocations with bandwidth utilizations, signal traffic in cellular systems, frequency management and handoffs.

COURSE OUTCOMES:

The student will be introduced to:

1. Understand the basic cellular concepts like frequency reuse, cell splitting, cell sectoring etc., and various cellular systems.
2. Understand the different types of interference s influencing cellular and mobile communications.
3. Understand the frequency management, channel assignment and various propagation effects in cellular environment.
4. Understand the different types antennas used at cell site and mobile.
5. Understand the concepts of handoff and types of handoffs.

UNIT I

CELLULAR SYSTEMS:

Limitations of Conventional System , Basic Cellular Mobile System ,First, second ,third and fourth Generation cellular wireless systems .Operation of Cellular System .

Fundamentals of cellular Radio System Design: concept of frequency reuse channels, Co-channel Interference, Co-channel Interference Reduction Factor, desired C/I from a normal case in a Omni directional Antenna system

UNIT II

CO-CHANNEL & NON CO-CHANNEL INTERFERENCE: Measurement of Real Time Co-Channel Interference, design of Antenna system, Antenna parameters and their effects

Non-cochannel interference-adjacent channel interference, Near End far end interference,

UNIT III

CELL COVERAGE FOR SIGNAL AND TRAFFIC: Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, and general formula for mobile propagation over water and flat open area, near and long distance propagation.

UNIT IV

CELL SITE AND MOBILE ANTENNAS: Space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, Mobile Antennas.

Frequency Management And Channel Assignment : Numbering and grouping, setup access and paging channels ,channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells

UNIT V

HANDOFFS: Handoff Initiation, types of handoff, delaying handoff, advantages of Handoff, power difference handoff, forced handoff, mobile assisted and soft handoff. Intersystem handoff

TEXTBOOKS:

1. Mobile Cellular Telecommunications – W.C.Y. Lee, Tata McGraw Hill, 2rd Edn.,2006.
2. Wireless Communications - Theodore. S. Rapport, Pearson education, 2nd Edn.,2002.

REFERENCES:

1. Principles of Mobile Communications – Gordon L. Stuber, Springer International 2nd Edition,2001.
2. Modern Wireless Communication –Simon Haykin Michael Moher, Persons Eduction,2005.

B. Tech VI Semester

L	T	P	C
3	0	0	3

18EC6T04-INTERNET OF THINGS
(PROFESSIONAL ELECTIVE 1)

Prerequisites :Fundamentals of Computer Network, Computer Network Course

Objectives :
1. To understand what Internet of Things is.
2. To get basic knowledge of RFID Technology, Sensor Technology and Satellite Technology.
3. To make students aware of resource management and security issues in Internet of Things.

Course Outcomes : At the end of this course, students will be able to:

1. Explain what Internet of Thins is.
2. Describe key technologies in Internet of Things.
3. Understand wireless sensor network architecture and its framework along with WSN applications.
4. Explain resource management in the Internet of Things.
5. Explain Internet Of Things Privacy, Security And Governance

UNIT - I INTRODUCTION
What is the Internet of Things? : History of IoT, About IoT, Overview and Motivations, Examples of Applications, Internet of Things Definitions and Frameworks : IoT Definitions, IoT Architecture, General Observations, ITU-T Views, Working Definition, IoT Frameworks, Basic Nodal Capabilities

UNIT - II FUNDAMENTAL IoT MECHANISMS AND KEY TECHNOLOGIES
Identification of IoT Objects and Services, Structural Aspects of the IoT, Environment Characteristics, Traffic Characteristics, Scalability, Interoperability, Security and Privacy, Open Architecture, Key IoT Technologies, Device Intelligence, Communication Capabilities, Mobility Support, Device Power, Sensor Technology, RFID Technology, Satellite Technology.

UNIT - III RADIO FREQUENCY IDENTIFICATION TECHNOLOGY RFID:
Introduction, Principle of RFID, Components of an RFID system, Issues EPCGlobal Architecture Framework: EPCIS & ONS, Design issues, Technological challenges, Security challenges, IP for IoT, Web of Things. Wireless Sensor Networks: History and context, WSN Architecture, the node, Connecting nodes, Networking Nodes, Securing Communication WSN specific IoT applications, challenges: Security, QoS, Configuration, Various integration approaches, Data link layer protocols, routing protocols and infrastructure establishment.

UNIT - IV RESOURCE MANAGEMENT IN THE INTERNET OF THINGS
Clustering, Software Agents, Clustering Principles in an Internet of ThingsArchitecture, Design Guidelines, and Software Agents for Object Representation, Data Synchronization. Identity portrayal, Identity management, various identity management models: Local, Network, Federated and global web identity, user-centric identity management, device centric identity management and hybrid-identity management, Identity and trust.

UNIT - V INTERNET OF THINGS PRIVACY, SECURITY AND GOVERNANCE
Vulnerabilities of IoT, Security requirements, Threat analysis, Use cases and misuse cases, IoT security

tomography and layered attacker model, Identity establishment, Access control, Message integrity, Non-repudiation and availability, Security model for IoT.

Text Books

1. Daniel Minoli, ―Building the Internet of Things with IPv6 and MIPv6: The Evolving World of M2M Communications‖, ISBN: 978-1-118-47347-4, Willy Publications
2. Bernd Scholz-Reiter, Florian Michahelles, ―Architecting the Internet of Things‖, ISBN 978-3- 642-19156-5 e- ISBN 978-3-642-19157-2, Springer

Reference Books

1. HakimaChaouchi, ― The Internet of Things Connecting Objects to the Web‖ ISBN : 978-1- 84821-140-7, Willy Publications
2. Olivier Hersent, David Boswarthick, Omar Elloumi, The Internet of Things: Key Applications and Protocols, ISBN: 978-1-119-99435-0, 2 nd Edition, Willy Publications

B. Tech VI Semester

L	T	P	C
3	0	0	3

18EC6T05-DSP PROCESSORS AND ARCHITECTURE
(PROFESSIONAL ELECTIVE 1)

COURSE OBJECTIVE: Students able to familiarize with DSP systems, Discrete transforms, digital filters design procedures, Computations and accuracy with DSP systems, programmable DSP systems and different DSP processors and architectures.

COURSE OUTCOMES: After completion of the course students able to
1. Evaluate the transformations and design of filters
2. Compute the accuracy and errors in DSP implementations
3. Analyze the Architectures of DSP systems
4. Write program for DSP and able to distinguish with GPP
5. Distinguish different DSP families.

UNIT-I

Introduction to Digital Signal Processing Introduction, a Digital signal processing system, the sampling process, discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), Linear time-invariant systems, Digital filters, Decimation and interpolation.

UNIT-II

Computational Accuracy in DSP Implementations Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT-III

Architectures for Programmable DSP Devices Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation UNIT, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT-IV

Programmable Digital Signal Processors Commercial Digital signal processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX Instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX Processors, Pipeline Operation of TMS320C54XX Processors.

UNIT-V

Analog Devices Family of DSP Devices Analog Devices Family of DSP Devices – ALU and MAC block diagram, Shifter Instruction, Base Architecture of ADSP 2100, ADSP-2181 high performance Processor. Introduction to Black fin Processor - The Black fin Processor, Introduction to Micro Signal Architecture, Overview of Hardware Processing Units and Register files

TEXT BOOKS:

1. Digital Signal Processing – Avtar Singh and S. Srinivasan, Thomson Publications, 2004.
2. A Practical Approach To Digital Signal Processing - K Padmanabhan, R. Vijayarajeswaran, Ananthi. S, New Age International, 2006/2009

REFERENCE BOOKS:

1. Digital Signal Processors, Architecture, Programming and Applications- B. Venkataramani and M. Bhaskar, 2002, TMH.
2. DSP Processor Fundamentals, Architectures & Features – Lapsley et al. 2000, S. Chand & Co.

B. Tech VI Semester	L	T	P	C
	3	0	0	3

18EC6T07-Employability skills 2
(OPEN ELECTIVE-II)

COURSE OBJECTIVES:

COURSE OUTCOMES:

SYLLABUS:

Unit-I:
Divisibility and remainder rules of numbers,Unit digit , square root, cube root and simplification of numbers, HCF and LCM of numbers, Averages and Percentages Alphabetical and miscellaneous series, Coding and decoding and Blood Relations

Unit-II:
Profit & loss, Simple interest and Compound interest Direction, Order and Ranking, Sitting arrangement and Puzzle

Unit-III:
Ratio & proportions, Partnership, Alligation and mixtures and Ages.Data sufficiency, Inequalities and Decision making .

Unit-IV:
Time and work, Pipes & cisterns and Time and distance .Syllogism, Statement and course of action and Statement and Assumption.

Unit-V:
Boats and streams, Areas, Volume and surface areas.Statement and argument, Cause and effect and Drawing inference.

Text Books:
1) ―Objective Arithmetic‖ by R.S. Agarwal, S. Chand Publications.
2) Verbal and non-verbal Reasoning, R.S. Agarwal, S. Chand Publications

REFERENCES:
1) Quantitative Aptitude by Dinesh Khattar, Pearson Education.
2) .Quantitative Aptitude by Abhjit Guha.
3) Fast Track objective Arithmetic, Rajesh Verma, Arihant publications.

B. Tech VI Semester

L	T	P	C
3	0	0	3

18EC6T08-Computer Networks
(OPEN ELECTIVE-II)

OBJECTIVES:

- Understand state-of-the-art in network protocols, architectures, and applications.
- Process of networking research
- Constraints and thought processes for networking research
- Problem Formulation—Approach—Analysis—

OUTCOMES:

1. Understand OSI and TCP/IP models
2. Analyze MAC layer protocols and LAN technologies
3. Design applications using internet protocols
4. Understand routing and congestion control algorithms
5. Understand how internet works

UNIT – I

Introduction: Network Topologies WAN, LAN, MAN. Reference models- The OSI Reference Model- the TCP/IP Reference Model - A Comparison of the OSI and TCP/IP Reference Models

UNIT– II

Physical Layer – Fourier Analysis – Bandwidth Limited Signals – The Maximum Data Rate of a Channel - Guided Transmission Media, Digital Modulation and Multiplexing: Frequency Division Multiplexing, Time Division Multiplexing, Code Division Multiplexing,Data Link Layer Design Issues, Error Detection and Correction, Elementary Data Link Protocols, Sliding Window
Protocols

UNIT – III

The Data Link Layer - Services Provided to the Network Layer – Framing – Error Control – Flow Control, Error Detection and Correction – Error-Correcting Codes – Error Detecting Codes, Elementary Data Link Protocols- A Utopian Simplex Protocol-A Simplex Stop and Wait Protocol for an Error free channel-A Simplex Stop and Wait Protocol for a Noisy Channel, Sliding Window Protocols-A One Bit Sliding Window Protocol-A Protocol Using Go-Back-N- A Protocol Using Selective Repeat

UNIT – IV

The Medium Access Control Sublayer-The Channel Allocation Problem-Static Channel Allocation-Assumptions for Dynamic Channel Allocation, Multiple Access Protocols-Aloha-Carrier Sense Multiple Multiple Access Protocols- Collision-Free Protocols-Limited Contention Protocols-Wireless LAN Protocols, Ethernet-Classic Ethernet Physical Layer-Classic Ethernet MAC Sublayer Protocol-Ethernet Performance-Fast Ethernet Gigabit Ethernet-10-Gigabit Ethernet-Retrospective on Ethernet, Wireless Lans-The 802.11 Architecture and Protocol Stack-The 802.11 Physical Layer-The802.11 MAC Sublayer Protocol-The 805.11 Frame Structure-Services

UNIT – V

Design Issues-The Network Layer Design Issues – Store and Forward Packet Switching-Services Provided to the Transport layer- Implementation of Connectionless Service-Implementation of Connection Oriented Service- Comparison of Virtual Circuit and Datagram Networks, Routing Algorithms-The Optimality principle-Shortest path Algorithm, Congestion Control Algorithms-Approaches to Congestion Control-Traffic Aware Routing- Admission Control-Traffic Throttling-Load Shedding.

Transport Layer – The Internet Transport Protocols: Udp, the Internet Transport Protocols: Tcp Application Layer –The Domain Name System: The DNS Name Space, Resource Records, Name Servers,

Electronic Mail: Architecture and Services, The User Agent, Message Formats, Message Transfer, Final Delivery

TEXT BOOKS:

1. Computer Networks, Tanenbaum and David J Wetherall, 5th Edition, Pearson Edu, 2010
2. Computer Networks: A Top Down Approach, Behrouz A. Forouzan, FirouzMosharraf, McGraw Hill Education

REFERENCE BOOKS:

1. Larry L. Peterson and Bruce S. Davie, ―Computer Networks - A Systems Approach‖ (5th ed), Morgan Kaufmann/ Elsevier, 2011
2. An Introduction to Computer Networks - Second Edition, Peter Lars Dordal, Loyola University of Chicago Copyright Year: 2014

B. Tech VI Semester

L	T	P	C
3	0	0	3

18EC6T09-EMBEDDED STSTEMS
(OPEN ELECTIVE-II)

OBJECTIVES:

1. Technology capabilities and limitations of the hardware, software components
2. Methods to evaluate design tradeoffs between different technology choices.
3. Design Methodologies

OUTCOMES:

Understand the basics of an embedded system
1. Program an embedded system
2. Design, implement and test an embedded system.
3. Identify the unique characteristics of real-time systems
4. Explain the general structure of a real-time system
5. Define the unique design problems and challenges of real-time systems

Syllabus

UNIT-I:

Introduction to Embedded systems:What is an embedded system Vs. General Computing system, history, classification, major application areas, Purpose of embedded systems, Core of embedded system, Characteristics and Quality Attributes of Embedded Systems, Application Specific and Domain specific embedded systems-Examples

UNIT-II:

Factors to be considered in selecting a controller, 8051 architecture, RTOS and Scheduling, Operating basics, types, RTOS, tasks, process and threads, multiprocessing and multitasking, types of multitasking, non preemptive, preemptive scheduling.

UNIT-III:

Task communication of RTOS, Shared memory, pipes, memory mapped objects, message passing, message queue, mailbox, signaling, RPC and sockets, task communication/synchronization issues, racing, deadlock, live lock, the dining philosopher‘s problem.

UNIT-IV:

The producer-consumer problem, Reader writers problem, Priority Inversion, Priority ceiling, Task Synchronization techniques, busy waiting, sleep and wakery, semaphore, mutex, critical section objects, events, device, device drivers, how to clause an RTOS, Integration and testing of embedded hardware and fire ware.

UNIT-V:

Simulators, Emulators, Debuggers, Embedded Product Development life cycle (EDLC), Trends in embedded Industry, Introduction to ARM family of processor.

TEXT BOOK:

1. Introduction to embedded systems Shibu. K.V, TMH, 2009
2. Embedded Systems: A Contemporary Design Tool Paperback by James K. Peckol

REFERENCE BOOKS:

1. Ayala &Gadre: The 8051 Microcontroller & Embedded Systems using Assembly and C, CENGAGE
2. Embedded Systems, Rajkamal, TMH, 2009.

B. Tech VI Semester	L	T	P	C
	0	0	3	1.5

18EC6L11- OOPS through JAVA lab

COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

1. Understand the behavior of primitive data types, object references, and arrays.
2. Implement Java classes from specifications
3. Implement interfaces, inheritance, and polymorphism as programming techniques
4. Apply exceptions handling.

LIST OF LAB EXPERIMENTS:

Exercise - 1 (Basics)

a). Write a JAVA program to display default value of all primitive data type of JAVA

b). Write a java program that display the roots of a quadratic equation ax2+bx=0. Calculate the discriminate D and basing on value of D, describe the nature of root.

Exercise - 2 (Operations, Expressions, Control-flow, Strings)

a). Write a JAVA program to search for an element in a given list of elements using binary search mechanism.

b). Write a JAVA program to sort for an element in a given list of elements using bubble sort

(c). Write a JAVA program to sort for an element in a given list of elements using merge sort.

(d) Write a JAVA program using StringBuffer to delete, remove character.

Exercise - 3 (Class, Objects)

a). Write a JAVA program to implement class mechanism. – Create a class, methods and invoke them inside main method.

b). Write a JAVA program to implement constructor.

Exercise - 4 (Methods)

a). Write a JAVA program to implement constructor overloading.

b). Write a JAVA program implement method overloading.

Exercise - 5 (Inheritance)

a). Write a JAVA program to implement Single Inheritance.

b). Write a JAVA program to implement multi level Inheritance.

c). Write a java program showing the usage of abstract class.

Exercise - 6 (Inheritance - Continued)

a). Write a JAVA program give example for ―super‖ keyword. b). Write a JAVA program to implement Interface.

Exercise - 7 (Exception)

a).Write a JAVA program that describes exception handling mechanism b).Write a JAVA program Illustrating Multiple catch clauses.

Exercise – 8 (Runtime Polymorphism)

a). Write a JAVA program that implements Runtime polymorphism

Exercise – 9 (Exception)

a). Write a JAVA program Illustrating exception handling keywords. b). Write a JAVA program for creation of Java Built-in Exceptions c).Write a JAVA program for creation of User Defined Exception

Exercise – 10 (Threads)

a). Write a JAVA program that creates threads by extending Thread class. b). Write a program illustrating **isAlive** and **join ()**

c). Write a Program illustrating Daemon Threads.

Exercise - 11 (Threads continuity)

a).Write a JAVA program Producer Consumer Problem

b).Write a case study on thread Synchronization after solving the above producer consumer problem.

Exercise – 12 (Packages)

a). Write a JAVA program illustrate class path

b). Write a case study on including in class path in your os environment of your package. c). Write a JAVA program that import and use your package in the previous Problem.

Exercise - 13 (Applet)

a).Write a JAVA program to paint like paint brush in applet.

b). Write a JAVA program to create different shapes and fill colors using Applet.

Exercise - 14 (Event Handling)

a).Write a JAVA program that display the x and y position of the cursor movement using Mouse. b).Write a JAVA program that identifies key-up key-down event user entering text in a Applet.

B. Tech VI Semester

L	T	P	C
1	0	0	1

18EC6L12-Technical Seminar

The students are required to select current challenges and develop orientation skills relevant to the Electronics and Communication. The technical seminar should be given by individual student. The seminar topic should be innovative in development; student should give presentation and demonstration of seminar work study. The students are required to submit document of seminar report at the end.

COURSE OUTCOMES:

After going through this course the student will be able to

- Define the real world problems
- Acquire knowledge to solve and address the problem
- Improve presentation skills and writing skills
- Involve in both theoretical and practical survey work

The evaluation of Technical Seminar is done based on

1. Relevance of the Topic
2. Literature Survey
3. New Information involved in the Topic
4. Current age Acceptance of Seminar
5. Presentation and Communication skill of student
6. Seminar Report given by the Student

B. Tech V Semester	L	T	P	C
	0	0	3	1.5

18EC5L09-Digital Signal Processing Laboratory

List of Experiments

1. Generation of basic sequences like impulse,unit step, ramp. Sinusoidal, co-sinusoidal, exponentially growing and decaying sequences.
2. Verification of linear convolution.
3. Verification of circular convolution.
4. DFT of an N-point sequence
5. IDFT of an N-point sequence
6. Frequency response of IIR low pass and high pass Butterworth filters
7. Frequency response of IIR lowpass and high pass Chebyshev filters
8. Frequency response of FIR low pass filter using Rectangular and Hamming Windows
9. Decimation.
10. Interpolation

Software needed: MATLAB

B. Tech V Semester	L	T	P	C
	1	0	2	2

18EC5L10-Communication Systems Laboratory

List of Experiments

All the experiments should be performed in Hardware and software (MATLAB)

1. Amplitude modulation(AM)- Modulation and demodulation
2. DSB-SC Modulation and demodulation
3. SSB-SC Modulation and demodulation
4. Frequency Modulation and demodulation
5. PCM Modulation and demodulation
6. DPCM Modulation and demodulation
7. DM Modulation and demodulation
8. ASK Modulation and demodulation
9. FSK Modulation and demodulation
10. PSK Modulation and demodulation
11. Sampling theorem
12. Time division Multiplexing

Equipment required for Laboratories:

1. RPS – 0 – 30 V
2. CRO – 0 – 20 M Hz.
3. Function Generators – 0 – 1 M Hz
4. RF Generators – 0 – 1000 M Hz./0 – 100 M Hz.
5. Multimeters
6. Lab Experimental kits for analog and Digital Communication
7. Components

B. Tech V Semester	L	T	P	C
	3	0	0	0

18EC5N11-Essence of Indian Traditional Knowledge

Objectives:
To facilitate the students with the concepts of Indian traditional knowledge and to make them understand the Importance of roots of knowledge system.

1. The course aim of the importing basic principle of third process reasoning and inference sustainability is at the course of Indian traditional knowledge system
2. To understand the legal framework and traditional knowledge and biological diversity act 2002 and geographical indication act 2003.
3. The courses focus on traditional knowledge and intellectual property mechanism of traditional knowledge and protection.
4. To know the student traditional knowledge in different sector.

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

1. understand the concept of Traditional knowledge and its importance
2. know the need and importance of protecting traditional knowledge
3. know the various enactments related to the protection of traditional knowledge.
4. understand the concepts of Intellectual property to protect the traditional knowledge

Unit-I:
Introduction to traditional knowledge: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge

Unit-II:
Protection of traditional knowledge: the need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

Unit-III:
Legal framework and TK: A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmers Rights Act, 2001 (PPVFR Act);B:The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indications act 2003.

Unit-IV:
Traditional knowledge and intellectual property: Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

Unit-V:
Traditional knowledge in different sectors: Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

Reference Books:

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012.
3. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002
4. "Knowledge Traditions and Practices of India" Kapil Kapoor, Michel Danino

E-Resources:

1. https://www.youtube.com/watch?v=LZP1StpYEPM 2.http://nptel.ac.in/courses/121106003/

B.TECH I SEMESTER	BSC	L	T	P	C
		3	0	0	3

20CS1T01 LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS

Pre-requisite: Basic knowledge about matrices, differentiation and integration

Course Objective: Objective of the course is to impart

- Basic understanding of mathematical methods to solve simultaneous linear systems
- Understanding of formation and solutions of ordinary differential equations
- Knowing the mathematical methods to solve applications of differential equations

Course Outcomes:

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

CO1: Apply the knowledge to solve a system of homogeneous and non homogeneous linear equations

CO2: Illustrate the methods of computing eigen values and eigen vectors

CO3: Able to analyze the real life situations, formulate the differential equations and then applying the methods

CO4: Determine the solutions of linear differential equations

CO5: Optimize functions of several variables and able to find extreme values of constrained functions

SYLLABUS

UNIT-I: Linear systems of equations:

Rank of a matrix, Echelon form, Normal form, PAQ is in normal form, linear dependence and independence of vectors, Consistency of linear system of equations, System of linear homogeneous equations, Gauss-elimination and Gauss -Jordan methods.

UNIT-II: Eigen values & Eigen vectors:

Eigen values, Eigen vectors, Properties of Eigen values (without proofs), Cayley-Hamilton theorem (without proof), finding inverse and powers of a matrix using C-H theorem, Reduction to diagonal form, reduction of quadratic form to canonical form using orthogonal reduction, nature of quadratic forms.

UNIT-III: Ordinary Differential Equations of first order:

Linear equations, Bernoulli's equation, Exact differential equations. Equations reducible

to exact equations, **Applications:** Orthogonal Trajectories, Newton's Law of cooling, Rate of decay & growth, R-L series circuits.

UNIT-IV: Linear Differential Equations higher order:

Definitions, Complete solution (without proof), Operator D, Rules to find complementary function, Inverse operator, Rules to find the particular integral(nonhomogeneous term of the form e^{ax}, sin(ax+b), cos(ax+b), polynomials in x^m, $e^{ax}V(x)$, any other function), Method of variation of parameters.

UNIT-V: Partial Differentiation:

Functions of two variables, Partial derivatives, Homogeneous functions, Euler's theorem, Total derivative, Jacobian and functional dependence, Taylor's theorem for functions of two variables. **Applications:** Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers.

Text Books:

1. B. S. GREWAL, Higher Engineering Mathematics, Khanna Publishers, 43rd Edition, 2014.
2. B. V. RAMANA, Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:

1. ERWIN KREYSZIG, Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.
2. N. P. BALI & Dr. MANISH GOYAL**,** A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition, 2014.

B.TECH I SEMESTER	BSC	L	T	P	C
		3	0	0	3

20CS1T02 APPLIED CHEMISTRY

Pre-requisite: Knowledge of basic concepts of Chemistry for Engineering students will help them as professional engineers later in design and material selection, as well as utilizing the availableresources

Course Objective: Objective of the course is to impart

- Importance of usage of plastics in household appliances and composites (FRP) in aerospace and automotive industries.
- Outline the basics for the construction of electrochemical cells, batteries and fuel cells. Understand the mechanism of corrosion and how it can be prevented.
- Explain the preparation of semiconductors and nanomaterials, engineering applications of nanomaterials, superconductors and liquid crystals.
- Recall the increase in demand for power and hence alternative sources of power are studied due to depleting sources of fossil fuels. Advanced instrumental techniques are introduced.
- Outline the basics of green chemistry and molecular switches

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

CO1: Analyze the different types of composite plastic materials and interpret the mechanism ofconduction in conducting polymers.

CO2: Utilize the theory of construction of electrodes, batteries and fuel cells in redesigning newengineering products and categorize the reasons for corrosion and study methods to control corrosion.

CO3: Synthesize nanomaterials for modern advances of engineering technology. Summarize the preparation of semiconductors; analyze the applications of liquid crystalsand superconductors.

CO4: Design models for energy by different natural sources.
Analyze the principles of different analytical instruments and their applications.

CO5: Obtain the knowledge of green chemistry and molecular machines

SYLLABUS

UNIT-I: Polymer Technology

Polymerisation: Introduction, methods of polymerization (addition and Condensation), Physical and mechanical properties.

Plastics: Compounding, fabrication (compression, injection, blown film and extrusion), preparation, properties and applications (PVC, polycarbonates and Bakelite), mention some examples of plastic materials used in electronic gadgets.

Elastomers: Natural rubber-Drawbacks-vulcanization, preparation, properties and applications (Buna S, thiokol and polyurethanes).

Composite materials: Fiber reinforced plastics – GFRP and Aramid FRP

Conducting polymers: Intrinsic and extrinsic conducting polymers

Biodegradable polymers: preparation and applications

UNIT-II: Electrochemical Cells And Corrosion

Part I: ELECTROCHEMICAL CELLS: Single electrode potential, electrochemical series and uses of series, standard hydrogen electrode,calomel electrode, batteries (Dry cell, Li ion battery and zinc air cells), fuel cells (H_2-O_2, CH_3OH-O_2, phosphoric acid and molten carbonate).

Part II: Corrosion: Definition, theories of corrosion (chemical and electrochemical), galvanic corrosion, differential aeration corrosion, stress corrosion, galvanic series, factors influencing rate of corrosion, corrosion control (cathodic protection), Protective coatings (cathodic coatings, anodic coatings, electroplating and electroless plating)

UNIT-III: Material Chemistry

Part I: Non-elemental semiconducting materials: Stoichiometric, controlled valency & chalcogen photo/semiconductors-preparation of semiconductors (distillation, zone refining, Czochralski crystal pulling technique) - Semiconductor devices (p-n junction diode as rectifier, junction transistor).

Super conductors:-Type –I, Type II-characteristics and applications

Part II: Nano materials: Introduction, sol-gel method, characterization by (Brunauer Emmet Teller[BET]), (scanning electron microscopy [SEM]) and (transmission electron microscopy [TEM]),applications of graphene and fullerenes, carbon nanotubes (types, preparation and applications)

Liquid crystals: Introduction-types-applications.

UNIT-IV: Non-Conventional Energy Sources & Spectroscopy

Part I: NON-CONVENTIONAL ENERGY SOURCES

Design, working, schematic diagram, advantages and disadvantages of photovoltaic cell, hydropower, geothermal power, tidal and wave power, ocean thermal energy conversion.

Part II: **SPECTROSCOPY**

UV spectroscopy- Basic principle-Instrumentation-Applications

IR spectroscopy- Basic principle-Instrumentation-Applications

NMR spectroscopy- Basic principle-Instrumentation-Applications

UNIT-V: Advanced Concepts/Topics In Chemistry

Part-I: Green chemistry: Introduction, Principles of green chemistry, Green synthesis-Aquaeous Phase method-Microwave method-Phase transfer catalysis method, R4M4 principles (Econoburette).

PART-II: Molecular switches: characteristics of molecular motors and machines, Rotaxanes and Catenanes as artificial molecular machines, prototypes – linear motions in rotaxanes, an acid- base controlled molecular shuttle, a molecular elevator, an autonomous light-powered molecular motor.

Text Books:

1. P.C. Jain and M. Jain “Engineering Chemistry”, 15/e, Dhanpat Rai & Sons, Delhi,(Latest edition).
2. Shikha Agarwal, “Engineering Chemistry”, Cambridge University Press, New Delhi,(2019).
3. S.S. Dara, “A Textbook of Engineering Chemistry”, S.Chand & Co, (2010).
4. Shashi Chawla, “Engineering Chemistry”, Dhanpat Rai Publicating Co. (Latest edition).

References:

1. K. Sesha Maheshwaramma and Mridula Chugh, “Engineering Chemistry”, Pearson India
2. O.G. Palana, “Engineering Chemistry”, Tata McGraw Hill Education Private Limited,(2009).
3. CNR Rao and JM Honig (Eds) “Preparation and characterization of materials” Academic press, New York (latest edition)
4. B. S. Murthy, P. Shankar and others, “Textbook of Nanoscience and Nanotechnology”,University press (latest edition)

B.TECH I SEMESTER **HSMC**

L	T	P	C
3	0	0	3

20CS1T03 ENGLISH

Pre-requisite:

Course Objective:

- Facilitate effective listening skills for better comprehension of academic lectures and English spoken by native speakers
- Focus on appropriate reading strategies for comprehension of various academic texts and authentic materials
- Help improve speaking skills through participation in activities such as role plays, discussions and structured talks/oral presentations
- Impart effective strategies for good writing and demonstrate the same in summarizing, writing well organized essays, record and report useful information
- Provide knowledge of grammatical structures and vocabulary and encourage their appropriate use in speech and writing

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

CO1 understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information

CO2 ask and answer general questions on familiar topics

CO3 employ suitable strategies to master the art of letter writing and email writing

CO4 recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs

CO5 form sentences using proper grammatical structures and correct word forms

SYLLABUS

UNIT-I A Drawer full of happiness (Detailed Study)
Deliverance (Non-detailed Study)

UNIT-II Nehru's letter to his daughter Indira on her birthday(Detailed Study)
Bosom Friend (Non-detailed Study)

UNIT-III Stephen Hawking-Positivity 'Benchmark' (Detailed Study)
Shakespeare's Sister(Non-detailed Study)

UNIT-IV Liking a Tree, Unbowed: Wangari Maathai-biography (Detailed Study)

Telephone Conversation(Non-detailed Study)

UNIT-V Stay Hungry-Stay foolish (Detailed Study)
Still I Rise(Non-detailed Study)

Text Books

1. "Infotech English", Maruthi Publications. (Detailed)
2. "The Individual Society", Pearson Publications.(Non-detailed)

Reference Books

1. Bailey, Stephen. Academic writing: A handbook for international students. Routledge, 2014.
2. Chase, Becky Tarver. Pathways: Listening, Speaking and Critical Thinking. Heinley ELT; 2nd Edition, 2018.
3. Skillful Level 2 Reading & Writing Student's Book Pack (B1) Macmillan Educational.
4. Hewings, Martin. Cambridge Academic English (B2). CUP, 2012.

B.TECH I SEMESTER	ESC	L	T	P	C
		1	0	4	3

20CS1L04 COMPUTER ENGIENERING WORKSHOP

Course Objectives:

Skills and knowledge provided by this subject are the following:

- **PC Hardware:** Identification of basic peripherals, Assembling a PC, Installation of system software like MS Windows, device drivers, etc. Troubleshooting of PC Hardware and Software issues.
- **Internet & World Wide Web:** Different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet, web browsers, email, newsgroups and discussion forums. Awareness of cyber hygiene (protecting the personal computer from getting infected with the viruses), worms and other cyber attacks.
- **Productivity Tools:** Understanding and practical approach of professional word documents, excel spread sheets, power point presentations and personal web sites using the Microsoft suite office tools.

Course Outcomes:

CO1: Identify, assemble and update the components of a computer

CO2: Configure, evaluate and select hardware platforms for the implementation and execution of computer applications, services and systems

CO3: Make use of tools for converting pdf to word and vice versa

CO4: Develop presentation, documents and small applications using productivity tools such as word processor, presentation tools, spreadsheets, HTML, LaTex

LIST OF EXERCISES

Task 1: Identification of the peripherals of a computer - Prepare a report containing the block diagram of the computer along with the configuration of each component and its functionality. Describe about various I/O Devices and its usage.

Task 2: Practicing disassembling and assembling components of a PC

Task 3: Installation of Device Drivers, MS Windows, Linux Operating systems and Disk Partitioning, dual boating with Windows and Linux.

Task 4: Introduction to Memory and Storage Devices, I/O Port, Assemblers, Compilers, Interpreters, Linkers and Loaders.

Task 5: Demonstration of Hardware and Software Troubleshooting

Task 6: Demonstrating Importance of Networking, Transmission Media, Networking Devices- Gateway, Routers, Hub, Bridge, NIC, Bluetooth Technology, Wireless Technology, Modem, DSL, and Dialup Connection.

Task 7: Surfing the Web using Web Browsers, Awareness of various threats on the Internet and its solutions, Search engines and usage of various search engines, Need of anti-virus, Installation of anti-virus, configuring personal firewall and windows update.

(Students should get connected to their Local Area Network and access the Internet. In the process they should configure the TCP/IP setting and demonstrate how to access the websites and email. Students customize their web browsers using bookmarks, search toolbars and popup blockers)

Productivity Tools:

Task 8: Basic HTML tags, Introduction to HTML5 and its tags, Introduction to CSS3 and its properties. Preparation of a simple website/ homepage,

Assignment: Develop your home page using HTML Consisting of your photo, name, address and education details as a table and your skill set as a list.

Features to be covered:- Layouts, Inserting text objects, Editing text objects, Inserting Tables, Working with menu objects, Inserting pages, Hyper linking, Renaming, deleting, modifying pages, etc.,

Task 9: Demonstration and Practice of various features of Microsoft Word

Assignment:

1. Create a project certificate.

2. Creating a news letter

Features to be covered:-Formatting Fonts, Paragraphs, Text effects, Spacing, Borders and Colors, Header and Footer, Date and Time option, tables, Images, Bullets and Numbering, Table of Content, Newspaper columns, Drawing toolbar and Word Art and Mail Merge in word etc.,

Task 10: Demonstration and Practice of various features Microsoft Excel

Assignment: 1. Creating a scheduler

2. Calculating GPA

3. Calculating Total, average of marks in various subjects and ranks of students

based on marks

Features to be covered:Format Cells, Summation, auto fill, Formatting Text, Cell Referencing, Formulae in excel, Charts, Renaming and Inserting worksheets, etc.,

Task 11: Demonstration and Practice of various features Microsoft Power Point

Features to be covered:Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Hyperlinks Tables and Charts, Master Layouts, Types of views, Inserting – Background, textures, Design Templates, etc.,

Task 12: Demonstration and Practice of various features LaTeX – document preparation, presentation (Features covered in Task 9 and Task 11 need to be explored in LaTex)

Task 13: Tools for converting word to pdf and pdf to word

Task 14: Internet of Things (IoT): IoT fundamentals, applications, protocols, communication models, architecture, IoT devices

Reference Books:

1. Computer Fundamentals, Anita Goel, Pearson India Education, 2017

2. PC Hardware Trouble Shooting Made Easy, TMH

3. Introduction to Information Technology, ITL Education Solutions Limited, 2nd Edition, Pearson, 2020

4. Upgrading and Repairing PCs, 18th Edition, Scott Mueller, QUE, Pearson, 2008

5. LaTeX Companion – Leslie Lamport, PHI/Pearson

6. Introducing HTML5, Bruce Lawson, Remy Sharp, 2nd Edition, Pearson, 2012

7. Teach yourself HTML in 24 hours, By Techmedia

8. HTML 5 and CSS 3.0 to the Real World by Alexis Goldstein, Sitepoint publication.

9. Internet of Things, Technologies, Applications, Challenges and Solutions, B K Tripathy, J Anuradha, CRC Press

10. Comdex Information Technology Course Tool Kit, Vikas Gupta, Wiley Dreamtech.

11. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme, CISCO Press, Pearson Education.

12. Essential Computer and IT Fundamentals for Engineering and Science Students, Dr. N. B. Venkateswarlu, S. Chand Publishers

B.TECH I SEMESTER	ESC	L	T	P	C
		3	0	0	3

20CS1T05 PROBLEM SOLVING THROUGH C

Pre-requisite:

Course Objective:

- To learn about the computer systems, computing environments, developing of a computer program and Structure of a C Program
- To gain knowledge of the operators, selection, control statements and repetition in C. To learn about the design concepts of arrays, strings, enumerated structure and union types and their usage. To assimilate about pointers, dynamic memory allocation and know the significance of Preprocessor. To assimilate about File I/O and significance of functions

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

CO1: Understand the basic concepts of programming

CO2: Understand and Apply loop construct for a given problem

CO3: Demonstrate the use pointers

CO4: Understand the use of functions and develop modular reusable code

CO5: Understand File I/O operations

SYLLABUS

UNIT-I:

INTRODUCTION TO COMPUTERS: Functional Components of computer, computer software, categories of memory, types of programming languages, Development of algorithms, flow charts, software development process, Computer Numbering system

BASICS OF C PROGRAMMING: Introduction to programming paradigms, Structure of C program, Data Types, C Tokens, Operators: Precedence and Associativity, Expressions Input/output statements, Assignment statements

UNIT-II:

Decision making statements: if, if else, nester if. Multi way decision making statements: else if, Switch statement. **Loop statements**: while, do while, for, Compilation process.

UNIT-III:

Introduction to Arrays: Declaration, Initialization, One dimensional array, Example Programs on one dimensional array, Selection sort, linear and binary search, two

dimensional arrays, Matrix Operations, Multi-dimensional Arrays

Strings: Declaration, String operations: length, compare, concatenate, copy, String handling functions.

UNIT-IV:

FUNCTIONS: Introduction to functions: Function prototype, function definition, function call, Built-in functions, Recursion, Storage classes, Passing Arrays & Strings to the functions, Preprocessor directives

POINTERS: Pointers, Pointer operators, Pointer arithmetic, Arrays and pointers, Array of pointers, Parameter passing: Pass by value, Pass by reference, Dynamic Memory Allocation

UNIT-V:

STRUCTURES AND UNIONS: Structure, Nested structures, Pointer and Structures, Array of structures, Example Program using structures and pointers, Self-referential structures, Unions.

FILE PROCESSING: Files, Types of file processing: Sequential access, Random access, Sequential access file, Random access file, Command line arguments

Text Books:

1. Krnighan. B.W and Ritche, D.M, "The C Programming Language", Second Edition, Pearson Education, 2006
2. ReemaThareja, "Programming in C", Oxford University Press, Second Edition, 2016.

References:

1. Pradepdey, Manas Ghosh, "Fundamentals of Computing and programming in C", First Edition, Oxford University Press, 2009.
2. Paul Deitel and Harvey Deitel, "C How to Program", Seventh Edition, Pearson Publication.
3. E Balagursamy, "Programming in C, Sixth Edition, Tata McGraw Hill.
4. Ajay Mittal, "Programming in C A practical Approach", Pearson education

B.TECH I SEMESTER	HSMC	L	T	P	C
		0	0	3	1.5

20CS1L06 ENGLISH COMMUNICATION SKILLS LAB

Course Objectives:

- Facilitate effective usage of functional English through role plays
- Focus on vocabulary enhancement
- Foster various nuances of phonetics and accent neutralization

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

CO1: Acquire basic proficiency in English by learning functional aspects of English language

CO2: Learn the methods of enhancing vocabulary

CO3: Acquaint himself/herself with nuances of Phonetics

LIST OF EXPERIMENTS

1 Greetings and Introductions
2 Requesting Permission & Giving Directions
3 Inviting/Complaining/Congratulating
4 Root Words
5 Phonetics-Sounds and Symbols
6 Pronunciation Rules

References:

1. Strengthen Your Steps, Maruti Publications
2. Interact, Orient Blackswan
3. Word Power Made Easy, Pocket Books

B.TECH I SEMESTER	BSC	L	T	P	C
		0	0	3	1.5

20CS1L07 APPLIED CHEMISTRY LAB

Pre-requisite: Acquire some experimental skills.

Course Objective: Objective of the course is to impart

- The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations.
- A few instrumental methods of chemical analysis.

Course Outcomes:

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

CO1: The student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

LIST OF EXPERIMENTS

1 Determination of HCl using standard Na2CO3 solution.

2 Determination of alkalinity of a sample containing Na2CO3 and NaOH.

3 Determination of Mn+2 using standard oxalic acid solution.

4 Determination of ferrous iron using standard K2Cr2O7 solution.

5 Determination of Cu+2 using standard hypo solution.

6 Determination of temporary and permanent hardness of water using standard EDTA solution.

7 Determination of Fe+3 by a colorimetric method.

8 Determination of the concentration of acetic acid using sodium hydroxide (pH-metry method).

9 Determination of iso-electric point of amino acids using pH-metry method/conductometric method

10 Determination of the concentration of strong acid vs strong base (by conductometric method).

11 Determination of strong acid vs strong base (by potentiometric method).

12 Determination of Mg+2 present in an antacid.

13 Determination of CaCO3 present in an egg shell.

14 Estimation of Vitamin C.

15 Determination of phosphoric content in soft drinks.

16 Adsorption of acetic acid by charcoal.

17 Preparation of nylon-6, 6 and Bakelite (demonstration only).

B.TECH I SEMESTER		L	T	P	C
	ESC	0	0	3	1.5

20CS1L08 PROBLEM SOLVING THROUGH C LAB

Course Objectives:

- Apply the principles of C language in problem solving.
- To design flowcharts, algorithms and knowing how to debug programs.
- To design & develop of C programs using arrays, strings pointers &functions.
- To review the file operations, preprocessor commands.

Course Outcomes:

- Demonstrate Knowledge on various concepts of a C language.
- Able to draw flowcharts and write algorithms.
- Able design and development of C problem solving skills.
- Able to design and develop modular programming skills.
- Able to trace and debug a program

Exercise 1:

1. Write a C program to print a block F using hash (#), where the F has a height of six characters and width of five and four characters.
2. Write a C program to compute the perimeter and area of a rectangle with a height of 7 inches and width of 5inches.
3. Write a C program to display multiple variables.

Exercise 2:

1. Write a C program to calculate the distance between the two points.
2. Write a C program that accepts 4 integers p, q, r, s from the user where r and s are positive and p is even. If q is greater than r and s is greater than p and if the sum of r and s is greater than the sum of p and q print "Correct values", otherwise print "Wrong values".

Exercise 3:

1. Write a C program to convert a string to a long integer.
2. Write a program in C which is a Menu-Driven Program to compute the area of the various geometrical shape.
3. Write a C program to calculate the factorial of a given number.

Exercise 4:

1. Write a program in C to display the n terms of even natural number and their sum.

2. Write a program in C to display the n terms of harmonic series and their sum. 1 + 1/2 + 1/3 + 1/4 + 1/5 ... 1/n terms.
3. Write a C program to check whether a given number is an Armstrong number or not.

Exercise 5:

1. Write a program in C to print all unique elements in an array.
2. Write a program in C to separate odd and even integers in separate arrays.
3. Write a program in C to sort elements of array in ascending order.

Exercise 6:

1. Write a program in C for multiplication of two square Matrices.
2. Write a program in C to find transpose of a given matrix.

Exercise 7:

1. Write a program in C to search an element in a row wise and column wise sorted matrix.
2. Write a program in C to print individual characters of string in reverse order.

Exercise 8:

1. Write a program in C to compare two strings without using string library functions.
2. Write a program in C to copy one string to another string.

Exercise 9:

1. Write a C Program to Store Information Using Structures with Dynamically Memory Allocation
2. Write a program in C to demonstrate how to handle the pointers in the program.

Exercise 10:

1. Write a program in C to demonstrate the use of & (address of) and *(value at address) operator.
2. Write a program in C to add two numbers using pointers.

Exercise 11:

1. Write a program in C to add numbers using call by reference.
2. Write a program in C to find the largest element using Dynamic Memory Allocation.

Exercise 12:

1. Write a program in C to swap elements using call by reference.
2. Write a program in C to count the number of vowels and consonants in a string using a pointer.

Exercise 13:

1. Write a program in C to show how a function returning pointer.
2. Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc( )function.

Exercise 14:

1. Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc( ) function. Understand the difference between the above two programs
2. Write a program in C to convert decimal number to binary number using the function.

Exercise 15:

1. Write a program in C to check whether a number is a prime number or not using function.
2. Write a program in C to get the largest element of an array using the function.

Exercise 16:

1. Write a program in C to append multiple lines at the end of a text file.
2. Write a program in C to copy a file in another name
3. Write a program in C to remove a file from the disk.

B.TECH I SEMESTER

	L	T	P	C
MC	2	0	0	--

20CS1M09 ENVIRONMENTAL SCIENCE

Course objective:

To understand the importance of Environment and the importance of biodiversity

Course outcomes:

- The importance of environment, Natural resources and current global environmental challenges for the sustenance of the life on planet earth.
- The concepts of the ecosystem and its function in the environment.
- 3.The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity
- The various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices.
- The environmental legislations of India and Social issues and the possible means
- Environmental assessment and the stages involved in EIA.

SYLLABUS

UNIT-I: MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES

Introduction- Scope of Environmental Studies- Importance of Environmental Studies- Need for public awareness, Environmental ethics- Contemporary Environmentalists- Environmental Global moves: Stockholm conference, Earth summit

Concept of an ecosystem - Structure of an ecosystem- function of an ecosystem- Food chains, food webs- ecological pyramids- Energy flow in the ecosystem- Ecological succession- Nutrient cycling- 1^{o}production& 2^{o}production- Major ecosystems: Forest ecosystem- Grassland ecosystem, Desert ecosystem- Aquatic ecosystem: pond, Lake Ecosystem- Streams, river ecosystem, Oceans

UNIT-II: NATURAL RESOURCES AND CONSERVATION

Introduction and classification of natural resources-Forest resources**:** Use and over-exploitation- Deforestation-Timber extraction-Mining- Conservation-Water resources**:** Use and over utilization of surface and ground water,- Floods, drought, Dams and associated problems- Water conservation, rain water harvesting, water shed management-Energy resources**:** renewable energy sources –solar-wind-hydro-

tidal- Ocean thermal-geo thermal-bio mass-bio gas-bio fuels- Hydrogen.- Non-renewable energy sources-coal-petroleum-natural gas-Nuclear energy

UNIT-III: **BIODIVERSITY AND ITS CONSERVATION**

Definition, classification- Value of biodiversity-Threats to biodiversity: habitat loss, man-wildlife conflicts- Endangered and endemic species of India-Conservation of biodiversity- Biodiversity at national and local levels, Hot-sports of biodiversity

UNIT-IV: ENVIRONMENTAL PROBLEMS

Global warming, Climate change- Acid rain, Ozone depletion- Air pollution- Water pollution- Soil pollution- Noise pollution, Nuclear hazards- Solid Waste Management: Causes, Consequences and Control methods- Solid Waste Management- Population growth and explosion, effects, control measures- Pollution case studies- Role of an individual in prevention of pollution

UNIT-V: ENVIRONMENTALLEGISLATION & MANAGEMENT

Sustainable development- Air (Prevention and Control of Pollution) Act-Drawbacks- Water (Prevention and control of Pollution) Act- Drawbacks- Wildlife Protection Act- Drawbacks- Forest Conservation Act- Drawbacks- Environmental Protection Act- Drawbacks- Environmental Impact Assessment and its significance- Preparation of Environmental Management Plan and Environmental Impact Statement- Ecotourism

TEXT BOOKS:

1. Environmental Studies, Anubha Kaushik, C P Kaushik, New Age Publications, New Delhi

2. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada

3. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.

4. Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai

REFERENCES:

1. Text Book of Environmental Studies, Deeshita Dave & P. UdayaBhaskar, Cengage Learning.

2. A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi

3. Environmental Studies, Benny Joseph, Tata McGraw Hill Co, New Delhi

4. Perspectives in Environment Studies, Anubha Kaushik, C P Kaushik, New Delhi

B.TECH II SEMESTER	BSC	L	T	P	C
		3	0	0	3

20CS2T01 TRANSFORM TECHNIQUES

Pre-requisite: Linear Algebra and Differential Equations

Course Objective: Objective of the course is to impart

- Learning the techniques of Laplace transforms to solve ordinary differential equations
- knowledge of Fourier series & Fourier transforms for piecewise continuous functions
- knowledge of solving boundary valued problems

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

CO1: Able to analyze a class of integrals in terms of beta and gamma functions

CO2: Provide the techniques of Laplace transformations and able to solve problems related to digital signal processing

CO3: Analyze the general periodic functions in the form of an infinite convergent sine and cosine series

CO4: Illustrate the methods to solve the boundary value problems

CO5: Determine a solution of a discrete system using Z- transforms

SYLLABUS

UNIT-I: Special functions:

Beta function, Properties & problems, Gamma function, properties & problems, Relation between Beta and Gamma functions, Evaluation of improper integrals.

UNIT-II: Laplace Transforms (all properties without proofs):

Definition, Transforms of elementary functions, properties of Laplace transforms, Transforms of periodic functions, Transforms of derivatives and integrals, Multiplication by t^n, Division by t, Evaluation of improper integrals.

Inverse Laplace transforms–Method of partial fractions, other methods of finding inverse transforms, Convolution theorem (without proof). **Application:** Application to differential equations.

UNIT-III: Fourier Series & Fourier Transforms:

Euler's formulae (without proof), Conditions of Fourier expansion, Functions having points of discontinuity, Change of inerval, Even and odd functions, Half-range series. Fourier Integral theorem (without proof), Fourier cosine & sine integral, complex form of Fourier integral, Fourier transform, Fourier sine & cosine transforms, properties of Fourier transforms (without proof), Convolution theorem(without proof), finite & infinite Fourier sine & cosine transforms.

UNIT-IV: Partial Differential Equations:

Formation of partial differential equations by eliminating arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and nonlinear (standard type) equations. Method of separation of Variables, Applications: One-dimensional wave and heat equations, two-dimensional heat equation.

UNIT-V: Z-Transforms: (all properties without proofs)

Introduction, definition, some standard z-transforms, linearity property, damping rule, some standard results, shifting U_n to the right, multiplication by n, initial and final value theorems, Inverse z-transforms, convolution theorem, evaluation of inverse z-transforms by partial fractions, applications to difference equations.

Text Books:

1. B. S. GREWAL, Higher Engineering Mathematics, Khanna Publishers, 43rd Edition, 2014.
2. B. V. RAMANA, Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:

1. ERWIN KREYSZIG, Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.
2. N. P. BALI & Dr. MANISH GOYAL, A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition, 2014.

B.TECH II SEMESTER **BSC**

L	T	P	C
3	0	0	3

20CS2T02 APPLIED PHYSICS

Pre-requisite: Knowledge of basic concepts of waves, Optics, Electricity and Magnetism

Course Objective: Objective of the course is to impart

- ***Knowledge*** of fundamentals of Physics which helps them in the study of advanced topics of Engineering.
- ***Develop*** analytical capability and understand various Engineering concepts.

Course Outcomes:

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

CO1: ***Impart*** knowledge of Physical Optics phenomenon Polarization and identify these phenomenon in natural processes

CO2: ***Gain*** knowledge of applications of lasers and optical fibers in various fields .

CO3: ***Classify*** magnetic and dielectric materials and their Engineering applications.

CO4: ***Understand*** basic quantum mechanics and free electron theories.

CO5: ***Obtain*** the concept of concept of holes and electrons in semiconductors.

SYLLABUS

UNIT-I: Wave Optics:

Interference*:* Introduction-Principle of Superposition – Coherent Sources – Interference in thin films (reflection geometry) – Colors in thin films-Newton's rings-Determination of wave length nd refractive index.

Diffraction: C Introduction- Fresnel and Fraunhofer diffraction - Fraunhofer Diffraction due to Single slit, Double slit, N –slits(Qualitative) - Diffraction Grating – Resolving Power of Grating(Qualitative).

Polarizations: Introduction- Types of polarization-polarization by reflection, refraction and Double refraction-Nicol's prism –Half and Quarter wave plates.

UNIT-II: Lasers and Fiber Optics:

Lasers:: Introduction – Characteristics of laser – Spontaneous and Stimulated emissions of radiation – Einstein's coefficients – Population inversion – Lasing action - Pumping Schemes – Ruby laser – He-Ne laser - Applications of lasers.

***Fiber optics*:** Introduction –Principle of optical fiber-Construction- - Acceptance Angle - Numerical Aperture -Classification of optical fibers based on refractive index profile and modes .

UNIT-III: Magnetic and Dielectric Materials:

***Magnetic Materials*:** Introduction – Magnetic dipole moment – Magnetization – Magnetic susceptibility and permeability – Origin of permanent magnetic moment – Bohr magneton – Classification of magnetic materials: Dia, para ferro, anti ferro & ferri – Domain concept of Ferromagnetism(Qualitative) - Hysteresis – soft and hard magnetic materials .

***Dielectric Materials*:** Introduction - Dielectic polarization **–** Dielectric Polarizability, Susceptibility and Dielectric constant-types of polarizations: Electronic and Ionic (Quantitative), Orientational polarizations (qualitative) – Lorentz Internal field – Claussius-Mossoti equation.

UNIT-IV: Quantum Mechanics,Free Electron Theory:

***Quantum Mechanics*:** Dual nature of matter – Heisenberg's Uncertainty Principle – Significance and properties of wave function – Schrodinger's time independent and dependent wave equations– Particle in a one-dimensional infinite potential well.

***Free Electron Theory*:** Classical free electron theory (Qualitative with discussion of merits and demerits) – Quantum free electron theory– Equation for electrical conductivity based on quantum free electron theory- Fermi-Dirac distribution- Density of States(3D),Fermi energy.

UNIT-V: Band Theory of Solids and Semiconductors:

Band theory of Solids: Introduction- Bloch's Theorem (Qualitative) - Kronig - Penney model (Qualitative)- E vs K diagram - V vs K diagram - effective mass of electron – Classification of crystalline solids–concept of hole.

***Semiconductors:*:**Introduction– Intrinsic semi conductors - density of charge carriers - Electrical conductivity – Fermi level – extrinsic semiconductors - p-type & n-type - Density of charge carriers - Dependence of Fermi energy on carrier concentration and temperature – Drift and Diffusion currents – Einstein's equation-Hall effect- Hall coefficient - Applications of Hall effect.

Text Books

1. "A Text book of Engineering Physics" by M.N. Avadhanulu, P.G. Kshirsagar - S. Chand Publications, 2019.
2. "Engineering Physics" by D.K. Bhattacharya and Poonam Tandon, Oxford press (2015).

3. “Engineering Physics” by R.K Gaur. and S.L Gupta., - Dhanpat Rai publishers, 2012.

Reference Books

1. Applied Physics by P.K. Palanisamy, Scitech publications (2014).
2. Engineering Physics by M. Arumugam, Anuradha Publication (2014).
3. Physics for Engineers by M.R. Srinivasan, New Age international publishers (2009).

B.TECH II SEMESTER	ESC	L	T	P	C
		3	0	0	3

20CS2T03 DIGITAL LOGIC DESIGN

Course Objectives:

- To represent numbers and conversion between different representations.
- To analyze logic processes and implement logical operations.
- To develop the combinational logic circuits.
- To design and analyze the concepts of sequential circuits.
- To understand concept of programmable logic devices like PROM, PLA,PAL.

Course Outcomes

CO1: Understand different number systems and their conversions.
CO2: Analyze the logical operations and Boolean algebra
CO3: Develop combinational circuits and perform logical operations.
CO4: Design the sequential logic functions.
CO5: Know finite state machines and different programmable logic devices.

SYLLABUS

UNIT I

Number Systems: Binary- Octal- Decimal- Hexadecimal Number Systems- Conversion of Numbers from One Radix to Another Radix- r's Complement- (r-1)'s Complement- Subtraction of Unsigned Numbers- Problems- Signed Binary Numbers- Weighted and Non weighted codes.

UNIT II

Logic Gates and Boolean Algebra: Basic Gates- Universal Gates- Ex-Or and Ex-Nor Gates- SOP- POS- Boolean Theorems- Dual of Logical Expressions- Minimizations of Logic Functions Using Boolean Theorems- K Map Method- Minimization of Boolean Functions.

UNIT III

Combinational Logic Circuits: Design of Half Adder- Full Adder- Half Subtractor- Full Subtractor- Ripple Adder, Carry Look Ahead adder and Subtractors- Design of Decoders- Encoders- Multiplexers- Demultiplexers- Priority Encoder- Code Converters- Magnitude Comparator. Cascading of Decoders & Multiplexers

Introduction to Programmable Logic Devices (PLDs): PLA- PAL- PROM- Realization of Switching Functions Using PROM- Comparison of PLA, PAL and PROM.

UNIT IV

Introduction to Sequential Logic Circuits: Basic Sequential Logic Circuits- Latch and Flip-Flop- RS- Latch Using NAND and NOR Gates- RS, JK, T and D Flip Flops- Conversion of Flip Flops- Flip Flops With Asynchronous Inputs (Preset and Clear).

Registers and Counters: Design of Registers- Control Buffer Registers- Bidirectional Shift Registers- Universal Shift Register- Design of Ripple Counters- Synchronous Counters and Variable Modulus Counters- Ring Counter- Johnson Counter.

UNIT V

Finite state Machine: Analysis of clocked sequential circuits- state diagrams- state tables- design procedures- Realization of circuits using various flip-flops- ASM- Meelay to Moore conversion and vice-versa.

TEXT BOOKS

1. Digital Design, M.Morris Mano, Michael D Ciletti, 4thEdition,PEA,2003.
2. Fundamentals of Logic Design, Roth, 5thEdition,Cengage2004

REFERENCE BOOKS

1. Switching and Finite Automata Theory,Kohavi, 3rd Edition, Jha, Cambridge2005
2. Digital Logic Design, Leach, Malvino, Saha,TMH,2000.

B.TECH II SEMESTER	ESC	L	T	P	C
		3	0	0	3

20CS2T04 DATA STRUCTURES

Course Objectives:

- Introduce the fundamental concept of data structures and abstract data types
- Emphasize the importance of data structures in developing and implementing efficient algorithms
- Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms

Course Outcomes:

CO1: Understand the properties, interfaces, and behaviors of basic abstract data types.

CO2: Understand and apply linked lists

CO3: Apply Stacks and Queue data structures.

CO4: Demonstrate different methods for traversing trees.

CO5: Demonstrate the application of Graphs

SYLLABUS

UNIT I

Data Structures - Definition, Classification of Data Structures, Operations on Data Structures, Abstract Data Type (ADT), Preliminaries of algorithms. Time and Space complexity.

Searching - Linear search, Binary search, Fibonacci search.

Sorting- Insertion sort, Selection sort, Exchange (Bubble sort, quick sort), distribution (radix sort), merging (Merge sort) algorithms.

UNIT II

Linked List: Introduction, Single linked list, Representation of Linked list in memory, Operations on Single Linked list-Insertion, Deletion, Search and Traversal, Reversing Single Linked list, Applications on Single Linked list- Polynomial Expression Representation, Addition and Multiplication, Sparse Matrix Representation using Linked List, Advantages and Disadvantages of Single Linked list, Double Linked list-Insertion, Deletion, Circular Linked list-Insertion, Deletion.

UNIT III

Queues: Introduction to Queues, Representation of Queues-using Arrays and using Linked list, Implementation of Queues-using Arrays and using Linked list, Application of Queues- Circular Queues

Stacks: Introduction to Stacks, Array Representation of Stacks, Operations on Stacks, Linked list Representation of Stacks, Operations on Linked Stack, Applications- Infix to Postfix Conversion, Evaluating Postfix Expressions.

UNIT IV

Trees: Basic Terminology in Trees, Binary Trees-Properties, Representation of Binary Trees sing Arrays and Linked lists. Binary Search Trees- Basic Concepts, BST Operations: Insertion, Deletion, Tree Traversals, Applications-Expression Trees, Heap Sort, Balanced Binary Trees- AVL Trees, Insertion, Deletion and Rotations.

UNIT V

Graphs: Basic Concepts, Representations of Graphs-Adjacency Matrix and using Linked list, Graph Traversals (BFT & DFT), Applications- Minimum Spanning Tree Using Prims &Kruskals Algorithm, Dijkstra's shortest path, Transitive closure, Warshall's Algorithm.

Text Books:

1. Data Structures Using C. 2nd Edition. Reema Thareja, Oxford.
2. Data Structures and algorithm analysis in C, 2nded, Mark Allen Weiss.

Reference Books:

1. Fundamentals of Data Structures in C, 2nd Edition, Horowitz, Sahni, Universities Press.
2. Data Structures: A PseudoCode Approach, 2/e, Richard F.Gilberg, Behrouz A. Forouzon, Cengage.
3. Data Structures with C, Seymour Lipschutz TMH

B.TECH II SEMESTER	ESC	L	T	P	C
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20CS2T05 PYTHON PROGRAMMING

Course Objectives:

- Identify/characterize/define a problem
- Design a program to solve the problem
- Create executable code
- Read most Python code

Course Outcomes:

CO1: Understand the fundamentals of Python programming language.

CO2: Understand Data Structures

CO3: Understand the use of functions in Python

CO4: Understand the Object-Oriented Programming concepts of Python

CO5: Apply regular expressions for different situations.

SYLLABUS

UNIT – I:

Introduction: History of Python, Need of Python Programming, Applications of Python Programming Variables, Assignment, Keywords, Input-Output, Indentation.

Types, Operators, and Expressions: Types – Integers, Strings, Booleans; Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations Control Flow- if, if-elif-else, for, while break, continue, pass

UNIT – II:

Data Structures Lists – Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences. Comprehensions.

UNIT – III:

Functions – Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions (Function Returning Values), Scope of the Variables in a Function- Global and Local Variables. Modules: Creating modules, import statements, from. The import statement, name spacing, Python packages, Introduction to PIP, Installing Packages via PIP, Using Python Packages

UNIT – IV:

Object-Oriented Programming OOP in Python: Classes, 'self-variable', Methods, Constructor Method, Inheritance, Overriding Methods, Data hiding, Error, and Exceptions: Difference between an error and Exception, Handling Exception, try except for block, Raising Exceptions, User Defined Exceptions

UNIT – V:

Regular expressions: Power of pattern matching and searching using regex in python, Meta characters and Sequences used in Patterns, Password, email, URL validation using regular expression, Pattern finding programs using regular expression.

Text Books:

1. Learning Python, Mark Lutz, Orielly
2. Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.
3. Reema Thareja, "Python Programming using Problem Solving Approach", ISBN-13:978-0-19- 948017-3, Oxford University Press, 2017.

Reference Books:

1. Think Python, Allen Downey, Green Tea Press
2. Core Python Programming, W.Chun, Pearson.
3. Introduction to Python, Kenneth A. Lambert, Cengage
4. "Python in easy steps In Easy Steps", Mike MC Grath, illustrated edition, In easy steps 2013 publishers.
5. Professional Python Frameworks: Web 2.0 Programming, Dana Moore, Raymond Budd, William Wright, Wrox Publication, ISBN: 978-0-470-13809-0, October 2007.

B.TECH II SEMESTER	BSC	L	T	P	C
		0	0	3	1.5

20CS2L06 APPLIED PHYSICS LAB

Pre-requisite: Fundamental understanding of usage of an instrument with proper care.

Course Objective: Objective of the course is to impart

- Training Engineering graduates to handle instruments and their usage methods to improve the accuracy of measurements.

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

CO1: **Outcomes**: The student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.

CO2: Implement the basic principles of Mechanics to measure different physical parameters.

CO3: Enhance the knowledge of Usage of electronic devices in various applications

SYLLABUS

1. Newton's rings –Determination of radius of curvature of Plano Convex Lens.
2. Determination of wavelength of spectral lines -Diffraction Grating
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Determination of wavelength of laser source using diffraction grating
5. Determination of Numerical Aperture and bending loss of a given Optical Fiber.
6. Determination of dispersive power of prism.
7. Determination of Rigidity modulus of a material- Torsional Pendulum.
8. Determination of Acceleration due to Gravity and Radius of Gyration-Compound Pendulum.
9. Determination of Young's modulus by method of single cantilever oscillations
10. Verification of laws of vibrations in stretched strings – Sonometer.

11. Estimation of Planck's Constant using Photo electric Effect
12. Study of I /V Characteristics of Semiconductor diode.
13. I/V characteristics of Zener diode.
14. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus
15. Energy Band gap of a Semiconductor using p - n junction diode

Reference Books

1. A Text book of Practical Physics, Balasubramanian S, Srinivasan M.N, S Chand Publishers, 2017.

B.TECH II SEMESTER	ESC	L	T	P	C
		0	0	3	1.5

20CS2L07 DATA STRUCTURES LAB

Course Objectives:

The objective of this lab is to

- Demonstrate the different data structures implementation.

Course Outcomes:

- Use basic data structures such as arrays and linked list.
- Programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths.
- Use various searching and sorting algorithms.

List of Experiments:

Exercise -1 (Searching)

a) Write C program that use both recursive and non-recursive functions to perform Linear search for a Key value in a given list.

b) Write C program that use both recursive and non-recursive functions to perform Binary search for a Key value in a given list.

Exercise -2 (Sorting-I)

a) Write C program that implement Bubble sort, to sort a given list of integers in ascending order.

b) Write C program that implement Quick sort, to sort a given list of integers in ascending order.

c) Write C program that implement Insertion sort, to sort a given list of integers in ascending order.

Exercise -3 (Sorting-II)

a) Write C program that implement radix sort, to sort a given list of integers in ascending order

b) Write C program that implement merge sort, to sort a given list of integers in ascending order

Exercise -4 (Singly Linked List)

a) Write a C program that uses functions to create a singly linked list

b) Write a C program that uses functions to perform insertion operation on a singly linked list

c) Write a C program that uses functions to perform deletion operation on a singly linked list

d) Write a C program to reverse elements of a single linked List.

Exercise -5 (Queue)

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

b) Write C program that implement Queue (its operations) using linked lists

Exercise -6 (Stack)

a) Write C program that implement stack (its operations) using arrays

b) Write C program that implement stack (its operations) using Linked list

c) Write C program for implementing infix to postfix conversion

d) Write a C program that uses Stack operations to evaluate postfix expression

Exercise -7 (Binary Tree)

Write a recursive C program for traversing a binary tree in preorder, in-order and post-order.

Exercise -8 (Binary Search Tree)

a) Write a C program to Create a BST

b) Write a C program to insert a node into a BST.

c) Write a C program to delete a node from a BST.

Exercise-9

Write a program for implementing Heap Sort.

B.TECH II SEMESTER	ESC	L	T	P	C
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20CS2L08 PYTHON PROGRAMMING LAB

Course Objectives:

The objective of this lab is to

- To elucidate problem solving through python programming language.
- To introduce function-oriented programming paradigm through python.
- To train in development of solutions using modular concepts.
- To teach practical Python solution patterns

Course Outcomes

CO1: Develop fundamental programs in python programming language.
CO2: Develop Python programs for numerical and text-based problems.
CO3: Develop Python programs on object-oriented programming and regular expressions.
CO4: Develop python programs on data structures.

LIST OF EXPERIMENTS

1. Write a program to perform various list of operations (eg: Arithmetic, logical, bitwise etc) in python.
2. Write a program to implement control flow statements.
3. Write a program implementing various predefined function of Lists, Sets, Tuples and Dictionaries.
4. Write a program covering various arguments for a function.
5. Write a program to implement various types of functions.
6. Write a program to implement recursion.
7. Write a program to implement command line arguments.
8. Write a program to create a class and its constructors.
9. Write a program to implement inheritance.
10. Write a program for exception handling.
11. Write a program to perform various linear algebra operations like finding eigen values and vectors, determinant and trace for a matrix.

12. Write a program to perform matrix operations like addition, subtraction, multiplication of matrices using Numpy Module.
13. Write a program to use System, math etc., packages.
14. Write a Python program to find the occurrence and position of the substrings within a string.
15. Write a Python program to replace all occurrences of space, comma, or dot with a colon.
16. Write a Python program to match a string that contains only upper and lowercase letters, numbers, and underscores.

DATA MINING & DATA WAREHOUSING

III Year - I Semester **Course Code: 18CS5T01**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) Identify the scope and necessity of Data Mining & Warehousing for the society.

2) Describe the design of Data Warehousing so that it can be able to solve the root problems.

3) To understand various tools of Data Mining and their techniques to solve the real time problems.

4) To develop ability to design various algorithms based on data mining tools.

5) To develop further interest in research and design of new Data Mining Techniques.

COURSE OUTCOMES:

1) Design data warehouse with dimensional modeling and apply OLAP operations.

2) Understand the Data Mining Principles and need of preprocessing

3) Compare and evaluate different data mining techniques like classification and prediction.

4) Identify the frequent patterns from transactional data.

5) Compare and evaluate different clustering techniques.

SYLLABUS

UNIT-I

Data Warehouse: Basic Concepts: What is a Data Warehouse? Differences between Operational Databases system (OLTP) and Data warehouses (OLAP). Data warehousing: A Multitier Architecture, Fundamentals of ETL architecture, Data Warehouse Design Methodology, Data Warehouse Modeling: Data Cube: A Multidimensional Data Model, Data Marts and Star Schema Design.

UNIT-II

Data Mining: Introduction: Data mining on What Kind of Data, Data Mining Functionalities, Classification of Data Mining Systems, Data Objects and Attribute Types.

Data Preprocessing: Why Preprocess the Data? Data Cleaning, Data Integration, Data Transformation, Data Reduction, Data Discretization

.**UNIT-III**

Classification and Prediction: Basic concepts: What is Classification? General Approach to solving a Classification problem. Decision Tree Induction: Working of Decision Tree, building a Decision Tree, methods for expressing an Attribute test Conditions, measures for selecting the best split, Algorithm for Decision Tree Induction.

Bayes Classification Methods: Bayes' Theorem, Naive Bayesian Classification, Bayesian Belief Networks, K-Nearest-Neighbor Classifiers.

UNIT-IV

Association Analysis: Basic Concepts and Algorithms: Problem Defecation. Frequent Item Set generation: The Apriority Principle, Frequent Item set Generation in the Apriori Algorithm, Candidate Generation and Pruning, Support counting. Rule generation: Confidence- Based Pruning, Rule Generation in Apriori Algorithm. Compact Representation of Frequent Item sets: Maximal Frequent Item sets, Closed Frequent Item sets. FP-Growth Algorithm: FP Tree Representation, Frequent Itemset Generation in FP-Growth Algorithm.

UNIT-V

Cluster Analysis: Basic Concepts and Algorithms: Overview: What Is Cluster Analysis? Different Types of Clustering, Different Types of Clusters; K-means: The Basic K-means Algorithm, K-means Additional Issues, Bisecting K-means, Strengths and Weaknesses; Agglomerative Hierarchical Clustering: Basic Agglomerative Hierarchical Clustering Algorithm

DBSCAN: Traditional Density Center-Based Approach, DBSCAN Algorithm, Strengths and Weaknesses.

TEXT BOOKS:

1) Jiawei Han Micheline Kamber, "Data mining & Techniques", Morgan Kaufmann Publishers.
(Units 1,2, 3)
2) Pang-Ning Tan, Michael Steinbach, Vipin Kumar, "Introduction to Data Mining", Pearson Publications (Units 4, 5)

REFERENCES:

1) S.N.Sivanandam, S.Sumathi, "Data Mining – Concepts, Tasks and Techniques", Thomson
2) Ralph Kimball, "The Data Warehousing Toolkit", Wiley.
3) Margaret H. Dunham, "Data mining - Introductory and advanced topics", Pearson Education.
4) D.Hand, H. Mannila and P.Smyth, "Principles of Data mining", PHI (2001).

WEB TECHNOLOGIES

III Year - I Semester **Course Code: 18CS5T02**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 2 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) This course is designed to introduce students with no programming experience to the programming languages and techniques associated with the World Wide Web.

2) The course will introduce web-based media-rich programming tools for creating interactive web pages.

COURSE OUTCOMES:

1) Analyze a web page and identify its elements and attributes.
2) Create web pages using HTML and Cascading Styles sheets.
3) Build dynamic web pages and client-side scripts using AJAX
4) Build web applications using PHP.
5) Develop interactive web pages that include databases

SYLLABUS

UNIT-I

Web Basics and Overview: Introduction to Internet, World Wide Web, Web Browsers, URL, MIME, HTTP, Web Programmers Tool box.HTML Common tags: List, Tables, images, forms, frames, HTML5, Cascading Style Sheets (CSS) & its Types, Style Specification Formats, Selector Forms, CSS3 modules

UNIT-II

Java Script: Introduction to Java Script, Declaring variables, Event handlers (onclick, onsubmit, etc.,) and Form Validation. Objects, Primitives Operations and Expressions, Screen Output and Keyboard Input, Control Statements, Object Creation and Modification, Arrays, Functions, Pattern Matching using Regular
Expressions, DHTML: Positioning Moving and Changing Elements

UNIT-III

XML: XML Syntax, Namespace in XML, Document type Definition, XML schemas, XSLT,DOM and SAX Approaches. **AJAX A New Approach:** Introduction to AJAX.

UNIT-IV: PHP Programming:

Introducing PHP: Creating PHP script, Running PHP script, working with variables and constants: Using variables Using constants, Data types, Operators. Controlling program flow: Conditional statements, Control statements, Arrays, functions. Working with forms and Databases.

UNIT-V

MySQL: Introduction to MySQL, Data types, Queries, Applying Filters, Usage of Grouping and Sort, SET Operators, CRUD operations, Joins, Integration of MySQL with PHP.

TEXT BOOKS:

1) Programming the World Wide Web, Robert W Sebesta, 7ed, Pearson.(Unit 1,2,3)
2) Web Technologies, Uttam K Roy, Oxford publications (Units 1,2 3)
3) The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill.(Unit 4)
3) MySQL The Complete Reference - VikramVaswani McGraw Hill.(Unit 5)

REFERENCES:

1) Ruby on Rails Up and Running, Lightning fast Web development, Bruce Tate, Curt Hibbs, Oreilly (2006)
2) Programming Perl, 4ed, Tom Christiansen, Jonathan Orwant, Oreilly (2012)
3) Web Technologies, HTML< JavaScript, PHP, Java, JSP, XML and AJAX, Black book, Dream Tech.
4) An Introduction to Web Design, Programming, Paul S Wang, Sanda S Katila, Cengage Learning

DESIGN AND ANALYSIS OF ALGORITHMS

III Year - I Semester **Course Code: 18CS5T03**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) Reinforce basic design concepts (e.g., Pseudocode, specifications, top-down design)
2) Knowledge of algorithm design strategies
3) Ability to analyze time and space complexity

COURSE OUTCOMES:

1. Understand the performance Analysis of an Algorithm using Space and Time Complexities
2. Describe, apply and analyze the complexity of divide and conquer strategy.
3. Synthesize efficient Algorithms for common engineering problems using Greedy Method.
4. Apply and analyze the complexity of dynamic programming strategy.
5. Ability to solve complex problems using Back Tracking and Branch & Bound.

SYLLABUS

UNIT-I

Introduction: Algorithm, Pseudo code for expressing algorithms, performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Solving Recurrence relations.

UNIT-II

Divide and Conquer Method: General Method, Applications: Binary search, Quick sort, Merge sort, Defective Chessboard.

UNIT-III

Greedy Method: General method, Applications: Minimum cost spanning tree (Prim's and Kruskal's Algorithms), Single source shortest paths, Fractional Knapsack Problem, Job Sequencing with Deadlines.

UNIT-IV

Dynamic programming: General Method, Applications: Optimal Binary Search Tree, String Editing, 0/1 knapsack, Travelling salesman problem.

UNIT V

Back tracking: General Method, Applications: Sum of Subsets, Hamiltonian Cycles.

Branch and bound: General Method, Applications:0/1 Knapsack problem, travelling salesman problem.

Introduction to NP-Hard & NP-Complete Problems – Basic Concepts, Cook's Theorem.

TEXT BOOKS:

1. Fundamentals of computer algorithms E. Horowitz S. Sahni, University Press

REFERENCES:

1. The Design and Analysis of Computer Algorithms, Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman

2. Algorithm Design, Jon Kleinberg, Pearson.

3. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein. PHILearning.

FORMAL LANGUAGES & AUTOMATA THEORY

III Year - I Semester **Course Code: 18CS5T04**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 2 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Introduce the student to the concepts of Theory of computation in computer science.
2) The students should acquire insights into the relationship among formal languages, formal Grammars and automata.

COURSE OUTCOMES:

1) Understand the basic concepts of Automata Theory
2) Infer the equivalence of languages described by finite automata and regular expressions.
3) Devise regular, context free grammars while recognizing the strings and tokens and able to Normalize grammars.
4) Apply Pushdown Automata for problem solving.
5) Understand basic properties and compute using Turing Machines.

SYLLABUS

UNIT-I

Finite Automata: Why Study Automata Theory? The Central Concepts of Automata Theory, Automation, Finite Automation, Transition Systems, Acceptance of a String by a Finite Automation, DFA, Design of DFAs, NFA, Design of NFA, Equivalence of DFA and NFA, Conversion of NFA into DFA, Finite Automata with E-Transition, Minimization of Finite Automata, Mealy and Moore Machines.

UNIT-II

Regular Expressions: Regular Expressions, Regular Sets, Identity Rules, Equivalence of two Regular Expressions, Manipulations of Regular Expressions, Finite Automata, and Regular Expressions, Equivalence between Finite Automata and Regular Expressions, Pumping Lemma, Closures Properties, Finite Automata and Regular Grammars, Regular Expressions and Regular Grammars.

UNIT-III

Context Free Grammars: Formal Languages, Grammars, Classification of Grammars, Chomsky Hierarchy Theorem, Context Free Grammar, Leftmost and Rightmost Derivations, Parse Trees, Ambiguous Grammars, Simplification of Context Free Grammars, Normal Forms for Context Free Grammars-Chomsky Normal Form and Greibach Normal Form, Pumping Lemma, Closure Properties, Applications of Context Free Grammars.

UNIT-IV

Pushdown Automata: Pushdown Automata, Definition, Model, Graphical Notation, Instantaneous Description Language Acceptance of pushdown Automata, Design of Pushdown Automata, Deterministic and Non – Deterministic Pushdown Automata, Equivalence of Pushdown Automata and Context Free Grammars Conversion, Two Stack Pushdown Automata.

UNIT-V

Turning Machine: Turing Machine, Definition, Model, Representation of Turing Machines-Instantaneous Descriptions, Transition Tables and Transition Diagrams, Language of a Turing Machine, Types of Turing Machines

TEXT BOOKS:

1) Introduction to Automata Theory, Languages and Computation, J.E.Hopcroft, R.Motwani and J.D.Ullman, 3rd Edition, Pearson, 2008. (Units 1, 2, 3, 4, 5).
2) Theory of Computer Science-Automata, Languages and Computation, K.L.P.Mishra and N. Chandrasekharan, 3rd Edition, PHI, 2007. (Units (1, 2, 3, 4, 5).

REFERENCES:

1) Formal Language and Automata Theory, K.V.N.Sunitha and N.Kalyani, Pearson, 2015.
2) Introduction to Automata Theory, Formal Languages and Compuation, Shyamatendukandar, Pearson, 2013.
3) Theory of Computation, V.Kulkarni, Oxford University Press, 2013.
4) Theory of Automata, Languages and Computation, Rajendra Kumar, McGrawHill.

(Program Elective-I)

OBJECT ORIENTED ANALYSIS AND DESIGN

III Year- I Semester **Course Code: 18CS5T05**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) To understand how to solve complex problems.

2) Analyze and design solutions to problems using object oriented approach.

3) Study the notations of Unified Modeling Language.

COURSE OUTCOMES:

1) Understand the necessity of Object Modeling

2) Represent classes, responsibilities and states using UML notation.

3) Demonstrate knowledge about the conceptual Model of UML.

4) Model the event driven state of object and transform them into implementation specific layouts.

5) Identify, Analyze the subsystems, various components and collaborate them interchangeably.

SYLLABUS

UNIT-I

Introduction: Evolution of Object Model, Foundation of Object Model, Elements of Object Model, applying the Object Model.

UNIT-II

Classes and Objects: Nature of object, Relationships among objects, Nature of a Class, Relationship among Classes, Interplay of Classes and Objects, Identifying Classes and Objects, Importance of Proper Classification, Identifying Classes and Objects, Key abstractions and Mechanisms.

UNIT-III

Introduction to UML: Why we model, Conceptual model of UML, Architecture, Classes, Relationships, Common Mechanisms, Class diagrams, Object diagrams.

UNIT-IV

Basic Behavioral Modeling: Interactions, Interaction diagrams, Use cases, Use case Diagrams, Activity Diagrams.

UNIT-V

Advanced Behavioral Modeling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

Architectural Modeling: Component, Deployment, Component diagrams and Deployment diagrams.

TEXT BOOKS:

1) "The Unified Modeling Language User Guide", Grady Booch, James Rumbaugh, IvarJacobson, 12th Impression, 2012, PEARSON.

REFERENCES:

1) "Object-oriented analysis and design with the Unified process", John W. Satzinger, Robert B. Jackson, Stephen D. Burd, Cengage Learning.
2) "The Unified modeling language Reference manual", James Rumbaugh, IvarJacobson, Grady Booch, Addison-Wesley.
3) "Object- Oriented Analysis & Design with Applications", Grady BOOCH, RobertA. Maksimchuk, Michael W. ENGLE, Bobbi J. Young, Jim Conallen, Kellia. Houston, 3rd edition, 2013, PEARSON.

(Program Elective-I)

ADVANCED COMPUTER ARCHITECTURE

III Year - I Semester | Course Code: 18CS5T06

Lecture: 2 Practical: 0 | Internal Marks: 30

Credits: 3 Tutorial: 1 | External Marks: 70

COURSE OBJECTIVES:

1) The idea of Parallelism in computers.
2) The advanced concepts of computer architecture and exposing the major differentials of RISC and CISC architectural characteristics.
3) The functionalities of different memory systems and buses.
4) The features and functionalities in advanced processor architectures.
5) About the importance of multi processors and multi computers.

COURSE OUTCOMES:

1) Understand design of a computer and its Instruction Set
2) Interpret performance of different pipelined processors and memory mapping techniques.
3) Acquire in-depth knowledge of high performance instruction level parallelism.
4) Explore architectural features of advanced processors like shared memory architectures.
5) Analyze design issues of inter connection networks.

SYLLABUS

UNIT-I

Fundamentals of Computer Design: Fundamentals of Computer design, Changing faces of computing and task of computer designer, Technology trends, Cost price and their trends, Measuring and reporting performance, Quantitative principles of computer design, Amdahl's law. Instruction set principles and examples- Introduction, Classifying instruction set- Memory addressing- type and size of operands, Operations in the instruction set.

UNIT–II

Pipelines: Introduction, Basic RISC instruction set, Simple implementation of RISC instruction set, Classic five stage pipe lined RISC processor, Basic performance issues in pipelining, Pipeline hazards, and Reducing pipeline branch penalties.

Memory Hierarchy Design: Introduction, Review of ABC of cache, Cache performance, Reducing cache miss penalty, Virtual memory.

UNIT–III

Instruction Level Parallelism the Hardware Approach: Instruction-Level parallelism, Dynamic scheduling, Dynamic scheduling using Tomasulo's approach, Branch prediction, high performance instruction delivery- hardware based speculation.**ILP Software** Approach Basic compiler level techniques, Static branch prediction, VLIW approach, Exploiting ILP, Parallelism at compile time, Cross cutting issues -Hardware versus Software.

UNIT–IV

Multi Processors and Thread Level Parallelism: Multi Processors and Thread level Parallelism-Introduction, Characteristics of application domain, Systematic shared memory architecture, and Distributed shared – memory architecture, Synchronization.

UNIT–V

Inter Connection and Networks: Introduction, Interconnection network media, Practical issues in interconnecting networks, Examples of inter connection, Cluster, Designing of clusters.

TEXT BOOKS:

1) John L. Hennessy and David A. Patterson, Computer Architecture: A quantitative approach 5thed,Morgan Kaufmann Elsevier, 2013.

REFERENCES:

1) Computer Architecture and Parallel Processing – Kai Hwang, Faye A.Brigs., MC Graw Hill.
2) Advanced Computer Architecture – A Design Space Approach – DezsoSima, Terence Fountain, Peter Kacsuk , Pearson Ed.

(Program Elective-I)

ADVANCED OPERATING SYSTEMS

III Year - I Semester **Course Code: 18CS5T07**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) The aim of this module is to study, learn, and understand the main concepts of advanced operating systems (parallel processing systems, distributed systems, real time systems, network operating systems, and open source operating systems).

2) Hardware and software features that support these systems.

COURSE OUTCOMES:

1) Outline the potential benefits of distributed operating systems.

2) Analyze the synchronization mechanism in distributed operating systems.

3) Infer the techniques used to detect and handle deadlocks in distributed operating systems.

4) Understand the process management in distributed operating systems.

5) Explore various distributed shared memory organizations.

SYLLABUS

UNIT–I

Introduction to Distributed systems: Goals of distributed system, hardware and software concepts, design issues. **Communication in Distributed systems**: Layered protocols, ATM networks, the Client - Server model, remote procedure call and group communication.

UNIT–II

Synchronization in Distributed systems: Clock synchronization, Mutual exclusion, E-tech Algorithms, the Bully algorithm, a ring algorithm, atomic transactions,

UNIT-III

Deadlocks: deadlock in distributed systems, Distributed deadlock prevention, and distributed dead lock detection.

UNIT–IV

Processes: Processes and Processors in distributed systems: Threads, system models, Processor allocation, Scheduling in distributed system, Fault tolerance and real time distributed systems.

UNIT-V

Distributed file systems: Distributed file systems design, distributed file system implementation, trends in distributed file systems**.**

Distributed shared memory: What is shared memory, consistency models, page based distributed shared memory, shared variable distributed shared memory, and object based DSM.

TEXT BOOKS:

1) Distributed Operating System - Andrew. S. Tanenbaum, PHI. (Units 1, 2.3).
2) Operating Systems' – Internal and Design Principles Stallings, Fifth Edition–2005, Pearson education. (Units 4, 5).

REFERENCES:

1) Operating System Principles Abraham Silberchatz, Peter B.Galvin,Greg Gagme 7th Edition, John Wiley.
2) Modern Operating Systems, Andrew S Tanenbaum 2nd edition Pearson

DATA MINING LAB

III Year - I Semester **Course Code: 18CS5L16**

Lecture: 0 Practical: 3 **Internal Marks: 40**

Credits: 1.5 Tutorial: 0 **External Marks: 60**

COURSE OBJECTIVES:

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.

COURSE OUTCOMES:

1. Learn about WEKA tool and its applications
2. Extract knowledge using Data Mining techniques.
3. Adapt to new Data Mining tools.
4. Explore recent trends in Data Mining such as Web mining, spatial-temporal mining,

LIST OF LAB EXPERIMENTS

1. Demonstration of preprocessing on dataset student.arff
2. Demonstration of preprocessing on dataset labor.arff
3. Demonstration of Association rule process on dataset contactlenses.arff using apriori algorithm
4. Demonstration of Association rule process on dataset test.arff using apriori algorithm
5. Demonstration of classification rule process on dataset student.arff using j48 algorithm
6. Demonstration of classification rule process on dataset employee.arff using j48 algorithm
7. Demonstration of classification rule process on dataset employee.arff using Random Tree algorithm
8. Demonstration of classification rule process on dataset employee.arff using naïve bayes algorithm
9. Demonstration of clustering rule process on dataset iris.arff using simple k-means
10. Demonstration of clustering rule process on dataset student.arff using simple k- means.

WEB TECHNOLOGIES LAB

III Year - I Semester **Course Code: 18CS5L12**

Lecture: 0 Practical: 3 **Internal Marks: 40**

Credits: 1.5 Tutorial: 0 **External Marks: 60**

COURSE OUTCOMES:

1) Knowledge of HTML, Java Script and XML to develop web applications

2) Understanding about JDBC connections and Java Mail API

3) Acquire Knowledge of the design and development process of a complete web application

LIST OF LAB EXPERIMENTS

1. Design the following static web pages required for an online book store web site.

i)HOME PAGE: The static homepage must contain three frames. ii) LOGIN PAGE iii) REGISTRATION PAGE IV) CATOLOGUE PAGE: The catalogue page should contain the details of all the books available in the web site in a table.

2. Write JavaScript to validate the following fields of the Registration page.

I). FirstName (Name should contain alphabets and the length should not be less than 6 characters).

ii).Password (Password should not be less than 6 characters length).

iii). E-mailid (should not contain any invalid and must follow the standard pattern name@domain.com)

iv). Mobile Number (Phonenumbershouldcontain10digitsonly).

v).Last Name and Address (should not be Empty).

3. Develop and demonstrate the usage of inline, internal and external style sheet usingCSS

4. Develop and demonstrate JavaScript with POP-UP boxes and functions for the following problems:

i) Input: Click on Display Date button using onclick()function Output: Display date in the textbox

ii) Input: A number n obtained using prompt Output: Factorial of n number using alert

iii) Input: A number n obtained using prompt Output: A multiplication table of numbersfrom1 to 10of n using alert

iv) Input: A number n obtained using prompt and add another number using confirmOutput: Sum of the entire n numbers using alert

5. Write an HTML page that contains a selection box with a list of 5 countries. When the user selects a country, its capital should be printed next in the list. Add CSS to customize the properties of the font of the capital (color, bold and font size).

6. Write an HTML page including any required JavaScript that takes a number from text field in the range of0 to 999 and shows it in words. It should not accept four and above digits, alphabets and special characters.

7. Create an XML document thatcontains10 users information. Write a Java Program, which takes User Id as input and returns the user details by taking the user information from XML document using DOM parser or SAXparser.

8. Develop and demonstrate PHPScript for the following problems:

i) Write a PHP Script to find out the Sum of the Individual Digits.

ii) Write a PHP Script to check whether the given number is Palindrome or not

9. Implement the following web applications using (a) PHP

i) A web application that takes a name as input and on submit it shows a hello page where name is taken from the request. It shows the start time at the right top corner of the page and provides a logout button. On clicking this button, it should show a logout page with Thank You message with the duration of usage (hint: Use session to store name and time).

ii) Write a PHP Program to display current Date, Time and Day.

iii) A web application that takes name and age from an HTML page. If the age is less than 18, it should send a page with "Hello, you are not authorized to visit the site" message, where should be replaced with the entered name. Otherwise it should send "Welcome to this site" message.

iv) A web application that lists all cookies stored in the browser on clicking"List Cookies" button. Add cookies if necessary.

10. Implement the web applications with Database using PHP

11. Modify the above PHP program to use an xmlinstead of database

12. Write a program to design a simple calculator using JavaScript and PHP

13. Installation and usage of XAMPP on the given operating system and get accustomed to usage of phpmyadmin.

14. Simple to complex queries in MySQL.

15. Examples using the integration of PHP with MySQL.

(Example1: Sign up form and login form)

(Example2: Construct a simple shopping cart by calculating price and reducing quantity dynamically.)

III YEAR
SEMESTER-II
SYLLABUS

COMPILER DESIGN

III Year – II Semester **Course Code: 18CS6T01**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) The process involved in a compiler.
2) Create an overall view of various types of translators, linkers, loaders, and phases of a compiler.
3) To apply the code generation algorithms to get the machine code for the optimized code.
4) What is syntax analysis, various types of parsers- top down approach, bottom up parsers.
5) Various aspects of the run-time environment into which the high-level code is translated.

COURSE OUTCOMES:

1) Acquire knowledge in different phases and passes of Compiler.
2) Demonstrate knowledge about scanning of tokens and perform the syntax analysis by using Top-down parsing techniques.
3) Perform the syntax analysis by using Bottom Up parsing techniques for more complex grammars.
4) Compare different memory management techniques in runtime environment.
5) Demonstrate knowledge about compiler generation tools and techniques.

SYLLABUS

UNIT–I

Phases of Compilation – Lexical Analysis, Regular Grammar and regular expression for common programming language features, pass and Phases of translation, interpretation, bootstrapping, data structures in compilation.

Lexical Analysis: The role of lexical analyzer, Input buffering, specification of tokens. Recognition of tokens, The lexical analyzer generator - LEX.

UNIT–II

Syntax Analysis: The Role of a parser, Context free Grammars, Writing a grammar, Top down parsing - Backtracking, LL (1) Grammars, Recursive descent parsing, Non – recursive Predictive parsing, Error recovery in Predictive Parsing.

Bottom up parsing: Reductions, Handle Pruning, Shift – Reduce Parsing, Conflicts during Shift – Reduce Parsing,

UNIT –III

Simple LR Parser – LR Parsing Algorithm, SLR - Parsing Table, Viable Prefixes.

More Powerful LR parser – Constructing Canonical LR1, LALR parsing tables, Using Ambiguous Grammars, Error Recovery in LR parser.

UNIT – IV

Intermediated Code Generation: Variants of Syntax trees, 3 Address code – Quadruples, Triples.

Runtime Environments: Stack allocation of space, Access to Non Local data on the stack, Heap Management.

UNIT – V

Code Generation: – Issues in design of code generation, the target Language, peephole Optimization, A simple Code Generator. Basic Blocks & Flow Graphs, Optimization of Basic Blocks – DAGs, Local Common sub expression elimination.

Machine independent code optimization:

The principle sources of Optimization: Global Common sub expression elimination - Constant folding - Copy propagation - Dead code elimination – Induction Variable & Strength reduction - Loop optimization - Procedure in-lining.

TEXT BOOKS:

1. Compilers – Principles, Techniques and Tools. Alfred V Aho, Monica S. Lam, Ravi Sethi, Jeffery D. Ullman, 2nd edition, Pearson - 2007.

REFERENCE BOOKS:

1. Compiler Construction, Principles and practice, Kenneth C Louden, CENGAGE

2. Implementations of Compiler, A New approach to Compilers including the algebraic methods, Yunlinsu, SPRINGER

3. LEX & YACC – John R. Levine, Tony Mason, Doug Brown, O'reilly

4. Principles of compiler design, 2nd edition, Nandhini Prasad, Elsevier.

COMPUTER NETWORKS

III Year - II Semester **Course Code: 18CS6T02**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
2) Familiarize the student with the basic taxonomy and terminology of the computer networking area.
3) Introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
4) Learn various IEEE standards for medium access.
5) Recognize different network connecting devices.

COURSE OUTCOMES:

1) Independently enumerate the layers of the OSI model and TCP/IP
2) Identify the different types of network topologies and protocols.
3) Compare and contrast methods to identify Errors and correct them.
4) Differentiate between various network routing algorithms.
5) Understand WWW and HTTP Architectures.

SYLLABUS

UNIT–I

Introduction: OSI overview, TCP/IP and other networks models, Examples of Networks: Arpanet, Internet, Network Topologies Wide Area Networks(WAN), Local Area Networks(LAN), Metropolitan Area Networks(MAN).

UNIT–II

Physical Layer and overview of PL Switching: Multiplexing: frequency division multiplexing, wave length division multiplexing, synchronous time division multiplexing, statistical time division multiplexing, introduction to switching: Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

UNIT–III

Data link layer: Design issues, **Framing**: fixed size framing, variable size framing, flow control, error control, error detection and correction, CRC, Checksum: idea, one's complement internet checksum, services provided to Network.

Elementary Data Link Layer protocols: Simplex protocol, Simplex stop and wait, Simplex protocol for Noisy Channel. **Sliding window protocol**: One bit, Go-back N, Selective Repetitive protocol, Stop and wait protocol.

UNIT – IV

Random Access: ALOHA, MAC addresses, Carrier sense multiple access (CSMA), CSMA with Collision Detection, CSMA with Collision Avoidance, Controlled Access: Reservation, Polling, Token Passing, Channelization: Frequency Division Multiple Access(FDMA), Time Division Multiple Access (TDMA), Code Division Multiple Access(CDMA).

Network layer: Shortest Path, Distance Vector Routing Algorithm, Hierarchal routing algorithm

UNIT–V

Application layer (WWW and HTTP): WWWARCHITECTURE: Client (Browser),Server, Uniform Resource Locator, Resource Record, HTTP: HTTP Transaction, HTTP Operational Model and Client/Server Communication, HTTP Request Message Format, HTTP Response Message Format.

TEXT BOOKS:

1. Data Communications and Networks – Behrouz A. Forouzan. Third Edition TMH.
Units 1,2,4)
2**.** Computer Networks — Andrew S Tanenbaum, 4th Edition. Pearson Education (Units 1, 3, 5)

REFERENCES:

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson

SOTWARE ENGINEERING

III Year - II Semester **Course Code: 18CS6T03**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) To grasp generic models to structure the software development process.
2) To understand core concepts of requirements engineering and requirements specification.
3) To recognize different notion of complexity at both the module and system level.
4) To be aware of some widely known design methods.
5) To understand the role and contents of testing activities in different life cycle phases.

COURSE OUTCOMES:

1) Understand the perspective of various software process models
2) Understand the Requirements Engineering Process and compile an SRS
3) Analyze the requirements and perform a Design
4) Apply testing principles on software project and understand the maintenance concepts.
5) Identify risks, manage the change to assure quality in software projects

SYLLABUS

UNIT-I

The Evolving Role of Software – Software – The changing Nature of Software – Legacy software — A generic view of process– A layered Technology – A Process Framework – The Capability Maturity Model Integration (CMMI) – Process Assessment –Personal and Team Process Models – Product and Process – Process Models – The Waterfall Model – Incremental Process Models – Incremental Model – The RAD Model – Evolutionary Process Models – Prototyping – The Spiral Model – The Concurrent Development Model – Specialized Process Models – The Unified Process.

UNIT-II

Requirement Engineering Process: Elicitation, Analysis, Documentation, Review and Management of User Needs, Feasibility Study, Information Modeling, Data Flow Diagrams, Entity Relationship Diagrams,

Designing the architecture. Assessment: Impact of Requirement Engineering in their problem. Decision Tables, SRS Document, IEEE Standards for SRS, Design: Architectural design, component level design, user interface design.

UNIT-III

Requirements Analysis – Analysis Modeling Approaches: Design Engineering – Design Process -Design Quality - Design Model - User Interface Design

Design: Modeling with UML, Use case Diagrams, Class Diagrams, Object Diagrams, Sequence Diagrams, Collaboration Diagrams, Component Diagrams, Deployment Diagrams

Coding standards, Coding Guidelines, Modern Programming Language features, Documentation Guidelines

UNIT-IV

Implementation and Testing: Quality concepts, Review techniques, Software Quality Assurance (SQA): Verification and Validation, SQA Plans, Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Testing for Functionality and Testing for Performance, Top-Down and Bottom-Up Testing, Software Testing Strategies - Strategies: Structural Testing (White Box Testing), Functional Testing (Black Box Testing), Testing conventional applications, Testing object oriented applications, and Testing Web applications.

UNIT-V

Project Management Concepts, Process and Project Metrics, Estimation for Software projects, Software Cost Estimation, Project Scheduling, Risk Management, Maintenance and Reengineering. Assessment: Preparation of Risk mitigation plan.

TEXT BOOKS:

1. “Fundamentals of Software Engineering”, Rajib Mall, PHI Publication, 3rdedition.(Units 1,2,5)
2. Software Engineering, A Precise approach, Pankaj Jalote, Wiley.(Units 3,4)
3. Software Engineering, concepts and practices, Ugrasen Suman, Cengage learning(Units 3,5)

REFERENCES:

1. Roger S. Pressman, -Software Engineering: A Practitioner‘s Approach‖, McGraw Hill International edition, Seventh edition.

2. Stephan Schach, ―Software Engineering‖, Tata McGraw Hill.
3. Ian Sommerville, Software Engineering, 9th Edition, Pearson Publishers.

(Program Elective-II)

UNIX & SHELL PROGRAMMING

III Year - II Semester **Course Code: 18CS6T04**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Written technical communication and effective use of concepts and terminology.
2) Facility with UNIX command syntax and semantics.
3) Ability to read and understand specifications, scripts and programs.
4) Individual capability in problem solving using the tools presented within the class
5) Students will demonstrate a mastery of the course materials and concepts within in class discussions.

COURSE OUTCOMES:

1) Create powerful data processing applications using UNIX shell and commands
2) Manage data, files and programs at command line using UNIX
3) Create and modify data files and documents using editors and tools
4) Demonstrate knowledge of creating new commands.
5) Develop Scripts and programs that demonstrate effective use of structured programming.

SYLLABUS

UNIT-I

Introduction to UNIX-Brief History-What is Unix-Unix Components-Using Unix-Commands in Unix-Some Basic Commands-PATH, man, echo, who, date, stty, pwd ,cd, mkdir, rmdir, cp, mv, rm, cat, more, wc, tar, kill, sleep.

UNIT-II

The File system –The Basics of Files-What's in a File-Directories and File Names-Permissions-INodes-The Directory Hierarchy, ls command with options-File Attributes and Permissions-The File Command knowing the File Type-The Chmod Command Changing File Permissions-The Chown Command Changing the Owner of a File-The Chgrp Command Changing the Group of a File.

UNIT-III

Introduction to Basic Regular Expressions -The Grep Command with options-EGrep and FGrep Commands, The Stream Editor Sed Command with options-The AWK command- awk preliminaries, awk using print and printf.

UNIT-IV

Simple Filtering commands: pr, cmp, comm, diff, head tail, cut, paste, sort - Meta characters-Creating New Commands - More on I/O Redirection- Command Substitution-Giving Multiple commands- Command Line Structure.

UNIT-V

Shell Programming-Shell Variables-The First Shell Script-The read Command-Positional parameters-The $? Variable knowing the exit Status-More about the Set Command-The Exit Command-Branching Control Structures-Loop Control Structures-The Continue and Break Statement-The Expr Command: Performing Integer Arithmetic-Real Arithmetic in Shell Programs-The Sleep Command-Debugging Scripts-The Script Command.

TEXT BOOKS:

1. Introduction to Unix Shell Programming by M.G.Venkateshmurthy, Pearson.(Units 1,2,3,4,5)
2. The Unix programming Environment by Brain W. Kernighan & Rob Pike, Pearson.(Unit 2,4)

REFERENCE BOOKS:

1. Unix and shell programming by B.M. Harwani, OXFORD university press.
2. UNIX and Shell Programming by Behrouz A. Forouzan, Richard F. Gilverg

(Program Elective-II)

INTERNET OF THINGS

III Year - II Semester **Course Code: 18CS6T05**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Understand the architecture of Internet of Things and connected world.
2) Explore on use of various hardware, communication and sensing technologies to build IoT applications.
3) Develop the real time IoT applications to make smart world.
4) Understand challenges and future trends in IoT.

COURSE OUTCOMES:

1) Design and Deployment of IoT.
2) Design and comparing M2M with IoT
3) Understand Platform design and modeling of IoT
4) Apply IoT in different devices using Python
5) Implement IoT and cloud platforms

SYLLABUS

UNIT-I

INTRODUCTION TO INTERNET OF THINGS (IoT): Definition and characteristics of IoT, physical design of IoT, logical design of IoT, IoT Enabling Technologies, IoT levels and deployment, domains Specific IoTs.

UNIT-II

IoT AND M2M : Introduction, M2M, difference between IoT and M2M, software defined networking (SDN) and network function virtualization (NFV) for IoT, basics of IoT system management with NETCONF-YANG.

UNIT-III

IoT PLATFORMS DESIGN METHODOLOGY: IoT Architecture: State of the art introduction, state of the art; Architecture reference model: Introduction, reference model and architecture, IoT reference model. Logical design using Python: Installing Python, Python data types and data Structures, control flow, functions, modules, packages, file handling.

IoT Physical Devices and Endpoints: Introduction to Raspberry Pi interfaces (Serial, SPI, I2C), programming Raspberry PI with Python, other IoT devices.

UNIT-IV

IoT Protocols: Messaging Protocols- MQ Telemetry Transport (MQTT), Constrained Application Protocol (CoAP) Transport Protocols-Light Fidelity(Li-Fi), Bluetooth Low Energy(BLE)

IoT Protocols: Addressing and Identification: Internet Protocol Version 4(IPV4), Internet Protocol Version 6(IPV6), Uniform Resource Identifier (URI)

UNIT-V

IoT Physical Servers And Cloud Offerings: Introduction to cloud storage models and communication APIs, WAMP –AutoBahn for IoT, Xively cloud for IoT, case studies illustrating IoT design –home automation, smart cities, smart environment.

TEXT BOOKS:

1) ArshdeepBahga, Vijay Madisetti, “Internet of Things: A Hands-on-Approach”, VPT, 1stEdition, 2014.(Units 1,2,3,5)
2) Matt Richardson, Shawn Wallace, “Getting Started with Raspberry Pi”, O’Reilly (SPD), 3rdEdition, 2014.(Unit 3)
3) Shriram K Vasudevan, Abhishek S Nagarajan, RMD Sundaram “ Internet of Things” Wiley(Unit 4)

REFERENCE BOOKS:

1) Internet of Things: Architecture, Design Principles And Applications, Rajkamal, McGraw HillHigher Education
2) Adrian McEwen, Hakim Cassimally, “Designing the Internet of Things”, John Wiley andSons2014.

(Program Elective-II)

DISTRIBUTED SYSTEMS

III Year - II Semester **Course Code: 18CS6T06**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) To learn the principles, architectures, algorithms and programming models used in distributed systems.
2) To examine state-of-the-art distributed systems concepts of operating system, Middleware.

COURSE OUTCOMES:

1) Differentiate between various System Models
2) Infer the importance of Inter process Communication in Distributed Systems.
3) Understand concepts of RMI and RPC
4) Demonstrate Knowledge of operating system support in distributed systems.
5) Understand various methods of concurrency control in Distributed Transactions.

SYLLABUS

UNIT-I

Characterization of Distributed Systems: Introduction, Examples of Distributed systems, Resource sharing and web, challenges. **System Models**: Introduction, Architectural and Fundamental models- Interaction Model.

UNIT-II

Inter Process Communication: Introduction, The API for the internet protocols-The Characteristics of Inter process communication, Sockets, UDP Datagram Communication, TCP Stream Communication; External Data Representation and Marshalling, Client-Server Communication, Group Communication.

UNIT-III

Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects- Object Model, Distributed Object Modal, Design Issues for RMI, Implementation of RMI, Distributed Garbage Collection; Remote Procedure Call, Events and Notifications.

UNIT-IV

Operating System Support: Introduction, the Operating System Layer, Protection, Processes and Threads –Address Space, Creation of a New Process, Threads. Communication and Invocation

UNIT-V

Transactions and Concurrency Control: Introduction, Transactions, Nested Transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control. **Distributed Transactions**: Introduction, Flat and Nested Distributed Transactions, Atomic commit protocols, Concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.

TEXT BOOKS:

1) Distributed Systems, Concepts and Design, George Coulouris, J Dollimore and Tim Kindberg, Pearson Education, 4th Edition,2009.

REFERENCES:

1) Distributed Systems, Principles and paradigms, Andrew S.Tanenbaum, Maarten Van Steen, Second Edition, PHI.
2) Distributed Systems, An Algorithm Approach, Sikumar Ghosh, Chapman & Hall/CRC, Taylor &Fransis Group, 2007.
3) Ajay D Kshemkalyani, Mukesh Sighal, “Distributed Computing, Principles, Algorithms and Systems”,Cambridge.

COMPUTER NETWORKS LAB

III Year - II Semester **Course Code: 18CS6L21**

Lecture: 0 Practical: 4 **Internal Marks: 40**

Credits: 2 Tutorial: 0 **External Marks: 60**

COURSE OUTCOMES:

1) Practical orientation of networking concepts
2) To teach students various forms of IPC through UNIX and socket Programming

LIST OF LAB EXPERIMENTS

1) Understanding and using of commands like ifconfig, netstat, ping, arp, telnet, ftp, finger, traceroute, whoisetc. Usage of elementary socket system calls (socket (), bind(), listen(), accept(), connect(), send(), recv(),sendto(),recvfrom()).
2) Implement the data link layer farming methods such as character stuffing and bit stuffing.
3) Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP.
4) Implement Dijkstra‘s algorithm to compute the Shortest path thru a graph.
5) Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table art each node usingdistance vector routing algorithm
6) Take an example subnet of hosts. Obtain broadcast tree for it.
7) Design TCP iterative Client and server application to reverse the given input sentence
8) Design UDP Client and server application to reverse the given input sentence
9) Implementation of getsockopt (), setsockopt () system calls.
10) Implementation of SMTP.

SOFTWARE ENGINEERING LAB

III Year - II Semester **Course Code: 18CS6L12**

Lecture: 0 Practical: 4 **Internal Marks: 40**

Credits: 2 Tutorial: 0 **External Marks: 60**

COURSE OUTCOMES:

1) Prepare SRS document, design document, test cases and software configuration management and risk management related document.
2) Develop function oriented and object oriented software design using tools like rational rose.
3) Design and develop Test Cases for a system
4) Track the progress of a project using various tools.

LIST OF LAB EXPERIMENTS

1) Create the problem statement for a specific system of relevance
2) Perform requirement analysis and develop Software Requirement Specification Sheet (SRS) for suggested system.
3) To carry out the function oriented diagram: Data Flow Diagram (DFD) and Structured chart.
4) To draw UML Diagrams for a suggested system
5) To illustrate the test cases, test case preparation and perform Manual Tests.
6) Perform Estimation of effort using FP Estimation for chosen system.
7) To prepare time line chart/Gantt Chart/PERT Chart for selected software project.

Note: Students shall prepare a document related to all the above activities for at least one real time Case Study

ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

III Year - II Semester **Course Code: 18CS6T23**

Lecture: 2 Practical: 0

Credits: 0 Tutorial: 0

COURSE OBJECTIVES:

1) The course aim of the importing basic principle of third process reasoning and inference sustainability is at the course of Indian traditional knowledge system
2) To understand the legal framework and traditional knowledge and biological diversity act 2002 and geographical indication act 2003.
3) The courses focus on traditional knowledge and intellectual property mechanism of traditional knowledge and protection.
4) To know the student traditional knowledge in different sector.

COURSE OUTCOMES:

1) Understand the concept of Traditional knowledge and its importance
2) Know the need and importance of protecting traditional knowledge
3) Know the various enactments related to the protection of traditional knowledge.
4) Understand the concepts of Intellectual property to protect the traditional knowledge
5) Evaluate strategies to increase the protection of TK.

SYLLABUS

UNIT-I

Introduction to traditional knowledge: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge

UNIT-II

Protection of traditional knowledge: The need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

UNIT-III

Legal framework and TK:A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmers Rights Act, 2001 (PPVFR Act);**B:**The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indications act 2003.

UNIT-IV

Traditional knowledge and intellectual property: Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

UNIT-V

Traditional knowledge in different sectors: Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

REFERENCES:

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012.
3. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002
4. "Knowledge Traditions and Practices of India" Kapil Kapoor, Michel Danino

B.TECH I SEMESTER	ESC	L	T	P	C
		3	0	0	3

20IT1T05 PROBLEM SOLVING THROUGH C

Pre-requisite:

Course Objective:

- To learn about the computer systems, computing environments, developing of a computer program and Structure of a C Program
- To gain knowledge of the operators, selection, control statements and repetition in C. To learn about the design concepts of arrays, strings, enumerated structure and union types and their usage. To assimilate about pointers, dynamic memory allocation and know the significance of Preprocessor. To assimilate about File I/O and significance of functions

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

CO1: Understand the basic concepts of programming

CO2: Understand and Apply loop construct for a given problem

CO3: Demonstrate the use pointers

CO4: Understand the use of functions and develop modular reusable code

CO5: Understand File I/O operations

SYLLABUS

UNIT-I:

INTRODUCTION TO COMPUTERS: Functional Components of computer, computer software, categories of memory, types of programming languages, Development of algorithms, flow charts, software development process, Computer Numbering system

BASICS OF C PROGRAMMING: Introduction to programming paradigms, Structure of C program, Data Types, C Tokens, Operators: Precedence and Associativity, Expressions Input/output statements, Assignment statements

UNIT-II:

Decision making statements: if, if else, nester if. Multi way decision making statements: else if, Switch statement. **Loop statements**: while, do while, for, Compilation process.

UNIT-III:

Introduction to Arrays: Declaration, Initialization, One dimensional array, Example Programs on one dimensional array, Selection sort, linear and binary search, two

dimensional arrays, Matrix Operations, Multi-dimensional Arrays

Strings: Declaration, String operations: length, compare, concatenate, copy, String handling functions.

UNIT-IV:

FUNCTIONS: Introduction to functions: Function prototype, function definition, function call, Built-in functions, Recursion, Storage classes, Passing Arrays & Strings to the functions, Preprocessor directives

POINTERS: Pointers, Pointer operators, Pointer arithmetic, Arrays and pointers, Array of pointers, Parameter passing: Pass by value, Pass by reference, Dynamic Memory Allocation

UNIT-V:

STRUCTURES AND UNIONS: Structure, Nested structures, Pointer and Structures, Array of structures, Example Program using structures and pointers, Self-referential structures, Unions.

FILE PROCESSING: Files, Types of file processing: Sequential access, Random access, Sequential access file, Random access file, Command line arguments

Text Books:

1. Krnighan. B.W and Ritche, D.M, “The C Programming Language”, Second Edition, Pearson Education, 2006
2. ReemaThareja, “Programming in C”, Oxford University Press, Second Edition, 2016.

References:

1. Pradepdey, Manas Ghosh, “Fundamentals of Computing and programming in C”, First Edition, Oxford University Press, 2009.
2. Paul Deitel and Harvey Deitel, “C How to Program”, Seventh Edition, Pearson Publication.
3. E Balagursamy, “Programming in C, Sixth Edition, Tata McGraw Hill.
4. Ajay Mittal, “Programming in C A practical Approach”, Pearson education

B.TECH I SEMESTER	ESC	L	T	P	C
		0	0	3	1.5

20IT1L08 PROBLEM SOLVING THROUGH C LAB

Course Objectives:

- Apply the principles of C language in problem solving.
- To design flowcharts, algorithms and knowing how to debug programs.
- To design & develop of C programs using arrays, strings pointers &functions.
- To review the file operations, preprocessor commands.

Course Outcomes:

- Demonstrate Knowledge on various concepts of a C language.
- Able to draw flowcharts and write algorithms.
- Able design and development of C problem solving skills.
- Able to design and develop modular programming skills.
- Able to trace and debug a program

Exercise 1:

1. Write a C program to print a block F using hash (#), where the F has a height of six characters and width of five and four characters.
2. Write a C program to compute the perimeter and area of a rectangle with a height of 7 inches and width of 5inches.
3. Write a C program to display multiple variables.

Exercise 2:

1. Write a C program to calculate the distance between the two points.
2. Write a C program that accepts 4 integers p, q, r, s from the user where r and s are positive and p is even. If q is greater than r and s is greater than p and if the sum of r and s is greater than the sum of p and q print "Correct values", otherwise print "Wrong values".

Exercise 3:

1. Write a C program to convert a string to a long integer.
2. Write a program in C which is a Menu-Driven Program to compute the area of the various geometrical shape.
3. Write a C program to calculate the factorial of a given number.

Exercise 4:

1. Write a program in C to display the n terms of even natural number and their sum.

2. Write a program in C to display the n terms of harmonic series and their sum. 1 + 1/2 + 1/3 + 1/4 + 1/5 ... 1/n terms.
3. Write a C program to check whether a given number is an Armstrong number or not.

Exercise 5:

1. Write a program in C to print all unique elements in an array.
2. Write a program in C to separate odd and even integers in separate arrays.
3. Write a program in C to sort elements of array in ascending order.

Exercise 6:

1. Write a program in C for multiplication of two square Matrices.
2. Write a program in C to find transpose of a given matrix.

Exercise 7:

1. Write a program in C to search an element in a row wise and column wise sorted matrix.
2. Write a program in C to print individual characters of string in reverse order.

Exercise 8:

1. Write a program in C to compare two strings without using string library functions.
2. Write a program in C to copy one string to another string.

Exercise 9:

1. Write a C Program to Store Information Using Structures with Dynamically Memory Allocation
2. Write a program in C to demonstrate how to handle the pointers in the program.

Exercise 10:

1. Write a program in C to demonstrate the use of & (address of) and *(value at address) operator.
2. Write a program in C to add two numbers using pointers.

Exercise 11:

1. Write a program in C to add numbers using call by reference.
2. Write a program in C to find the largest element using Dynamic Memory Allocation.

Exercise 12:

1. Write a program in C to swap elements using call by reference.
2. Write a program in C to count the number of vowels and consonants in a string using a pointer.

Exercise 13:

1. Write a program in C to show how a function returning pointer.
2. Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc( )function.

Exercise 14:

1. Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc( ) function. Understand the difference between the above two programs
2. Write a program in C to convert decimal number to binary number using the function.

Exercise 15:

1. Write a program in C to check whether a number is a prime number or not using function.
2. Write a program in C to get the largest element of an array using the function.

Exercise 16:

1. Write a program in C to append multiple lines at the end of a text file.
2. Write a program in C to copy a file in another name
3. Write a program in C to remove a file from the disk.

B.TECH II SEMESTER	BSC	L	T	P	C
		3	0	0	3

20IT2T01 TRANSFORM TECHNIQUES

Pre-requisite: Linear Algebra and Differential Equations

Course Objective: Objective of the course is to impart

- Learning the techniques of Laplace transforms to solve ordinary differential equations
- knowledge of Fourier series & Fourier transforms for piecewise continuous functions
- knowledge of solving boundary valued problems

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

CO1: Able to analyze a class of integrals in terms of beta and gamma functions

CO2: Provide the techniques of Laplace transformations and able to solve problems related to digital signal processing

CO3: Analyze the general periodic functions in the form of an infinite convergent sine and cosine series

CO4: Illustrate the methods to solve the boundary value problems

CO5: Determine a solution of a discrete system using Z- transforms

SYLLABUS

UNIT-I: Special functions:

Beta function, Properties & problems, Gamma function, properties & problems, Relation between Beta and Gamma functions, Evaluation of improper integrals.

UNIT-II: Laplace Transforms (all properties without proofs):

Definition, Transforms of elementary functions, properties of Laplace transforms, Transforms of periodic functions, Transforms of derivatives and integrals, Multiplication by t^n, Division by t, Evaluation of improper integrals.

Inverse Laplace transforms–Method of partial fractions, other methods of finding inverse transforms, Convolution theorem (without proof). **Application:** Application to differential equations.

UNIT-III: Fourier Series & Fourier Transforms:

Euler's formulae (without proof), Conditions of Fourier expansion, Functions having points of discontinuity, Change of inerval, Even and odd functions, Half-range series. Fourier Integral theorem (without proof), Fourier cosine & sine integral, complex form of Fourier integral, Fourier transform, Fourier sine & cosine transforms, properties of Fourier transforms (without proof), Convolution theorem(without proof), finite & infinite Fourier sine & cosine transforms.

UNIT-IV: Partial Differential Equations:

Formation of partial differential equations by eliminating arbitrary constants and arbitrary functions, solutions of first order linear (Lagrange) equation and nonlinear (standard type) equations. Method of separation of Variables, Applications: One-dimensional wave and heat equations, two-dimensional heat equation.

UNIT-V: Z-Transforms: (all properties without proofs)

Introduction, definition, some standard z-transforms, linearity property, damping rule, some standard results, shifting U_n to the right, multiplication by n, initial and final value theorems, Inverse z-transforms, convolution theorem, evaluation of inverse z-transforms by partial fractions, applications to difference equations.

Text Books:

1. B. S. GREWAL, Higher Engineering Mathematics, Khanna Publishers, 43rd Edition, 2014.
2. B. V. RAMANA, Higher Engineering Mathematics, Tata MC Graw Hill, 1st Edition, 2007.

Reference Books:

1. ERWIN KREYSZIG, Advanced Engineering Mathematics, John Wiley & Sons, 10th Edition, 2015.
2. N. P. BALI & Dr. MANISH GOYAL, A Text book of Engineering Mathematics, Lakshmi Publications, 9th Edition, 2014.

B.TECH II SEMESTER	ESC	L	T	P	C
		3	0	0	3

20IT2T05 PYTHON PROGRAMMING

Course Objectives:

- Identify/characterize/define a problem
- Design a program to solve the problem
- Create executable code
- Read most Python code

Course Outcomes:

CO1: Understand the fundamentals of Python programming language.

CO2: Understand Data Structures

CO3: Understand the use of functions in Python

CO4: Understand the Object-Oriented Programming concepts of Python

CO5: Apply regular expressions for different situations.

SYLLABUS

UNIT – I:

Introduction: History of Python, Need of Python Programming, Applications of Python Programming Variables, Assignment, Keywords, Input-Output, Indentation.

Types, Operators, and Expressions: Types – Integers, Strings, Booleans; Operators- Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators, Expressions and order of evaluations Control Flow- if, if-elif-else, for, while break, continue, pass

UNIT – II:

Data Structures Lists – Operations, Slicing, Methods; Tuples, Sets, Dictionaries, Sequences. Comprehensions.

UNIT – III:

Functions – Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful Functions (Function Returning Values), Scope of the Variables in a Function- Global and Local Variables. Modules: Creating modules, import statements, from. The import statement, name spacing, Python packages, Introduction to PIP, Installing Packages via PIP, Using Python Packages

UNIT – IV:

Object-Oriented Programming OOP in Python: Classes, 'self-variable', Methods, Constructor Method, Inheritance, Overriding Methods, Data hiding, Error, and Exceptions: Difference between an error and Exception, Handling Exception, try except for block, Raising Exceptions, User Defined Exceptions

UNIT – V:

Regular expressions: Power of pattern matching and searching using regex in python, Meta characters and Sequences used in Patterns, Password, email, URL validation using regular expression, Pattern finding programs using regular expression.

Text Books:

1. Learning Python, Mark Lutz, Orielly
2. Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.
3. Reema Thareja, "Python Programming using Problem Solving Approach", ISBN-13:978-0-19- 948017-3, Oxford University Press, 2017.

Reference Books:

1. Think Python, Allen Downey, Green Tea Press
2. Core Python Programming, W.Chun, Pearson.
3. Introduction to Python, Kenneth A. Lambert, Cengage
4. "Python in easy steps In Easy Steps", Mike MC Grath, illustrated edition, In easy steps 2013 publishers.
5. Professional Python Frameworks: Web 2.0 Programming, Dana Moore, Raymond Budd, William Wright, Wrox Publication, ISBN: 978-0-470-13809-0, October 2007.

B.TECH II SEMESTER	ESC	L	T	P	C
		0	0	3	1.5

20IT2L08 PYTHON PROGRAMMING LAB

Course Objectives:

The objective of this lab is to

- To elucidate problem solving through python programming language.
- To introduce function-oriented programming paradigm through python.
- To train in development of solutions using modular concepts.
- To teach practical Python solution patterns

Course Outcomes

CO1: Develop fundamental programs in python programming language.
CO2: Develop Python programs for numerical and text-based problems.
CO3: Develop Python programs on object-oriented programming and regular expressions.
CO4: Develop python programs on data structures.

LIST OF EXPERIMENTS

1. Write a program to perform various list of operations (eg: Arithmetic, logical, bitwise etc) in python.
2. Write a program to implement control flow statements.
3. Write a program implementing various predefined function of Lists, Sets, Tuples and Dictionaries.
4. Write a program covering various arguments for a function.
5. Write a program to implement various types of functions.
6. Write a program to implement recursion.
7. Write a program to implement command line arguments.
8. Write a program to create a class and its constructors.
9. Write a program to implement inheritance.
10. Write a program for exception handling.
11. Write a program to perform various linear algebra operations like finding eigen values and vectors, determinant and trace for a matrix.
12. Write a program to perform matrix operations like addition, subtraction, multiplication of matrices using Numpy Module.

13. Write a program to use System, math etc., packages.
14. Write a Python program to find the occurrence and position of the substrings within a string.
15. Write a Python program to replace all occurrences of space, comma, or dot with a colon.
16. Write a Python program to match a string that contains only upper and lowercase letters, numbers, and underscores.

DESIGN AND ANALYSIS OF ALGORITHMS

III Year – I Semester **Course Code: 18IT5T03**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) Reinforce basic design concepts (e.g., Pseudocode, specifications, top-down design)
2) Knowledge of algorithm design strategies
3) Ability to analyze time and space complexity

COURSE OUTCOMES:

1. Understand the performance Analysis of an Algorithm using Space and Time Complexities
2. Describe, apply and analyze the complexity of divide and conquer strategy.
3. Synthesize efficient Algorithms for common engineering problems using Greedy Method.
4. Apply and analyze the complexity of dynamic programming strategy.
5. Ability to solve complex problems using Back Tracking and Branch & Bound.

SYLLABUS

UNIT-I

Introduction: Algorithm, Pseudo code for expressing algorithms, performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Solving Recurrence relations.

UNIT-II

Divide and Conquer Method: General Method, Applications: Binary search, Quick sort, Merge sort, Defective Chessboard.

UNIT-III

Greedy Method: General method, Applications: Minimum cost spanning tree (Prim's and Kruskal's Algorithms), Single source shortest paths, Fractional Knapsack Problem, Job Sequencing with Deadlines.

UNIT-IV

Dynamic programming: General Method, Applications: Optimal Binary Search Tree, String Editing, 0/1 knapsack, Travelling salesman problem.

UNIT V

Back tracking: General Method, Applications: Sum of Subsets, Hamiltonian Cycles.

Branch and bound: General Method, Applications:0/1 Knapsack problem, travelling salesman problem.

Introduction to NP-Hard & NP-Complete Problems – Basic Concepts, Cook's Theorem.

TEXT BOOKS:

1. Fundamentals of computer algorithms E. Horowitz S. Sahni, University Press

REFERENCES:

1. The Design and Analysis of Computer Algorithms, Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman

2. Algorithm Design, Jon Kleinberg, Pearson.

3. Introduction to Algorithms by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein. PHILearning.

FORMAL LANGUAGES AND AUTOMATA THEORY

III Year – I Semester **Course Code: 18IT5T04**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 2 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1) Introduce the student to the concepts of Theory of computation in computer science.
2) The students should acquire insights into the relationship among formal languages, formal Grammars and automata.

COURSE OUTCOMES:

1) Understand the basic concepts of Automata Theory
2) Infer the equivalence of languages described by finite automata and regular expressions.
3) Devise regular, context free grammars while recognizing the strings and tokens and able to Normalize grammars.
4) Apply Pushdown Automata for problem solving.
5) Understand basic properties and compute using Turing Machines.

SYLLABUS

UNIT-I

Finite Automata: Why Study Automata Theory? The Central Concepts of Automata Theory, Automation, Finite Automation, Transition Systems, Acceptance of a String by a Finite automation, DFA, Design of DFAs, NFA, Design of NFA, Equivalence of DFA and NFA, Conversion of NFA into DFA, Finite Automata with E-Transition, Minimization of Finite Automata, Mealy and Moore Machines.

UNIT-II

Regular Expressions: Regular Expressions, Regular Sets, Identity Rules, Equivalence of two Regular Expressions, Manipulations of Regular Expressions, Finite Automata, and Regular Expressions, Equivalence between Finite Automata and Regular Expressions, Pumping Lemma,

Closures Properties, Finite Automata and Regular Grammars, Regular Expressions and Regular Grammars.

UNIT-III

Context Free Grammars: Formal Languages, Grammars, Classification of Grammars, Chomsky Hierarchy Theorem, Context Free Grammar, Leftmost and Rightmost Derivations, Parse Trees, Ambiguous Grammars, Simplification of Context Free Grammars, Normal Forms for Context Free Grammars-Chomsky Normal Form and Greibach Normal Form, Pumping Lemma, Closure Properties, Applications of Context Free Grammars.

UNIT-IV

Pushdown Automata: Pushdown Automata, Definition, Model, Graphical Notation, Instantaneous Description Language Acceptance of pushdown Automata, Design of Pushdown Automata, Deterministic and Non – Deterministic Pushdown Automata, Equivalence of Pushdown Automata and Context Free Grammars Conversion, Two Stack Pushdown Automata.

UNIT-V

Turning Machine: Turing Machine, Definition, Model, Representation of Turing Machines-Instantaneous Descriptions, Transition Tables and Transition Diagrams, Language of a Turing Machine, Types of Turing Machines

TEXT BOOKS:

1) Introduction to Automata Theory, Languages and Computation, J.E.Hopcroft, R.Motwani and J.D.Ullman, 3rd Edition, Pearson, 2008. (Units 1, 2, 3, 4, 5).
2) Theory of Computer Science-Automata, Languages and Computation, K.L.P.Mishra and N. Chandrasekharan, 3rd Edition, PHI, 2007. (Units (1, 2, 3, 4, 5).

REFERENCES:

1) Formal Language and Automata Theory, K.V.N.Sunitha and N.Kalyani, Pearson, 2015.
2) Introduction to Automata Theory, Formal Languages and Compuation, Shyamatendukandar, Pearson, 2013.

3) Theory of Computation, V.Kulkarni, Oxford University Press, 2013.

4) Theory of Automata, Languages and Computation, Rajendra Kumar, McGrawHill.

(PROGRAM ELECTIVE-I)
INTERNET OF THINGS

III Year – I Semester **Course Code: 18IT5T05**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: **External Marks: 70**

COURSE OBJECTIVES:

1) Understand the architecture of Internet of Things and connected world.
2) Explore on use of various hardware, communication and sensing technologies to build IoT applications.
3) Develop the real time IoT applications to make smart world.
4) Understand challenges and future trends in IoT.

COURSE OUTCOMES:

1) Design and Deployment of IoT.
2) Design and comparing M2M with IoT
3) Understand Platform design and modeling of IoT
4) Apply IoT in different devices using Python
5) Implement IoT and cloud platforms

SYLLABUS

UNIT-I

INTRODUCTION TO INTERNET OF THINGS (IoT): Definition and characteristics of IoT, physical design of IoT, logical design of IoT, IoT Enabling Technologies, IoT levels and deployment, domains Specific IoTs.

UNIT-II

IoT AND M2M : Introduction, M2M, difference between IoT and M2M, software defined networking (SDN) and network function virtualization (NFV) for IoT, basics of IoT system management with NETCONF-YANG.

UNIT-III

IoT PLATFORMS DESIGN METHODOLOGY: IoT Architecture: State of the art introduction, state of the art; Architecture reference model: Introduction, reference model and architecture, IoT reference model. Logical design using Python: Installing Python, Python data types and data Structures, control flow, functions, modules, packages, file handling.

IoT Physical Devices and Endpoints: Introduction to Raspberry Pi interfaces (Serial, SPI, I2C), programming Raspberry PI with Python, other IoT devices.

UNIT-IV

IoT Protocols: Messaging Protocols- MQ Telemetry Transport (MQTT), Constrained Application Protocol (CoAP) Transport Protocols-Light Fidelity(Li-Fi), Bluetooth Low Energy(BLE)

IoT Protocols: Addressing and Identification: Internet Protocol Version 4(IPV4), Internet Protocol Version 6(IPV6), Uniform Resource Identifier (URI)

UNIT-V

IoT Physical Servers And Cloud Offerings: Introduction to cloud storage models and communication APIs, WAMP –AutoBahn for IoT, Xively cloud for IoT, case studies illustrating IoT design –home automation, smart cities, smart environment.

TEXT BOOKS:

1) ArshdeepBahga, Vijay Madisetti, “Internet of Things: A Hands-on-Approach”, VPT, 1stEdition, 2014.(Units 1,2,3,5)
2) Matt Richardson, Shawn Wallace, “Getting Started with Raspberry Pi”, O’Reilly (SPD), 3rdEdition, 2014.(Unit 3)
3) Shriram K Vasudevan, Abhishek S Nagarajan, RMD Sundaram “ Internet of Things” Wiley(Unit 4)

REFERENCE BOOKS:

1) Internet of Things: Architecture, Design Principles And Applications, Rajkamal, McGraw HillHigher Education
2) Adrian McEwen, Hakim Cassimally, “Designing the Internet of Things”, John Wiley andSons2014.

(PROGRAM ELECTIVE- I)

AGILE TECHNOLOGIES

III Year – I Semester **Course Code: 18IT5T07**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1. To have an understanding of the Agile Manifesto and Principles
2. To Apply Agile based techniques in each of the development phases.

COURSE OUTCOMES:

1. Understand the Agile Manifesto and Principles.
2. Apply agile software development practices to create high-quality software.
3. Acquire Knowledge on software design, set of software technologies and APIs.
4. Examine and demonstrate knowledge of Agile development
5. Demonstrate the Agile Approach to estimate project variables, control and Risk Management

SYLLABUS

UNIT-I

Agile Software Development: Genesis of Agile, Introduction and Background, Traditional Model Vs Agile Model, Values of Agile, Agile Manifesto and Principles, Stakeholders, Challenges.

UNIT-II

Lean Approach: Waste Management, Kaizen and Kanban, Add process and products add Value, Roles related to life cycle, Differences between Agile and Traditional Plans, Differences at different life cycle phases, Key techniques, Principles, Understand as a means of assessing the initial status of the project, How agile helps to build quality.

UNIT-III

Agile Scrum Framework: Introduction to Scrum, Project phases, Agile estimation, Planning game, Product backlog, Sprint backlog, Iteration planning, **Agile Requirements:** User story definition, Characteristics and contents of user stories, Acceptance tests and verifying stories, Product Velocity,

Burn down chart, Sprint planning and retrospective, Daily Scrum, Scrum roles- Product Owner, Scrum Master, Scrum Team, Scrum Case Study, Tools for Agile Project Management.

UNIT-IV

Agile Software Design and Development: Agile Design practices, Role of design principles including Single Responsibility principle, Open Closed Principle, Liskov Substitution principle, Interface Segregation principles, Dependency Inversion principle in Agile Design, Refactoring- Need and significance, Refactoring techniques, Continuous Integration, Automated Build tools, Version Control.

UNIT-V

Agile Testing and Review: Agile Testing Techniques, Test Driven Development, User Acceptance Test, Agile Metrics and Measurements, The Agile Approach to estimate project variables, Agile control- The 7 control parameters, Agile Approach to Risk, Agile approach to Configuration Management, Atern Principles and Philosophy, Best practices to manage Scrum.

TEXT BOOKS:

1. Robort C. Martin, Agile Software Development- Principles, Patterns and Practices, Prentice Hall, 2013(Units 1, 3, 5)
2. Ken Schawber, Mike Beedle, Agile Software Development with Scrum, Pearson(Units 3,4)
3. Mike Cohn, Succeeding with Agile: Software Development Using Scrum, Addison Wesley Series.(Units 3, 4)

REFERENCES:

1. David J. Anderson and Eli Schragenheim,―Agile Management for SoftwareEngineering: 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,.
3. Craig Larman, ―Agile and Iterative Development: A Managers Guide, Addison-Wesley.
4. Kevin C. Desouza, ―Agile Information Systems: Conceptualization, Construction, and Management, Butterworth-Heinemann.

COMPILER DESIGN

III Year – II Semester **Course Code: 18IT6T01**

Lecture: 2 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 1 **External Marks: 70**

COURSE OBJECTIVES:

1) The process involved in a compiler.
2) Create an overall view of various types of translators, linkers, loaders, and phases of a compiler.
3) To apply the code generation algorithms to get the machine code for the optimized code.
4) What is syntax analysis, various types of parsers- top down approach, bottom up parsers.
5) Various aspects of the run-time environment into which the high-level code is translated.

COURSE OUTCOMES:

1) Acquire knowledge in different phases and passes of Compiler.
2) Demonstrate knowledge about scanning of tokens and perform the syntax analysis by using Top-down parsing techniques.
3) Perform the syntax analysis by using Bottom Up parsing techniques for more complex grammars.
4) Compare different memory management techniques in runtime environment.
5) Demonstrate knowledge about compiler generation tools and techniques.

SYLLABUS

UNIT–I

Phases of Compilation – Lexical Analysis, Regular Grammar and regular expression for common programming language features, pass and Phases of translation, interpretation, bootstrapping, data structures in compilation.

Lexical Analysis: The role of lexical analyzer, Input buffering, specification of tokens. Recognition of tokens, The lexical analyzer generator - LEX.

UNIT–II Syntax Analysis: The Role of a parser, Context free Grammars, Writing a grammar, Top down parsing - Backtracking, LL (1) Grammars, Recursive descent parsing, Non – recursive Predictive parsing, Error recovery in Predictive Parsing.

Bottom up parsing: Reductions, Handle Pruning, Shift – Reduce Parsing, Conflicts during Shift – Reduce Parsing,

UNIT –III

Simple LR Parser – LR Parsing Algorithm, SLR - Parsing Table, Viable Prefixes.

More Powerful LR parser – Constructing Canonical LR1, LALR parsing tables, Using Ambiguous Grammars, Error Recovery in LR parser.

UNIT – IV

Intermediated Code Generation: Variants of Syntax trees, 3 Address code – Quadruples, Triples.

Runtime Environments: Stack allocation of space, Access to Non Local data on the stack, Heap Management.

UNIT – V

Code Generation: – Issues in design of code generation, the target Language, peephole Optimization, A simple Code Generator. Basic Blocks & Flow Graphs, Optimization of Basic Blocks – DAGs, Local Common sub expression elimination.

Machine independent code optimization:

The principle sources of Optimization: Global Common sub expression elimination - Constant folding - Copy propagation - Dead code elimination – Induction Variable & Strength reduction - Loop optimization - Procedure in-lining.

TEXT BOOKS:

1. Compilers – Principles, Techniques and Tools. Alfred V Aho, Monica S. Lam, Ravi Sethi, Jeffery D. Ullman, 2nd edition, Pearson - 2007.

REFERENCE BOOKS:

1. Compiler Construction, Principles and practice, Kenneth C Louden, CENGAGE

2. Implementations of Compiler, A New approach to Compilers including the algebraic methods, Yunlinsu, SPRINGER

3. LEX & YACC – John R. Levine, Tony Mason, Doug Brown, O'reilly

4. Principles of compiler design, 2nd edition, Nandhini Prasad, Elsevier.

(PROGRAM ELECTIVE - II)

BUSINESS INTELLIGENCE

III Year – II Semester **Course Code: 18IT6T04**

Lecture: 3 Practical: 0 **Internal Marks: 30**

Credits: 3 Tutorial: 0 **External Marks: 70**

COURSE OBJECTIVES:

1. Provide the comprehensive knowledge of Business Intelligence principles and techniques by introducing the relationship between managerial and technological perceptive.
2. Exposing the students to the frontiers of business intelligence-intensive big data computing and information systems.

COURSE OUTCOMES:

1. Understand the concepts and components of Business Intelligence (BI).
2. Understand the value of business Intelligence.
3. Discover the requirements need to design a business intelligence model.
4. Understanding a Business Intelligence Environment
5. Develop Business Models and Information Flow

SYLLABUS

UNIT-I

Business Intelligence and Information Exploitation: Why Business Intelligence? The Information Asset, Exploiting Information, Business Intelligence and Program Success,
What Is Business Intelligence? Actionable Knowledge

UNIT-II

The Value of Business Intelligence: The Information Asset and Data Valuation, Actionable Knowledge--Return on Investment, Business Intelligence Applications, The Intelligence Dashboard, Business Intelligence Adds Value

UNIT-III

Planning for Success: Initiating a Program, Business/Information Technology Partnership, Business Intelligence Success Factors, Team Building, Strategic versus Tactical Planning

UNIT-IV

The Business Intelligence Environment: The Business Case, The Business Intelligence Process, System Infrastructure, Information Access, Delivery, and Analysis, Services Management Issues

UNIT-V

Business Models and Information Flow: The Business Case, Information Processing and Information Flow, The Information Flow Model, Usage in Practice, Modeling Frameworks, Management Issues

TEXT BOOKS:

1. D. Loshin, Business Intelligence: The savvy manager‘s guide, Morgan Kaufmannpublishers,2003.

REFERENCE BOOKS:

1. M. Biere, Business intelligence for the enterprise, 2 ed.: IBM Press, 2003.
2. C. Howson, Successful Business Intelligence: Secrets to making Killer BI Applications, 1 ed.: McGraw-Hill 2007.

COMPUTER NETWORKS LAB

III Year – II Semester **Course Code: 18IT6L21**

Lecture: 0 Practical: 4 **Internal Marks: 40**

Credits: 2 Tutorial: 0 **External Marks: 60**

COURSE OBJECTIVES:

1. To teach students practical orientation of f networking concepts
2. To teach students various forms of IPC through UNIX and socket Programming

COURSE OUTCOMES:

1. Implement programs on networking concepts using various services.
2. Implement networking applications using IPC mechanism of UNIX.
3. Compare routing algorithms.
4. Understand the working principles of various communication services using protocols.
5. Practice packet/file transmission between nodes.

LIST OF EXPERIMENTS

1. Understanding and using of commands like ifconfig, netstat, ping, arp, telnet, ftp, finger, traceroute, whoisetc. Usage of elementary socket system calls (socket (), bind(), listen(), accept(), connect(), send(), recv(),sendto(),recvfrom()).
2. Implement the data link layer farming methods such as character stuffing and bitstuffing.
3. Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP.
4. Implement Dijkstra‘s algorithm to compute the Shortest path thru a graph.
5. Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table art each node usingdistance vector routing algorithm
6. Take an example subnet of hosts. Obtain broadcast tree for it.
7. Design TCP iterative Client and server application to reverse the given input sentence
8. Design UDP Client and server application to reverse the given input sentence
9. Implementation of gesockopt (), setsockopt () system calls.
10. Implementation of SMTP.

SOFTWARE ENGINNERING LAB

III Year – II Semester **Course Code: 18IT6L22**

Lecture: 0 Practical: 4 **Internal Marks: 40**

Credits: 2 Tutorial: 0 **External Marks: 60**

COURSE OUTCOMES:

1) Prepare SRS document, design document, test cases and software configuration management and risk management related document.
2) Develop function oriented and object oriented software design using tools like rational rose.
3) Design and develop Test Cases for a system
4) Track the progress of a project using various tools.

1. LIST OF LAB EXPERIMENTS

1) Create the problem statement for a specific system of relevance
2) Perform requirement analysis and develop Software Requirement Specification Sheet (SRS) for suggested system.
3) To carry out the function oriented diagram: Data Flow Diagram (DFD) and Structured chart.
4) To draw UML Diagrams for a suggested system
5) To illustrate the test cases, test case preparation and perform Manual Tests.
6) Perform Estimation of effort using FP Estimation for chosen system.
7) To prepare time line chart/Gantt Chart/PERT Chart for selected software project.

Note: Students shall prepare a document related to all the above activities for at least one real time Case Study

ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

III Year – II Semester **Course Code: 18IT6T12**

Lecture: 2 Practical: 0

Credits: 0 Tutorial: 0

COURSE OBJECTIVES:

1) The course aim of the importing basic principle of third process reasoning and inference sustainability is at the course of Indian traditional knowledge system
2) To understand the legal framework and traditional knowledge and biological diversity act 2002 and geographical indication act 2003.
3) The courses focus on traditional knowledge and intellectual property mechanism of traditional knowledge and protection.
4) To know the student traditional knowledge in different sector.

COURSE OUTCOMES:

1) Understand the concept of Traditional knowledge and its importance
2) Know the need and importance of protecting traditional knowledge
3) Know the various enactments related to the protection of traditional knowledge.
4) Understand the concepts of Intellectual property to protect the traditional knowledge
5) Evaluate strategies to increase the protection of TK.

SYLLABUS

UNIT-I

Introduction to traditional knowledge: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, the physical and social contexts in which traditional knowledge develop, the historical impact of social change on traditional knowledge systems. Indigenous Knowledge (IK), characteristics, traditional knowledge vis-à-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge vis-à-vis formal knowledge

UNIT-II

Protection of traditional knowledge: The need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

UNIT-III

Legal framework and TK: A: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmers Rights Act, 2001 (PPVFR Act); **B:** The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016. Geographical indications act 2003.

UNIT-IV

Traditional knowledge and intellectual property: Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Certain non IPR mechanisms of traditional knowledge protection, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge, global legal FORA for increasing protection of Indian Traditional Knowledge.

UNIT-V

Traditional knowledge in different sectors: Traditional knowledge and engineering, Traditional medicine system, TK and biotechnology, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK.

REFERENCES:

1. Traditional Knowledge System in India, by Amit Jha, 2009.
2. Traditional Knowledge System and Technology in India by Basanta Kumar Mohanta and Vipin Kumar Singh, Pratibha Prakashan 2012.
3. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002
4. "Knowledge Traditions and Practices of India" Kapil Kapoor, Michel Danino

MCA I Semester

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3	0	0	3

20MC1T01 BUSINESS COMMUNICATION

Course Objectives:

To acquaint the students with fundamentals of communication, help them honing oral, written and non- verbal communication skills and to transform them as effective communicators.

Course Outcomes:

- Understand various components of communication skills besides listening skills.
- Learn nuances of organizational communication, Interpersonal and Intra Personal communication
- Demonstrate the Non Verbal communication strategies for effective usage during interview process
- Demonstrate writing skills
- Use presentation skills in real time environments

SYLLABUS

UNIT I:

Purpose and process of communication: Objectives of Communication-Process of Communication - Types of communication; noise, listening skills, Types of listening, essentials of good listening and tips.

UNIT II:

Managing Organizational Communication: Formal and Informal Communication- Interpersonal and Intrapersonal communication- Role of Emotion in Interpersonal Communication- Barriers to Interpersonal Communication- Exchange Theory- Gateways for Effective Interpersonal Communication.

UNIT III:

Non-verbal communication and Body Language: Kinesics, Proxemics, Paralanguage, Haptics, handshakes, appropriate body language and mannerisms for interviews: business etiquettes- across different cultures.

UNIT IV:

Written communication: mechanics of writing, report writing- business correspondence- business letter format- Meetings and managing meetings- Resume writing- Formats and Skills.

UNIT V:

Presentation skills: prerequisites of effective presentation, format of presentation; Assertiveness – strategies of assertive behavior; Communication skills for group discussion and interviews, Interview Techniques.

Note: Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Reference Books:

1) Mallika Nawal: "Business Communication", Cengage Learning, New Delhi, 2012.
2) Edwin A. Gerloff, Jerry C. Wofford, Robert Cummins Organisational Communication: The key stone to managerial effectiveness.
3) Meenakshi Rama: "*Business Communication*", Oxford University Press, New Delhi
4) C.S.G. Krishnamacharyulu and Dr. Lalitha Ramakrishnan, Business Communication, Himalaya Publishing House, Mumbai
5) Paul Turner: "*Organisational Communication*", JAICO Publishing House, New Delhi.
6) Sathya Swaroop Debasish, Bhagaban Das" "*Business Communication*", PHI Private Limited, New Delhi, 2009.
7) R.K.Madhukar: "Business Communication", Vikas Publishing House, New Delhi, 2012.
8) Kelly M Quintanilla, Shawn T. Wahl:"Business and Professional Communication", SAGE, New Delhi, 2012.
9) Sangita Mehta, Neety Kaushish: "Business Communication", University Science Press, New Delhi, 2010.
10) Anjali Ghanekar:"Business Communication Skills", Everest Publishing House, New Delhi, 2011

MCA I SEMESTER

L	T	P	C
3	0	0	3

20MC1T02 MATHEMATICAL AND STATISTICAL FOUNDATIONS

Course Objectives: This course is aimed at enabling the students to

- Understand the mathematical fundamentals that is prerequisites for variety of courses like Data mining, Network protocols, analysis of Web traffic, Computer security, Software engineering, Computer architecture, operating systems, distributed systems bio informatics, Machine learning.
- Develop the understanding of the mathematical and logical basis to many modern techniques in computer science technology like machine learning, programming language design, and concurrency.
- Study various sampling and classification problems.

Course Outcomes:

- Apply the basic rules and theorems of probability theory.
- Analyze sampling, means, proportions, variances and estimate the maximum likelihood based on population parameters.
- Formulate sample means, variances and proportions and draw conclusions based on the results of statistical tests.
- Design various ciphers using number theory.
- Apply graph theory for real time problems like network routing problem.

UNIT I:

Basic Probability and Random Variables: Random Experiments, Sample Spaces Events, the Concept of Probability the Axioms of Probability, Some Important Theorems on Probability Assignment of Probabilities, Conditional Probability Theorems on Conditional Probability, Independent Events, Bayes Theorem or Rule. Random Variables, Discrete Probability Distributions, Distribution Functions for Random Variables, Distribution Functions for Discrete Random Variables, Continuous Random Variables

UNIT II:

Sampling and Estimation Theory: Population and Sample, Statistical Inference Sampling With and Without Replacement Random Samples, Random Numbers Population Parameters Sample Statistics Sampling Distributions, The Sample mean, sampling distribution of means, sampling distribution of Proportions.. Unbiased Estimates and Efficient Estimates Point Estimates and Interval Estimates.

UNIT III:

Tests of Hypothesis and Significance: Statistical Decisions Statistical Hypotheses. Null Hypotheses, Tests of Hypotheses and Significance Type I and Type II Errors Level of Significance Tests Involving the Normal Distribution One-Tailed and Two-Tailed Tests, P Value, Special Tests of Significance for Large Samples, Special Tests of Significance for Small Samples.

UNIT IV:

Algebraic Structures and Number Theory: Algebraic Systems, Examples, General Properties, Semi Groups and Monoids, Homomorphism of Semi Groups and Monoids, Group, Subgroup, Abelian Group, Homomorphism, Isomorphism. Properties of Integers, Division Theorem, The Greatest Common Divisor, Euclidean Algorithm, Least Common Multiple, Testing for Prime Numbers, The Fundamental Theorem of Arithmetic, Modular Arithmetic (Fermat's Theorem and Euler's Theorem)

UNIT V:

Graph Theory: Basic Concepts of Graphs, Sub graphs, Matrix Representation of Graphs: Adjacency Matrices, Incidence Matrices, Isomorphic Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraphs, Planar Graphs, Euler's Formula, Graph Coloring and Covering, Chromatic Number, Spanning Trees, Algorithms for Spanning Trees (Problems Only and Theorems without Proofs).

Reference Books:

1) Foundation Mathematics for Computer Science, 1st Edition, John Vince,Springer,2015
2) Probability & Statistics, 3rd Edition, Murray R. Spiegel, John J. Schiller and R. Alu Srinivasan, Schaum's Outline Series, Tata McGraw-Hill Publishers,2018

3) Probability and Statistics with Reliability,2nd Edition, K. Trivedi, Wiley,2011
4) Discrete Mathematics and its Applications with Combinatorics and Graph Theory, 7th Edition, H. Rosen, Tata McGraw Hill, 2003
5) Probability and Computing: Randomized Algorithms and Probabilistic Analysis,1st Edition, M. Mitzenmacher and E.Upfal,2005
6) Applied Combinatorics, 6thEdition, Alan Tucker,Wiley,2012

MCA I SEMESTER

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20MC1L06 BUSINES COMMUNICATION LAB

Course Objectives:

To acquaint the students with fundamentals of communication, help them honing oral, written and non- verbal communication skills and to transform them as effective communicators.

Course Outcomes:

- Understand various components of communication skills besides listening skills.
- Learn nuances of organizational communication, Interpersonal and Intra Personal communication
- Demonstrate the Non Verbal communication strategies for effective usage during interview process
- Demonstrate writing skills
- Use presentation skills in real time environments

Task 1:

- Role plays

Task 2:

- JAM

Task 3:

- Group Discussion

Task 4:

- Debate

Task 5:

- Presentation Skills

Task 6:

- Interview Process

MCA I SEMESTER

L	T	P	C
0	0	1	0.5

20MC1M09 PROJECT USING DESIGN THINKING

Course Objectives:

- Build mindsets & foundations essential for designers
- Learn about the Human-Centered Design methodology and understand their real-world applications
- Use Design Thinking for problem solving methodology for investigating ill defined problems.
- Undergo several design challenges and work towards the final design challenge

Apply Design Thinking on the following Streams to

- Project Stream1: Electronics, Robotics, IOT and Sensors
- Project Stream2: Computer Science and IT Applications
- Project Stream 3: Mechanical and Electrical tools
- Project Stream 4: Eco-friendly solutions for waste management, infrastructure, safety, lternative energy sources, Agriculture, Environmental science and other fields of engineering.

How to Pursue the Project Work?

- The first part will be learning-based-masking students to embrace the methodology by exploring all the phases of design thinking through the wallet/ bag challenge and podcasts.
- The second part will be more discussion-based and will focus on building some necessary skills as designers and learning about complementary material for human-centered design.
- The class will then divide into teams and they will be working with one another for about 2 – 3 weeks. These teams and design challenges will be the basis for the final project and final presentation to be presented.
- The teams start with **Design Challenge** and go through all the phases more in depth from coming up with the right question to empathizing to ideating to prototyping and to testing.
- Outside of class, students will also be gathering the requirements, identifying the challenges, usability, importance etc
- At the end, Students are required to submit the final reports, and will be evaluated by the faculty.

Tasks to be done:

Task 1: Everyone is a Designer

- Understand class objectives & harness the designer mindset

Task 2: The Wallet/Bag Challenge and Podcast

- Gain a quick introduction to the design thinking methodology
- Go through all stages of the methodology through a simple design challenge
- Podcast: Observe, Listen and Engage with the surrounding environment and identify a design challenge.

Task 3: Teams & Problems

- Start Design Challenge and learn about teams & problems through this
- Foster team collaboration, find inspiration from the environment and learn how to identify problems

Task 4: Empathizing

- Continue Design Challenge and learn empathy
- Learn techniques on how to empathize with users
- Go to the field and interview people in their environments
- Submit Activity Card

Task 5: Ideating

- Continue Design Challenge and learn how to brain storm effectively
- Encourage exploration and foster spaces for brainstorming
- Submit Activity Card

Task 6: Prototyping

- Continue Design Challenge and learn how to create effective prototypes
- Build tangible models and use them as communication tools
- Start giving constructive feedback to classmates and teammates
- Submit Activity Card

Task 7: Testing

- Finish Design Challenge and iterate prototypes and ideas through user feedback
- Evolve ideas and prototypes through user feedback and constructive criticism
- Get peer feedback on individual and group performance
- Submit Activity Card

Task 8 :

- Final Report Submission and Presentation

References:

1. Tom Kelly, The Art of Innovation: Lessons in Creativity From IDEO, America's Leading Design Firm (Profile Books,2002)
2. Tim Brown, Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation (HarperBusiness,2009)
3. Jeanne Liedtka, Randy Salzman, and Daisy Azer, Design Thinking for the Greater Good: Innovation in the Social Sector (Columbia Business School Publishing,2017)

Other Useful Design Thinking Frameworks and Methodologies:

- Human-Centered Design Toolkit (IDEO);https://www.ideo.com/post/design-kit
- Design Thinking Boot Camp Bootleg (Stanford D-School);https://dschool.stanford.edu/resources/the-bootcamp-bootleg
- Collective Action Toolkit (frog design) ; https://www.frogdesign.com/wpcontent/uploads/2016/03/CAT_2.0_English.pdf
- Design Thinking for Educators (IDEO);https://designthinkingforeducators.com/

R PROGRAMMING

18MC3T02

Lecture : 3	**Practical : 0**	**Internal Marks:30**
Credits: 3	**Tutorial : 0**	**External Marks:70**

COURSE OBJECTIVES:

After taking the course, students will be able to

- Use R for statistical programming, computation, graphics, and modeling,
- Write functions and use R in an efficient way,
- Fit some basic types of statistical models
- Use R in their own research,
- Be able to expand their knowledge of R on their own.

UNIT-I: Introduction, How to run R, R Sessions and Functions, Basic Math, Variables, Data Types, Vectors, Conclusion, Advanced Data Structures, Data Frames, Lists, Matrices, Arrays, Classes.
UNIT-II: R Programming Structures, Control Statements, Loops, - Looping Over Nonvector Sets,- If-Else, Arithmetic and Boolean Operators and values, Default Values for Argument, Return Values, Deciding Whether to explicitly call return- Returning Complex Objects, Functions are Objective, No Pointers in R, Recursion, A Quick sort Implementation Extended Extended Example: A Binary Search Tree.
UNIT-III: Doing Math and Simulation in R, Math Function, Extended Example Calculating Probability- Cumulative Sums and Products-Minima and Maxima- Calculus,Sorting, Linear Algebra Operation on Vectors and Matrices, Extended Example: Vector cross Product- Set Operation, Input /output, Accessing the Keyboard and Monitor, Reading and writer Files,
UNIT-IV: Graphics, Creating Graphs, The Workhorse of R Base Graphics, the plot () Function – Customizing Graphs, Saving Graphs to Files.
UNIT-V: Probability Distributions, Normal Distribution- Binomial Distribution- Poisson Distributions Other Distribution, Basic Statistics, Correlation and Covariance, T-Tests,- ANOVA. Linear Models, Simple Linear Regression, -Multiple Regression.

OUTCOMES:

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

- List motivation for learning a programming language
- Access online resources for R and import new function packages into the R workspace
- Import, review, manipulate and summarize data-sets in R
- Explore data-sets to create testable hypotheses and identify appropriate statistical tests
- Perform appropriate statistical tests using R Create and edit visualizations with

TEXT BOOKS:

1) The Art of R Programming, A K Verma, Cengage Learning.

2) R for Everyone, Lander, Pearson

3) The Art of R Programming, Norman Matloff, No starch Press.

REFERENCE BOOKS:

1) R Cookbook, Paul Teetor, Oreilly.

2) R in Action, Rob Kabacoff, Manning

CRYPTOGRAPHY AND NETWORK SECURITY

(Elective)

18MC4T05

Lecture :	**3**	**Practical :**	**0**	**Internal Marks:30**
Credits :	**3**	**Tutorial :**	**0**	**External Marks:70**

COURSE OBJECTIVES:

At the end of the course the student is able to understand

- Basics of Information Security
- How to provide security with Symmetric Encryption Methods
- How to provide security with Asymmetric Encryption Methods
- About E-Mail Privacy
- Web Security
- Basic principles of SNMP
- About Firewalls

COURSE OUTCOMES:

1. Be able to individually reason about software security problems and protection techniques on both an abstract and a more technically advanced level.
2. Be able to individually explain how software exploitation techniques, used by adversaries, function and how to protect against them.

UNIT I : Classical Encryption Techniques

Introduction: Security attacks, services & mechanisms, Symmetric Cipher Model, Substitution Techniques, Transportation Techniques, Cyber threats and their defense(Phishing Defensive measures, web based attacks, SQL injection & Defense techniques)(TEXT BOOK 2), Buffer overflow & format string vulnerabilities, TCP session hijacking(ARP attacks, route table modification) UDP hijacking (man-in-the-middle attacks)(TEXT BOOK 3).

UNIT II: Block Ciphers & Symmetric Key Cryptography

Traditional Block Cipher Structure, DES, Block Cipher Design Principles, AES-Structure, Transformation functions, Key Expansion, Blowfish, CAST-128, IDEA, Block Cipher Modes of Operations

UNIT III: Number Theory & Asymmetric Key Cryptography

Number Theory: Prime and Relatively Prime Numbers, Modular Arithmetic, Fermat's and Euler's Theorems, The Chinese Remainder theorem, Discrete logarithms.

Public Key Cryptography: Principles, public key cryptography algorithms, RSA Algorithms, Diffie Hellman Key Exchange, Elgamal encryption & decryption, Elliptic Curve Cryptography.

UNIT IV: Cryptographic Hash Functions & Digital Signatures, IP Security

Application of Cryptographic hash Functions, Requirements & Security, Secure Hash Algorithm, Message Authentication Functions, Requirements & Security, HMAC& CMAC. Digital Signatures, NIST Digital Signature Algorithm. Key management & distribution.

IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT V: User Authentication, Transport Layer Security & Email Security, Intrusion detection systems
User Authentication: Remote user authentication principles, Kerberos
Transport Level Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Shell(SSH)
Electronic Mail Security: Pretty Good Privacy (PGP) and S/MIME.
Intrusion detection: Overview, Approaches for IDS/IPS, Signature based IDS, Host based IDS/IPS. (TEXT BOOK 2)

TEXT BOOKS:

1. Cryptography & Network Security: Principles and Practices, William Stallings, PEA, Sixth edition.
2. Introduction to Computer Networks & Cyber Security, Chwan Hwa Wu, J.David Irwin, CRC press
3. Hack Proofing your Network, Russell, Kaminsky, Forest Puppy, Wiley Dreamtech.

REFERENCE BOOKS:

1. Everyday Cryptography, Fundamental Principles & Applications, Keith Martin, Oxford
2. Network Security & Cryptography, Bernard Menezes, Cengage, 2010

Distributed Systems

18MC4T06

Lecture : 3	**Practical : 0**	**Internal Marks:30**
Credits : 3	**Tutorial : 0**	**External Marks:70**

COURSE OUTCOMES:

The student should be made to:

- Understand foundations of Distributed Systems.
- Understand about various issues in Inter-process communication.
- Introduce the idea of peer to peer services and file system.
- Understand in detail the system level and support required for distributed system.
- Understand the issues involved in distributed transactions & concurrency control.

UNIT I

Examples of Distributed Systems–Trends in Distributed Systems, Focus on resource sharing, Challenges, Case study: World Wide Web.

System Models – Physical Model, Architectural Model, Fundamental Model.

UNIT II

Interprocess Communication: Introduction, The API for the Internet Protocols, The Characteristics of Interprocess communication. Sockets, UDP Datagram Communication, TCP Stream Communication; External Data Representation and Marshalling;

Multicast Communication – IP Multicast, Reliability & ordering of multicast; Network virtualization: Overlay networks – Example.

UNIT III

Peer-to-peer Systems – Introduction, Napster and its legacy, Peer-to-peer, Middleware, Routing overlays, Overlay case studies: Pastry, Tapestry.

Distributed File Systems – Introduction, File service architecture, Network File system, Andrew File system, Enhancements and further developments.

UNIT IV

Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects-Object Model, Distributed Object Model; Design Issues for RMI, Implementation of RMI, Distributed Garbage Collection; Remote Procedure Call, Events and Notifications, Case Study: JAVARMI

Operating System Support: Introduction, the Operating System Layer, Protection, Processes and Threads - Address Space, Creation of a New Process, Threads.

UNIT V

Transactions and Concurrency Control– Transactions -Nested transactions, Locks, Optimistic concurrency control, Timestamp ordering, Comparison of methods for concurrency control, **Distributed Transactions** - Flat and nested distributed transactions, Atomic Commit protocols, Concurrency Control in Distributed

Transactions, Distributed deadlocks, Transaction recovery.

TEXT BOOKS:

1. George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems- Concepts and Design", Fourth Edition, Pearson Publication.
2. Ajay D Kshemkalyani, MukeshSighal, "Distributed Computing, Principles, Algorithms and Systems", Cambridge.