1.2.1(4)

Certified List of Courses for 2019-20

NRIINSTITUTEOFTECHNOLOGY

Pothavarappadu(v),Agiripalli(M)VijayawadaRural-521212

1.2.1(4)-Certified List of New Courses along with the Highlighted Course Structure for the A.Y. 2019-20

NRI INSTITUTE OF TECHNOLOGY

(An Autonomous Institution Permanently Affiliated to JNTUK, Kakinada)
(Accredited by NAAC with "A" Grade and ISO 9001:2015 Certified Institution)
POTHAVARAPPADU (V), (VIA) NUNNA, AGIRIPALLI (M), PIN – 521 212

DEPARTMENT OF CIVIL ENGINEERING

COURSE STRUCTURE FOR SECOND YEAR B.TECH PROGRAMME

II YEAR I SEMESTER

Sl. No	Course Code	Title of the Course	Scheme of Instruction (Periods Per Week)				Scheme of Examination (Maximum Marks)			No. of Credits
			L	T	P	Total	CIA	SEA	Total	
1	18A2100201	Complex Variables and Fourier Series	3	0	0	3	40	60	100	3
2	18A2101401	Strength of Materials	2	1	0	3	40	60	100	3
3	18A2101402	Fluid Mechanics	2	1	0	3	40	60	100	3
4	18A2101403	Surveying & Geo-Matics	3	0	0	3	40	60	100	3
5	18A2101404	Building Construction Practice	3	0	0	3	40	60	100	3
6	18A2101301	Building Planning & Drawing	1	2	0	3	40	60	100	3
7	18A2101491	Surveying lab	0	0	3	3	40	60	100	1.5
8	18A2101492	Strength of materials Lab	0	0	3	3	40	60	100	1.5
9	18A2100801	Professional Ethics & Human Values	2	0	0	2	40	60	100	0
Total			16	4	6	26	360	540	900	21

II YEAR II SEMESTER

Sl. No	Course Code	Title of the Course	Scheme of Instruction (Periods Per Week)				Scheme of Examination (Maximum Marks)			No. of Credits
			L	T	P	Total	CIA	SEA	Total	
1	18A2200201	Probability & Statistics	3	0	0	3	40	60	100	3
2	18A2201401	Concrete technology	2	1	0	2	40	60	100	3
3	18A2201402	Hydraulic Engineering	2	1	0	2	40	60	100	3
4	18A2201403	Engineering Geology	2	0	0	2	40	60	100	2
5	18A2201404	Structural Analysis -I	2	1	0	2	40	60	100	3
6	18A2201601 18A2201602	**Open Elective –I** i) Elements of Civil Engineering ii) Basic Surveying	2	0	0	2	40	60	100	2
7	18A2201491	Fluid Mechanics & Hydraulic Machines Lab	0	0	3	3	40	60	100	1.5
8	18A2201492	Engineering Geology Lab	0	0	2	2	40	60	100	1
9	18A2201493	Advanced Surveying Lab	0	0	3	3	40	60	100	1.5
10	18A2201494	Surveying Camp	0	0	4	4	40	60	100	2
11	18A2200802	IPR & Patents	2	0	0	2	40	60	100	0
Total			15	3	12	40	440	660	1100	22

L - LECTURE T - TUTORIAL P - PRACTICAL
CIA – Continuous Internal Assessment SEA – Semester End Assessment

Head of the Department
CIVIL ENGINEERING
NRI Institute of Technology
POTHAVARAPPADU.

B.TECH CE
II YEAR-I SEMESTER

18A2100201- COMPLEX VARIABLES AND FOURIER SERIES

Lecture – Tutorial: 3-0 Hours **Internal Marks:** 40
Credits: 3 **External Marks:** 60

Prerequisites: Mathematics I

Course Objectives:

1. To familiarize the techniques in complex variables.
2. To familiarize the techniques in Fourier series.
3. To familiarize the techniques in partial differential equations.
4. To equip the students to solve application problems in their disciplines.

Course Outcomes:

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

CO1	**Write** an analytic function if either real part or imaginary part is known and by **using** Cauchy-Riemann equations or **apply** Milne-Thompson method**(L3)**
CO2	**Evaluate** the integral of complex function over the region bounded by the closed curves by **apply** either Cauchy-Goursat theorem or Cauchy's integral formula or Cauchy's Residue theorem**(L5)**
CO3	**Write** the infinite series expansion of complex function by **apply** Taylor's/Maclaurin's/Laurent's series**(L3)**
CO4	**Write** a Fourier series expansion of a periodic function by **using** Euler's formulae **(L3)**
CO5	**Solve** the Partial difference equations **(L3)**
CO6	Solve one dimensional wave and heat equations by using partial differential equations **(L3)**

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	2	2	-	-	-	-	-	-	-	-
CO2	3	3	2	2	-	-	-	-	-	-	-	-
CO3	3	3	2	2	-	-	-	-	-	-	-	-
CO4	3	3	2	2	-	-	-	-	-	-	-	-
CO5	3	3	2	2	-	-	-	-	-	-	-	-
CO6	3	3	2	2	-	-	-	-	-	-	-	-

UNIT I

Complex Variable – Differentiation &Integration

Complex function , Real and Imaginary parts of Complex function, Limit, Continuity and Derivative of complex function, Cauchy-Riemann equations, Analytic function, entire function, singular point, conjugate function, Harmonic functions, Milne-Thomson method.

Line integral of a complex function, Cauchy's theorem (only statement), Cauchy's Integral Formula.

UNIT II

Complex Variable- Series expansion, Residue Theorem & Evaluation of Real Integrals

Absolutely convergent and uniformly convergent of series of complex terms, Radius of convergence, Taylor's series, Maclaurin's series expansion, Laurent's series.

Zeros of an analytic function, Singularity, Isolated singularity, Removable singularity, Essential singularity, pole of order m, simple pole, Residues, Residue theorem, Calculation of residues, Residue at a pole of order m, Evaluation of real definite integrals: Integration around the unit circle, Integration around semi circle.

UNIT III

Fourier Series

Introduction- Periodic functions – Fourier series of -periodic function - Dirichlet's conditions – Even and odd functions –Change of interval– Half-range sine and cosine series.

UNIT IV

Partial Differentials Equations & Applications

Introduction, Formation of PDE, Solution of PDE, Linear equations of first order, Non-linear equations of first order.

Applications: Method of separation of Variables, One dimensional Wave and Heat equations.

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43/e, 2010.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9/e, John Wiley & Sons, 2006.

REFERENCE BOOKS:

1. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7/e, Mc-Graw Hill, 2004.
2. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, 2008.

E-RESOURCES:

18A2101401- STRENGTH OF MATERIALS

Lecture – Tutorial: 2-1 Hours **Internal Marks:** 40
Credits: 3 **External Marks:** 60

Prerequisites: Physics, Mathematics II and Engineering Mechanics.

Course Objectives:

1) To impart procedure for drawing shear force and bending moment diagrams for beams.
2) To make the student able to analyze flexural stresses in beams due to different loads.
3) To enable the student to apply the concepts of strength of materials in engineering applications and design problems.
4) To make the student able to analyze shear stresses in beams due to different loads.

Course Outcomes:

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

CO1	Understand the concepts of stress, strain, generalized Hooke's law, elastic moduli and strain energy.
CO2	Develop shear force and bending moment diagrams for different load cases.
CO3	Compute the flexural stresses for different load cases and different cross-sections. Determine shear stresses for different cross-sections.
CO4	Knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the beams and deflections due to various loading conditions
CO5	Understand the basic concepts of Principal stresses developed in a member when it is subjected to stresses along different axes.
CO6	Can Analyze members subjected to torsion, combined torsion and bending moment & asses stresses in different engineering applications like springs subjected to different loading conditions

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	2	-	-	-	3	-	-	-	-
CO2	3	-	-	2	-	-	-	3	-	-	-	-
CO3	3	-	-	2	-	-	-	3	-	-	-	-
CO4	3	-	-	2	-	-	-	3	-	-	-	-
CO5	3	-	-	2	-	-	-	3	-	-	-	-
CO6	3	-	-	2	-	-	-	3	-	-	-	-

UNIT I

Simple Stresses and Strains: Types of stresses and strains – Hooke's law – Stress – strain diagram for mild steel – working stress – Factor of safety – lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying sections-Composite bars. Strain energy – Resilience – Gradual, Sudden, impact and shock loadings – simple applications.

LOs:

1. **Understand concepts of stresses, strains, elastic moduli and strain energy.**
2. **Evaluate relations between different moduli**
3. **Understand different types loadings**

Shear Force and Bending Moment: Definition of beam – types of beams – Concept of Shear force

and bending moment – S.F and B.M diagrams for cantilever, simply supported and over changing beams subjected to point loads, uniformly distributed load, uniformly varying loads and combination of these loads – point of contra flexure – Relation between S.F, B.M and rate of loading at section of a beam.

LOs:

1. ***Draw the shear force and bending moment diagrams for cantilevers, simply supported beams and Overhanging beams with different loads***
2. ***Understand the relationship between shear force and bending moments***

UNIT II

Flexural Stresses:

Theory of simple bending – Assumptions – Derivation of bending equation: M/I = f/Y = E/R – Neutral axis – Determination of bending stresses – Section modulus of rectangular and circular sections (Solid and Hallow), I, T, Angle and Channel Sections – Design of simple beam sections.

LOs:

1. **Derive bending equations**
2. **Compute the flexural stresses for different cross sections.**
3. **Design beam sections for flexure**

Shear Stresses:

Derivation of formula-Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T and angle sections. Combined bending and shear.

LOs:

1. **Determine shear stresses for different shapes.**
2. **Evaluate effect of combined bending and shear on sections**

UNIT III

Deflection of Beams: Uniform bending – slope, deflection and radius of curvature – Differential equation for elastic line of a beam – Double integration and Macaulay's methods. Determination of slope and deflection for cantilever and simply supported beams under point loads, U.D.L. uniformly varying load- Mohr's theorems – Moment area method – application to simply supported and overhanging beams- analysis of propped cantilever beams under UDL and point loads.

LOs:

1. **Compute slopes and deflections of beams with different boundary conditions**
2. **Understand types of loads acting on beams**
3. **Evaluate effect of different loads on propped cantilever beams**

UNIT IV

Compound Stresses and Strains: Two dimensional system, stress at a point on a plane, principal stresses and principal planes, Mohr circle of stress, and its applications.

LOs:

1. ***Identify critical planes in two dimensional stress systems***
2. ***Estimate principals stresses & Assess safety of structural elements under principal stresses***

Torsion: Theory of pure torsion – Assumptions and Derivation of Torsion formula for circular shaft – Torsional moment of resistance – Polar section modulus – power transmission through shafts – Combined bending and torsion. Springs - Types of springs – deflection of closed coiled helical springs under axial pull – Carriage or leaf springs.

LOs:

1. ***Analyze members subjected to torsion, combined torsion and bending moment***
2. ***Calculate power transmission through shafts***
3. ***Estimate energy absorption in springs.***

TEXT BOOKS:

3. R. K. Bansal, Strength of Materials, Lakshmi Publications House Pvt. Ltd.
4. Strength of Materials by R. K. Rajput, S. Chand & Co, New Delhi.

REFERENCE BOOKS:

1. Sadhu Singh, Strength of Materials, Khanna Publishers 11th edition 2015.
2. S. Timoshenko, D.H. Young and J.V. Rao, Engineering Mechanics, Tata McGraw-Hill Company.
3. R. Subramanian, Strength of Materials, Oxford University Press.
4. Strength of Materials by S. Ramamrutham.

E-RESOURCES:

18A2101402- FLUID MECHANICS

Lecture – Tutorial: 2-1 Hours **Internal Marks:** 40
Credits: 3 **External Marks:** 60

Prerequisites: Engineering Mechanics, Mathematics II and Physics

Course Objectives:

1) To explain concepts of fluid mechanics used in Civil Engineering.
2) To explain basics of statics, kinematics and dynamics of fluids and various measuring techniques of hydrostatic forces on objects.
3) To impart ability to solve engineering problems in fluid mechanics
4) To enable the students measure quantities of fluid flowing in pipes, tanks and channels
5) To teach integral forms of fundamental laws of fluid mechanics to predict relevant pressures, velocities and forces.
6) To strengthen the students with fundamentals useful in application-intensive courses dealing with hydraulics, hydraulic machinery and hydrology in future courses.

Course Outcomes:

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

CO1	Understand the principles of fluid statics, kinematics and dynamics
CO2	Familiarize basic terms used in fluid mechanics
CO3	Understand flow characteristics and classify the flows
CO4	Apply the continuity, momentum and energy principles
CO5	Estimate various losses in flow through channels
CO6	Understand fundamentals of kinematics and equations Cartesian coordinates.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	2	-	1	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-
CO3	3	-	-	-	-	-	-	-	-	-	-	-
CO4	3	2	-	3	-	-	-	2	-	-	-	-
CO5	2	2	-	3	-	-	-	2	-	-	-	-
CO6	2	2	-	2	-	-	-	-	-	-	-	-

UNIT I

Basic concepts and definitions:

Distinction between a fluid and a solid; Density, Specific weight, Specific gravity, Kinematic and dynamic viscosity; variation of viscosity with temperature, Newton law of viscosity; vapour pressure, boiling point, cavity, surface tension, capillarity, Bulk modulus of elasticity, compressibility.

LOs: 1. Understand basic characteristics of fluids

2. Understand Newton's Law of Viscosity

UNIT II

Fluid statics:

Fluid Pressure: Pressure at a point, Pascal's law, pressure variation with temperature, density and altitude. Piezometer, U-Tube Manometer, Single Column Manometer, U Tube Differential Manometer. Pressure gauges.

Hydrostatic pressure and force: horizontal, vertical and inclined surfaces. Buoyancy and stability of floating bodies.

LOs: 1. Understand concepts of fluid statics.
2. Distinguish different equipment and their applications.
3. Demonstrate stability of floating bodies

UNIT III

Fluid kinematics:

Classification of fluid flow : steady and unsteady flow; uniform and non-uniform flow; laminar and turbulent flow; rotational and irrotational flow; compressible and incompressible flow; ideal and real fluid flow; one, two and three dimensional flows; Stream line, path line, streak line and stream tube; stream function, velocity potential function. One, two and three -dimensional continuity equations in Cartesian coordinates.

LOs: 1. Understand fundamentals of fluid kinematics
2. Differentiate types of fluid flows
3. Explain equations of different order Cartesian coordinates

UNIT IV

Fluid Dynamics:

Surface and body forces; Equations of motion - Euler's equation; Bernoulli's equation – derivation; Energy Principle; Practical applications of Bernoulli's equation : Venturimeter, orifice meter and Pitot tube; Momentum principle; Forces exerted by fluid flow on pipe bend; Vortex Flow – Free and Forced; Definitions of Reynolds Number, Froude Number, Mach Number, Weber Number and Euler Number;

Analysis Of Pipe Flow: Energy losses in pipelines; Darcy – Weisbach equation; Minor losses in pipelines; Hydraulic Grade Line and Total Energy Line; Concept of equivalent length; Friction factor for pipe flow.

LOs: 1. Demonstrate applications of Bernoulli's equations
2. Experiment with different equipments under fluid flow
3. Apply principles of fluid dynamics along with governing equations.
4. Estimate Energy losses in pipelines
5. Determine flow characteristics through closed conduits.

TEXT BOOKS:

1. R. K. Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi Publications (P) Ltd., New Delhi, 7th Edition.
2. P. M. Modi and S. M. Seth, Hydraulics and Fluid Mechanics, Standard Book House, 18th Edition

REFERENCE BOOKS:

1. N. Narayana Pillai, Principles of Fluid Mechanics and Fluid Machines, Universities Press Pvt Ltd, Hyderabad. 3rd Edition 2009.
2. K. Subrahmanya, Theory and Applications of Fluid Mechanics, Tata McGraw Hill.
3. C. S. P. Ojha, R. Berndtsson and P. N. Chadramouli, Fluid Mechanics and Machinery, Oxford University Press, 2010.
4. K. Subramanya, Open Channel flow, Tata Mc.Grawhill Publishers.

E-RESOURCES:

18A2101403- SURVEYING & GEOMATICS

Lecture – Tutorial: 3-0 Hours **Internal Marks:** 40
Credits: 3 **External Marks:** 60
Prerequisites: None

Course Objectives:

1. Highlight the purpose of surveying in civil engineering construction,
2. Explain different types of curves, their requirement and curve setting.
3. Formulate survey observations and perform calculations
4. Train on utilization of surveying instruments like EDM, Total station and GPS.
5. Demonstrate basics of photogrammetry and mapping process.
6. Throw light on remote sensing elements.

Course Outcomes:

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

CO1	Understand basics of surveying and identifying the needs of surveying.
CO2	Apply the knowledge, techniques and survey tools in engineering practices
CO3	Calculate angles, distances and levels.
CO4	Translate the knowledge gained for implementation infrastructure facilities.
CO5	Correlate knowledge to frontiers like Hydrography, Electronic Distance Measurement, Global Positioning System, Photogrammetry and Remote Sensing.
CO6	Identify data collection methods and prepare field notes. Estimate errors in measurements and apply corrections

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	-	3	-	-	1	-	-	-	-	-	-	-
CO2	-	3	-	-	1	-	-	-	-	-	-	-
CO3	-	3	-	1	-	-	-	-	-	-	-	-
CO4	-	3	-	-	1	-	-	-	-	-	-	-
CO5	-	3	-	-	1	-	3	1	-	-	-	-
CO6	-	-	-	-	-	-	2	1	-	-	-	-

UNIT I

Introduction to surveying:

Principles, Linear, angular and graphical methods, Survey stations, Survey lines- ranging, Bearing of survey lines, Levelling: Plane table surveying, Principles of levelling - booking and reducing levels; differential, reciprocal levelling, profile levelling and cross sectioning. Digital and Auto Level, Errors in levelling; contouring: Characteristics, methods, uses; areas and volumes.

LOs:

1. ***Understand basic procedures in surveying***
2. ***Estimate errors in levelling***
3. ***Computing areas and volumes.***

UNIT II

Trigonometric Levelling and Curves:

Theodolite survey: Instruments, Measurement of horizontal and vertical angle; Horizontal and vertical control - methods -triangulation -network- Signals. Baseline - choices - instruments and accessories - extension of base lines -corrections - Satellite station - reduction to centre - Inter-visibility of height and distances - Trigonometric levelling - Axis single corrections. Curves - Elements of simple and compound curves – Method of setting out– Elements of Reverse curve - Transition curve – length of curve – Elements of transition curve - Vertical curves

LOs:

1. ***Measure angles using Theodolite***
2. ***Carryout trigonometric levelling***
3. ***Set simple and compound curve***

UNIT III

Modern Field Survey Systems: Principle of Electronic Distance Measurement, Modulation, Types of EDM instruments, Distomat, Total Station – Parts of a Total Station – Accessories –Advantages and Applications, Field Procedure for total station survey, Errors in Total Station Survey; Global Positioning Systems- Segments, GPS measurements, errors and biases, Surveying with GPS, Co-ordinate transformation, accuracy considerations.

LOs:

1. ***Illustrate distance measurements using modern field survey systems***
2. ***Carryout surveying using Total Station***
3. ***Determine Coordinates using GPS***

UNIT IV

Photogrammetry Surveying: Introduction, Basic concepts, perspective geometry of aerial photograph, relief and tilt displacements, terrestrial photogrammetry, flight planning; Stereoscopy, ground control extension for photographic mapping- aerial triangulation, radial triangulation, methods; photographic mapping- mapping using paper prints, mapping using stereo plotting instruments, mosaics, map substitutes.

LOs:

1. Understand photogrammetry adopting various techniques.
2. Mapping areas using triangulation
3. Distinguish different types of plotting instruments

Remote Sensing: Introduction –Electromagnetic Spectrum, interaction of electromagnetic radiation with the atmosphere and earth surface, remote sensing data acquisition: platforms and sensors; visual image interpretation; digital image processing.

LOs:

1. Understand principles of remote sensing.
2. Carryout date acquisition and interpretation

TEXT BOOKS:

1. Arora, K.R. I, Surveying, Vol-I, II and II, Standard Book House, 2015.
2. C. Venkatramaiah, Text Book of Surveying, Universities Press Pvt Ltd, Hyderabad. Revised Edition 2011.

REFERENCE BOOKS:

1. Manoj K., Arora and Badjatia, Geomatics Engineering, Nem Chand & Bros, 2011.
2. Madhu N., Sathikumar, R. and Satheesh Gobi, Advanced Surveying: Total Station, GIS and Remote Sensing, Pearson India, 2006.
3. Chandra A.M., Higher Surveying, Third Edition, New Age International (P) Limited, 2002.
4. Anji Reddy M., Remote sensing and Geographical information system, B.S. Publications, 2001.

E-RESOURCES:

18A2101301- BUILDING PLANNING & DRAWING

Lecture – Tutorial: 1-2 Hours **Internal Marks:** 40
Credits: 3 **External Marks:** 60
Prerequisites: Engineering drawing

Course Objectives:

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

Course Outcomes:

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

CO1	Student should be able to plan various buildings as per the building by-laws.
CO2	Student should know the minimum standards for various parts of buildings & characteristics.
CO3	The student should be able to distinguish the relation between the plan, elevation and cross section and identify the form and functions among the buildings.
CO4	The student is expected to learn the skills of drawing building elements and plan
CO5	Student should be able to understand various brick masonry & building elements standard drawings.
CO6	Student should be able to develop drawing of building plan, section and elevation.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	2	-	-	-	-	-	-	-	-	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-
CO3	2	1	-	-	2	-	-	-	-	-	-	-
CO4	1	2	-	-	3	-	-	-	-	-	-	-
CO5	-	1	-	-	3	-	-	-	-	-	-	-
CO6	-	-	-	-	3	-	-	-	-	-	-	-

UNIT I

Introduction of building drawing: 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. Types of buildings and principals of planning of buildings

LOs:

1. **Understand building bye-laws**
2. **Understand planning components of building and standard dimensions.**

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

Public Buildings: Planning of educational institutions, hospitals, dispensaries, office buildings, banks, industrial buildings, hotels and motels, buildings for recreation, Landscaping requirements.

LOs:

1. **Understand various requirements of building by visualizing the details.**
2. **Identify differences between residential buildings and public building standards.**

UNIT III

Sign Conventions: Brick, stone, plaster, sand filling, concrete, glass, steel, cast iron, copper alloys, aluminium alloys etc., lead, zinc, tin etc., earth, rock, timber and marbles.

Bonds: 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.

Doors, Windows, Ventilators: Panelled door, glazed door, panelled and glazed door, panelled windows glazed windows, fixed ventilators, swing ventilators.

Roofs: coupled roof, collar roofs, King Post truss and Queen Post truss.

LOs:

1. **Identify sign conventions and symbols used in civil engineering drawing.**
2. **Understand detailed Drawing of building and structural elements and visualize.**

UNIT IV

Planning and Designing of Buildings: Draw the Plan, Elevation and Sections of a Residential and Public buildings from the given line diagram.

LOs:

1. **Understand basic terms plan section and elevation in drawing**
2. **Introduction to computer applications in developing drawing skills**

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,

REFERENCE BOOKS:

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.

E-RESOURCES:

18A2101404- BUILDING CONSRUCTION PRACTICE

Lecture – Tutorial: 3-0 Hours **Internal Marks:** 40
Credits: 3 **External Marks:** 60

Prerequisites: None

Course Objectives:

1. Initiating the student with the knowledge of basic building materials and their properties.
2. Imparting the knowledge of course pattern in masonry construction and flat roofs and techniques of forming foundation, columns, beams, walls, sloped and flat roofs.
3. The student is to be exposed to the various patterns of floors, walls, different types of paints and varnishes.
4. Imparting the students with the techniques of formwork and scaffolding.
5. The students should be exposed to classification of aggregates, moisture content of the aggregate.

Course Outcomes:

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

CO1	Get the knowledge of different construction materials and their properties
CO2	Know the classification of aggregates and their structural requirements.
CO3	Understand properties and the components of lime and cement
CO4	Understand the types of masonry , uses of timber and its properties
CO5	Identify components of building and types of floors and roof
CO6	Gain the knowledge of proofing materials and formworks

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	1	-	1	-	-	-	-	-	-	-	-
CO2	2	1	-	-	-	-	-	-	-	-	-	-
CO3	2	2	-	3	-	-	-	-	-	-	-	-
CO4	2	2	-	3	-	-	-	-	-	-	-	-
CO5	2	1	-	2	-	-	-	-	-	-	-	-
CO6	2	1	-	1	-	-	-	-	-	-	-	-

UNIT I

Stones, Bricks And Tiles 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 manufacturing of bricks. Characteristics of good tile - manufacturing methods, types of tiles. Uses of materials like Aluminium, Gypsum, Glass and Bituminous materials

LOs:

1. **Understand components of structures and their performance**
2. **Explain construction materials their importance**

UNIT II

Lime And Cement Lime: Various ingredients of lime – Constituents of lime stone – classification of lime – various methods of manufacture of lime. Cement: Portland cement-Chemical Composition – Hydration, setting and fineness of cement. Various types of cement and their properties. Various field and laboratory tests for Cement. Various ingredients of cement concrete and their importance – various tests for concrete.

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 – Sieve analysis.

LO: 1Understand materials used for components of structures
2.Explain construction materials their importance
3.Compare different types of construction materials

UNIT III

Masonry -Types of masonry, English and Flemish bonds, Rubble and Ashlar Masonry. Cavity and partition walls. Wood: Structure – Properties- Seasoning of timber. Classification of various types of woods used in buildings- Defects in timber. Alternative materials for wood – Galvanized Iron, Fiber Reinforced Plastics, Steel, Aluminium.

LO: 1. Understand components of structures and their performance

UNIT IV

Building Components Lintels, arches, vaults, stair cases – types. Different types of floors – Concrete, Mosaic, Terrazzo floors, Pitched, flat roofs. Lean to roof, Coupled Roofs.

Finishing: Damp Proofing and water proofing materials and uses – Plastering Pointing, white washing and distempering. Paints: Constituents of paint – Types of paints – Painting of new/old wood- Varnish. Form Works and Scaffoldings.

LO: 1. Classify types of roofs based on features materials and engineering
2. Understand components of structures and their performance

TEXT BOOKS:

1. Building Material &Construction, S. S. Bhavikatti, Vices publications.
2. Building Construction, B.C. Punmia, Laxmi Publications private ltd.

REFERENCE BOOKS:

1. Building Materials, S. K. Duggal, New Age International Publications.
2. Building Materials, P. C. Verghese, PHI learning (P) ltd.
3. Building Materials, M. L. Gambhir, Tata McGraw Hill Publishing Co. Ltd. New Delhi.
4. Building construction, P. C. Verghese, PHI Learning (P) Ltd.
5. Building Materials, Construction and Planning, S. Mahaboob Basha, Anuradha Publications, Chennai.

E-RESOURCES:

18A2101491- SURVEYING LAB

Practical	3 Hours	**Internal Marks:**	40
Credits:	1.5	**External Marks:**	60

Prerequisites: Surveying

Course Objectives:

To impart the practical knowledge in the field, it is essential to introduce in curriculum. Drawing of Plans and Maps and determining the area are pre requisites before taking up any Civil Engineering works.

Course Outcomes:

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

CO1	Conduct survey and collect field data.
CO2	Prepare field notes from survey data
CO3	Interpret survey data and compute areas and volumes.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	3	-	1	1	-	-	-	-	-	-	2
CO2	2	1	-	1	1	-	-	-	-	-	-	-
CO3	3	3	-	2	1	-	-	-	-	-	-	2

LIST OF EXPERIMENTS

1. Survey by chain survey of road profile with offsets in case of road widening.
2. Survey in an area by chain survey (Closed circuit)
3. Determination of distance between two inaccessible points by using compass.
4. Survey in an area using compass (Closed Traverse) – Local Attraction
5. Plane table survey; finding the area of a given boundary by the method of Radiation
6. Plane table survey; finding the area of a given boundary by the method of intersection.
7. Two Point Problem by the plane table survey.
8. Fly levelling : Height of the instrument method (differential levelling)
9. Fly levelling: rise and fall method.
10. Fly levelling: closed circuit/ open circuit.
11. Fly levelling; Longitudinal Section and Cross sections of a given road profile.

18A2101492- STRENGTH OF MATERIALS LAB

Practical	3 Hours	**Internal Marks:**	40
Credits:	1.5	**External Marks:**	60

Prerequisites: Strength of materials

Course Objectives:

Course Outcomes:

1. Conduct tension test on steel
2. Conduct compression tests on spring, wood, brick and concrete
3. Conduct flexural and torsion test to determine elastic constants
4. Determine hardness of metals

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	1	2	-	-	-	-	2	-	-	-	2
CO2	3	1	2	-	-	-	-	2	-	-	-	2
CO3	3	1	2	-	-	-	-	2	-	-	-	-
CO4	3	1	2	-	-	-	-	2	-	-	-	2

LIST OF EXPERIMENTS

1. Tension test on Steel bar
2. Bending test on (Steel / Wood) Cantilever beam.
3. Bending test on simple support beam.
4. Continuous beam – deflection test
5. Torsion test
6. Hardness test
7. Spring test
8. Compression test on wood or brick.
9. Impact test
10. Shear test
11. Verification of Maxwell's Reciprocal theorem on beams.
12. Use of Electrical resistance strain gauges

18A2100801- PROFESSIONAL ETHICS AND HUMAN VALUES

(Common to CE, CSE and IT)

Lecture – Tutorial: 2-0 Hours **Internal Marks:** 40
Credits: 0 **External Marks:** 60
Prerequisites: Basic understanding about Engineering profession.
Course Objectives:

1) To create awareness on engineering ethics and human values.
2) To understand social responsibility of an engineer.
3) To instill moral and social values and loyalty.

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

CO1	Grooms themselves as ethical, responsible and societal beings.
CO2	Discuss ethics in society and apply the ethical issues related to engineering.
CO3	Exhibit the understanding of ethical theories in professional environment.
CO4	Recognize their roe as social experimenters (engineers) and comprehend codes of ethics.
CO5	Identify the risks likely to come across in the professional world, analyzing them and find solutions.
CO6	Realize the responsibilities and rights of engineers in the society.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	-	-	-	-	-	1	1	2	-	-	-	1
CO2	-	-	-	-	-	1	1	2	-	-	-	1
CO3	-	-	-	-	-	1	1	2	-	-	-	1
CO4	-	-	-	-	-	1	1	2	-	-	-	1
CO5	-	-	-	-	-	1	1	2	-	-	-	1
CO6	-	-	-	-	-	1	1	2	-	-	-	1

UNIT I

Human Values: Objectives, Morals, Values, Ethics, Integrity, Work ethics, Service learning , Virtues, Respect for others, Living peacefully, Caring, Sharing, Honesty, Courage, Valuing time, Cooperation, Commitment, Empathy, Self-confidence, Challenges in the work place.

UNIT II

Engineering ethics Senses of 'Engineering Ethics' — Variety of moral issues — Types of inquiry — Moral dilemmas — Moral Autonomy — Kohlberg's theory — Gilligan's theory — Consensus and Controversy — Models of professional roles — Theories about right action — Self-interest — Customs and Religion — Uses of Ethical Theories

UNIT III

Engineering as Social Experimentation: Engineering as experimentation, Engineers as responsible experimenters, Codes of ethics, Industrial standards, A balanced outlook on law, Case study: The challenger.

UNIT IV

Safety, Responsibilities and Rights: Safety and risk, types of risks, Assessment of safety and risk, Safe exit, Risk-benefit analysis, safety lessons from 'the challenger' , Case study: Power plants, Collegiality and loyalty, Collective bargaining, Confidentiality, Conflict of interests, Occupational crime, whistle blowing, Intellectual property rights, professional rights.

TEXT BOOKS:

- **A Text book on Professional Ethics and Human Values by R.S Naagarazan- New Age International Publishers.**
- **" Engineering Ethics includes Human Values" by M. Govindarajan, S. Natarajan and V. S. Senthil Kumar- PHI Learning Pvt. Ltd-2009**

REFERENCE BOOKS:

"Professional Ethics and Human Values" by A. Alavudeen, R. Kalil Rahman and M. Jayakumaran- Laxmi Publications.

E-RESOURCES:

- **www.onlineethics.org**
- **www.nspe.org**
- **www.globalethics.org**
- **www.ethics.org**

B.TECH CE
II YEAR-II SEMESTER

18A2200201-
COURSE NAME-EM-IV-PROBABILITY AND STATISTICS

Lecture – Tutorial:	L-T Hours	**Internal Marks:**	40
Credits:	3	**External Marks:**	60

Prerequisites:

Course Objectives:

1.To familiarize the techniques in central tendency, curve fitting ,correlation and regression.
2. To familiarize the techniques in probability and random variables.
3. To familiarize the techniques in probability distribution.
4. To familiarize the techniques in large and small sample tests.
5.To equip the students to solve problems in their disciplines.

Course Outcomes:

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

CO1 Student will be able to

- **Find the measures of central tendency and relation between them.(L1)**

CO2 Student will be able to

- **Evaluate the correlation coefficient, rank coefficient and regression.(L5)**

CO3 Students will be able to

- **Understand probabilities of events and expectationsof random variables for elementary problems.(L2)**

CO4 Students will be able to

- **Solve problems related to binomial and passion distribution.(L3)**

CO5 Student will be able to

- Compare situations in which it is appropriate to consider the relevance of the Normal distribution.(L4)

CO6 Student will be able to

- Construct hypothesis and carryout appropriate tests to checks its acceptability.(L3)

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	2	2	--	--	--	--	--	--	--	--
CO2	3	3	2	2	--	--	--	--	--	--	--	--
CO3	3	3	2	2	--	--	--	--	--	--	--	--
CO4	3	3	2	2	--	--	--	--	--	--	-	--
CO5	3	3	2	2	--	--	--	--	--	--	-	--
CO6	3	3	2	2	--	--	--	--	--	--	--	--

UNIT I

Descriptive statistics and methods for data science

(Pre-requisite:Data science, Statistics Introduction, Population vs Sample, Collection of data, primary and secondary data, Type of variable: dependent and independent

Categorical and Continuous variables, Data visualization.---No Question selects from the above part)

Measures of Central tendency: Arithmetic Mean – Median – Mode - Geometric Mean- Harmonic Mean and Relations between them- Merits and Demerits.

Measures of Dispersion: Range – Quartile Deviation – Variance, Standard Deviation –Skewness- Kurtosis.

Curve Fitting and Principles of Least Squares.

Correlation- correlation coefficient - rank correlation - Regression coefficients - Regression lines.

UNIT II

Probability

Probability, probability axioms, addition law and multiplicative law of probability, conditional probability, Baye's theorem, random variables (discrete and continuous), probability density functions, properties, mathematical expectation.

UNIT III

Distributions

Probability distribution - Binomial, Poisson approximation to the binomial distribution and normal distribution-their properties.

UNIT IV

Estimation and Testing of hypothesis:Large sample tests Small sample tests

Estimation-parameters, statistics, sampling distribution, point estimation, Formulation of null hypothesis, alternative hypothesis, the critical and acceptance regions, level of significance, two types of errors and power of the test.

Large Sample Tests: Test for single proportion, difference of proportions, test for single mean and difference of means. Confidence interval for parameters in one sample and two sample problems

Small Sample Tests: Student t-distribution (test for single mean, two means and paired t-test), testing of equality of variances (F-test), $\chi 2$ - test for goodness of fit, $\chi 2$ - test for independence of attributes.

TEXT BOOKS:

1. Miller and Freund, Probability and Statistics for Engineers,7/e, Pearson, 2008.
2. S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons Publications, 2012.

REFERENCE BOOKS:

1. S. Ross, a First Course in Probability, Pearson Education India, 2002.

W. Feller, an Introduction to Probability Theory and its Applications, 1/e, Wiley, 1968.

E-RESOURCES:

1.nptel

18A2201401- CONCRETE TECHNOLOGY

Lecture – Tutorial:	2-1 Hours	**Internal Marks:**	40
Credits:	3	**External Marks:**	60

Prerequisites: Building Materials, Building Construction Practice

Course Objectives:

1. To learn the concepts of Concrete production and its behaviour in various Environments.
2. To learn the test procedures for the determination of properties of concrete.
3. To understand durability properties of concrete in various environments.

Course Outcomes:

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

CO1	Understand the basic concepts of concrete.
CO2	Realize the importance of quality of concrete
CO3	Familiarize the basic ingredients of concrete and their role in the production of concrete and its behaviour in the field.
CO4	Test the fresh concrete properties and the hardened concrete properties.
CO5	Evaluate the ingredients of concrete through lab test results. design the concrete mix
CO6	familiarize the basic concepts of special concrete and their production and Applications. Understand the behavior of concrete in various environments.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	-	2	3	2	-	-	-	2	-	-	-	-
CO2	-	2	3	2	-	-	-	2	-	-	-	-
CO3	-	2	3	2	-	-	-	2	-	-	-	-
CO4	-	2	3	2	-	-	-	2	-	-	-	-
CO5	-	1	-	1	-	-	-	2	-	-	-	-
CO6	-	1	-	1	-	-	-	2	-	-	-	-

UNIT I

Cement General, Manufacture of Portland cement by dry process, Approximate oxide composition limits of OPC, Bogue's compounds, Hydration of cement, heat of hydration, structure of hydrated cement. Types Of Cements. Tests on cement-Soundness test, Setting times test, Compressive strength test and Fineness test by air permeability apparatus.

Aggregates And Testing Of Aggregates Classification of aggregates –size, shape and texture, Mechanical properties of aggregates. Tests for aggregates-strength, bulking of fine aggregate, Fineness modulus and Zoning of fine aggregate, Fineness modulus of coarse aggregate. Water Tolerable concentrations of impurities in mixing water, Use of sea water for mixing concrete.

UNIT II

Fresh Concrete Workability, factors affecting workability, Segregation and Bleeding in concrete, measurement of workability using slump cone test, Kelly ball test, Vee-Bee test, compaction factor test.

Hardened Concrete Factors affecting compressive strength of concrete, Cube compression test, split tensile strength test, flexural strength of concrete. Durability of concrete, factors affecting durability of concrete.

UNIT III

Production Of Concrete Batching of materials, mixing, transportation, placing, compaction and finishing of concrete. Curing of concrete and methods of curing.
Concrete Mix Design Basic considerations for concrete mix design, factors influencing the choice of mix proportions, Indian standard method of concrete mix design .ACI method of concrete mix design. Ready Mixed Concrete (RMC)

UNIT IV

Chemical And Mineral Admixtures Functions of admixtures, accelerators, retarders, air entraining admixtures, plasticizers and super plasticizers, water proofers, fly ash, silica fume, ground granulated blast furnace slag.

Special Materials In Construction And Concreting Techniques Ferro-cement, self-compacting concrete, fiber reinforced concrete, high strength concrete. Shortcrete or guniting. Future Trends In Concrete Technology polymer concrete-properties, green building, maintenance, need for green buildings.

TEXT BOOKS:

1. Concrete technology by A.R.Santhakumar, Oxford University Press
2. Concrete technology by M.S.Shetty, S.Chand& Company Pvt. Ltd., New Delhi

REFERENCE BOOKS:

1. Properties of concrete by A.M.Neville, Longman Publishers
2. Concrete technology by M.L.Gambhir, Tata McGraw-Hill Publishing company Ltd., New Delhi

E-RESOURCES:

18A2201402- HYDRAULIC ENGINEERING

Lecture – Tutorial:	2-1 Hours	**Internal Marks:**	40
Credits:	3	**External Marks:**	60

Prerequisites: Mathematical Methods , Fluid Mechanics

Course Objectives:

1) Introduce concepts of laminar and turbulent flows
2) To teach principles of uniform and non-uniform flows through open channel.
3) To impart knowledge on design of turbines.
4) To impart knowledge on design of pumps.

Course Outcomes:

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

CO1	Understand characteristics of laminar and turbulent flows.
CO2	Analyze characteristics for uniform flows in open channels.
CO3	Analyze characteristics for non-uniform flows in open channels.
CO4	Design different types of turbines
CO5	Design of centrifugal and multi stage pumps.
CO6	Design of reciprocating pump

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	1	-	-	2	2	-	-	-	-
CO3	3	-	-	1	-	-	2	2	-	-	-	-
CO4	2	-	-	3	-	-	1	2	-	-	-	-
CO5	2	-	-	3	-	-	1	2	-	-	-	-
CO6	2	-	-	3	-	-	1	2	-	-	-	-

UNIT I

Laminar & Turbulent flow in pipes:

Laminar Flow- Laminar flow through: circular pipes, annulus and parallel plates. Measurement of viscosity.

Turbulent Flow- Reynolds experiment, Transition from laminar to turbulent flow. Definition of turbulence, scale and intensity. Reynolds stresses semi-empirical theories of turbulence. Resistance to flow of fluid in smooth and rough pipes-Moody's diagram.

UNIT II

Uniform flow in Open Channels:

Open Channel Flow-Comparison between open channel flow and pipe flow, geometrical parameters of a channel, classification of open channels, classification of open channel flow, Velocity Distribution of channel section. Uniform Flow-Continuity Equation, Energy Equation and Momentum Equation, Characteristics of uniform flow, Chezy's formula, Manning's formula. Computation of Normal depth.

Non-Uniform flow in Open Channels:

Specific energy, critical flow, discharge curve, Specific force, Specific depth, and Critical depth. Measurement of Discharge and Velocity – Broad Crested Weir. Gradually Varied Flow- Dynamic Equation of Gradually Varied Flow. Hydraulic Jump and classification - Elements and characteristics- Energy dissipation.

UNIT III

Impact of Jets: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes - velocity triangles at inlet and outlet - Work done and efficiency

Hydraulic Turbines: Classification of turbines; pelton wheel and its design. Francis turbine and its design - Kaplan turbine and its design – efficiency - Draft tube: theory - characteristic curves of hydraulic turbines. Cavitation: causes and effects.

UNIT IV

Centrifugal pumps:

Working principles of a centrifugal pump, work done by impeller; heads, losses and efficiencies; minimum starting speed; Priming; specific speed; limitation of suction lift, net positive suction head (NPSH); Performance and characteristic curves; Cavitation effects; Multistage centrifugal pumps; troubles and remedies.

Reciprocating pumps:

Working principles of a Reciprocating pump, work done; heads, losses and efficiencies;

TEXT BOOKS:

1. 1. P. M. Modi and S. M. Seth, Hydraulics and Fluid Mechanics, Standard Book House
2. D. S. Kumar Fluid Mechanics & Fluid Power Engineering, Kataria & Sons.

REFERENCE BOOKS:

1. 1. Rajput, Fluid mechanics and fluid machines , S. Chand & Co
2. K. Subramanya, Open channel Flow, Tata McGraw Hill.
3. Srinivasan, Open channel flow by, Oxford University Press
4. Banga & Sharma, Hydraulic Machines, Khanna Publishers.

E-RESOURCES:

18A2201403- ENGINEERING GEOLOGY

Lecture – Tutorial:	2-0 Hours	**Internal Marks:**	40
Credits:	2	**External Marks:**	60

Prerequisites: None

Course Objectives:

1) To understand weathering process and mass movement
2) To distinguish geological formations
3) To identify geological structures and process of rock mass quality.
4) To identify subsurface information and groundwater potential sites through geophysical investigations
5) To apply geological principles of mitigation of natural hazards and select sites for dams and tunnels

Course Outcomes:

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

CO1	Gain basic knowledge on characteristics of rocks and minerals.
CO2	Identify and differentiate rocks using geological classification.
CO3	Apply concepts of structural geology for civil engineering structures.
CO4	Understand the seismic zones of India.
CO5	Understanding about Geophysical investigation methods & Carryout geo physical investigations using various methods
CO6	Investigate the project site for mega/mini civil engineering projects. Site selection for mega engineering projects like Dams, Tunnels, disposal sites etc.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	-	3	-	1	-	-	-	-	-	-	-
CO2	2	3	3	-	2	-	-	-	-	-	2	-
CO3	2	3	3	-	3	-	-	-	-	-	2	-
CO4	-	2	3	-	3	-	-	-	-	-	2	2
CO5	3	-	3	-	2	-	-	-	-	-	2	1
CO6	-	-	3	-	3	-	-	-	-	-	-	-

UNIT I

Earth Science

Application of Earth Science in Civil Engineering Practices, Understanding the earth, internal structure and composition. Weathering, erosion and denudations process on earth material and natural agencies, Geological work of wind, river underground water and glaciers Mineralogy: Mineral properties, composition and their use in the manufacture of construction materials – Quartz Group; Feldspar Group; Kaolin; Asbestos; Carbonate Group ; Gypsum; Mica Group; Ore minerals - Iron ores; pyrite; Chlorite

LO: 1. Explain the formation of earth and its internal structure

2. Understand weathering and formation of natural minerals

3. Explain composition of minerals and their utilization in construction industry.

UNIT II

Definition of rock - Rock forming processes - Geological classification of rocks - Dykes and sills, common structures and textures - Megascopic study, Chemical and Mineralogical Composition of rock (Granite, Gabbro, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Limestone, Tuff, Felsite, Gneiss, Schist, Quartzite, Breccia, Marble, Porphyries, Charnockite and Slate).

Structural Geology:

Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults unconformities, and joints – their important types. Their importance insitu and drift soils, common types of soils, their origin and occurrence in India

LO: 1. Understand classification of rocks

2. Demonstrate chemical composition

3. Identify mineral composition of rock

4. Explain formation of folds strike and dip of geological structures

5. Assess importance of soils

6. Locate origin of different types of rocks and soils and their origin India

UNIT III

Geomorphology, hydrogeology and seismology:

Ground water, Water table - ground water exploration. Site selection for dams and tunnels – analysis of failures in dams and tunnels - Seismic zones of India - Earth quakes, their causes and effects. Seismic waves, Richter scale. Landslides - causes and effects; Tsunami – causes and effects.

LO: 1. Understand geomorphology

2. Identify procedures for site selection of important structures

3. Contrast seismic Zonation of India in stages

4. Understanding about Geophysical investigation methods

5. Carryout geo physical investigations using various methods.

UNIT IV

Geology of Dams, Reservoirs and Tunnels: Types and purpose of Dams, Geological considerations in the selection of a Dam site. Life of Reservoirs Purpose of Tunnelling, effects, Lining of Tunnels. Influence of Geology for successful Tunnelling.

TEXT BOOKS:

1. N. Chenna Kesavulu, Text Book of Engineering Geology, 2nd Edition (2009), Macmillan Publishers India.
2. Vasudev Kanithi, Engineering Geology, Universities Press Pvt Ltd, Hyderabad. 2012.

REFERENCE BOOKS:

1. Parbin Singh, Engineering and General Geology, 8th Edition (2010), S K Kataria & Sons.
2. J. C. Harvey, Geology for Geotechnical Engineers, Cambridge University Press (1982).
3. Richard E. Goodman, Engineering Geology, Rock in Engineering Construction by John Wiley & Sons, Inc. 1993.
4. Billings, M. P., Structural Geology, Prentice-Hall India, 1974, New Delhi

E-RESOURCES:

18A2201404- STRUCTURAL ANALYSIS

Lecture – Tutorial:	2-1 Hours	**Internal Marks:**	40
Credits:	3	**External Marks:**	60

Prerequisites: Engineering Mechanics, Strength of Materials

Course Objectives:

1) To impart knowledge on Columns & Struts
2) To teach procedure for analysis of fixed beams.
3) To teach procedure for analysis of continuous beams.
4) To enable the student undergo analysis procedure of moving loads & their influence.

Course Outcomes:

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

CO1	Apply Rankine's & Euler's theories for analysis of columns & struts
CO2	Analyze indeterminate propped cantilever beams
CO3	Analyze fixed beams using compatibility method
CO4	Analyze continuous beams using Clapeyron's theorem of three moments Analysis
CO5	Analyze continuous beams using slope deflection equation
CO6	Identify the behavior of structures due to the expected loads, including the moving loads, acting on the structure. Estimate the bending moment and shear forces in beams for different fixity conditions

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	1	-	-	-	-
CO3	3	-	-	-	-	-	-	1	-	-	-	-
CO4	3	-	-	-	-	-	-	1	-	-	-	-
CO5	3	-	-	-	-	-	-	1	-	-	-	-
CO6	2	2	-	-	-	-	-	1	-	-	-	-

UNIT I

Columns and Struts:

Introduction – classification of columns – Axially loaded compression members – Euler's crippling load theory – derivation of Euler's critical load formulae for various end conditions – Equivalent length – Slenderness ratio – Euler's critical stress – Limitations of Euler's theory – Rankine – Gordon formula – eccentric loading and Secant formula – Prof. Perry's formula.

LO: 1. Classify columns
2. Understand Euler's theory on columns and assess crippling loads
3. Analyze compression members using different theories
4. Assess load carrying capacity using different formulae

Propped Cantilevers: Analysis of propped cantilevers-shear force and bending moment diagrams-Deflection of propped cantilevers.

LO: 1. Classify Propped Cantilevers
2. Analyze the beams subjected to loads

3. Study effect of sinking of supports of performance

UNIT II

Fixed Beams – Introduction to statically indeterminate beams with U. D. load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads - shear force and Bending moment diagrams-Deflection of fixed beams including effect of sinking of support, effect of rotation of a support.

LO. 1. Categorize fixed beams and their performance

2. Analyze the beams subjected to loads

3. Study effect of sinking of supports of performance

UNIT III

Continuous Beams: Introduction-Clapeyron's theorem of three moments Analysis of continuous beams with constant moment of inertia with one or both ends fixed continuous beams with overhang, continuous beams with different moment of inertia for different spans-Effects of sinking of supports-shear force and bending moment diagrams.

LO. 1. Categorize continuous beams and their performance

2. Analyze the beams subjected to loads

3. Study effect of sinking of supports of performance

Slope-Deflection Method: Introduction, derivation of slope deflection equation, application to continuous beams with and without settlement of supports.

LO. 1. Develop slope deflection expressions

2. Analyze structures with and without support sinking

UNIT IV

Moving Loads : Introduction maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single concentrated load, U. D load longer than the span, U. D load shorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load-Focal length.

LO. 1. Categorize different types of moving loads and their performance

2. Analyze the beams subjected to loads

TEXT BOOKS:

1. Ramamurtham S., Theory of Structures, Dhanpat Rai Publishing Company (p) Ltd, 2009
2. C. S. Reddy, Basic Structural Analysis, Tata McGraw Hill

REFERENCE BOOKS:

1. Timoshenko & Young, Theory of Structures, Tata McGraw Hill
2. Junarkar S. B., Structural Mechanics Vol I & II, Charotar Publishers
3. C. K. Wang, Intermediate Structural Analysis, McGraw Hill

E-RESOURCES:

18A2201491- FLUID MECHANICS & HYDRAULIC MACHINES LAB

Practical	3 Hours	**Internal Marks:**	40
Credits:	1.5	**External Marks:**	60

Prerequisites: Fluid mechanics, Fluid mechanics & hydraulic machines

Course Objectives:

1. To impart the experimental skills in flow measurement and real fluid flow problems
2. To impart experimental skills to verify the performance characteristics of pumps and turbines

Course Outcomes:

1. Student will be able to utilize the knowledge in the design of water supply pipe networks and measure the rate of flow in pipes and channels.
2. Students will have confidence in the hydraulic design of turbines and should be able to identify suitable pumps and turbines for different working conditions.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	1	2	3	2	-	-	-	1	-	-	-	-
CO2	1	2	3	3	-	-	-	1	-	-	-	-

LIST OF EXPERIMENTS

1. Calibration of Venturimeter & Orifice meter
2. Determination of Coefficient of discharge for a small orifice by a constant head method.
3. Determination of Coefficient of discharge for an external mouth piece by variable head method.
4. Calibration of contracted Rectangular Notch and /or Triangular Notch
5. Determination of Coefficient of loss of head in a sudden contraction and friction factor.
6. Verification of Bernoulli's equation.
7. Reynold's Experiment
8. Impact of jet on vanes
9. Performance test on Pelton wheel turbine
10. Performance test on Francis turbine.
11. Performance test on Kaplan turbine
12. Efficiency test on centrifugal pump.
13. Efficiency test on reciprocating pump.

18A2201492- ENGINEERING GEOLOGY LAB

Practical	2 Hours	**Internal Marks:**	40
Credits:	1	**External Marks:**	60

Prerequisites: Engineering geology

Course Objectives:

Course Outcomes:

1. Identify minerals and rocks
2. Measure strike and dip of the bedding planes
3. Interpret geological maps

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	-	2	3	3	2	1	1	1	-	-	-	-
CO2	2	3	2	2	2	1	2	2	-	-	-	-
CO3	1	3	2	2	2	-	1	1	-	-	-	-

LIST OF EXPERIMENTS

1. Physical properties of minerals: Mega-scopic identification of
   a. Rock forming minerals – Quartz group, Feldspar group, Garnet group, Mica group & Talc, Chlorite, Olivine, Kyanite, Asbestos, Tourmelene, Calcite, Gypsum, etc...
   b. Ore forming minerals – Magnetite, Hematite, Pyrite, Pyralusite, Graphite, Chromite, etc...
2. Megascopic description and identification of rocks.
   a) Igneous rocks – Types of Granite, Pegmatite, Gabbro, Dolerite, Syenite, Granite Poryphery, Basalt, etc...
   b) Sedimentary rocks – Sand stone, Ferrugineous sand stone, Lime stone, Shale, Laterite, Conglamorate, etc...
   c) Metamorphic rocks – Biotite – Granite Gneiss, Slate, Muscovite & Biotiteschist, Marble, Khondalite, etc...
3. Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities etc.
4. Simple Structural Geology problems.
5. Bore hole problems

18A2201493- ADVANCED SURVEYING LAB

Practical	3 Hours	**Internal Marks:**	40
Credits:	1.5	**External Marks:**	60

Prerequisites: Surveying

Course Objectives:

To impart the practical knowledge in the field, it is essential to introduce in curriculum. Drawing of Plans and Maps and determining the area are pre requisites before taking up any Civil Engineering works.

Course Outcomes:

1. Conduct survey and collect field data.
2. Prepare field notes from survey data
3. Interpret survey data and compute areas and volumes.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	3	-	1	1	-	-	-	-	-	-	2
CO2	2	1	-	1	1	-	-	-	-	-	-	-
CO3	3	3	-	2	1	-	-	-	-	-	-	2

LIST OF EXPERIMENTS

1. Theodolite Survey: Determining the Horizontal and Vertical Angles by the method of Repetition method.
2. Theodolite Survey: Finding the distance between two inaccessible points.
3. Theodolite Survey: Finding the height of far object.
4. Tachometric Survey: Heights and distance problems using tachometric principles.
5. One Exercise on Curve setting.
6. One Exercise on contours.
7. Total Station: Introduction to total station and practicing setting up, levelling up and elimination of parallax error.
8. Total Station: Determination of area using total station.
9. Total Station: Traversing
10. Total Station: Contouring
11. Total Station: Determination of Remote height.
12. Total Station: distance between two inaccessible points.

18A2201494- SURVEY CAMP

Practical	3 Hours	**Internal Marks:**	40
Credits:	2	**External Marks:**	60

Prerequisites: Surveying

Course Objectives:

To impart the practical knowledge in the field, it is essential to introduce in curriculum. Drawing of Plans and Maps and determining the area are pre requisites before taking up any Civil Engineering works.

Course Outcomes:

1. Conduct survey and collect field data.
2. Prepare field notes from survey data
3. Interpret survey data and compute areas and volumes.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	3	-	1	1	-	-	-	-	-	-	2
CO2	2	1	-	1	1	-	-	-	-	-	-	-
CO3	3	3	-	2	1	-	-	-	-	-	-	2

Surveying camp will be conducted for a **week schedule** to carryout survey in nearby villages using survey equipments (Dumpy/Auto level, Total Station).

- **Levelling, Contouring**

18A2200801-IPR & Patents

Lecture – Tutorial:	2-0 Hours	**Internal Marks:**	40
Credits:	0	**External Marks:**	00

Prerequisites: Professional Ethics

Course Objectives:

1) To impart knowledge on innovations and creations.
2) To encourage students on developing Entrepreneurship Skills
3) To teach procedure for registrations of various intellectual property rights.
4) To bring awareness on cybercrimes.

Course Outcomes:

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

CO1	Understand the need for Intellectual Property Rights and its importance
CO2	Study of Information Technology Act 2000 and classification of Cybercrimes
CO3	Study of Copyrights Act and its registrations process
CO4	Study of Patents Act and it's infringement
CO5	Study of Trademarks Act and it's registration formalities
CO6	Understand the importance of Trade secrets and maintaining trade secrets

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	2	-	-	-	-	-	3	-	-	-	-
CO2	3	-	-	-	-	-	-	3	-	2	-	-
CO3	2	-	2	-	-	-	-	3	-	-	-	-
CO4	2	-	-	2	-	-	-	3	-	-	-	-
CO5	2	-	2	-	-	-	-	3	-	-	-	-
CO6	2		-	-	-	-	-	3	2	2	-	-

UNIT I

Introduction to Intellectual Property Rights (IPR)

Concept of Property - Introduction to IPR – International Instruments and IPR - WIPO - TRIPS – WTO –Laws Relating to IPR - IPR Tool Kit - Protection and Regulation - Copyrights and Neighboring Rights – Industrial Property – Patents - Agencies for IPR Registration – Traditional Knowledge –Emerging Areas of IPR – Layout Designs and Integrated Circuits – Use and Misuse of Intellectual Property Rights.

LO: 1. Classify intellectual property rights
2.Understand the importance of IPR

Cyber Law and Cyber Crime

Introduction to Cyber Law – Information Technology Act 2000 - Protection of Online and Computer Transactions -E-commerce - Data Security – Authentication and Confidentiality - Privacy - Digital Signatures – Certifying Authorities - Cyber Crimes - Prevention and Punishment – Liability of Network Providers.

LO: 1. Classification of cyber crimes
2. Awareness and preventive measures of cyber crimes

UNIT II

Copyrights and Neighboring Rights

Introduction to Copyrights – Principles of Copyright Protection – Law Relating to Copyrights - Subject Matters of Copyright – Copyright Ownership – Transfer and Duration – Right to Prepare Derivative Works –Rights of Distribution – Rights of Performers – Copyright Registration – Limitations – Infringement of Copyright – Relief and Remedy – Case Law - Semiconductor Chip Protection Act.

LO. 1. Categorize subject matters of copyrights

2. Understand the registration process of copyrights

3. Study effect of Infringement under Copyright Act

UNIT III

Patents: Introduction to Patents - Laws Relating to Patents in India – Patent Requirements – Product Patent and Process Patent - Patent Search - Patent Registration and Granting of Patent - Exclusive Rights – Limitations – Ownership and Transfer –– Revocation of Patent – Patent Appellate Board - Infringement of Patent – Double Patenting –Patent Cooperation Treaty – New developments in Patents – Software Protection and Computer related Innovations.

LO. 1.Analyze Patent requirements and its registration formalities

2.Study the effect of Infringement under Patent Act

UNIT IV

Trademarks: Introduction to Trademarks – Laws Relating to Trademarks – Functions of Trademark – Distinction between Trademark and Property Mark – Marks Covered under Trademark Law - Trade Mark Registration – Trade Mark Maintenance – Transfer of rights - Deceptive Similarities - Likelihood of Confusion - Dilution of Ownership –Trademarks Claims and Infringement – Remedies – Passing Off Action.

LO. 1.Analyze functions of Trademark and its registration formalities

2.Study the effect of Infringement under Trademark Act

Trade Secrets

Introduction to Trade Secrets – General Principles - Laws Relating to Trade Secrets - Maintaining Trade Secret –Physical Security – Employee Access Limitation – Employee Confidentiality Agreements – Breach of Contract –Law of Unfair Competition – Trade Secret Litigation – Applying State Law.

LO. 1. Understand the importance of Tradesecrets

2. Understand how to maintain Tradesecrets

TEXT BOOKS:

1. Deborah E.Bouchoux: Intellectual Property, Cengage Learning, New Delhi.
2. PrabhuddhaGanguli: Intellectual Property Rights, Tata Mc-Graw –Hill, New Delhi

REFERENCE BOOKS:

1 Intellectual Property Rights (Patents & Cyber Law), Dr. A. Srinivas. Oxford University Press, New Delhi.

2 R.Radha Krishnan, S.Balasubramanian: Intellectual Property Rights, Excel Books. New Delhi.

3 M.Ashok Kumar and MohdIqbal Ali: Intellectual Property Rights, Serials Pub.

E-RESOURCES:

- https://www.wipo.int/edocs/pubdocs/en/intproperty/450/wipo_pub_450.pdf
- https://www.icsi.edu/media/webmodules/publications/9.4%20Intellectual%20Property%20Rights.pdf
- https://lecturenotes.in/notes/20883-note-for-intellectual-property-rights-ipr-by-gyan-prakash

Open Elective-1 (Offered by Department of civil engineering)

18A2201601- ELEMENTS OF CIVIL ENGINEERING

Lecture – Tutorial:	2-0 Hours	**Internal Marks:**	40
Credits:	2	**External Marks:**	60

Prerequisites: Engineering Mechanics, Strength of Materials

Course Objectives:

- To inculcate the essentials of civil engineering field to the students of all branches
- To provide the students an illustration of the significance of the civil engineering profession satisfying societal needs.

Course Outcomes:

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

CO1	Attain basic knowledge on simple stress & strains and civil engineering materials.
CO2	Attain basic knowledge on sub-structure and super structure of a building.
CO3	Attain basic knowledge on principles of surveying, various types of surveying.
CO4	Attain basic knowledge on various types of transportation systems.
CO5	Attain basic knowledge on various types of bridges
CO6	Attain basic knowledge on purpose, components and various types of dams.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	2	-	2	-	-	-	-
CO2	3	-	-	-	-	1	-	1	-	-	-	-
CO3	3	2	-	-	-	1	-	1	-	-	-	-
CO4	3	-	-	-	-	1	-	1	-	-	-	-
CO5	3	2	-	-	-	-	-	1	-	-	-	-
CO6	3	2	-	-	-	2	-	1	-	-	-	-

UNIT I

SIMPLE STRESS AND STRAINS:

Definition of Mechanics- External and Internal forces-Stress and Strain-Elasticity and Hooke's Law- Relations between elastic constants.

CIVIL ENGINEERING MATERIALS:

Classification of bricks, Manufacture of bricks, Laboratory and field tests on bricks, stones; Grades of Steel and Cement Concrete.

UNIT II

MASONRY:

Bonds in Brick Masonry, Stone Masonry; Types of Flooring and Roofing.

SUB-STRUCTURE:

Soil –Types; Introduction to Foundations – Classifications; Bearing capacity of Soil - Improvement

UNIT III

SURVEYING:

Objectives, Types, Principles of Surveying; Measurement of distances and angles

TRANSPORTATION ENGINEERING:

Roads- Classification; Road Network Patterns; Cross section of roads; Traffic signs

UNIT IV

BRIDGES:

Necessity of bridges; Components; Classification; Preliminary data to be collected, selection of bridge site; Investigation for major bridges.

DAMS:

Purpose of Dams; Components; Classification; selection of site for construction.

TEXT BOOKS:

1. Palanichamy, M. S.:"Basic Civil Engineering", Tata McGraw-Hill Publishing Company Limited, New Delhi, 2002.
2. Premalatha, J. and Kasir.: "Basic Civil Engineering", Coimbatore

REFERENCE BOOKS:

1. Jayagopal,L.S. and Rudramoorthy,R., Basic Civil and Mechanical Engineering ,Vikas Publishing House Pvt. Ltd., New Delhi, 1999.
2. Gopi, Satheesh, Basic Civil Engineering, New Delhi Pearson 2010.

E-RESOURCES:

- ncees.org/exmas/fe-exma/
- www.aboutcivil.com/

18A2201602-BASIC SURVEYING

Lecture – Tutorial:	2-0 Hours	**Internal Marks:**	40
Credits:	2	**External Marks:**	60

Prerequisites: ----------

Course Objectives:

- To understand the importance of surveying in the field of civil engineering
- To study the basics of linear/angular measurement methods like chain surveying, compass surveying
- To understand calculations of areas and volumes of a given boundary.

Course Outcomes:

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

CO1	Understand the principles of surveying and types of scales
CO2	Understand the principles of chain surveying.
CO3	Attain basic knowledge on compass surveying and various types of compass.
CO4	Attain basic knowledge on bearings and included angles from bearings
CO5	Compute areas of a given section.
CO6	Compute volumes of a given section.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	2	-	-	-	2	-	2	-	-	-	-
CO2	3	2	-	-	-	1	-	1	-	-	-	-
CO3	3	2	-	-	-	-	-	1	-	-	-	-
CO4	3	2	-	-	-	-	-	1	-	-	-	-
CO5	3	2	-	-	-	-	-	1	-	-	-	-
CO6	3	2	-	-	-	2	-	1	-	-	-	-

UNIT I

BASICS OF SURVEYING:

Surveying: Definition; Classification; Principles of surveying; Plan and map; Scales used for Maps and plans. Accuracy, Precision, Sources of errors; Types of errors.

UNIT II

CHAIN SURVEYING:

Principles of chain surveying; Basic definitions; Different methods; Ranging out; Chaining a line on a flat ground; Chaining on an uneven or a sloping ground; Chain & Tape corrections; Degree of accuracy.

UNIT III

COMPASS SURVEYING:

Traverse Bearings (WCB&RB); Prismatic compass, Surveyor compass, Magnetic Dip and Declination; Local attraction; included angles from bearings; Limits of accuracy.

UNIT IV

AREAS& VOLUMES

Introduction; Boundaries with offsets at irregular intervals; Area of cross sections – two level sections only; Trapezoidal rule; Prismoidal formula; Capacity of a reservoir.

TEXT BOOKS:

1. Surveying Vol I & II by K R Arora, Standard Book house.
2. Plane Surveying by AM Chandra, New Age International (P) Ltd.

REFERENCE BOOKS:

1. Fundamentals of surveying by S.K. Roy 1999, Prentice- Hall of India, New Delhi.
2. Surveying Vol.1 by B.C. Punmia, Laxmi Publications.
3. Advanced Surveying, by S. Gopi, R.S. Kumar and N. Madhu, 2007, Pearson education, New Delhi.

E-RESOURCES:

- http://nptel.ac.in/courses/webcourse-contents/IIT ROORKEE/SURVEYING/home.htm

NRI INSTITUTE OF TECHNOLOGY

POTHAVARAPPADU (V), (VIA) NUNNA, AGIRIPALLI (M), PIN – 521 212

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE STRUCTURE FOR SECOND YEAR B.TECH PROGRAMME

II YEAR I SEMESTER

Sl. No	Course Code	Title of the Course	Scheme of Instruction (Periods Per Week)				Scheme of Examination (Maximum Marks)			No. of Credits
			L	T	P	Total	CIA	SEA	Total	
1	18A2100202	Complex Variables and Transform Techniques	3	-	-	3	40	60	100	3
2	18A2103302	Thermal and Hydraulic Prime Movers	3	-	-	3	40	60	100	3
3	18A2104301	Basic Electronic Devices and Circuits	3	-	-	3	40	60	100	3
4	18A2102401	Electrical Circuit Analysis- II	3	-	-	3	40	60	100	3
5	18A2102402	Electrical Machines – I	3	-	-	3	40	60	100	3
6	18A2103391	Thermal and Hydro Lab	-	-	3	3	40	60	100	1.5
7	18A2104391	Basic Electronic Devices and Circuits Lab	-	-	3	3	40	60	100	1.5
8	18A2102491	Electrical Circuits Lab	-	-	3	3	40	60	100	1.5
Total			**15**	**-**	**11**	**26**	**360**	**540**	**900**	**19.5**

II YEAR II SEMESTER

Sl. No	Course Code	Title of the Course	Scheme of Instruction (Periods Per Week)				Scheme of Examination (Maximum Marks)			No. of Credits
			L	T	P	Total	CIA	SEA	Total	
1	18A2200101	Managerial Economics and Financial Analysis	3	-	-	3	40	60	100	3
2	18A2202401	Electro Magnetic Fields	3	-	-	3	40	60	100	3
3	18A2202402	Control Systems	3	-	-	3	40	60	100	3
4	18A2202403	Electrical Machines – II	3	-	-	3	40	60	100	3
5	18A2202404	Power Systems - I	3	-	-	3	40	60	100	3
6	18A2202601 18A2202602	**Open Elective –I** 1) Electrical Materials 2) Control systems	3	-	-	3	40	60	100	3
7	18A2202491	Electrical Machines – I Lab	-	-	3	3	40	60	100	1.5
8	18A2202492	Control Systems lab	-	-	3	3	40	60	100	1.5
9	18A2200801	Professional Ethics and Human Values	2	0	0	2	40	60	100	0
Total			**20**	**-**	**6**	**26**	**360**	**540**	**900**	**21**

L - LECTURE T – TUTORIAL P - PRACTICAL

CIA – Continuous Internal Assessment SEA – Semester End Assessment

Dr. N. SAMBASIVA RAO
B.Tech, M.Tech, Ph.D, MISTE
Head of the Department & Professor of EEE
NRI INSTITUTE OF TECHNOLOGY (KN)

18A2100202- COMPLEX VARIABLES AND TRANSFORM TECHNIQUES

(MATHEMATICS-III)

Lecture – Tutorial:	1 – 2	Internal Marks:	40
Credits:	3	External Marks:	60

Course Objectives:

- To familiarize the techniques in complex variables
- To familiarize the techniques in fourier series.
- To familiarize the techniques in fourier transforms
- To familiarize the techniques in Z-transforms
- To equip the students to solve application problems in their disciplines.

Course Outcomes:

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

CO1	**Write** an analytic function if either real part or imaginary part is known and by **using** cauchy-riemann equations or **apply** milne-thompson method
CO2	**Evaluate** the integral of complex function over the region bounded by the closed curves by **apply** either cauchy-goursat theorem or cauchy's integral formula or cauchy's residue theorem
CO3	**Write** the infinite series expansion of complex function by **apply** taylor's/maclaurin's/laurent's series
CO4	**Write** a fourier series expansion of a periodic function by **using** euler's formulae
CO5	**Understand** the concept of fourier transform and its properties
CO6	**Solve** the difference equations using z-transforms and inverse z-transforms

Contribution of Course Outcomes towards achievement of Program Outcomes (1– Low, 2- Medium, 3 – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1	3	3	2	2								
CO2	3	3	2	2								
CO3	3	3	2	2								
CO4	3	3	2	2								
CO5	3	3	2	2								
CO6	3	3	2	2								

UNIT I

Unit-1: Complex Variable – Differentiation & Integration

Complex function , Real and Imaginary parts of Complex function, Limit, Continuity and Derivative of complex function, Cauchy-Riemann equations, Analytic function, entire function, singular point, conjugate function, Harmonic functions, Milne-Thomson method.

Line integral of a complex function, Cauchy's theorem(only statement) , Cauchy's Integral Formula

UNIT II

Unit-2: Complex Variable- Series expansion, Residue Theorem & Evaluation of Real

Integrals

Absolutely convergent and uniformly convergent of series of complex terms, Radius of convergence, Taylor's series, Maclaurin's series expansion, Laurent's series.

Zeros of an analytic function, Singularity, Isolated singularity, Removable singularity, Essential singularity, pole of order m, simple pole, Residues, Residue theorem, Calculation of residues, Residue at a pole of order m, Evaluation of real definite integrals: Integration around the unit circle, Integration around semi circle.

UNIT III

Unit-3: Fourier Series and Transforms

Introduction, Eulers formula, conditions for Fourier expansion, Functions having points of discontinuity, change of interval, Odd and Even function-expansions, Half-range series.

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

UNIT IV

Unit-4: Z-Transforms .

Definition of Z-transform, elementary properties, linearity property, damping rule, shifting u_n to the right and left, multiplication by n, initial value theorem, final value theorem, Inverse Z-transform, convolution theorem, formation of difference equations, solution of difference equations using Z-transforms.

TEXT BOOKS:

1.B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 43/e, 2010.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9/e, John Wiley & Sons, 2006.

REFERENCE BOOKS:

1. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7/e, Mc-Graw Hill, 2004.
2.N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, 2008.

E-RESOURCES:

1.**www.nptel**videos.com/mathematics/ (Math Lectures from MIT,Stanford,IIT'S)
2.nptel.ac.in/courses/122104017
3.nptel.ac.in/courses/111105035

18A2103302- THERMAL AND HYDRO PRIMEMOVERS

Lecture – Tutorial:	1 – 2	Internal Marks:	40
Credits:	3	External Marks:	60

Course Objectives:

- To learn the working of Thermal and hydraulic prime movers.
- To understand the engine terminology and working principles of I.C Engines and Gas Turbines.
- To learn main features of Rankine cycle and its performance improvement methods and impulse, reaction turbines.
- To learn the properties of fluids and its measuring devices.
- To know the working of different types of pumps.
- To learn the basics of turbo machinery.

Course Outcomes:

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

CO1	Understanding the working of various internal combustion engine components and their working.
CO2	Describe the components and functioning of gas turbines.
CO3	Analyze the performance of steam turbines and gas turbines using principles of thermodynamics.
CO4	Understand the basic fundamentals of fluid mechanics
CO5	Analyze different types of working pumps.
CO6	Design& formulate the working parameters of Hydraulic machines.

Contribution of Course Outcomes towards achievement of Program Outcomes (1– Low, 2- Medium, 3 – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO H	PO i	PO j	PO k	PO l
CO1	2	1	1	1		1	1					1
CO2	1	1	1	1		1	1					1
CO3	2	1	1	1		1	1					1
CO4	2	1	1	1		1						1
CO5	1	1	1	1		1						1
CO6	2	1	2	1		1	1					1

UNIT I

INTERNAL COMBUSTION ENGINES: Classification, Working Principles of Spark Ignition and Compression Ignition Engines – 4 Stroke and 2 Stroke Engines, – Valve and Port Timing diagrams– Parameters of Performance ,Engine Performance Evaluation.

GAS TURBINES: Introduction, Classification of Gas Turbines, Simple Gas Turbine Plant-Ideal Cycle, Closed Cycle -Open Cycle - Efficiency, Work Ratio and Optimum Pressure Ratio For Simple Gas Turbine Cycle and Basic Problems. Actual Cycle, Analysis Of Simple Cycles & Cycles With Inter Cooling, Reheating and Regeneration.

UNIT II

VAPOR POWER CYCLES: Properties of Steam And Use of Steam Tables- T-S and H-S Diagrams. Carnot Cycle- Rankine Cycle- Thermodynamic Variables Effecting Efficiency and Output of Rankine Cycle-. Analysis of Simple Rankine Cycle.

STEAM TURBINES: Introduction, Schematic Layout of Steam Power Plant - Classification of Steam Turbines- Impulse Turbine and Reaction Turbine- Compounding in Turbines- Velocity Diagrams For Simple Impulse and Reaction Turbines- Work Done & Efficiency.

UNIT III

FUNDAMENTALS OF FLUID MECHANICS: Introduction- Properties of Fluids - Pressure, Density, Specific Weight, Specific Gravity, Viscosity-Types of Fluid Flows.

IMPACT OF JETS AND PUMPS: Impulse Momentum Equation, Impact of Jet on Stationary and Moving Vanes (Flat). **PUMPS:** Types of Pumps, Centrifugal Pumps: Main Components, Working Principle, Multi Stage Pumps, Performance and Characteristic Curves.

UNIT IV

HYDRAULIC TURBINES: Classification of Turbines; Working Principle, Work done Efficiencies of Pelton Wheel, Francis and Kaplan Turbines; Governing of Pelton Wheel Characteristic Curves of Hydraulic Turbine.

HYDRO POWER: Components of Hydro Electric Power Plant: Pumped Storage Systems, Estimation of Water Power Potential.

TEXT BOOKS:

1. Thermal Engineering by Rajput, Lakshmi publications
2. Thermal engineering by M.L.Mathur and F.S.Mehta, Jain Brothers.
3. "Hydraulics & Fluid Mechanics", P.N. Modi and S.M. Seth, TEXT BOOKS House, Delhi
4. "Fluid Mechanics & Hydraulic Machinery" A.K.Jain, , Khanna Publishers, Delhi.

REFERENCE BOOKS:

1. R.K.Bansal, —Fluid Mechanics and Hydraulic Machines||,laxmi publications.
2. Mahesh M. Rathode, Thermal Engineering, Tata McGraw-Hill, 5th Edition 2010.
3. "Fluid Mechanics & Its Applications", Vijay Gupta, Santhosh.k.Gupta
4. "Fluid Mechanics & Fluid power Engineering, Dr D.S.Kumar

E-RESOURCES:

1. http://nptel.iitm.ac.in/video.php?subjectId=108102042

18A2104301- BASIC ELECTRONIC DEVICES AND CIRCUITS

Lecture – Tutorial:	1 – 2	Internal Marks:	40
Credits:	3	External Marks:	60

Course Objectives:

- The basic concepts of semiconductor physics are to be reviewed
- Study the physical phenomena such as conduction, transport mechanism electrical Characteristics of different diodes.
- The applications of diode as rectifiers with their operation and characteristics with and without filters.
- The principle of working and operation of bipolar junction transistors and field effect transistors and their characteristics are explained

Course Outcomes:

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

CO1	Understand the basic concepts of semiconductor physics
CO2	Understand the formation of p-n junction and how it can be used as diode in different modes of operation
CO3	Know the construction ,working principles of rectifiers
CO4	Understands the working principles of rectifiers with and without filters
CO5	Understand the construction, principle of operation of BJT and their V-I characteristics.
CO6	Understand the construction, principle of operation of FET and their V-I characteristics.

Contribution of Course Outcomes towards achievement of Program Outcomes (1– Low, 2- Medium, 3 – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO H	PO i	PO j	PO k	PO l
CO1	✓	✓	✓									
CO2		✓	✓		✓							
CO3	✓	✓			✓							
CO4		✓	✓	✓	✓							
CO5	✓	✓		✓	✓							
CO6	✓	✓	✓									

UNIT I

SEMICONDUCTOR PHYSICS:

Classification of materials using energy band diagrams, mobility and conductivity, intrinsic semi conductors, extrinsic semi conductors, drift and diffusion, Hall effect, continuity equation, Fermi level in intrinsic and extrinsic semiconductors

PN JUNCTION DIODE:

P-N junction diode, biasing in PN junction Diode, V-I Characteristics, temperature dependence on V-I characteristics, Diode resistance

UNIT II

SPECIAL SEMICONDUCTOR DIODES:

Zener Diode, Zener breakdown and Avalanche breakdown mechanisms, LED, Photo diode, Tunnel Diode, Varactor diode, SCR, UJT.

UNIT III

RECTIFIERS:

Basic Rectifier setup, half wave rectifier, full wave rectifier, bridge rectifier, Analysis of rectifiers, comparison of rectifiers

FILTERS:

Inductor filter, Capacitor filter, L- section filter, Π- section filter, Multiple L- section and Multiple Π section filter , comparison of various filter circuits in terms of ripple factors.

UNIT IV

BIPOLAR JUNTCION TRANSISTOR:

Junction transistor, transistor current components, transistor as an amplifier, characteristics of transistor in Common Base, Common Emitter and Common Collector configurations, punch through/ reach through, Photo transistor.

FIELD EFFECT TRANSISTOR:

FET types, construction, operation, characteristics, parameters, MOSFET-types, construction, operation, characteristics, comparison between JFET and MOSFET.

TEXT BOOKS:

1) Jacob Millman, Christos C.HalkiasAnd SatyabrataJit, Electronic Devices And Circuits, McGraw Hill, 3rdEdition , 2010.
2) S. Salivahanan, N. Kumar And A. Vallavaraj, Electronic Devices And Circuits, McGraw Hill, 2rd Edition , 2007.

REFERENCE BOOKS:

1) R.L.BoylestadAndLouis Nashelsky, Electronic Devices And Circuits, Pearson/Prentice Hall Publishers.
2) David A.Bell, Electronic Devices And Circuits, Oxford University Press, 5th Edition, 2008.
3) Micro Electronic Circuits, Sedra Smith, Oxford Press, India(5/E), Oxford, 2004
4) Electronic Devices And Circuits- K.SatyaPrasad , VgsBooklinks

E-RESOURCES:

1. http://nptel.iitm.ac.in/video.php?subjectId=108102042
2. http://freevideolectures.com/Course/2350/Networks-Signals-and-Systems/33

18A2102401- ELECTRICAL CIRCUIT ANALYSIS-II

Lecture – Tutorial:	3-1 Hours	**Internal Marks:**	40
Credits:	3	**External Marks:**	60
Prerequisites:			
None			

Course Objectives:

- To study the concepts of balanced three-phase circuits.
- To analyze 3-phase circuits with unbalanced loading.
- To determine the transient response of R-L, R-C, R-L-C Series circuits with ac and dc excitation
- To determine the solution using differential equations and Laplace transforms
- To calculate the parameters for a given two port network.

Course Outcomes:

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

CO1	Understand the basic concepts of three phase electrical circuits
CO2	Measure the power in balanced three phase circuits.
CO3	Understand the basic concepts of three phase electrical circuits
CO4	Measure the power in Unbalanced three phase circuits.
CO5	Determine the transient response of R-L, R-C, R-L-C Series circuits with ac and dc excitation
CO6	Calculate the parameters for a given two port network

Contribution of Course Outcomes towards achievement of Program Outcomes (1– Low, 2- Medium, 3 – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1	3	2	2									
CO2	2	2										
CO3	3	3	2									
CO4	2	3										
CO5	3	2										
CO6	3	2										

UNIT I

Balanced Three Phase Circuits :

Generation of 3-phase alternating emf, Phase sequence, star and delta connection, Relation between line and phase voltages and currents in balanced systems, Analysis of balanced three phase circuits, Measurement of Active and Reactive power in balanced three phase systems, Two Wattmeter method of measurement of three phase power.

UNIT II

Unbalanced Three Phase Circuits:

Analysis of Three phase unbalanced circuits-Loop Method-Application of Millman's Theorem-

Star Delta transformation Technique-Measurement of Active and Reactive power in unbalanced three phase systems.

UNIT III

Transient Analysis for DC Excitation:
Transient response of R-L, R-C, R-L-C series circuits for DC Excitation, initial conditions-solution method using differential equation and Laplace transforms.

Transient Analysis for AC Excitation :
Transient response of R-L, R-C, R-L-C series circuits for sinusoidal Excitation, initial conditions-solution method using differential equation and Laplace transforms.

UNIT IV

Two Port Networks :
Two port network parameters-Z,Y,ABCD and hybrid parameters and their relations, connection of Two Port Networks-series, parallel and cascaded connections.

TEXT BOOKS:

1. Engineering Circuit Analysis, William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 6th edition.
2. Circuits & Networks by A. Sudhakar and Shyammohan S Palli, Tata McGraw- Hill
3. Electric Circuits by N.Sreenivasulu, REEM Publications Pvt. Ltd., 201
4. Network Analysis 3rd Edition, M.E Van Valkenberg, PHI.

REFERENCE BOOKS:

1. Circuit Theory by A.Chakrabarti Danapat Rai & Co publisher.
2. Network Analysis by N.C.Jagan, C.Lakshmi Narayana BS publications 2nd edition

3000 Solved Problems in Electrical Circuit by Schaum's solved problem series Tata McGraw-Hill.

E-RESOURCES:

1. http://nptel.ac.in/courses.php
2. http://jntuk-coeerd.in/
3. https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/

18A2102402- ELECTRICAL MACHINES - I

Lecture – Tutorial:	3 – 1	Internal Marks:	40
Credits:	3	External Marks:	60

Prerequisites:

None

Course Objectives:

- To teach principles of magnetic circuits and electromechanical energy conversion
- To make students to learn construction and operation of dc machines
- To train students to conduct tests on dc machines to determine performance by direct and indirect methods
- To train students to find the performance of transformers from the results of practical tests

Course Outcomes:

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

CO1	Analyze the basic operation of DC generators, their armature reaction.
CO2	Analyze the conditions required for analyzing the performance of dc generators
CO3	Analyze the operation of dc motors & the necessity of starters.
CO4	Determine the performance of testing of dc motors.
CO5	Determine the voltage regulation and efficiency of single phase transformer from test results
CO6	Determine the operation of a poly phase transformers and their parallel operation.

Contribution of Course Outcomes towards achievement of Program Outcomes (1– Low, 2- Medium, 3 – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1	3	2										
CO2	2	3										
CO3	3	3										
CO4	2	3										
CO5	3	3										
CO6	3	3										

UNIT I

DC Generators :

Constructional details of dc machine, armature windings and its types, Emf equation, armature reaction, effect of brush lead, demagnetizing and cross magnetizing ampere turns, compensating windings, commutation, EMF induced in a coil undergoing commutation, time of commutation, methods of improving commutation, OCC and load characteristics of different types of generators, Parallel operation of DC shunt and series Generators, equalizing connections

UNIT II

DC Motors

Force on current carrying conductor-Torque and power developed by armature, speed control of dc motors, starting of dc motors, constructional details of 3-point and 4-point starters, load characteristics of dc motors, Losses in dc machine, condition for maximum efficiency

Testing of dc machines: Swinburne's Test, Brake Test, Hopkinson's Test, Field's Test, Retardation Test, Separation of iron and frictional losses

UNIT III

Transformers

Principle, construction and operation of single-phase transformer, phasor diagram, equivalent circuit, voltage regulation, losses and efficiency Testing-open circuit and short ciruit tests, polarity test, back-to-back test, separation of hysteresis and eddy current losses

UNIT IV

Parallel Operation of Transformers: Parallel operation of single-phase transformers, Auto transformers-construction, principle, applications and comparison withtwo winding transformer.

Three-phase transformer-construction, types of connection and their comparative features, Phase conversion-Scott connection, three-phase to six-phase conversion.

TEXT BOOKS:

I. J. Nagrath and D. P. Kothari, "Electric Machines", McGraw Hill Education, 2010.

REFERENCE BOOKS:

1. A. E. Fitzgerald and C. Kingsley, "Electric Machinery", New York, McGraw Hill Education, 2013.
2. A. E. Clayton and N. N. Hancock, "Performance and design of DC machines", CBS Publishers, 2004.
3. M. G. Say, "Performance and design of AC machines", CBS Publishers, 2002.
4. P. S. Bimbhra, "Electrical Machinery", Khanna Publishers, 2011.

E-RESOURCES:

1. http://nptel.ac.in/courses.php
2. http://jntuk-coeerd.in/
3. https://ocw.mit.edu/courses/electrical-engineering- /

18A2103391-THERMAL AND HYDRO LAB

Lecture – Tutorial:	3-0	Internal Marks:	40
Credits:	1.5	External Marks:	60

List of experiments

Minimum Of 12 Experiments By Conducting A Minimum Of Six From Each Section.

SECTION: A - THERMAL ENGINEERING LAB

1. I.C. Engines Valve & Port Timing Diagrams.
2. Performance Test on single cylinder 4 -Stroke Diesel Engine.
3. I.C. Engines performance test on 2-stroke petrol engine.
4. Evaluation of engine friction by conducting Morse test on 4-stroke multi cylinder petrol engine
5. Heat Balance of 4 stroke single cylinder diesel engine.
6. Economical speed test of an IC engine
7. Study of boilers

SECTION: B – HYDRAULIC MACHINES LAB

1. Impact of jets on Vanes.
2. Performance Test on Pelton Wheel.
3. Performance Test on Francis Turbine.
4. Performance Test on Kaplan Turbine.
5. Performance Test on Single Stage Centrifugal Pump.
6. Performance Test on Reciprocating Pump.
7. Calibration of Venturimeter.
8. Calibration of Orifice meter.

18A2104391 -BASIC ELECTRONIC DEVICES AND CIRCUITS LAB

Lecture – Tutorial:	3-0	Internal Marks:	40
Credits:	1.5	External Marks:	60

List of experiments

Note: The students are required to perform the experiment to obtain the V-I characteristics and to determine the relevant parameters from the obtained graphs.

Electronic Workshop Practice:

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Coils, Gang Condensers, Relays, Bread Boards.
2. Identification, Specifications and Testing of active devices, Diodes, BJTs, JFETs, LEDs, LCDs, SCR, UJT.
3. Study and operation of Ammeters, Voltmeters, Analog and Digital Multimeter, Function Generator, Regulated Power Supply and CRO.

List of Experiments: (Minimum of Ten Experiments has to be performed)

1. P-N Junction Diode Characteristics
   - Part A: Germanium Diode (Forward bias& Reverse bias)
   - Part B: Silicon Diode (Forward Bias only)
2. Zener Diode Characteristics
   - Part A: V-I Characteristics
   - Part B: Zener Diode as Voltage Regulator
3. Half-wave Rectifier (without and with c-filter)
4. Full-wave Rectifier (without and with c-filter)
5. BJT Characteristics(CB Configuration)
   - Part A: Input Characteristics
   - Part B: Output Characteristics
6. BJT Characteristics(CE Configuration)
   - Part A: Input Characteristics
   - Part B: Output Characteristics
7. BJT Characteristics(CC Configuration)
   - Part A: Input Characteristics
   - Part B: Output Characteristics
8. FET Characteristics(CS Configuration)
   - Part A: Drain Characteristics
   - Part B: Transfer Characteristics
9. SCR Characteristics
10. UJT Characteristics
11. Transistor Biasing
12. CRO Operation and its Measurements

Equipment required:

1. Regulated Power supplies
2. Analog/Digital Storage Oscilloscopes
3. Analog/Digital Function Generators
4. Digital Multimeters
5. Decade Resistance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Ammeters (Analog or Digital)
8. Voltmeters (Analog or Digital)
9. Active & Passive Electronic Components

18A2102491- ELECTRICAL CIRCUITS LAB

Lecture – Tutorial:	3-0	**Internal Marks:**	40
Credits:	1.5	**External Marks:**	60

List of experiments

1. Verification of Superposition & Reciprocity Theorems.
2. Verification of Thevenin's and Norton's Theorems.
3. Verification of Maximum Power Transfer Theorem.
4. Verification of Compensation & Millman's Theorems.
5. Z and Y Parameters.
6. Transmission and hybrid parameters.
7. Verification of KCL & KVL.
8. Determination of Self, Mutual Inductances and Coefficient of coupling.
9. Measurement of Active Power for Star connected balanced loads
10. Measurement of Reactive Power for Star connected balanced loads.

The following experiments are to be conducted beyond the syllabus:

11. Measurement of Power Factor by using PF Meter.
12. Dielectric Oil Testing using HT Testing kit.

18A2200101- MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Lecture – Tutorial:	3 – 1	Internal Marks:	40
Credits:	3	External Marks:	60

Course Objectives:

- To enhance the knowledge of the students regarding importance of management and Managerial problems with optimum solutions and demand forecasting methods.
- To develop the concepts viz., consumer behavior and demand concept.
- To provide the knowledge regarding production and cost and break even analysis.
- To share the concepts like market structures and business organization.
- To provide awareness regarding capital budgeting decisions & give an idea of practicing technique of ratio analysis.
- To introduce the concepts- Financial Accounting.

Course Outcomes:

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

CO1	Use the theory of managerial economics, demand, production analysis and forecasting theories.
CO2	Analyse of production markets and pricing strategies. Functions and cost-price functions to manage markets & break-even point.
CO3	Develop ability to identify, formulate and solve engineering problem by applying the knowledge of managerial economics.
CO4	Theorize about characteristics features and types of industrial organization, concept of changing business environment in post-liberalization scenario.
CO5	Enhance their capabilities in the interpretation of b/s that are followed in industries, organizational and industries.
CO6	Apply financial analysis, capital budgeting techniques in evaluating various investment opportunities.

Contribution of Course Outcomes towards achievement of Program Outcomes (1– Low, 2- Medium, 3 – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1	1											
CO2		1										
CO3	2	2	1									
CO4			1				1					
CO5	1		1			2						
CO6	1				1						1	

UNIT I

Introduction to Managerial Economics and Demand Analysis

Nature and scope of managerial economics & its relationship with other subjects concept of demand, Determinants of demand-law of demand &its limitations Elasticity of demand Types of measurements-Demand forecasting and methods.

UNIT II

Cost Analysis & Introduction to Markets

Different cost concepts: Opportunity costs, Explicit & Implicit costs, Fixed & Variable costs Average & Marginal, Short run & Long run costs, Break Even Analysis(Simple Problems), market-nature and

types-monopolistic competition and oligopoly.

UNIT III

Types of Business Organization & Business Cycles

Features and Evaluation of sole Trader, Partnership, Joint Stock company & Co-operative Societies. Business Cycles: Meaning & features of Business cycles-Phases & control of Business cycles-concept of money and money supply, Functions of Commercial banks and RBI credit control methods of RBI

UNIT IV

Introduction to Accounting and Financial Analysis

Introduction to Double entry system, Journal, Ledger, Trial balance & Final Accounts

Financial Analysis

Ratio Analysis-Need & significance(Simple Problems) Capital budgeting Meaning & importance-Methods of Capital Budgeting: payback period, ARR(Accounting Rate of Return), NPV(Net Present Value)(Simple Problems)

Text book:

1. Dr. A.R. Aryasri-Managerial Economics and Financial Analysis TMH 2011.
2. Dr. N. Appa Rao, Dr. P. Vijay Kumar: Managerial Economics and Financial Analysis carigage publications, New Delhi-2011.
3. Prof J.V. Prabhakara Rao, Prof. P. Venkat Rao, Managerial Economics and Financial Analysis.

References:

1.V. Maheswari Managerial Economics Sultan Chand. 2014.
2. Dr. B. Kuberudu and Dr. T. V. Ramana:managerial economics and Financial Analysis, Himalaya publishing House, 2014.
3. Suma Damodaran: Managerial Economics, Oxford, 2011.
4. Maheswari:Financial Accounting, Vikas Publications.
5. Shailaja, Gajjala and Usha Munipalle, Universities press, 2015
6. Banking Law and Practise, Gordan and Mithani, Himalaya Publications

E-RESOURCES:

1. http://nptel.ac.in/courses.php
2. http://jntuk-coeerd.in/
3. https://ocw.mit.edu/courses/electrical-engineering- /

18A2202401-ELECTRO MAGNETIC FIELDS

Lecture – Tutorial:	3 – 1	Internal Marks:	40
Credits:	3	External Marks:	60

Course Objectives:

- Understand the laws concerning Static Electric Fields, Equations concerned with static electric fields.
- Explain the behavior and comparison of conductors and dielectrics.
- Understand the laws of magnetic fields, Ampere's law and Maxwell's Equations.
- Calculate the MFI for a current carrying wire.
- Determine the Self and Mutual Inductance of a Solenoid and Toroid.
- Solve the energy stored and energy density in static electric and magnetic fields, Electric Dipole, Dipole Moment.

Course Outcomes:

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

CO1	Understand the concerned laws of Electro Statics.
CO2	Understanding and analyzing the behavior of conductors and dielectrics.
CO3	Understand the concerned laws of Magneto Statics and basic concepts of Magnetic Fields.
CO4	Solve the MFI for a current carrying wire.
CO5	Identify the need of Self and Mutual Inductance.
CO6	Understand the time varying fields.

Contribution of Course Outcomes towards achievement of Program Outcomes (1– Low, 2- Medium, 3 – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1	3	2										
CO2	3	2										
CO3	3	2										
CO4	3	3										
CO5	3	2										
CO6	3	2	2	2								

UNIT I

ELECTROSTATICS -I

Review of vector calculus, Cartesian, cylindrical and spherical co-ordinate systems. Coulomb's law - Electric field due to different charge distributions - Electric flux and flux density - Gauss's Law - Applications of Gauss's Law - Divergence - Maxwell's first Law, Laplace's and Poison's equations - Solution of Laplace's equation in one variable, Electric Dipole - Dipole Moment - Potential and Electric Field due to Dipole - Torque on an Electric Dipole in an Electric field

UNIT II

CONDUCTORS AND DIELECTRICS: Behavior of conductors in an electric field, Current density – conduction and Convection current densities – Ohm's law in point form – Equation of continuity, concept of Polarization, Electric field inside dielectric material, Capacitance - Capacitance of parallel plate – Spherical - Co-axial capacitors with Composite Dielectric.

UNIT III

MAGNETOSTATICS :Static magnetic fields - Biot-Savart's law -Magnetic field intensity (MFI) – MFI due to a straight current carrying filament – MFI due to circular, square and solenoid current – Carrying wire – Relation between magnetic flux, magnetic flux density and MFI – Maxwell's second Equation, div(B)=0. Ampere's circuital law and its applications viz. MFI due to an infinite sheet of current and a long current carrying filament – Point form of Ampere's circuital law – Maxwell's third equation, Curl (H)=Jc.

UNIT IV

INDUCTANCE AND TIME VARYING FIELDS: Self and Mutual inductance – determination of self-inductance of a solenoid and toroid and mutual inductance between a straight long wire and a square loop wire in the same plane – energy stored and density in a magnetic field.

TIME VARYING FIELDS :Time varying fields – Faraday's laws of electromagnetic induction – Its integral and point forms – Maxwell's fourth equation, Curl (E)=-$\partial B/\partial t$ – Simple problems -Modification of Maxwell's equations for time varying fields – Displacement current – Poynting Theorem

Text books:

1. "Engineering Electromagnetics" by William H. Hayt& John. A. Buck Mc. Graw-Hill Companies, 7th Editon.2006.
2. Electro Magnetic Fields and Transmission Lines by G.S.N. Raju

References:

1. "Principles of Electro Magnetics" by Sadiku, Oxford Publications,4th edition
2. "Introduction to Electro Dynamics" by D J Griffiths, Prentice-Hall of India Pvt. Ltd, 2nd edition
3. "Electromagnetic Field Theory" by Yaduvir Singh,Pearson.
4. Fundamentals of Engineering Electromagnetics by Sunil Bhooshan, Oxford higher Education.

E-RESOURCES:

1. http://nptel.ac.in/courses.php
2. http://jntuk-coeerd.in/
3. https://ocw.mit.edu/courses/electrical-engineering- /

18A2202402-CONTROL SYSTEMS

Lecture – Tutorial:	3 – 1	Internal Marks:	40
Credits:	3	External Marks:	60

Course Objectives:
Learn the mathematical modeling of physical systems and to use block diagram algebra and signal flow graph to determine overall transfer function
Study the time response of first and second order systems and improvement of performance by proportional plus derivative and proportional plus integral controllers
Study the stability of closed loop systems using Routh's stability criterion and the analysis by root locus method.
Present the Frequency Response approaches for the analysis of linear time invariant (LTI) systems using Bode plots, polar plots and Nyquist stability criterion.
Learn basic aspects of design of linear control systems using Bode plots.
Study state models & analyze the systems and to present the concepts of Controllability & Observability

Course Outcomes:	
Upon successful completion of the course, the student will be able to:	
CO1	Understand Closed/Open Loop Control Systems, derive the transfer function of physical systems and determine overall transfer function using block diagram algebra & signal flow graph reduction techniques
CO2	Study different types of standard test signals, find the output response of first and second order systems, determine time response specifications of second order systems and determine steady state error along with error constants
CO3	Acquire the skill to analyze absolute and relative stability of LTI systems using Routh-Hurwitz stability criterion and the Root Locus Plot
CO4	Analyze the stability of LTI systems using frequency response methods using Bode plots & Polar Plots.
CO5	Analyze the stability of LTI systems using frequency response methods using Nyquist Plots
CO6	Represent physical systems by State Transition Matrices based state space modeling and determine the output response by understanding the concepts of controllability and observability

Contribution of Course Outcomes towards achievement of Program Outcomes (1– Low, 2- Medium, 3 – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1	3	2										
CO2	3	2										
CO3	2	2										
CO4	3	3		2								
CO5	3	2	2	2								
CO6	2			3								

UNIT I
Introduction to Control Systems Components Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback. Mathematical models – Differential equations, Impulse Response and transfer function. Transfer Function of DC Servo motor - AC Servo motor- Synchro transmitter and Receiver, Block diagram representation of systems considering -Block diagram algebra – Representation by Signal flow graph - Reduction is using Mason's gain formula.
UNIT II
Time Response Analysis Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants, Introduction to P, PI, PD and PID controllers.
UNIT III
Stability Analysis in S-Domain The concept of stability – Routh's stability , limitations ,Routh-Hurwitz criterion – qualitative stability and conditional stability. **Root Locus Technique:** The root locus concept - construction of root loci –effects of adding poles and zeros to G(s) H(s) on the root loci.
UNIT IV
Frequency Response Analysis Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram- Phase margin and Gain margin-Stability Analysis from Bode Plots. Polar Plots- Nyquist Plots- Stability Analysis. **State Space Analysis of Continuous Systems** Concept of state, state variables and state model, derivation of state models from physical systems (Electrical), solving the Time invariant state Equations- State Transition Matrix and its Properties – Concepts of Controllability and Observability.
Text books:
1. Control Systems principles and design, M.Gopal, Tata McGraw Hill education Pvt Ltd., 4th Edition. 2. Automatic control systems, Benjamin C.Kuo, Prentice Hall of India,2nd Edition.
References:
1.Modern Control Engineering, Kotsuhiko Ogata, Prentice Hall of India. 2.Control Systems, ManikDhanesh N, Cengage publications. 3.Control Systems Engineering, I.J.Nagarath and M.Gopal, Newage International Publications, 5th Edition. 4. Control Systems Engineering, S.Palani,TataMcGraw Hill Publications.
E-RESOURCES:
1. http://nptel.ac.in/courses.php 2. http://jntuk-coeerd.in/ 3. https://ocw.mit.edu/courses/electrical-engineering- /

18A2202403-ELECTRICAL MACHINES -II

(AC Machines)

Lecture – Tutorial:	3 – 1	Internal Marks:	40
Credits:	3	External Marks:	60

Course Objectives:

- Understand the principle of operation and performance of induction machines.
- Quantify the starting methods of induction machines
- To understand the torque producing mechanism of a single phase induction motor.
- To understand the construction and principle of synchronous generators.
- To understand the construction and operation of synchronous motor.
- To analyze the performance of synchronous motor.

Course Outcomes:

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

CO1	Understand the constructional details and principle of operation of induction machines
CO2	Understand the starting methods of induction machines
CO3	Understand the operation of constructional features and principle of operation of single phase induction motors.
CO4	Understand the constructional details and principle of operation of synchronous generators.
CO5	Analyze the construction and principle of operation of synchronous motor.
CO6	Analyze the performance of the synchronous motor and its operation

Contribution of Course Outcomes towards achievement of Program Outcomes (1– Low, 2- Medium, 3 – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1	1	3	3		3		3					
CO2	2	3			3		3					
CO3	2	3	3		3		3					
CO4	1	3	3		3		3					
CO5	2	3					3					
CO6	2	3	3		3							

UNIT I

Induction Machines

Construction, principle of operation, Types (squirrel cage and slip-ring), Torque Slip Characteristics, Starting and Maximum Torque. Equivalent circuit. Phasor Diagram, Losses and Efficiency. Effect of parameter variation on torque speed characteristics (variation of rotor and stator resistances, stator voltage, frequency).

UNIT II

Starting methods of Induction machines

Methods of starting, braking and speed control for induction motors. Generator operation. Self-excitation. Doubly-Fed Induction Machines.

Single-phase induction motors

Constructional features, double revolving field theory, cross field theory, equivalent circuit,

determination of parameters. Split-phase starting methods and applications

UNIT III

Synchronous generators

Constructional features, principle of operation, types (Salient &Non-salient) synchronous machine – generated EMF, Effects of Harmonics of generated EMF-phasor diagram, armature reaction, synchronous impedance, voltage regulation. Salient pole machine – two reaction theory, analysis of phasor diagram, power angle characteristics. Parallel operation of alternators – synchronization

UNIT IV

Synchronous motors Principle of operation, methods of starting , Phasor diagram of synchronous motor, variation of current and power factor with excitation , Predetermination of V and inverted V curves, Hunting and use of damper bars, Synchronous condenser and power factor correction, Excitation and power circles.

Text books:

1. I.J.Nagrath and D.P. Kothari, — Electric Machines||, Tata McGrawHill Education Private Limited Publishing Company Ltd, 4th Edition, 2010.
2. AshfaqHusain, ||Electric Machines", Dhanpat Rai & Co.(Pvt.) Ltd, 2nd Edition, 2009

References:

1. Dr.P.S.Bhimbra, —Electrical Machinery", Khanna Publications, 7th Edition, 2007.
2. A.E Fitzgerald and Charles Kinsley, _Electric Machinery', Tata McGraw- Hill Education Publications, 6th Edition, 2002.
3. Alexander S.Langsdorf, —Theory of Alternating- Current Machinery" Tata McGraw- Hill Publications, 2001.
4. J.B Gupta, —Theory & Performance of Electrical Machines", S.K.Kataria & Sons, 15th Edition,2015

E-RESOURCES:

1. http://nptel.ac.in/courses/108105017
2. http://jntuk-coeerd.in/
3. https://ocw.mit.edu/courses/electrical-engineering- /

18A2202404-POWER SYSTEMS-I

Lecture – Tutorial:	3 – 1	Internal Marks:	40
Credits:	3	External Marks:	60

Course Objectives:
Study the principle of operation and different components of a thermal power stations.
Study the principle of operation and different components of a Nuclear power stations.
Study the principle of operation and different components of hydel power stations and their classification.
Study the principle of operation and different components of gas power stations.
Study the constructional and operation of different components of substations and their classification.
Learn different types of load curves and tariffs applicable to consumers.

Course Outcomes:	
Upon successful completion of the course, the student will be able to:	
CO1	Identify the different components of thermal power plants and principle of operation.
CO2	Identify the different components of nuclear Power plants and their principle of operation.
CO3	Identify the different components of hydel power plants and their classification and principle of operation
CO4	Identify the components of gas power station and their principle of operation.
CO5	Identify different components of substation and their classification.
CO6	Calculate the different tariffs applicable to consumers.

Contribution of Course Outcomes towards achievement of Program Outcomes (1– Low, 2- Medium, 3 – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1	3		3			2						
CO2	3		3			2						
CO3	3		1			2						
CO4	3		1			2						
CO5	2		2			1						
CO6	3	2				1						

UNIT I

Thermal Power Stations

Single line diagram of Thermal Power Station showing paths of coal, steam, water, air, ash and flue gasses-Brief description of TPS components: Economizers, Boilers, super heaters, Turbines, condensers, chimney and cooling towers

Nuclear Power Stations:

Working principle, Nuclear fuels. Nuclear reactor Components: Moderators, Control rods, Reflectors and Coolants. Types of Nuclear reactors and brief description of PWR, BWR and FBR. Radiation: Radiation hazards and Shielding

UNIT II

Hydel and Gas Power Stations

Selection of site, block diagram approach of hydro electric power plant and classification of hydro electric power plants. Gas power stations: principle of operation and components (block diagram approach only)

UNIT III

Substations

Classification of substations, Indoor & Outdoor substations, Substations layout showing the location of all the substation equipment- Bus bar arrangements in the Sub-Stations and their classification. Advantages of Gas insulated substations.

UNIT IV

Economic Aspects of Power Generation:

Load curve, load duration and integrated load duration curves, Discussion on economic aspects: connected load, maximum demand, demand factor, load factor, diversity factor, plant capacity factor, utilization factor, plant use factors- Numerical Problems. Costs of Generation and their division into Fixed, Semi-fixed and Running Costs.

Tariff Methods

Desirable Characteristics of a Tariff Method. Tariff Methods: Simple rate, Flat 0Rate, Block-Rate, two-part, three –part, and power factor tariff methods.

Text book:

1. A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta, U.S.Bhatnagarand A. Chakrabarti, DhanpatRai& Co. Pvt. Ltd.
2. Generation, Distribution and Utilization of Electric Energy by C.L.Wadhawa New age International (P) Limited, Publishers.

References:

1.Electrical Power Distribution Systems by - V. Kamaraju, TataMcGraw Hill, New Delhi.
2. Elements of Electrical Power Station Design by – M V Deshpande, PHI, New Delhi.

E-RESOURCES:

1. http://nptel.ac.in/courses.php
2. http://jntuk-coeerd.in/
3. https://ocw.mit.edu/courses/electrical-engineering- /

OPEN ELECTIVE-I

18A2202602-CONTROL SYSTEMS

Lecture - Tutorial:	3 – 0	Internal Marks:	40
Credits:	3	External Marks:	60

Course Objectives:
Learn the mathematical modeling of physical systems and to use block diagram algebra and signal flow graph to determine overall transfer function
Study the time response of first and second order systems and improvement of performance by proportional plus derivative and proportional plus integral controllers
Study the stability of closed loop systems using Routh's stability criterion and the analysis by root locus method.
Present the Frequency Response approaches for the analysis of linear time invariant (LTI) systems using Bode plots, polar plots and Nyquist stability criterion.
Learn basic aspects of design of linear control systems using Bode plots.
Study state models & analyze the systems and to present the concepts of Controllability & Observability

Course Outcomes:	
Upon successful completion of the course, the student will be able to:	
CO1	Understand Closed/Open Loop Control Systems, derive the transfer function of physical systems and determine overall transfer function using block diagram algebra & signal flow graph reduction techniques
CO2	Study different types of standard test signals, find the output response of first and second order systems, determine time response specifications of second order systems and determine steady state error along with error constants
CO3	Acquire the skill to analyze absolute and relative stability of LTI systems using Routh-Hurwitz stability criterion and the Root Locus Plot
CO4	Analyze the stability of LTI systems using frequency response methods using Bode plots & Polar Plots.
CO5	Analyze the stability of LTI systems using frequency response methods using Nyquist Plots
CO6	Represent physical systems by State Transition Matrices based state space modeling and determine the output response by understanding the concepts of controllability and observability

Contribution of Course Outcomes towards achievement of Program Outcomes (1- Low, 2- Medium, 3 - High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1	3	2										
CO2	3	2										
CO3	2	2										
CO4	3	3		2								
CO5	3	2	2	2								
CO6	2			3								

UNIT I

Introduction to Control Systems Components

Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback. Mathematical models – Differential equations, Impulse Response and transfer function.

Transfer Function of DC Servo motor - AC Servo motor- Synchro transmitter and Receiver, Block diagram representation of systems considering -Block diagram algebra – Representation by Signal flow graph - Reduction is using Mason's gain formula.

UNIT II

Time Response Analysis

Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants, Introduction to P, PI, PD and PID controllers.

UNIT III

Stability Analysis in S-Domain

The concept of stability – Routh's stability , limitations ,Routh-Hurwitz criterion – qualitative stability and conditional stability.

Root Locus Technique: The root locus concept - construction of root loci –effects of adding poles and zeros to G(s) H(s) on the root loci.

UNIT IV

Frequency Response Analysis

Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram- Phase margin and Gain margin-Stability Analysis from Bode Plots. Polar Plots- Nyquist Plots- Stability Analysis.

State Space Analysis of Continuous Systems

Concept of state, state variables and state model, derivation of state models from physical systems (Electrical), solving the Time invariant state Equations- State Transition Matrix and its Properties – Concepts of Controllability and Observability.

Text books:

1. Control Systems principles and design, M.Gopal, Tata McGraw Hill education Pvt Ltd., 4th Edition.
2. Automatic control systems, Benjamin C.Kuo, Prentice Hall of India,2nd Edition.

References:

1.Modern Control Engineering, Kotsuhiko Ogata, Prentice Hall of India.
2.Control Systems, ManikDhanesh N, Cengage publications.
3.Control Systems Engineering, I.J.Nagarath and M.Gopal, Newage International Publications, 5th Edition.
4. Control Systems Engineering, S.Palani,TataMcGraw Hill Publications.

E-RESOURCES:

1. http://nptel.ac.in/courses.php
2. http://jntuk-coeerd.in/
3. https://ocw.mit.edu/courses/electrical-engineering- /

18A2202491- ELECTRICAL MACHINES-I LAB

Lecture – Tutorial:	3-0	**Internal Marks:**	40
Credits:	1.5	**External Marks:**	60

LIST OF EXPERIMENTS

The following experiments are to be conducted as compulsory:

1. Swinburne's test and Predetermination of efficiencies as Generator and Motor.
2. Brake test on DC shunt motor. Determination of performance curves.
3. Speed control of DC shunt motor by Field and armature Control.
4. Magnetization characteristics of DC shunt generator. Determination of critical field resistance and critical speed.
5. Hopkinson's test on DC shunt machines. Predetermination of efficiency.
6. OC & SC Tests on Single Phase Transformer.
7. Sumpner's Test on a pair of Single Phase Transformers.
8. Scott Connection of Transformers.
9. Parallel Operation of Single Phase Transformers.
10. Separation of core losses of a Single Phase Transformer.

The following experiments are to be conducted beyond the syllabus:

11. Separation of losses in DC Shunt Motor.
12. Load test on DC Series motor.

18A2202492-CONTROL SYSTEMS LAB

Lecture – Tutorial:	3-0	**Internal Marks:**	40
Credits:	1.5	**External Marks:**	60

LIST OF EXPERIMENTS

Any 10 of the following experiments are to be conducted:

1. Time response of Second order system

2. Characteristics of Synchros

3. Programmable logic controller – characteristics of stepper motor

4. Effect of feedback on DC servo motor

5. Effect of P, PD, PI, PID Controller on a second order systems

6. Lag and lead compensation – Magnitude and phase plot

7. DC position control system

8. Transfer function of DC motor

9. Temperature controller using PID

10. Characteristics of magnetic amplifiers

11. Characteristics of AC servo motor

12. Characteristics of DC servo motor

13. Potentiometer as an error detector

18A2200801- PROFESSIONAL ETHICS AND HUMAN VALUES

Lecture – Tutorial:	2 – 0	Internal Marks:	40
Credits:	0	External Marks:	60

Course Objectives:

- To create awareness on engineering ethics and human values.
- To understand social responsibility of an engineer.
- To instill moral and social values and loyalty.

Course Outcomes:

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

CO1	Grooms themselves as ethical, responsible and societal beings.
CO2	Discuss ethics in society and apply the ethical issues related to engineering.
CO3	Exhibit the understanding of ethical theories in professional environment.
CO4	Recognize their role as social experimenters (engineers) and comprehend codes of ethics.
CO5	Identify the risks likely to come across in the professional world, analyzing them and find solutions.
CO6	Realize the responsibilities and rights of engineers in the society.

Contribution of Course Outcomes towards achievement of Program Outcomes (1- Low, 2- Medium, 3 – High)

	PO a	PO b	PO c	PO d	PO e	PO f	PO g	PO h	PO i	PO j	PO k	PO l
CO1						1	1	2				1
CO2						1	1	2				1
CO3						1	1	2				1
CO4						1	1	2				1
CO5						1	1	2				1
CO6						1	1	2				1

UNIT I

Human Values: Objectives, Morals, Values, Ethics, Integrity, Work ethics, Service learning , Virtues, Respect for others, Living peacefully, Caring, Sharing, Honesty, Courage, Valuing time,Cooperation, Commitment, Empathy, Self-confidence, Challenges in the work place.

UNIT II

Engineering ethics :Senses of 'Engineering Ethics' – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Models of professional roles – Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories.

UNIT III

Engineering as Social Experimentation: Engineering as experimentation, Engineers as responsible experimenters, Codes of ethics, Industrial standards, A balanced outlook on law,

Case study: The challenger.

UNIT IV

Safety, Responsibilities and Rights: Safety and risk, types of risks, Assessment of safety and risk, Safe exit, Risk-benefit analysis, safety lessons from 'the challenger' , Case study: Power plants, Collegiality and loyalty, Collective bargaining, Confidentiality, Conflict of interests, Occupational crime, whistle blowing, Intellectual property rights, professional rights.

Text books:

- A Text book on Professional Ethics and Human Values by R.S Naagarazan- New Age International Publishers.
- " Engineering Ethics includes Human Values" by M. Govindarajan, S. Natarajan and V. S. Senthil Kumar- PHI Learning Pvt. Ltd-2009

References:

"Professional Ethics and Human Values" by A. Alavudeen, R. Kalil Rahman and M. Jayakumaran- Laxmi Publications.

E-RESOURCES:

- www.onlineethics.org
- www.nspe.org
- www.globalethics.org
- www.ethics.org

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DEPARTMENT OF MECHANICAL ENGINEERING

COURSE STRUCTURE FOR SECOND YEAR B.TECH PROGRAMME

II YEAR I SEMESTER

Sl. No	Course Code	Title of the Course	Scheme of Instruction (Periods Per Week)				Scheme of Examination (Maximum Marks)			No. of Credits
			L	T	P	Total	CIA	SEA	Total	
1	18A2100201	Complex Variables and Fourier Series	3	0	0	3	40	60	100	3
2	18A2103301	Material Science and Engineering	3	0	0	3	40	60	100	3
3	18A2103401	Basic Thermodynamics	3	0	0	3	40	60	100	3
4	18A2103402	Mechanics of Materials	3	0	0	3	40	60	100	3
5	18A2103403	Manufacturing Process	3	0	0	3	40	60	100	3
6	18A2102301	Essential of Electrical and Electronic Engineering	3	0	0	3	40	60	100	3
7	18A2103491	Material Testing and Metallurgy Lab	0	0	2	2	40	60	100	1
8	18A2103492	Manufacturing Process Lab	0	0	2	2	40	60	100	1
9	18A2102391	Essential of Electrical and Electronics Engineering Lab	0	0	2	2	40	60	100	1
		Total	**18**	**0**	**06**	**24**	**360**	**540**	**900**	21

II YEAR II SEMESTER

Sl. No	Course Code	Title of the Course	Scheme of Instruction (Periods Per Week)				Scheme of Examination (Maximum Marks)			No. of Credits
			L	T	P	Total	CIA	SEA	Total	
1	18A2200201	Mathematics-IV	3	0	0	3	40	60	100	3
2	18A2203401	Design of Machine Members-I	3	0	0	3	40	60	100	3
	18A2203402	Fluid Mechanics and Hydraulic Machines	3	0	0	3	40	60	100	3
4	18A2203403	Kinematics of Machines	3	0	0	3	40	60	100	3
5	18A2203404	IC Engines and Gas Turbines	3	0	0	3	40	60	100	3
6	18A2203601 18A2203602	**Open Elective –I** i) Basics of Mechanical Engineering ii) Industrial Materials	3	0	0	3	40	60	100	3
7	18A2203301	Computer aided Machine Drawing (Internal)	2	0	3	5	40	60	100	1.5
8	18A2203491	Fluid Mechanics and Hydraulic Machines Lab	0	0	3	3	40	60	100	1
9	18A2203492	Thermal Engineering Lab	0	0	3	3	40	60	100	1
10	18A2200801	Professional Ethics and Human Values	3	0	0	3	40	60	100	0
		Total	**23**	**0**	**9**	**33**	**400**	**600**	**10000**	21.5

L - LECTURE T – TUTORIAL P - PRACTICAL
CIA – Continuous Internal Assessment SEA – Semester End Assessment

Prof. Mechanical Department, NRI Institute of Technology, POTHAVARAPPADU (Vill), Agiripalli (Mdl), Krishna Dist.

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2019 - 2020

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

COURSE STRUCTURE FOR SECOND YEAR B.TECH PROGRAMME

II YEAR I SEMESTER

Sl. No	Course Code	Title of the Course	Scheme of Instruction (Periods Per Week)				Scheme of Examination (Maximum Marks)			No. of Credits
			L	T	P	Total	CIA	SEA	Total	
1	18A2100202	Complex Variables and Transform Techniques	3	-	-	3	40	60	100	3
2	18A2104201	Digital Electronics and Logic Design	3	-	-	3	40	60	100	3
3	18A2102302	Network Analysis and Transmission Lines	3	-	-	3	40	60	100	3
4	18A2104401	Signals and Systems	3	-	-	3	40	60	100	3
5	18A2105601	**Open Elective -I**	3	-	-	3	40	60	100	3
6	18A2100101	Managerial Economics and Financial Analysis	3	-	-	3	40	60	100	3
7	18A2102392	Network Analysis Lab	-	-	2	2	40	60	100	1
8	18A2104392	Basic Simulation lab	-	-	2	2	40	60	100	1
9	18A2104491	Electronic Devices and Circuits Lab	-	-	2	2	40	60	100	1
		Total	**18**	**-**	**6**	**24**	**360**	**540**	**900**	**21**

II YEAR II SEMESTER

Sl. No	Course Code	Title of the Course	Scheme of Instruction (Periods Per Week)				Scheme of Examination (Maximum Marks)			No. of Credits
			L	T	P	Total	CIA	SEA	Total	
1	18A2200202	Probability Theory and Stochastic Process	3	-	-	3	40	60	100	3
2	18A2204301	Electro Magnetic Theory	3	-	-	3	40	60	100	3
	18A2204302	Control Systems	3	-	-	3	40	60	100	3
4	18A2204401	Analog and Pulse Circuits	3	-	-	3	40	60	100	3
5	18A2204402	Analog Communications	3	-	-	3	40	60	100	3
6		**Open Elective –II**	3	-	-	3	40	60	100	3
7	18A2200801	Professional Ethics and Human Values	2	-	-	2	40	60	100	0
8	18A2204491	Analog Communications Lab	-	-	2	2	40	60	100	1
9	18A2204492	Analog and Pulse Circuits lab	-	-	2	2	40	60	100	1
10	18A2204493	Digital Electronics and Logic Design Lab	-	-	2	2	40	60	100	1
		Total	**18**	**-**	**6**	**24**	**360**	**540**	**900**	**21**

L - LECTURE T – TUTORIAL P - PRACTICAL
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NRI Institute of Technology
POTHAVARAPPADU (Vill)
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Pothavarappadu, Agiripalli Mandalam, Krishna Dt., Andhra Pradesh - 521212
URL : www.nrigroupofcolleges.ac.in, Ph : 0866 2469666, Email : principal@nriit.edu.in

DEPARTMENT OF COMUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE FOR SECOND YEAR
B.TECH PROGRAMME

II YEAR I SEMESTER

L - LECTURE T – TUTORIAL P – PRACTICAL CIA – Continuous Internal Assessment SEA – Semester End Assessment

Sl. No	Course Code	Title of the Course	Scheme of Instruction (Periods Per Week)				Scheme of Examination (Maximum Marks)			No. of Credits
			L	T	P/D	Total	CIA	SEA	Total	
1	18A2100202	Discrete Mathematical Structures	3	1	0	4	40	60	100	4
2	18A2105401	Data Structures	3	0	0	3	40	60	100	3
3	18A2105402	Data Base Management Systems	3	0	0	3	40	60	100	3
4	18A2105403	Digital Logic Design	2	0	2*	4	40	60	100	3
5	18A2105493	Internet of Things Lab	0	2	2	4	40	60	100	3
6	18A2105491	Data Structures Lab	0	0	2	2	40	60	100	1
7	18A2105492	Data Base Management System Lab	0	0	2	2	40	60	100	1
8	18A2105494	Python programming Lab	0	1	2	3	40	60	100	2
9	HSS Elective	Humanities elective-1	2	0	0	2	40	60	100	1
10	18A2100802	Professional ethics and Human Values	2	0	0	2	40	60*	100	0
Total			**15**	**4**	**10**					**21**

No External EvaluationList of Humanities Electives

A	Professional Communication Skills(18A2100601)	D	Psychology (18A2100604)
B	Visual Communication(18A2100602)	E	Philosophy (18A2100605)
C	Sanskrit (18A2100603)	F	Foreign Languages (German/French) (18A2100606)

Head, CSE Department
NRI Institute of Technology
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Agiripalli (Mdl.), Krishna Dist.

H.O.D

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B.TECH CSE
II YEAR-I SEMESTER

II YEAR I SEMESTER

L - LECTURE T – TUTORIAL P – PRACTICAL CIA – Continuous Internal Assessment SEA – Semester End Assessment

Sl. No	Course Code	Title of the Course	Scheme of Instruction (Periods Per Week)				Scheme of Examination (Maximum Marks)			No. of Credits
			L	T	P/D	Total	CIA	SEA	Total	
1	18A2100203	Discrete Mathematical Structures	3	1	0	4	40	60	100	4
2	18A2105401	Data Structures	3	0	0	3	40	60	100	3
3	18A2105402	Data Base Management Systems	3	0	0	3	40	60	100	3
4	18A2105403	Digital Logic Design	2	0	2*	4	40	60	100	3
5	18A2105391	Internet of Things Lab	0	2	2	4	40	60	100	3
6	18A2105491	Data Structures Lab	0	0	2	2	40	60	100	1
7	18A2105492	Data Base Management System Lab	0	0	2	2	40	60	100	1
8	18A2105494	Python Programming Lab	0	1	2	3	40	60	100	2
9	HSS Elective	Humanities Elective-1	2	0	0	2	40	60	100	1
10	18A2100801	Professional Ethics and Human Values	2	0	0	2	40	60*	100	0
Total			**15**	**4**	**10**	**29**	**400**	**600**	**1000**	**21**

*** No External Evaluation**

List of Humanities Electives

A	18A2100601	Professional Communication Skills	D	18A2100604	Psychology
B	18A2100602	Visual Communication	E	18A2100605	Philosophy
C	18A2100603	Sanskrit			

II YEAR II SEMESTER

L - LECTURE T – TUTORIAL P – PRACTICAL CIA – Continuous Internal Assessment SEA – Semester End Assessment

Sl. No	Course Code	Title of the Course	Scheme of Instruction (Periods Per Week)				Scheme of Examination (Maximum Marks)			No. of Credits
			L	T	P/D	Total	CIA	SEA	Total	
1	18A2200201	Probability and Statistics	3	1	0	4	40	60	100	4
2	18A2205401	Web Technologies and Advanced Java Programming	3	0	0	3	40	60	100	3
3	18A2205402	Software Engineering	3	0	2	5	40	60	100	4
4	18A2205403	Computer Organization	3	0	0	3	40	60	100	3
5	OE-1	Open Elective-1	3	0	0	3	40	60	100	3
6	18A2205491	Web Technologies and Advanced Java Programming Lab	0	0	3	3	40	60	100	1.5
7	18A2205492	Aptitude and Reasoning	0	0	2	2	40	60*	100	1
8	18A2205901	Mini project	0	0	2	2	40	60*	100	1
Total			**15**	**1**	**9**	**25**	**320**	**480**	**800**	**20.5**

* No External Evaluation

18A2100202- DISCRETE MATHEMATICAL STRUCTURES

Lecture – Tutorial-Practical:	3-1-0	**Internal Marks:**	40
Credits:	4	**External Marks:**	60

Prerequisites:

Course Objectives:

Acquiring the relevance of statements, inferences and predicates in computer science.
Overview of group theory.
Overview of recurrence relations and solving recurrence relations.
Exposure of graphs, their representations, types, trees and tree variants.

Course Outcomes:

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

CO1	Apply the concept of Mathematical Logic in software development process.
CO2	Apply the recurrence relation for analyzing recursive algorithms.
CO3	Student will able to understand the concepts of group theory.
CO4	Apply the concept of group theory in robotics, computer vision & computer graphics.
CO5	Student will able to understand the concepts of graph theory and Trees.
CO6	Use the concepts of graph theory to provide solutions for routing applications in computer networks.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-
CO3	2	2	2	-	-	-	-	-	-	-	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	-
CO5	2	2	2	-	-	-	-	-	-	-	-	
CO6	3	3	3	-	-	-	-	-	-	-	-	

UNIT I :Mathematical logic

Connectives, negation, conjunction, disjunction, conditional and bi-conditional, well formed formulae, tautologies, equivalence of formulae, duality, tautological implications, functionally complete set of connectives, principal disjunctive and conjunctive normal forms, inference calculus, rules of inference, indirect method of proof, conditional proof, automatic theorem proving.

UNIT II: Recurrence relations

Recurrence relations, solving linear recurrence relations by characteristic roots method, system of recurrence relations, non - linear recurrence relations.

UNIT III: Group theory

Groups, subgroups, Lagrange's theorem on finite groups, normal subgroups. group codes

UNIT IV: Graph theory & Trees

Definitions, finite and infinite graphs, incidence and degree, isolated pendant vertices, isomorphism, sub graphs, walk, path and circuit, connected and disconnected graphs, components, Euler graphs, Euler graph theorem, operations on graphs, decomposition of Euler graphs into circuits, arbitrarily traceable Euler graphs, Hamiltonian paths and circuits, number of edge disjoint Hamiltonian circuits in complete graph with odd number of vertices, travelling salesman problem. Some properties of trees, pendant vertices, distance and centers, rooted and binary trees, spanning trees, fundamental circuit, shortest spanning trees, Kruskal's algorithm.

TEXT BOOKS:

1. J.P. Tremblay and R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, 1997. (Modules 1 and 3)
2. Joe L. Mott, Abraham Kandel and T. P. Baker, Discrete Mathematics for computer
3. scientists & Mathematicians, 2/e, Prentice Hall of India Ltd, 2012. (Module 2)
4. Narsingh Deo, Graph Theory with Applications to Engineering and Computer Science, Prentice Hall of India, 2006. (Modules 4 and 5).

REFERENCE BOOKS:

1. Keneth. H. Rosen, Discrete Mathematics and its Applications, 6/e, Tata McGraw-Hill, 2009.
2. Richard Johnsonburg, Discrete mathematics, 7/e, Pearson Education, 2008

E-RESOURCES:

18A2105401- DATA STRUCTURES

Lecture – Tutorial-Practical::	3-0-0	**Internal Marks:**	40
Credits:	3	**External Marks:**	60

Prerequisites:

C- Programming

Course Objectives:

1 To impart basic knowledge of data structures.

2 Be familiar with basic techniques of algorithm analysis

3 Be familiar with writing recursive methods

4 To understand concepts about searching and sorting techniques

5 To design and implementation of various basic and advanced data structures like stacks, queues, lists, trees and graphs.

6 To introduce various techniques for representation of the data in the real world.

To understanding about writing algorithms and step by step approach in solving problems with the help of fundamental data structures

Course Outcomes:

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

CO1	Ability to illustrate the concepts of algorithm apply the learning concepts to design data structure for the given problem definition.
CO2	Ability to design applications using stacks and queues and implements various types of queues
CO3	Analyze and implement operations on linked list and demonstrate their applications
CO4	Ability to analyze and implement operations on trees
CO5	Ability to demonstrate various operations on binary search trees and its applications
CO6	Ability to evaluate the properties and operations on graphs and implement the graph applications

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2-Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	2	2	-	-	-	-	-	-	-	3
CO2	3	2	3	2	-	-	-	-	-	-	-	3
CO3	3	2	3	2	-	-	-	-	-	-	-	3
CO4	3	2	3	2	-	-	-	-	-	-	-	3
CO5	3	2	3	2	-	-	-	-	-	-	-	3
CO6	3	2	3	2	-	-	-	-	-	-	-	3

UNIT I : Data Structures, Recursion, Searching, and Sorting.

Data Structures: Definition, Types of Data Structures, Arrays, structures, self-referential structures, Operations, Algorithm analysis Time Complexity and Space Complexity.

Recursion: Definition, Linear and Binary recursions, Iteration vs. Recursion.

Chairman BOS

Searching: Linear Search, Binary Search.
Sorting: Basic concepts, Divide-and-Conquer approach, Insertion Sort, Merge Sort, Quick Sort, and Heap Sort.

UNIT II: Linked Lists, Stacks, and Queues.

Linked Lists: Introduction, types of Linked Lists, operations, inserting a node in Single Linked List, deleting a node in Single Linked List, searching a node in Single Linked List, inserting, deleting, and searching a node in Double Linked List.
Stacks: Introduction, operations, applications, Stacks implementation using Arrays, Stacks implementation using Linked List, Expression Conversion: Infix to Postfix, Infix to Prefix.
Queues: Introduction, operations, applications, Queues implementation using Arrays, Queues implementation using Linked Lists, Circular Queue. Priority Queues

UNIT III: Trees.

Basic Tree Concepts, Terminology, operations, Tree traversals, **Binary Trees:** definition, properties, Binary Tree representations, operations, **Binary Search Tree:** definition, properties, applications, Inserting, Deleting, and Searching element in Binary Search Tree,
Threaded Binary Tree: definition, properties, Inserting a Node into a Threaded Binary Tree,
Heaps: Definition of a Max Heap, properties.

UNIT IV: Graphs.

Graphs: Introduction, Terminology, Representation of graphs, types of graphs, applications, operations, Graph transversal techniques: Breadth First Search (BFS), Depth First Search (DFS), implementations. **Minimum Spanning Tree (MST):** definition, Prim's algorithm, Kruskal's algorithm, **Shortest paths:** Basic Concepts, Dijsktra's algorithm

TEXT BOOKS:

1. Fundamentals of DATA STRUCTURES in C, Horowitz,Sartaj Sahani, Susan Anderson – Freed, University Press
2.Data Structures, 2/e, Richard F, Gilberg , Forouzan, Cengage

REFERENCE BOOKS:

1 .Data Structures using C, 2nd Edition,by A. K. Sharma, Pearson India
2. Classic Data Structures, 2/e, Debasis, Samanta, PHI,2009
3. Data Structures and Algorithms, 2008, G.A.V.Pai, TMH
4. DATA STRUCTURE USING C,Udit Agarwal,KATSON Books
5. Data Structures using C,Reema Thareja, Oxford

E-RESOURCES:

1. https://en.wikipedia.org/wiki/Data_structure
2. https://www.tutorialspoint.com/data_structures_algorithms/data_structures_basics
3. http://nptel.ac.in/courses/106103069/

18A2105402- DATA BASE MANAGEMNET SYSTEMS

Lecture – Tutorial-Practical::	3-0-0	**Internal Marks:**	40
Credits:	3	**External Marks:**	60

Prerequisites:

C- Programming, Mathematics

Course Objectives:

- Learn and practice data modeling using the entity-relationship and developing database designs
- Understand the use of Structured Query Language (SQL) and learn SQL syntax.
- Apply normalization techniques to normalize the database
- Understand the needs of database processing and learn techniques for controlling the consequences of concurrent data access
- Understand the indexing concepts and how help full in accessing data
- Learn the concepts of transaction management and how they provide security and consistency

Course Outcomes:

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

CO1	Ability to define, understand the database management system structure
CO2	Ability to apply SQL as well as relational algebra to find solutions to a broad range of queries.
CO3	Ability to design ER diagrams or database for given scenario
CO4	Ability to create applications using various normal forms, functional dependencies, validating and identifying anomalies.
CO5	Ability to design application using locking methods and recovery management.
CO6	Ability to conduct experiments of database using modern tools.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	-	3	-	-
CO5	-	-	-	3	-	-	-	-	-	-	-	-
CO6	-	-	-	-	3	-	-	-	-	3	-	-

UNIT I

Databases and Database Users: Introduction, Characteristics of the Database Approach, Actors on the Scene, Workers behind the Scene, Advantages of Using the DBMS Approach.

Database System Concepts and Architecture: Data Models, Schemas, and Instances, Three-Schema Architecture and Data Independence, Database Languages and Interfaces, The Database System Environment, Centralized and Client/Server

Architectures for DBMSs

UNIT II

SQL: SQL Data Definition and Data Types, Specifying Constraints in SQL, Schema Change Statements in SQL , INSERT, DELETE, and UPDATE Statements in SQL, Basic Retrieval Queries in SQL, More Complex SQL Retrieval Queries, Views (Virtual Tables) in SQL.

The Relational Algebra: Unary Relational Operations: SELECT and PROJECT, Relational Algebra Operations from Set Theory, Binary Relational Operations: JOIN and DIVISION.

Data Modeling Using the Entity-Relationship (ER) Model: Using High-Level Conceptual Data Models for Database Design, A Sample Database Application, Entity Types, Entity Sets, Attributes, and Keys, Relationship Types, Relationship Sets, Roles, and Structural Constraints, Weak Entity Types, Relational Database Design Using ER-to-Relational Mapping.

UNIT III

Normalization: Functional Dependencies, Inference Rules, Equivalence, and Minimal Cover, Properties of Relational Decompositions, Algorithms for Relational Database Schema Design, Normal Forms Based on Primary Keys, General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form, Multivalued Dependency and Fourth Normal Form, Join Dependencies and Fifth Normal Form.

File Structures, Hashing and Indexing: Placing File Records on Disk, Operations on Files, Files of Unordered Records (Heap Files), Files of Ordered Records (Sorted Files), Hashing Techniques, Types of Single-Level Ordered Indexes, Multilevel Indexes, Dynamic Multilevel Indexes Using B-Trees and B+-Trees.

UNIT IV:

Transaction Processing: Transaction and System Concepts, Desirable Properties of Transactions, Characterizing Schedules Based on Recoverability, Characterizing Schedules Based on Serializability.

Concurrency Control Techniques: Two-Phase Locking Techniques for Concurrency Control, Concurrency Control Based on Timestamp Ordering, Validation (Optimistic) Concurrency Control Techniques

Database Recovery Techniques: Recovery Concepts, NO-UNDO/REDO Recovery Based on Deferred Update, Recovery Techniques Based on Immediate Update, Shadow Paging, The ARIES Recovery Algorithm

TEXT BOOKS:

1. Fundamentals of Database Systems, Elmasri Navrate, 6th edition, Pearson Education

REFERENCE BOOKS:

1. "Database System Concepts", . Korth, Slberchatz, Sudarshan, 6th Edition, McGraw – Hill

2. Peter Rob and Carlos Coronel, " Database Systems Design, Implementation and Management", Thomson Learning, 5th Edition.

3. Introduction to Database Systems, CJ Date, Pearson 4. DATA STRUCTURE USING C,Udit Agarwal,KATSON Books

4. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGraw Hill 3rd Edition

E-RESOURCES:

18A2105403- DIGITAL LOGIC DESIGN

Lecture – Tutorial- Practical: 2-0-2	**Internal Marks:** 40
Credits: 3	**External Marks:** 60

Prerequisites:

Number Systems, Mathematics-I , Mathematics-II

Course Objectives:

- To study the basic philosophy underlying the various number systems, negative number representation, binary arithmetic, binary codes and error detecting and correcting binary code.
- To study the theory of Boolean algebra and to study representation of switching functions using Boolean expressions and their minimization techniques.
- To study the combinational logic design of various logic and switching devices and their realization.
- To study some of the programmable logic devices and their use in realization of switching functions.
- To study the sequential logic circuits design both in synchronous and Asynchronous modes for various complex logic and switching devices, their minimization techniques and their realizations.
- To implement synchronous state machines using flip flops.

Course Outcomes:

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

CO1	Understand the numeric information in different forms and interpret different logic gates.
CO2	Minimize the given Switching functions in SoP and PoS forms using K-Map and Tabular Method.
CO3	Analyze and Design various combinational circuits like Encoders, Decoders, Multiplexers, De-multiplexers, and Arithmetic Circuits.
CO4	Design combinational logic circuits using different types of Programmable Logic Designs.
CO5	Design and Implement various sequential circuits like flip flops, registers.
CO6	Design the state diagrams with the knowledge of Mealy and Moore conversions, state machines using various flip flops.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	1	-	-	-	-	-	-	2	-	3
CO4	2	-	-	-	-	-	-	-	-	-	-	-
CO5	3	3	2	-	-	-	-	-	-	2	-	3
CO6	2	2	3	-	-	-	-	-	-	-	-	-

UNIT I

NUMBER SYSTEMS & BOOLEAN FUNCTIONS: Representation of numbers in different radix, conversation from one radix to another radix, r-1's compliments and r's compliments of signed numbers, weighted and non-weighted codes , Gray code, Error detection, error correction codes, parity checking, Hamming code, Boolean theorems, principle of complementation & duality, De-Morgans theorems, Basic logic gates and Universal gates, NAND-NAND and NOR-NOR realizations, Standard SOP and POS.

Practical's

1. Verification of Basic Logic Gates.
2. Implementing all individual gates with Universal Gates NAND & NOR.

Design a circuit for the given Canonical form, draw the circuit diagram and verify the De-Morgan laws

UNIT II

MINIMIZATION TECHNIQUES & COMBINATIONAL LOGIC DESIGN: Minimization techniques: minimization of logic functions using Boolean theorems, minimization of switching functions using K-Map up to 5 variables, tabular minimization, Design of Half adder, full adder half subtractor, full subtractor, 4-bit binary subtractor, adder-subtractor circuit, BCD adder circuit, Excess 3 adder circuit, 4 bit parallel adder, Carry look-a-head adder circuit, applications of adders and subtractors. Decoders, 7 segment decoder, Encoders, priority encoder, Multiplexer, Demultiplexer.

Practical's

1. Construct Half Adder and Full Adder using Half Adder and verify the truth table.
2. Design a Combinational Logic circuit for 4x1 MUX and verify the truth table.
3. Design a Combinational Logic circuit for 1x4 De- MUX and verify the truth table.

UNIT III

SEQUENTIAL LOGIC DESIGN: Classification of sequential circuits, Latches and Flipflops, Triggering, excitation tables, Asynchronous inputs, Conversion from one flip-flop to another flip flop. Registers-Types, modes of operations, bi-directional shift registers, universal shift register, Counters-synchronous & Asynchronous counters, design of Mod-counters, Counters using shift registers, Serial binary adder.

Practical's

1. Verification of truth tables of the basic Flip- Flops with *Synchronous* and *Asynchronous* modes
2. Implementation of Master Slave Flip-Flop with J-K Flip- Flop and verify the truth table for *race around* condition.
3. Design a Decade Counter and verify the truth table.
4. Design the Mod 6 counter using D-Flip –Flop.
5. Construct 4-bit ring counter with T-Flip –Flop and verify the truth table.
6. Design a 8 – bit right Shift Register using D-Flip -Flop and verify the truth table.

UNIT IV:

STATE MACHINES: Finite state machine, Analysis of clocked sequential circuits, state diagrams, state tables, reduction of state tables and state assignment, design procedures. Realization of circuits using various flip-flops. Melay to Moore conversion and vice-versa.

TEXT BOOKS:

1.Hill and Peterson "Switching Theory and Logic Design" Mc-Graw Hill TMH edition.

2.A. Anand Kumar "Switching Theory and Logic Design" PHI, 2009

EQUIPMENT REQUIRED:

Digital IC Trainer kit

REFERENCE BOOKS:

RP Jain, " Modern Digital Electronics", TMH, 2009.

Fundamentals of Logic Design by Charles H.Roth Jr, Cenage Learning, 2010

Digital Logic And Computer Design By M. Morris Mano

E-RESOURCES:

https://nptel.ac.in/courses/106108099/
https://swayam.gov.in/course/1392-digital-circuits-and-systems
http://www.nesoacademy.org/electronics-engineering/digital-electronics/digital
https://www.youtube.com/playlist?list=PLWPirh4EWFpHk70zwYoHu87uVsCC8E2S-
https://www.youtube.com/watch?v=X7M3rUxUpOc&list=PLbRMhDVUMngePP5JcezxImF-FzOC9wstz&index=1
https://www.youtube.com/watch?v=1Df2vEcvDfs
https://www.youtube.com/watch?v=HcH0khFGwS8&list=PLbRMhDVUMngfV8C6ElNAUaQQz06wEhFM5

18A2105493- INTERNET OF THINGS LAB

Lecture - Tutorial-Practical:	0-2-2	**Internal Marks:**	40
Credits:	3	**External Marks:**	60

Prerequisites:

Number Systems, Mathematics-I , Mathematics-II

Course Objectives:

Assess the genesis and impact of IoT applications, architectures in real world
Illustrate diverse methods of deploying smart objects and connect them to network
Compare different Application protocols for IoT
Expose the student to a variety of embedded boards and IoT Platforms
Identify sensor technologies for sensing real world entities and understand the role of IoT in various domains of Industry

Course Outcomes:

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

CO1	Interpret the impact and challenges posed by IoT networks leading to new architectural models.
CO2	Explain the basics of microcontrollers, architecture of Arduino and develop simple applications using Arduino.
CO3	Outline the architecture of Raspberry Pi and develop simple applications using Raspberry, select a platform for a particular embedded computing application
CO4	Interpret different protocols and compare them and select which protocol can be used for a specific application
CO5	Select IoT APIs for an application
CO6	Design and develop a solution for a given application using APIs and test for errors in the application

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	-	2	-	-	2	-	-	-	-	2	-
CO2	3	2	-	-	-	2	-	-	2	-	-	-
CO3	3	-	2	2	-	2	-	-	-	-	-	2
CO4	2	-	3	-	-	2	-	-	-	-	-	-
CO5	3	2	2	-	2	2	-	-	-	-	-	2
CO6	-	2	3	-	2	2	-	-	-	-	-	2

UNIT I

Overview of IoT:

The Internet of Things: An Overview; The Flavour of the Internet of Things, The "Internet" of "Things", The Technology of the Internet of Things, Design Principles for Connected Devices, Calm and Ambient Technology, Privacy; Keeping Secrets, Web Thinking for Connected Devices, Small Pieces, Loosely Joined, First-Class Citizens On The Internet

UNIT II

Embedded Computing Basics; Microcontrollers; System-on-Chips; Choosing Your Platform; Arduino; Developing on the Arduino; Some Notes on the Hardware; Openness;
Raspberry Pi ; Cases and Extension Boards; Developing on the Raspberry Pi; Some Notes on the Hardware; Openness; Other notable platforms; Mobile phones and tablets; Plug Computing: Always-on Internet of Things

1. Select any one development board (Eg., Arduino or Raspberry Pi) and control LED using the board.
2. Using the same board as in (1), read data from a sensor. Experiment with both analog and digital sensors.
3. Control any two actuators connected to the development board using Bluetooth.
4. Create any cloud platform account, explore IoT services and register a thing on the platform.

UNIT III

Internet Principles; Internet Communications: An Overview of IP, TCP, The IP Protocol Suite (TCP/IP), UDP, IP Addresses, Static IP Address Assignment, Dynamic IP Address Assignment, IPv6.

1. Push sensor data to cloud.
2. Control an actuator through cloud.

Accesses the data pushed from sensor to cloud and apply any data analytics or visualization services.

UNIT IV:

Getting Started with an API, Mashing Up APIs, Scraping, Legalities, Writing a New API, MQ Telemetry Transport, Extensible Messaging and Presence Protocol, Constrained Application Protocol

1. Create a mobile app to control an actuator.
2. Identify a problem in your local area or college which can be solved by integrating the things you learned so far and create a prototype to solve it (Mini Project).

TEXT BOOKS:

1. 1. **Adrian McEwen, Hakim Cassimally - Designing the Internet of Things, Wiley Publications, 2012**

REFERENCE BOOKS:

1. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-on-Approach)", 1 stEdition, VPT, 2014. (ISBN: 978-8173719547)
2. **The Internet of Things, Enabling technologies and use cases – Pethuru Raj, Anupama C. Raman, CRC Press.**

E-RESOURCES:

https://www.arduino.cc/

https://www.raspberrypi.org/

18A2105491- DATA STRUCTURES LAB

Lecture – Tutorial-Practical:	0-0-2	**Internal Marks:**	40
Credits:	1	**External Marks:**	60

Prerequisites:

C Programming

Course Objectives:

- To understand and implement basic data structures
- To Apply linear and non linear data structures in problem solving.
- Have a good understanding of how several fundamental algorithms work, particularly those concerned with sorting and searching.
- Have a good understanding of the fundamental data structures used in computer science
- It enables them to gain knowledge in practical applications of data structures.

Course Outcomes:

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

CO1	Implement different searching and sorting techniques. Compare different searching and sorting techniques.
CO2	Design linear data structures stacks, queues and linked lists.
CO3	Design nonlinear data structures trees and Graphs, and implement their operations
CO4	Be capable to identity the appropriate data structure for given problem
CO5	Have practical knowledge on the applications of data structures

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	2	2	-	-	-	-	-	-	-	2
CO2	3	2	3	2	-	-	-	-	-	-	-	2
CO3	3	2	3	2	-	-	-	-	-	-	-	2
CO4	3	2	3	2	-	-	-	-	-	-	-	2
CO5	3	2	3	2	-	-	-	-	-	-	-	2

List of Experiments

Exercise 1:

a. Write a recursive C program to find the Factorial of an integer.
b. Write a recursive C program to calculate the GCD of two numbers.
c. Write a recursive C program for Towers of Hanoi: N disks are to be transferred from peg S to peg D with Peg I as the intermediate peg.
d. Write a recursive C program to display the Fibonacci Series: 0, 1, 1, 2, 3, 5, 8, ...N.

Exercise 2:

a. Write a recursive and non-recursive C program to implement Linear Search technique.

b. Write a recursive and non-recursive C program to implement Binary Search technique.

Exercise 3:

a. Write C program that implement Insertion sort, to sort elements in an ascending order.

b. Write C program that implement Merge sort, to sort elements in an ascending order.

c. Write C program that implement Quick sort, to sort elements in an ascending order.

Exercise 4:

a. Write a C program to insert a node in a Single Linked List.

b. Write a C program to delete a node in a Single Linked List.

c. Write a C program to reverse elements in a Single Linked List.

d. Write a C program to insert a node in a Doubly Linked List.

Exercise 5:

a. Write C program that implement Stack (its operations) using arrays.

b. Write C program that implement Queue (its operations) using arrays.

c. Write C program that implement Queue using Two Stacks.

Exercise 6:

a. Write C program that implement Stack using Linked List.

b. Write C program that implement Queue using Linked List.

c. Write a C program to implement the Circular Queue.

Exercise 7:

a. Write a C program to insert elements in a Binary Search Tree (BST).

b. Write a C program to delete element in a Binary Search Tree (BST).

c. Write a C program to implement BST traversals: Inorder, Preorder, and Postorder.

Exercise 8:

a. Write a C program to implement the Max Heap.

b. Write C program that implement Heap sort, to sort elements in an ascending order.

Exercise 9:

a. Write a C program to implement the Breadth First Search technique on a Graph.

b. Write a C program to implement the Depth First Search technique on a Graph.

Exercise 10:

a. Write a C program to implement the Prim's algorithm to construct Minimum Spanning Tree.

b. Write a C program to implement the Kruskal's algorithm to construct Minimum Spanning Tree.

TEXT BOOKS:

1 Data Structures using C,Reema Thareja, Oxford
2.DATA STRUCTURE USING C,Udit Agarwal,KATSON Books
3 Data Structures using C, 2nd Edition, by A. K. Sharma, Pearson India

REFERENCE BOOKS:

1. Keneth. H. Rosen, Discrete Mathematics and its Applications, 6/e, Tata McGraw-Hill, 2009.

2. Richard Johnsonburg, Discrete mathematics, 7/e, Pearson Education, 2008

E-RESOURCES:

18A2105492- DATABASE MANAGEMENT SYSTEMSLAB

Lecture - Tutorial-Practical:	0-2-2	**Internal Marks:**	40
Credits:	1	**External Marks:**	60
Prerequisites:			

C Programming, Mathematics

Course Objectives:

- Design and implement a database schema for a given problem-domain
- Populate and query a database using SQL DML/DDL commands.
- Declare and enforce integrity constraints on a database
- Programming PL/SQL including stored procedures, stored functions, cursors, packages.
- understand real time data base design models and can code the model
- understand and retrieve information from complex designed data bases using correlated nested queries

Course Outcomes:

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

CO1	Queries for Creating, Dropping, and Altering Tables, Views, and Constraints
CO2	Queries to Retrieve and Change Data: Select, Insert, Delete, and Update
CO3	Queries using Built-In Functions: String Functions, Numeric Functions, Date Functions and Conversion Functions.
CO4	Queries using Group By, Order By, and Having Clauses
CO5	Queries on Joins and Correlated Sub-Queries
CO6	Queries on Controlling Data: Commit, Rollback, and Save point

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	1	-	-	-	-	-	-	-	-	-	-
CO2	2	3	3	-	1	-	-	-	-	-	-	-
CO3	1	2	2	-	2	-	-	-	-	-	-	-
CO4	1	2	3	-	3	-	-	-	-	-	-	1
CO5	1	2	1	-	2	-	-	-	-	-	-	-
CO6	1	1	3	-	2	-	-	-	-	-	-	-

List of Experiments

SQL

1. Queries for Creating, Dropping, and Altering Tables, Views, and Constraints
2. Queries to Retrieve and Change Data: Select, Insert, Delete, and Update
3. Queries using operators in SQL
4. Queries using Built-In Functions: String Functions, Numeric Functions, Date Functions and Conversion Functions.
5. Queries using Group By, Order By, and Having Clauses

6. Queries on Controlling Data: Commit, Rollback, and Save point
7. Queries on Joins and Correlated Sub-Queries
8. Queries on Working with Index, Sequence, Synonym

PL/SQL

1. Write a PL/SQL Code using Basic Variable, Anchored Declarations, and Usage of Assignment Operation
2. Write a PL/SQL Code Bind and Substitution Variables. Printing in PL/SQL
3. Write a PL/SQL block using SQL and Control Structures in PL/SQL
4. Write a PL/SQL Code using Cursors, Exceptions and Composite Data Types
5. Write a PL/SQL Code using Procedures, Functions, Triggers and Packages

TEXT BOOKS:

1 Fundamentals of Database Systems, Elmasri Navrate, 6th edition, Pearson Education

REFERENCE BOOKS:

1. "Database System Concepts", . Korth, Slberchatz, Sudarshan, 6th Edition, McGraw – Hill
2. Peter Rob and Carlos Coronel, " Database Systems Design, Implementation and Management", Thomson Learning, 5th Edition.
3. Introduction to Database Systems, CJ Date, Pearson
4. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGraw Hill 3rd Edition

18A2105494- PYTHON PROGRAMMING LAB

Lecture – Tutorial-Practical:	0-1-2	**Internal Marks:**	40
Credits:	2	**External Marks:**	60

Prerequisites:

C Programming, Mathematics

Course Objectives:

- **To learn the fundamentals of python programming**
- **To get a solid understanding of python functions and data structures**
- To demonstrate the use of python lists and dictionaries.
- To implement methods and functions to improve readability of programs.
- Students able to describe and apply object-oriented programming methodology.
- Students able to build software for real needs and prior introduction to testing software.

Course Outcomes:

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

CO1	Students able to experience with an interpreted Language and to build software for real needs.
CO2	Students able to use basic Decision structures, Boolean logic, variable types, assignments and operators.
CO3	Students able to describe and use of Python lists, dictionaries, tuples and sets.
CO4	To implement methods and functions to improve readability of programs.
CO5	Students able to describe and apply object-oriented programming methodology,top-down concepts in algorithm design.
CO6	Students should be able to design, code ,test and debug python language programs.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	3	-	-	-	3	-	3	-
CO2	-	3	2	-	-	-	-	-	-	-	-	-
CO3	-	-	-	2	3	-	-	-	3	-	-	-
CO4	-	-	-	3	3	-	-	-	3	-	-	-
CO5	-	-	-	3	-	-	-	-	-	-	3	-
CO6	-	-	-	-	2	-	-	-	3	-	3	-

List of Experiments

Exercise 1 - Basics

a) Running instructions in Interactive interpreter and a Python Script

b) Write a program to purposefully raise Indentation Error and Correct it

Exercise 2 - Operations

a) Write a program to compute distance between two points taking input from the user

(Pythagorean Theorem)

b) Write a program add.py that takes 2 numbers as command line arguments and

prints its sum.

Exercise - 3 Control Flow

a) Write a Program for checking whether the given number is a even number or not.

b) Using a for loop, write a program that prints out the decimal equivalents of 1/2, 1/3, 1/4, . . . ,
1/10

c) Write a program using a for loop that loops over a sequence. What is sequence ?

d) Write a program using a while loop that asks the user for a number, and prints a countdown
from that number to zero.

Exercise 4 - Control Flow - Continued

a) Find the sum of all the primes below two million.

Each new term in the Fibonacci sequence is generated by adding the previous two terms. By
starting with 1 and 2, the first 10 terms will be:
1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...

b) By considering the terms in the Fibonacci sequence whose values do not exceed four million,
find the sum of the even-valued terms.

Exercise - 5 - DS

a) Write a program to count the numbers of characters in the string and store them in a
dictionary data structure

b) Write a program to use split and join methods in the string and trace a birthday with a
dictionary data structure.

Exercise - 6 DS - Continued

a) Write a program combine_lists that combines these lists into a dictionary.

b) Write a program to count frequency of characters in a given file. Can you use character
frequency to tell whether the given file is a Python program file, C program file or a text file?

Exercise - 7 Files

a) Write a program to print each line of a file in reverse order.

b) Write a program to compute the number of characters, words and lines in a file.

Exercise - 8 Functions

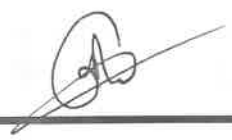
a) Write a function ball_collide that takes two balls as parameters and computes if they are
colliding. Your function should return a Boolean representing whether or not the balls are
colliding.

Hint: Represent a ball on a plane as a tuple of (x, y, r), r being the radius
If (distance between two balls centers) <= (sum of their radii) then (they are colliding)

b) Find mean, median, mode for the given set of numbers in a list.

Exercise - 9 Functions - Continued

a) Write a function nearly_equal to test whether two strings are nearly equal. Two strings a and b
are nearly equal when a can be generated by a single mutation on b.



b) Write a function dups to find all duplicates in the list.
c) Write a function unique to find all the unique elements of a list.

Exercise - 10 - Functions - Problem Solving

a) Write a function cumulative_product to compute cumulative product of a list of numbers.
b) Write a function reverse to reverse a list. Without using the reverse function.
c) Write function to compute gcd, lcm of two numbers. Each function shouldn't exceed one line.

Exercise 11 - Multi-D Lists

a) Write a program that defines a matrix and prints
b) Write a program to perform addition of two square matrices
c) Write a program to perform multiplication of two square matrices

Exercise - 12 - Modules

a) Install packages requests, flask and explore them. using (pip)
b) Write a script that imports requests and fetch content from the page. Eg. (Wiki)
c) Write a simple script that serves a simple HTTPResponse and a simple HTML Page

Exercise - 13 OOP

a) Class variables and instance variable and illustration of the self variable
i) Robot
ii) ATM Machine

Exercise - 14 GUI, Graphics

1. Write a GUI for an Expression Calculator using tk
2. Write a program to implement the following figures using turtle

Exercise - 15 - Testing

a) Write a test-case to check the function even_numbers which return True on passing a list of all
even numbers
b) Write a test-case to check the function reverse_string which returns the reversed string

Exercise - 16 - Advanced

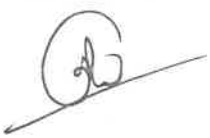
a) Build any one classical data structure.
b) Write a program to solve knapsack problem.

TEXT BOOKS:

1 A Modern Approach, Vamsi Kurama, Pearson
2.Learning Python, Mark Lutz, Orielly

REFERENCE BOOKS:

Think Python, Allen Downey, Green Tea Press
Core Python Programming, W.Chun, Pearson.
Introduction to Python, Kenneth A. Lambert, Cengage



18A2100802- PROFESSIONAL ETHICS AND HUMAN VALUES

Lecture – Tutorial-Practical:	0-2-0	**Internal Marks:**	40
Credits:	0	**External Marks:**	60*

Prerequisites:

Basic understanding about Engineering profession

Course Objectives:

- To create awareness on engineering ethics and human values.
- To understand social responsibility of an engineer.

To instill moral and social values and loyalty.

Course Outcomes:

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

CO1	Grooms themselves as ethical, responsible and societal beings.
CO2	Discuss ethics in society and apply the ethical issues related to engineering.
CO3	Exhibit the understanding of ethical theories in professional environment.
CO4	Recognize their role as social experimenters (engineers) and comprehend codes of ethics.
CO5	Identify the risks likely to come across in the professional world, analyzing them and find solutions.
CO6	Realize the responsibilities and rights of engineers in the society.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	-	-	-	-	-	1	1	2	-	-	-	1
CO2	-	-	-	-	-	1	1	2	-	-	-	1
CO3	-	-	-	-	-	1	1	2	-	-	-	1
CO4	-	-	-	-	-	1	1	2	-	-	-	1
CO5	-	-	-	-	-	1	1	2	-	-	-	1
CO6	-	-	-	-	-	1	1	2	-	-	-	1

UNIT I

Human Values: Objectives, Morals, Values, Ethics, Integrity, Work ethics, Service learning , Virtues, Respect for others, Living peacefully, Caring, Sharing, Honesty, Courage, Valuing time, Cooperation, Commitment, Empathy, Self-confidence, Challenges in the work place.

UNIT II

Engineering ethics

Senses of 'Engineering Ethics' – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Models of professional roles – Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories.

UNIT III

Engineering as Social Experimentation: Engineering as experimentation, Engineers as responsible experimenters, Codes of ethics, Industrial standards, A balanced outlook on law, Case study: The challenger.

UNIT IV

Safety, Responsibilities and Rights: Safety and risk, types of risks, Assessment of safety and risk, Safe exit, Risk-benefit analysis, safety lessons from 'the challenger' , Case study: Power plants, Collegiality and loyalty, Collective bargaining, Confidentiality, Conflict of interests, Occupational crime, whistle blowing, Intellectual property rights, professional rights.

TEXT BOOKS:

- A Text book on Professional Ethics and Human Values by R.S Naagarazan- New Age International Publishers.
- " Engineering Ethics includes Human Values" by M. Govindarajan, S. Natarajan and V. S. Senthil Kumar- PHI Learning Pvt. Ltd-2009

REFERENCE BOOKS:

"Professional Ethics and Human Values" by A. Alavudeen, R. Kalil Rahman and M. Jayakumaran- Laxmi Publications.

E-RESOURCES:

- www.onlineethics.org
- www.nspe.org
- www.globalethics.org
- www.ethics.org

18A2100601- Professional Communication Skills

Lecture – Tutorial-Practical:	2-0-0	**Internal Marks:**	40
Credits:	1	**External Marks:**	60

Prerequisites:

Basic understanding of English

Course Objectives:

- This course is expected to relate Soft Skills to real life scenario besides real time experiences. This provides an additional support in training students on already available practices. Attempt can be made to combine theory and practice enabling students learn more from experience.
- This course is expected to bridge the gap between theoretical knowledge and real time experiences while encountering challenges in the society.
- It is believed that the topics included in the course would enable the learner to develop a new perspective, to overcome a few current problems at the individual level and societal level.

Course Outcomes:

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

CO1	Develop effective familiarity with soft skills along with right attitude to eliminate conflict and strife in their presentation skills.
CO2	Develop awareness on setting suitable goals and planning accordingly by using the techniques of time management to climb the ladder of success.
CO3	Enhance the learners' analytical and logical skills besides lateral thinking and kindle the true professional spirit.
CO4	Interpret any situation positively by managing stress at all scenarios.
CO5	Become a responsible citizen by imbibing social etiquette and ethics.
CO6	Draft appropriate written documents using the acquired knowledge on writing.

UNIT I: KNOW YOUR SOFT SKILLS

Know your Soft Skills: What are soft skills?, Soft Skills vs Hard Skills, Why Soft Skills are important for success?, Can Soft Skills be cultivated?

Writing Skills: Creative Writing, Summarization of Mini Projects or Paper Presentations

UNIT II: ATTITUDE AND EMOTIONAL INTELLIGENCE

Attitude: What is attitude? Benefits of Positive Attitude and How to build Positive Attitude?

Emotional Intelligence: What is Emotional Intelligence? How to balance Emotional Intelligence? and Crisis Management.

Writing Skills: Memo Writing, Writing Technical Abstracts

UNIT III: GOAL SETTING AND ADAPTABILITY

Goal Setting: What is a Goal? What are smart goals? Goal as Commitment. Steps to reach one's goals.

Adaptability: What is Adaptability? What is its necessity? Adaptability as a tool to capture opportunities.

Writing Skills: Writing Circulars, Writing Agenda and Minutes of Meeting

UNIT IV: TIME MANAGEMENT AND SOCIAL CONSCIOUSNESS

Time Management: What is Time Management? Time Stealers. Strategies for effective Time Management. Time Management and Goal Setting go hand in hand.

Social Consciousness: Social Awareness and Civic Responsibility, Case Study based on Social Intelligence.

Writing Skills: Technical Reports, Writing Reviews of Projects or any Technical Topic

TEXT BOOKS:

1. Pillai Sabina, Fernandez Agna, Soft Skills and Employability Skills, Cambridge Publishers.
2. Khera Shiv, You Can Win, Bloomsbury India, 1998.
3. Covey Sean, Seven Habits of Highly Effective Teens, New York, Fireside Publiishers, 1998.
4. Thomas A Harris, I am OK, You Are OK, New York-Harper And Row, 1972
5. Daniel Coleman, Emotional Intelligence, Bantam Book, 2006.
6. Carnegie Dale, How to Win Friends and Influence People, New York; Simon & Schuster, 1998.

18A2100602- Visual Communications

Lecture – Tutorial-Practical:	2-0-0	**Internal Marks:**	40
Credits:	1	**External Marks:**	60
Prerequisites:			

Basic understanding about communication components

Course Objectives:

The core objective of the paper is to create awareness about the theories and technical aspects of visualization process. The paper deals with visual communication theories and analysis of visuals. It also imparts knowledge of making visuals, video production skills and application of the software required for the purpose.

Unit – I of the syllabus focuses on understanding visuals based on theories and principles.

Unit – II introduces the techniques of shooting, framing, composition of visuals with still-camera and other techniques of visualization.

Unit – III imparts knowledge about planning and production techniques of camera, editing and post production.

Unit – IV introduces the basic concepts of software and its application required for making visual presentation.

Course Outcomes:

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

CO1	The students will acquire the fundamental and foundation knowledge on image and creating meaning through visuals. They will acquire skills to present ideas and design messages.
CO2	They will be familiarised with communication and presentation of ideas visually.
CO3	The students will study various theories and concepts in understanding the visuals. They will learn new ways of understanding and presentation for different purposes.
CO4	The students will learn the key aspects of visual aspects in art, camera, and filming as well as trade secrets in communication media business to gain an up-to-date understanding of the field.
CO5	After studying the course, the students will acquire production planning skills and application of technology for projects based on communication.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	2	-	3	3	2	2	1	1	1	1
CO2	3	-	2	-	3	3	2	2	1	1	1	1
CO3		-	2	-	-	-	-	-	-	1	1	1
CO4	3	-	1	3	3	-	-	1	1	1	1	1
CO5	2	-	1	-	3	3	2	2	1	1	1	1

CO6	3	-	2	-	3	3	2	2	1	1	1	1

UNIT- 1

Introduction to Visual Communication – Image and understanding – Semiotics – Signs, symbols, codes and meanings – Description of signs – Denotations and connotations – Theories of Visual communication – Elements of Visual Communication – Colour, form, depth, movement.

UNIT- 2

Still and Video images – Still Camera – Types of cameras – Different aspects of camera – Basic shots – Angles – Photo framing and composition – Camera movements – Lenses – Filters – Lighting – Technical and ethical perspectives of camera

UNIT- 3

Television camera Shots & angles – movements – mountings of video camera, Shooting – Lighting – Planning – Pre-production – Concept / story development – Script / Screenplay writing – Casting – Budget and Finance – Direction & Cinematography – Post-Production – Sound recording – Dubbing – Special effects and graphics – Final mixing

UNI 4

Audio Sound Editing software: Sound Forge **Video editing Software:** Adobe Premiere

TEXT BOOKS:

References:

1. Visual Communication – Images with messages 3rd Edition, Paul MartinLester, Thomson
Wadsworth, USA 2003.
2. Herbert Zettl, Television Production Handbook, California, Thompson Wadsworth

Evaluation

At the end of the course students shall produce and submit a video capsule by applying the techniques which they learn based on the theoretical concepts.

Equipment required

Still cameras

1. Nikon D5600 Digital camera 18-55mm around Rs 40,000
2. Nikon D5600 with AF-P 70-300mm around Rs 50,000

Tripods

Digitek Professional Tripod around 6,000 (2min)

Video cameras

1. Canon XA11 Professional Camcorder around 80,000
2. Sony HXR-MC 2500 Camcorder around 75,000
3. Panasonic HC-MDH3GW professional Camcorder around Rs 65-75,000

18A2100603- Sanskrit

Lecture – Tutorial-Practical:	2-0-0	**Internal Marks:**	40
Credits:	1	**External Marks:**	60

Prerequisites:

Basic understanding of languages

Course Objectives:

1.Reading, Writing, understanding and conversational skills of Sanskrit language will be imparted (through lecture method, Questions and Answers, Test, Open text book study, Role play, Discussion, Debate or collaboration assignment or case study).
2. (As Sanskrit enriched all most all Indian Languages through it's rich vocabulary) proper understanding of one's mother tongue and usage are expected.
3. To enable the students for the proper understanding of the culture, Heritage, Traditions, Thinking, ethics and values of our country Bharath.

Course Outcomes:

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

CO1	Reading, Writing, understanding and conversational skills are developed.
CO2	Unity in diversity of our country is well understood.
CO3	The origin and development of Indian Languages is well understood
CO4	Proper usage of Language is achieved.
CO5	Sanskrit words that are familiar to us which we are using in our languages are identified.
CO6	The great Indian culture roots are well observed.

UNIT	TOPIC NAME	POEMS
I	विदुरानीतिः (Vidhuraneethi)	1 - 16
II	भर्तृहरि नीतिशतकम् (Bhartruhari – Neetisatakam)	1-16
III	संभाषणसंस्कृतम् (Prescribed Text by NRIIT)	1-16 Lesson From
IV	संस्कृतभाषा कौरालम् (Prescribed Text by NRIIT)	17-32 Lessons From संस्कृतमनोरम

Reference Books:

1. विदुरनीतिः from श्रीमन्महाभारतम् of वेदव्यासः
2. नीतिशतकम् of भर्तृहरिः
3. "TEACH YOURSELF SANSKRIT" (Graded Text Books) published by Rashtriya Sanskrit Sansthan, MHRD, Govt. of India, New Delhi.

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DEPARTMENT OF COMUTER SCIENCE AND ENGINEERING
COURSE STRUCTURE FOR SECOND YEAR
B.TECH PROGRAMME

II YEAR II SEMESTER

S.No	Course Code	Title of the Course	Scheme of Instruction (Periods Per Week)				Scheme of Examination (Maximum Marks)			
			L	T	P	Total	CIA	SEA	T	Credits
1	18A2200201	Probability and Statistics	3	1	0	4	40	60	100	4
4	18A2205401	Web Technologies and Advanced Java Programming	3	0	0	3	40	60	100	3
3	18A2205402	Software Engineering	3	0	2*	5	40	60	100	4
2	18A2205403	Computer Organization	3	0	0	3	40	60	100	3
5	18A2205601	**Open Elective-1** Data Structures	3	0	0	3	40	60	100	3
6	18A2205491	Web Technologies and Advanced Java Programming Lab	0	0	3	3	40	60	100	1.5
7	18A2205991	Aptitude and Reasoning	0	0	2	2	40	60*	100	1
8	18A2205791	Mini project	0	0	2	2	40	60*	100	1
Total			15	1	9					20.5

Head, CSE Department
NRI Institute of Technology
POTHAVARAPPADU (Vill)
Agiripalli (Mdl.), Krishna Dist.

H.O.D

B.TECH CSE
II YEAR-II SEMESTER

18A2200203-
COURSE NAME-PROBABILITY AND STATISTICS

Lecture – Tutorial:	3-1	**Internal Marks:**	40
Credits:	4	**External Marks:**	60

Prerequisites:

Course Objectives:

1.To familiarize the techniques in central tendency, curve fitting ,correlation and regression.
2. To familiarize the techniques in probability and random variables.
3. To familiarize the techniques in probability distribution.
4. To familiarize the techniques in large and small sample tests.
5.To equip the students to solve problems in their disciplines.

Course Outcomes:

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

CO1 Student will be able to **Find the measures of central tendency and relation between them.(L1)**

CO2 Student will be able to **Evaluate the correlation coefficient, rank coefficient and regression.(L5)**

CO3 Students will be able to **Understand probabilities of events and expectationsof random variables for elementary problems.(L2)**

CO4 Students will be able to **Solve problems related to binomial and passion distribution.(L3)**

CO5 Student will be able to Compare situations in which it is appropriate to consider the relevance of the Normal distribution.(L4)

CO6 Student will be able to Construct hypothesis and carryout appropriate tests to checks its acceptability.(L3)

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	2	2	--	--	--	--	--	--	--	--
CO2	3	3	2	2	--	--	--	--	--	--	--	--
CO3	3	3	2	2	--	--	--	--	--	--	--	--
CO4	3	3	2	2	--	--	--	--	--	--	--	--
CO5	3	3	2	2	--	--	--	--	--	--	--	--
CO6	3	3	2	2	--	--	--	--	--	--	--	--

UNIT I

Unit 1: Descriptive statistics and methods for data science

(Pre-requisite:Data science, Statistics Introduction, Population vs Sample, Collection of data, primary and secondary data, Type of variable: dependent and independent Categorical and Continuous variables, Data visualization.---No Question selects from the above part)

Measures of Central tendency: Arithmetic Mean – Median – Mode - Geometric Mean- Harmonic Mean and Relations between them- Merits and Demerits.

Measures of Dispersion: Range – Quartile Deviation – Variance, Standard Deviation – Skewness - Kurtosis.

Curve Fitting and Principles of Least Squares.

Correlation- correlation coefficient - rank correlation - Regression coefficients Regression lines.

UNIT 2: Probability

Probability, probability axioms, addition law and multiplicative law of probability, conditional probability, Baye's theorem, random variables (discrete and continuous), probability density functions, properties, mathematical expectation.

Unit3: Distributions

Probability distribution - Binomial, Poisson approximation to the binomial distribution and normal distribution-their properties.

Unit 4: Estimation and Testing of hypothesis:Large sample tests Small sample tests

Population, sample distribution of mean, point estimation of mean and variance, confidence limits and intervals for mean, standard error, sample distribution of variance.

Formulation of null hypothesis, alternative hypothesis, the critical and acceptance regions, level of significance, two types of errors and power of the test.

Large Sample Tests: Test for single proportion, difference of proportions, test for single mean and difference of means. Confidence interval for parameters in one sample and two sample problems

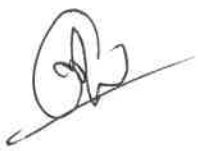
Small Sample Tests: Student t-distribution (test for single mean, two means and paired t-test), testing of equality of variances (F-test), $\chi 2$ - test for goodness of fit, $\chi 2$ - test for independence of attributes.

Textbooks:

1 Miller and Freund, Probability and Statistics for Engineers,7/e, Pearson, 2008.
2 S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons Publications, 2012.

Reference Books:

1 S. Ross, a First Course in Probability, Pearson Education India, 2002.
2 W. Feller, an Introduction to Probability Theory and its Applications, 1/e, Wiley, 1968.



18A2205401- WEB TECHNOLOGIES AND ADVANCED JAVA PROGRAMMING

Lecture - Tutorial-Practical:	3-0-0	**Internal Marks:**	40
Credits:	3	**External Marks:**	60*

Prerequisites:

Course Objectives:

To understand the concepts of HyperText Markup Language and Cascading Style Sheets
To learn JavaScript for creating dynamic websites
To learn JavaScript for creating dynamic websites
To learn Server-Side Programming using Servlets and Java Server Pages.
To learn the creation of pure Dynamic Web Application using JDBC

Course Outcomes:

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

CO1	Student able to Implement and design web based applications using features of HTML
CO2	Implement web based applications using features of XML
CO3	Student will Apply the concepts of server side technologies for dynamic web applications
CO4	Ability to design the web based applications using effective data base access with rich client interaction
CO5	Ability to Develop reusable component for Graphical User Interface applications

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	-	-	3	-	-	-	-	-	-	-	-	2
CO2	-	-	3	-	-	-	-	-	-	-	-	2
CO3	3	-	2	-	-	-	-	-	-	-	-	2
CO4	-	3	3	2	-	-	-	-	-	-	-	2
CO5	-	3	-	3	2	-	-	-	-	-	-	3

UNIT I

HTML tags, Lists, Tables, Images, forms, Frames, Cascading style sheets, Introduction to Java script, objects in Java Script, Dynamic HTML with Java Script.

UNIT II

Working with XML: Document Type Definition, XML schemas, Document object model, XSLT, DOM and SAX.

UNIT III

Web Servers and Servlets: Tomcat web server, Introduction to Servlets: Lifecycle of a Servlet, JSDK, The Servlet API, The javax.servlet Package, Reading Servlet parameters, and Reading Initialization parameters. The javax.servlet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues.

UNIT IV

Database Access: Database Programming using JDBC, studying javax.sql.* package, accessing a database from a JSP page,

Introduction to JSP: The Problem with Servlet. The Anatomy of a JSP Page, JSP Processing.

JSP application design with MVC

JSP Application Development: Generating Dynamic Content, Using Scripting ElementsImplicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations

TEXT BOOKS:

- The Complete Reference, Java 2 , 3ed, Patrik Naughton, Herbert Schildt, TMH
- Programming the World Wide Web, Robet W Sebesta, 7ed, Pearson.
- Web Technologies, Uttam K Roy, Oxford Java Server Pages , Hans Bergstan, Oreilly

REFERENCE BOOKS:

- Web Technologies, HTML< JavaScript, PHP, Java, JSP, XML and AJAX, Black book, Dream Tech.
- An Introduction to Web Design, Programming, Paul S Wang, Sanda S Katila, Cengage
- An introduction to Web Design and Programming, Wang Thomson
- Web application technologies concepts, Knuckles, John Wiley.
- Programming world wide web, Sebesta, Pearson
- Beginning Web Programming, Jon Duckett ,Wrox, Wiley Java server pages, Pekowsky, Pearson

E-RESOURCES:

1. https://www.w3schools.com/
2. https://www.tutorialspoint.com/perl/
3. https://www.railstutorial.org/book
4. https://www.cs.usfca.edu/~galles/visualization/Algorithms.html

18A2205402- SOFTWARE ENGINEERING

Lecture – Tutorial-Practical:	3-0-2*	**Internal Marks:**	40
Credits:	5	**External Marks:**	60*
Prerequisites:			

Course Objectives:

To understand the software requirements and SRS document
To design and develop correct and robust software products.
To understand the quality control and how to ensure good quality software.
To understand the planning and estimation of software projects.
To understand the implementation issues, validation and verification procedures

Course Outcomes:

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

CO1	Understand the basic concepts of Software engineering, applications, agile development and compare different software process models.
CO2	Analyze the principles of requirement engineering
CO3	Create architectural design for a given project.
CO4	Apply different testing techniques

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	3	3	--	--	2	2	2	3	2
CO2	3	3	3	3	3	--	--	2	2	2	3	2
CO3	3	3	3	3	3	--	--	2	2	2	3	2
CO4	3	3	3	3	3	--	--	2	2	2	3	2

UNIT I

Software and Software Engineering: The Nature of Software, Defining Software, Software Application Domains, Legacy Software, The Unique Nature of Web Apps, Software Engineering, The Software Process, Software Engineering Practice, The Essence of Practice, General Principles, Software Myths.

The Software Process: Process Models, A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Technology, Product and Process.

Agile Development: What Is Agility? Agility and the Cost of Change, What Is an Agile Process? Extreme Programming (XP). Other Agile Process Models, A Tool Set for the Agile Process.

Practice Session:

1. Write down the problem statement for a suggested system of relevance

UNIT II

Understanding Requirements: Requirements Engineering, Establishing the Groundwork, Eliciting Requirements, Developing Use Cases, Building the Requirements Model, Negotiating Requirements, Validating Requirements.

Requirements Modeling: Scenarios, Information and Analysis classes: Requirements Analysis, Scenario-Based Modeling, UML Models That Supplement the Use Case, Data Modeling Concepts, Class-Based Modeling.

Requirements Modeling: Flow, Behavior, Patterns, And Web apps: Requirements Modeling Strategies, Flow-Oriented Modeling, Creating a Behavioral Model, Patterns for Requirements Modeling, Requirement modeling for WebApps.

Practice Session:

1. Do requirement analysis and develop Software Requirement Specification Sheet (SRS) for suggested system.

UNIT III

Design Concepts: Design within the Context of Software Engineering, the Design Process, Design Concepts, the Design Model. **Architectural Design:** Software Architecture, Architectural Genres, Architectural Styles, Architectural Design, Assessing Alternative Architectural Designs.

Modeling Component-Level Design: What Is a Component? Designing Class-Based Components, Conducting Component Level Design, and Component level design for Web Apps.

Performing User Interface Design: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps.

Practice Session:

1. Preparation of Design Documents for suggested system.
2. Study and usage of any Design phase CASE tool.

UNIT IV

Software Testing Strategies: A Strategic Approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, Test Strategies for Object-Oriented Software, Validation testing, System testing, the art of debugging.

Testing Conventional Applications: Software Testing Fundamentals, Internal and External Views of Testing, White Box Testing, Basis Path Testing, Control Structure Testing, Black-Box Testing, Model-Based Testing, Testing for Specialized Environments, Architectures, and Applications, Patterns for Software Testing.

Practice Session:

1. Preparation of Testing Phase related documents for some problems
2. To perform unit testing and integration testing
3. To perform various white box and black box testing techniques.

TEXT BOOKS:

Roger S.Pressman, "Software Engineering- A Practitioner's Approach". Tata McGraw-Hill International 7th ed, 2010

REFERENCE BOOKS:

Ian Somerville, "Software Engineering". 9th ed, Pearson Education. 2011.
Carlo Ghezzi, Mehdi Jazayeri and Dino Mandrioli, "Fundamentals of Software Engineering".2 ed, PHI. 2009
RajibMall, Fundamentals of Software Engineering. 3 ed, PHI. 2009.
Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India,2010.

E-RESOURCES:

1. http://www.dcnicn.com/BusinessNews/WVU-MIS13Apr00/Software-Engineering.pdf
2. http://www.comp.lancs.ac.uk/computing/resources/IanS/SE7/Presentations/PDF/ch1.pdf
3. http://sites.computer.org/ccse/SE2004Volume.pdf
4. http://homepages.cs.ncl.ac.uk/brian.randell/NATO/nato1968.PDF
5. http://www.dau.mil/pubs/pdf/SEFGuide 01-01.pdf

18A2205403- COMPUTER ORGANIZATION

Lecture – Tutorial-Practical:	3-0-0	**Internal Marks:**	40
Credits:	3	**External Marks:**	60*

Prerequisites:

Course Objectives:

Understand the architecture of a modern computer with its various processing units. Also the Performance measurement of the computer system.

In addition to this the memory management system of computer.

Course Outcomes:

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

CO1	Able to understand the basic components and the design of CPU, ALU and Control unit
CO2	Students can calculate the effective address of an operand by addressing modes
CO3	Ability to understand memory hierarchy and its impact on computer cost/performance..
CO4	Ability to understand the advantage of instruction level parallelism and pipelining for high performance Processor design.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	--	--	--	--	--	--	--	--	--	--
CO2	3	3	--	3	--	--	--	--	--	--	--	--
CO3	3	3	--	--	--	--	--	--	--	--	--	--
CO4	3	3	--	--	--	--	--	--	---	--	--	--

UNIT I

Basic Structure Of Computers : Computer Types, Functional unit, Basic Operational concepts, Bus structures, Software, Performance.

Register Transfer and Micro-Operations: Register Transfer Language, Register Transfer, Bus and memory Transfers, Arithmetic Micro-operations, Logic Microoperations, Shift Micro-operations, Arithmetic Logic Shift Unit.

Basic Computer Organization and Design: Instruction codes, Computer Registers, Computer Instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input-Output and Interrupts

UNIT II

Central Processing Unit: General register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC).

Micro Programmed Control : Control memory, Address sequencing, microprogram example, design of control unit.

UNIT III

Computer Arithmetic : Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations.

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware.**Input Output**

UNIT IV

Organization: Peripheral Devices, Input-output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA), Input-Output Processor.,Serial Communication. Standard I/O Interfaces: PCI Bus, USB

Pipeline and vector processing: parallel processing, pipelining, Arithmetic pipeline, Instruction pipeline, RISC Pipeline, Vector Processing

TEXT BOOKS:

1 Morris M. Mano, Computer Systems Architecture.3 Ed, Pearson/PHI, 2013

[2] Carl Hamacher, Zvonko Vranesic, Safwat Zaky: Computer Organization, 5th Edition, Tata McGraw Hill, 2002.

REFERENCE BOOKS:

John P.Hayes, 'Computer architecture and Organisation', Tata McGraw-Hill, Third edition, 1998.

E-RESOURCES:

https://www.tutorialspoint.com/computer_organization/index.asp

https://www.geeksforgeeks.org/computer-organization-basic-computer-instructions/

OE- MICROPROCESSOR AND ITS APPLICATIONS

Lecture – Tutorial-Practical:	3-0-0	**Internal Marks:**	40
Credits:	3	**External Marks:**	60*

Prerequisites:

Number systems & digital logic design concepts, Basic compilation process

Course Objectives:

To demonstrate various families of Intel microprocessors and Significance of 8086
To explain Assembly language program development tools.
To know the architecture details of 8051 microcontroller.
To study and design the concepts of Counters/timers and serial port of 8051.
To understand the architecture of ARM7 and its THUMB instruction set.
To discuss the interfacing of 8051 to various peripheral devices.

Course Outcomes:

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

CO1	To Describe the basics of 8086 microprocessors architectures and its Functionalities
CO2	To Design and develop 8086 Microprocessor based systems for real time applications using low level language like ALP
CO3	To Analyze 8051 microcontrollers architectures and its functionalities
CO4	To Describe the importance of Timers/Counters and Serial ports of 8051 microcontroller
CO5	To Describe the basics of ARM and ARM7 architecture and its functionalities
CO6	To Interface external peripherals and I/O devices and program the 8051 microcontroller

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	3	-	-	-	-	-	2	-
CO3	3	2	3	2	2	-	-	-	-	-	2	-
CO4	2	2	2	-	-	-	-	-	-	-	-	-
CO5	3	2	2	2	3	-	-	-	-	-	2	-
CO6	2	2	2	3	2	-	-	-	-	-	-	-

UNIT I

UNIT-I

Microprocessor Architecture: Introduction to Microprocessors, Families of a Microprocessor, 8086 Microprocessor- Features, Architecture, Pin diagram of 8086.

8086 Architecture Modes: Register Organization, 8086 System Timing, Minimum Mode and Maximum Mode of Operation

UNIT II

UNIT-II

Instruction Set: Addressing Modes, Instruction Set, Assembler Directives, and Program development steps.

Programming and Interrupts: Assembly Language Program Development Tools, Programs with an Assembler, Interrupt Structure, Interrupt Service Routine, Interrupt Vector Table,

UNIT III

UNIT-III

Microcontroller: 8051 Microcontroller Architecture, Pin Diagram, Addressing Modes, Instruction Set and Programs, 8051 Memory and I/O Interfacing.

8051 Interfacing: Modes of Timer Operation, Serial Port Operation, Interrupt Structure of 8051, Interfacing of Seven Segment Displays, Stepper Motor.

UNIT IV

UNIT-IV

ARM: Introduction to 16/32 Bit Processor, Internal Architecture of ARM 7, Register Organization, ARM and THUMB Operating Modes, Development Tools.

Peripherals and Interfacing: 8255 PPI – Various Modes of Operation and Interfacing to 8086, Keyboard and Seven Segment Displays, Stepper Motor, D/A and A/D Converter Interfacing.

TEXT BOOKS:

TEXT BOOKS:

1. Advanced Microprocessor and Peripherals (Architecture, Programming & Interfacing) by A.K. Ray & K.M. Bhurchandi – TMH Publication.
2. Microcontrollers [theory and applications] TMH publication by Ajay V. Deshmukh.
3. Microcontrollers: Architecture, Programming, Interfacing and System Design, 2nd Edition, by Raj Kamal, Pearson Publications.

REFERENCE BOOKS:

1. Microprocessor and Interfacing by Douglas Hall 2nd Edition.
2. The 8051 Microcontroller & Embedded Systems by Mazidi & Mazidi – Pearson / PHI publication.

E-RESOURCES:

https://freevideolectures.com/course/3018/microprocessors-and-microcontrollers/1
https://www.tutorialspoint.com/microprocessor
https://www.javatpoint.com/microprocessor

18A2205491- WEB TECHNOLOGIES AND ADVANCED JAVA PROGRAMMING LAB

Lecture – Tutorial-Practical:	0-0-3	**Internal Marks:**	40
Credits:	3	**External Marks:**	60*

Prerequisites:

JAVA PROGRAMMING, DBMS

Course Objectives:

HyperText Markup Language (HTML) and Cascading Style Sheets (CSS) for laying out (formatting) pages that contain text, images and graphics.

Extensible Markup Languages (XML is used to store and transport data among webpages), a mechanism for defining new tag sets and interchanging data among web applications.

Client-side Programming using JavaScript for validating the data.

Server-Side Programming using servlets are to generate static content and Java Server Pages are used to generate dynamic content.

Creating a pure Dynamic Web Application which retrieves the data from Database according to the client request using JDBC.

Course Outcomes:

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

CO1	Create a website statically or dynamically.
CO2	Get knowledge on displaying and decorating the contents in a webpage.
CO3	Learn the concepts of store and transport the data among webpages.
CO4	Generate static or dynamic content according to the client's request.
CO5	Create objects with which the client can communicate with server.
CO6	Provide User Authentication by using cookies and back end operations using JDBC.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	--	--	--	--	--	--	--	--	--	--
CO2	3	3	--	3	--	--	--	--	--	--	--	3
CO3	3	3	--	--	--	--	--	--	--	--	--	--
CO4	3	3	--	--	--	--	--	--	--	--	--	3
CO5	3	3	--	--	--	--	--	--	--	--	--	3
CO6	3	3	--	--	--	--	--	--	--	--	--	--

Week-1:

Design the following static web pages required for an online book store web site.

1) HOME PAGE:

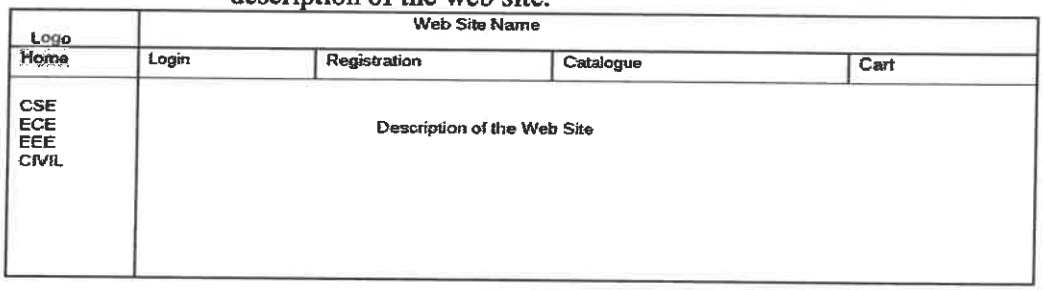
The static home page must contain three **frames.**

Top frame : Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below).

Left frame : At least four links for navigation, which will display the catalogue of respective links.

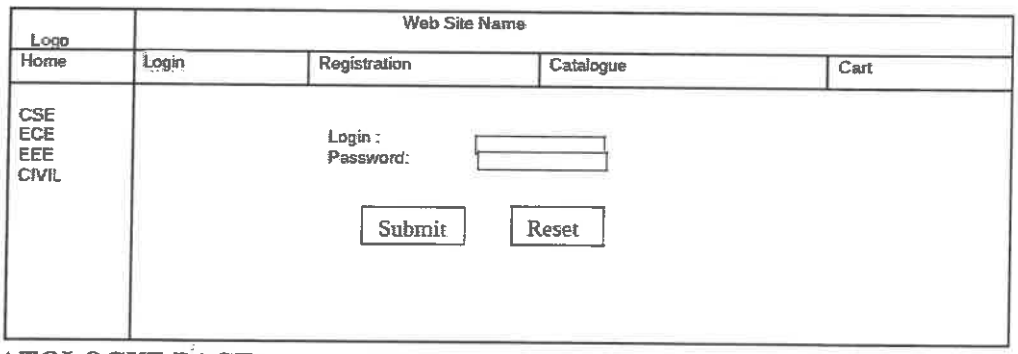
For e.g.: When you click the link **"CSE"** the catalogue for **CSE** Books should be displayed in the Right frame.

Right frame: The *pages to the links in the left frame must be loaded here*. Initially this page contains description of the web site.



2) LOGIN PAGE:

This page looks like below:



3) CATOLOGUE PAGE:

The catalogue page should contain the details of all the books available in the web site in a table.

The details should contain the following:

1. Snap shot of Cover Page.
2. Author Name.
3. Publisher.
4. Price.
5. Add to cart button.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	   	Book : XML Bible Author : Winston Publication : Wiely Book : AI Author : S.Russel Publication : Princeton hall Book : Java 2 Author : Watson Publication : BPB publications Book : HTML in 24 hours Author : Sam Peter Publication : Sam publication	$ 40.5 $ 63 $ 35.5 $ 50	Add to cart Add to cart Add to cart Add to cart

Note: Week 2 contains the remaining pages and their description.

Week-2:

4) CART PAGE: The cart page contains the details about the books which are added to the cart.

The cart page should look like this:

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	**Book name** Java 2 XML bible	**Price** $35.5 $40.5	**Quantity** 2 1 **Total amount -**	**Amount** $70 $40.5 $130.5

5) REGISTRATION PAGE:

Create a "*registration form* "with the following fields

1) Name (Text field)
2) Password (password field)
3) E-mail id (text field)
4) Phone number (text field)
5) Sex (radio button)
6) Date of birth (3 select boxes)
7) Languages known (check boxes – English, Telugu, Hindi, Tamil)
8) Address (text area)

WEEK 3:

VALIDATION:

Write *JavaScript* to validate the following fields of the above registration page.

1. Name (Name should contains alphabets and the length should not be less than 6 characters).
2. Password (Password should not be less than 6 characters length).
3. E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)
4. Phone number (Phone number should contain 10 digits only).

Note : You can also validate the login page with these parameters.

Use PHP to connect with the database to store the above details.

Week-4:

Design a web page using **CSS (Cascading Style Sheets)** which includes the following:

1) Use different font, styles:

In the style definition you define how each selector should work (font, color etc.). Then, in the body of your pages, you refer to these selectors to activate the styles.

For example:

```
<HTML>
<HEAD>
<style type="text/css">
B.headline {color:red; font-size:22px; font-family:arial; text-decoration:underline}
</style>

</HEAD>
```

```
<BODY>
<b>This is normal bold</b><br>
Selector {cursor:value}

For example:

<html>
<head>
<style type="text/css">
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>

<body>
<b>
<a href="mypage.htm" class="xlink">CROSS LINK</a>
<br>
<a href="mypage.htm" class="hlink">HELP LINK</a>
</b>
</body>
</html>

<b class="headline">This is headline style bold</b>
</BODY>

</HTML>
```

2) Set a background image for both the page and single elements on the page.
You can define the background image for the page like this:

```
BODY {background-image:url(myimage.gif);}
```

3) Control the repetition of the image with the background-repeat property.
As background-repeat: repeat
Tiles the image until the entire page is filled, just like an ordinary background image in plain HTML.

4) Define styles for links as

A:link
A:visited
A:active
A:hover

Example:

```
<style type="text/css">
A:link {text-decoration: none}
A:visited {text-decoration: none}
A:active {text-decoration: none}
A:hover {text-decoration: underline; color: red;}
</style>
```

5) Work with layers:
For example:
LAYER 1 ON TOP:

LAYER 1
<div style="position:relative; top:-50; left:5; color:red; font-size:80px; zindex:
1">LAYER 2
LAYER 2 ON TOP:
LAYER 1
<div style="position:relative; top:-50; left:5; color:red; font-size:80px; zindex:
4">LAYER 2

6) Add a customized cursor:

Selector {cursor:value}

For example:

```
<html>
<head>
<style type="text/css">
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>

<body>
<b>
<a href="mypage.htm" class="xlink">CROSS LINK</a>
<br>
<a href="mypage.htm" class="hlink">HELP LINK</a>
</b>
</body>
</html>
```

Week-5:

Write an XML file which will display the Book information which includes the following:

1) Title of the book
2) Author Name
3) ISBN number
4) Publisher name
5) Edition
6) Price

Write a Document Type Definition (DTD) to validate the above XML file.
Display the XML file as follows.
The contents should be displayed in a table. The header of the table should be in color GREY. And the
Author names column should be displayed in one color and should be capitalized and in bold.
Use your own colors for remaining columns.
Use XML schemas XSL and CSS for the above purpose.
Note: Give at least for 4 books. It should be valid syntactically.
Hint: You can use some xml editors like XML-spy

Week-6:

1) Install TOMCAT web server and APACHE.
While installation assign port number 4040 to TOMCAT and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port.
2) Access the above developed static web pages for books web site, using these servers by putting the web pages developed in week-1 and week-2 in the document root.
Access the pages by using the urls : http://localhost:4040/rama/books.html (for tomcat)
http://localhost:8080/books.html (for Apache)

Week-7:

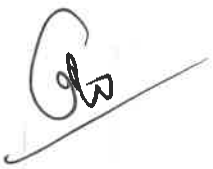
User Authentication :

Assume four users user1,user2,user3 and user4 having the passwords pwd1,pwd2,pwd3 and pwd4 respectively. Write a servelet for doing the following.
1. Create a Cookie and add these four user id's and passwords to this Cookie.
2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies.
If he is a valid user(i.e., user-name and password match) you should welcome him by name(user-name) else you should display " You are not an authenticated user ".
Use init-parameters to do this. Store the user-names and passwords in the webinf.xml and access them in the servlet by using the getInitParameters() method.

Week-8:
Install a database(Mysql or Oracle).
Create a table which should contain at least the following fields: name, password, email-id, phone number(these should hold the data from the registration form).
Practice 'JDBC' connectivity.
Write a java program/servlet/JSP to connect to that database and extract data from the tables and display them. Experiment with various SQL queries.
Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).

Week-9:
Write a JSP which does the following job:
Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies).

Week-10:
Create tables in the database which contain the details of items (books in our case like Book name , Price, Quantity, Amount)) of each category. Modify your catalogue page (week 2)in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using JDBC.



18A2205492--Aptitude and Reasoning

Lecture – Tutorial-Practical:	0-0-2	Internal Marks:	40
Credits:	1	External Marks:	60*

UNIT – I

1. PERCENTAGES
2. SIMPLE INTEREST & COMPOUND INTEREST
3. PROFIT AND LOSS

UNIT – II

1. TIME AND WORK
2. PIPES AND CISTERN
3. TIME, SPEED AND DISTANCE

UNIT- III

1. DATA INTERPRETATION
2. SYLLOGISMS, AVERAGES

UNIT- IV

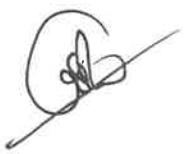
1. VISUAL /DIAGRAMATIC REASONING
2. CODING AND DECODING
3. NUMBER SERIES
4. PROBLEMS ON AGES

TEXT BOOKS:

1) **APTIPEDIA, WILEY**
2) **Quantitative Aptitude, RS AGARWAL, S.Chand Publishers**

REFERENCE BOOKS:

1. **HOW TO PREPARE FOR Quantitative Aptitude, ARUN SHARMA, Mc GRAW HILL**



18A2205901--Mini project

Lecture – Tutorial-Practical:	0-0-2	**Internal Marks:**	40
Credits:	1	**External Marks:**	60*

The mini project is designed to help students develop practical ability and knowledge about practical tools/techniques in order to solve real life problems related to the industry, academic institutions and computer science research. The course Mini Project is one that involves practical work for understanding and solving problems in the field of computing. Any computer science project usually consists of the following: analysis, design, coding/implementation and testing of some information system or subsystem, such as, a piece of software. The subsystem does not have to be a computer program; a design document might be the appropriate output from a design study. The design and development of hardware system/subsystem would also be an appropriate project, however, in this course we expect a software system or subsystem. This course will also develop your investigative, research and report writing skills and will provide an opportunity for you, to investigate a chosen topic in considerable depth. Mini Project provides the opportunity for students to demonstrate the application of their programming and research skills, and to apply their knowledge to complex computing problems.

Students can take up small problems in the field of Computer Science and Engineering as mini project.

Project can be related to solution to an engineering problem, verification and analysis of experimental data available, conducting experiments on various engineering subjects, material characterization, studying a software tool for the solution of an engineering problem etc.

A batch of 3 students can form it as group
The type of the project selection could be an application, product, a review or a research work.
Project Review Committee will conduct 3 internal Reviews and one Final Review for 100 Marks.

Review I (Project Synopsis ,analysis)	20 Marks
Review II(Project Design)	20 Marks
Review III(Project Implementation)	20 Marks
Final Review (Project Evaluation with conclusion and report)	40 Marks

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NRIA18

DEPARTMENT OF COMUTER SCIENCE AND ENGINEERING

HUMANITIES ELECTIVES

II CSE - I SEMESTER

Code	Open Elective – 2
18A2100601	Professional CommunicationSkills
18A2100602	Visual Communication
18A2100603	Sanskrit
18A2100604	Psychology
18A2100605	Philosophy
18A2100606	Foreign Languages (German/French)

II CSE - II SEMESTER

Code	Open Elective -1
18A2205601	Data Structures

Head, CSE Department
NRI Institute of Technology
POTHAVARAPPADU (VIII)
Agiripalli (Md.), Krishna Dis

H.O.D

Course Code- Professional Communication Skills

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

Prerequisites:

Basic understanding of English

Course Objectives:

- This course is expected to relate Soft Skills to real life scenario besides real time experiences. This provides an additional support in training students on already available practices. Attempt can be made to combine theory and practice enabling students learn more from experience.
- This course is expected to bridge the gap between theoretical knowledge and real time experiences while encountering challenges in the society.
- It is believed that the topics included in the course would enable the learner to develop a new perspective, to overcome a few current problems at the individual level and societal level.

Course Outcomes:

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

CO1	Develop effective familiarity with soft skills along with right attitude to eliminate conflict and strife in their presentation skills.
CO2	Develop awareness on setting suitable goals and planning accordingly by using the techniques of time management to climb the ladder of success.
CO3	Enhance the learners' analytical and logical skills besides lateral thinking and kindle the true professional spirit.
CO4	Interpret any situation positively by managing stress at all scenarios.
CO5	Become a responsible citizen by imbibing social etiquette and ethics.
CO6	Draft appropriate written documents using the acquired knowledge on writing.

UNIT I: KNOW YOUR SOFT SKILLS

Know your Soft Skills: What are soft skills?, Soft Skills vs Hard Skills, Why Soft Skills are important for success?, Can Soft Skills be cultivated?

Writing Skills: Creative Writing, Summarization of Mini Projects or Paper Presentations

UNIT II: ATTITUDE AND EMOTIONAL INTELLIGENCE

Attitude: What is attitude? Benefits of Positive Attitude and How to build Positive Attitude?

Emotional Intelligence: What is Emotional Intelligence? How to balance Emotional Intelligence? and Crisis Management.

Writing Skills: Memo Writing, Writing Technical Abstracts

Course Code- Visual Communications

Lecture – Tutorial- Practical:	3-0-0	**Internal Marks:**	30
Credits:	3	**External Marks:**	70
Prerequisites:			

Basic understanding about communication components

Course Objectives:

The core objective of the paper is to create awareness about the theories and technical aspects of visualization process. The paper deals with visual communication theories and analysis of visuals. It also imparts knowledge of making visuals, video production skills and application of the software required for the purpose.

Course Outcomes:

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

CO1	The students will acquire the fundamental and foundation knowledge on image and creating meaning through visuals. They will acquire skills to present ideas and design messages.
CO2	They will be familiarised with communication and presentation of ideas visually.
CO3	The students will study various theories and concepts in understanding the visuals. They will learn new ways of understanding and presentation for different purposes.
CO4	The students will learn the key aspects of visual aspects in art, camera, and filming as well as trade secrets in communication media business to gain an up- to-date understanding of the field.
CO5	After studying the course, the students will acquire production planning skills and application of technology for projects based on communication.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	2	-	3	3	2	2	1	1	1	1
CO2	3	-	2	-	3	3	2	2	1	1	1	1
CO3		-	2	-	-	-	-	-	-	1	1	1
CO4	3	-	1	3	3	-	-	1	1	1	1	1
CO5	2	-	1	-	3	3	2	2	1	1	1	1
CO6	3	-	2	-	3	3	2	2	1	1	1	1

Psychology

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

Prerequisites:

Basic understanding about communication components

Course Objectives:

1. Aware of different applications of psychology to everyday life.
2. Aware of different work place issues, behavioral issues
3. Understand how the knowledge gained from this course can be used in their personal and professional lives.

Course Outcomes:

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

CO1	The student will be able to understand the inter relationship of knowledge and our fund of knowledge
CO2	The students develops the discrimination between true and false knowledge
CO3	The students develops moral sense of Indian society
CO4	The students extends his mental horizons in understanding different stands of moral order
CO5	The students intuitively grasps the ways of understanding the world and our environment
CO6	The students gains an insight into the very nature of Science and Technology

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	1	2	-	-	-	2	-	3	-	-	-	2
CO2	1	2	-	2	-	2	-	2	-	-	-	2
CO3	1	-	-	-	-	3	-	3	-	-	-	-
CO4	1	-	-	-	-	3	-	3	-	-	-	-
CO5	1	-	=	-	-	2	-	-	-	-	-	2
CO6	3	3	3	3	3	3	3	-	-	3	3	3

UNIT- 1: Introduction

Course Code: Engineering Philosophy

Lecture – Tutorial- Practical:	3-0-0	**Internal Marks:**	30
Credits:	3	**External Marks:**	70
Prerequisites:			

Basic understanding

Course Objectives:

- The student gains knowledge and understanding of foundations of system building especially Indian philosophical systems i.e., darsanas, which originate from profound and novel ideas.
- It enables the student to understand the role of rigorously scrutinizing the internal structure, rigor, nature and validity of argumentation and thesis.
- It helps the student get training in the generation of new ideas, formulation of thoughts and its application for the benefit of society.
- The student is able to relate philosophy both Indian and western to literature, culture, society and lived experience.

Course Outcomes:

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

CO1	The course in **Philosophy** is expected to bridge the gap between theory and practice by making the courses interactive.
CO2	The course of philosophy, which includes ethics and values, different ways of knowing, self and society, theory and practice, self and transcendence. These would enable the student in gaining knowledge about one's meaning and purpose of life, identifying one's goals and purpose and working out one's program of action in life
CO3	The course can provide a new understanding, based on which one can move to overcome the current problems, both at the individual level as well as at the societal level.

Unit I- Characteristic Features of Philosophy

- Structure and the content of the Vedas
- The essence of the fundamental Upanishads about the atman and Brahman
- A brief survey of heterodox and orthodox systems of Indian philosophy
- Greek Philosophy--Thales, Heraclitus, Parmenides, Democritus and Leucippus, Socrates, Plato and Aristotle

Unit II –Knowledge and Its Sources

Credit Distribution Pattern

	SEM-1	SEM-2	TOTAL
I	18	22	40
II	21	20.5	41.5
III	21	22	43
IV	21.5	14	35.5
TOTAL	81.5	78.5	160

II YEAR I SEMESTER

L - LECTURE T – TUTORIAL P – PRACTICAL CIA – Continuous Internal Assessment SEA – Semester End Assessment

Sl. No	Course Code	Title of the Course	Scheme of Instruction (Periods Per Week)				Scheme of Examination (Maximum Marks)			No. of Credits
			L	T	P/D	Total	CIA	SEA	Total	
1	18A2100203	Discrete Mathematical Structures	3	1	0	4	40	60	100	4
2	18A2105401	Data Structures	3	0	0	3	40	60	100	3
3	18A2105402	Data Base Management Systems	3	0	0	3	40	60	100	3
4	18A2105403	Digital Logic Design	2	0	2*	4	40	60	100	3
5	18A2105391	Internet of Things Lab	0	2	2	4	40	60	100	3
6	18A2105491	Data Structures Lab	0	0	2	2	40	60	100	1
7	18A2105492	Data Base Management System Lab	0	0	2	2	40	60	100	1
8	18A2105494	Python programming Lab	0	1	2	3	40	60	100	2
9	HSS Elective	Humanities elective-1	2	0	0	2	40	60	100	1
10	18A2100801	Professional ethics and Human Values	2	0	0	2	40	60*	100	0
Total			**15**	**4**	**10**	**29**	**400**	**600**	**1000**	**21**

*** No External Evaluation**

List of Humanities Electives

A	18A2100601	Professional Communication Skills	D	18A2100604	Psychology
B	18A2100602	Visual Communication	E	18A2100605	Philosophy
C	18A2100603	Sanskrit			

18A2100202- DISCRETE MATHEMATICAL STRUCTURES

Lecture - Tutorial-Practical:	3-1-0	**Internal Marks:**	40
Credits:	4	**External Marks:**	60

Prerequisites:

Course Objectives:

Acquiring the relevance of statements, inferences and predicates in computer science.
Overview of group theory.
Overview of recurrence relations and solving recurrence relations.
Exposure of graphs, their representations, types, trees and tree variants.

Course Outcomes:

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

CO1	Apply the concept of Mathematical Logic in software development process.
CO2	Apply the recurrence relation for analyzing recursive algorithms.
CO3	Student will able to understand the concepts of group theory.
CO4	Apply the concept of group theory in robotics, computer vision & computer graphics.
CO5	Student will able to understand the concepts of graph theory and Trees.
CO6	Use the concepts of graph theory to provide solutions for routing applications in computer networks.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 - Low, 2- Medium, 3 - High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	-	-	-	-	-	-	-	-
CO3	2	2	2	-	-	-	-	-	-	-	-	-
CO4	3	2	2	-	-	-	-	-	-	-	-	-
CO5	2	2	2	-	-	-	-	-	-	-	-	
CO6	3	3	3	-	-	-	-	-	-	-	-	

UNIT I :Mathematical logic

Connectives, negation, conjunction, disjunction, conditional and bi-conditional, well formed formulae, tautologies, equivalence of formulae, duality, tautological implications, functionally complete set of connectives, principal disjunctive and conjunctive normal forms, inference calculus, rules of inference, indirect method of proof, conditional proof, automatic theorem proving.

UNIT II: Recurrence relations

Recurrence relations, solving linear recurrence relations by characteristic roots method, system of recurrence relations, non - linear recurrence relations.

UNIT III: Group theory

Groups, subgroups, Lagrange's theorem on finite groups, normal subgroups. group codes

UNIT IV: Graph theory & Trees

Definitions, finite and infinite graphs, incidence and degree, isolated pendant vertices, isomorphism, sub graphs, walk, path and circuit, connected and disconnected graphs, components, Euler graphs, Euler graph theorem, operations on graphs, decomposition of Euler graphs into circuits, arbitrarily traceable Euler graphs, Hamiltonian paths and circuits, number of edge disjoint Hamiltonian circuits in complete graph with odd number of vertices, travelling salesman problem. Some properties of trees, pendant vertices, distance and centers, rooted and binary trees, spanning trees, fundamental circuit, shortest spanning trees, Kruskal's algorithm.

TEXT BOOKS:

1. J.P. Tremblay and R. Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, 1997. (Modules 1 and 3)
2. Joe L. Mott, Abraham Kandel and T. P. Baker, Discrete Mathematics for computer
3. scientists & Mathematicians, 2/e, Prentice Hall of India Ltd, 2012. (Module 2)
4. Narsingh Deo, Graph Theory with Applications to Engineering and Computer Science, Prentice Hall of India, 2006. (Modules 4 and 5).

REFERENCE BOOKS:

1. Keneth. H. Rosen, Discrete Mathematics and its Applications, 6/e, Tata McGraw-Hill, 2009.
2. Richard Johnsonburg, Discrete mathematics, 7/e, Pearson Education, 2008

E-RESOURCES:

18A2105401- DATA STRUCTURES

Lecture - Tutorial-Practical::	3-0-0	**Internal Marks:**	40
Credits:	3	**External Marks:**	60
Prerequisites:			

C- Programming

Course Objectives:

1 To impart basic knowledge of data structures.

2 Be familiar with basic techniques of algorithm analysis

3 Be familiar with writing recursive methods

4 To understand concepts about searching and sorting techniques

5 To design and implementation of various basic and advanced data structures like stacks, queues, lists, trees and graphs.

6 To introduce various techniques for representation of the data in the real world.

To understanding about writing algorithms and step by step approach in solving problems with the help of fundamental data structures

Course Outcomes:

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

CO1	Ability to illustrate the concepts of algorithm apply the learning concepts to design data structure for the given problem definition.
CO2	Ability to design applications using stacks and queues and implements various types of queues
CO3	Analyze and implement operations on linked list and demonstrate their applications
CO4	Ability to analyze and implement operations on trees
CO5	Ability to demonstrate various operations on binary search trees and its applications
CO6	Ability to evaluate the properties and operations on graphs and implement the graph applications

Contribution of Course Outcomes towards achievement of Program Outcomes (1 - Low, 2- Medium, 3 - High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	2	2	-	-	-	-	-	-	-	3
CO2	3	2	3	2	-	-	-	-	-	-	-	3
CO3	3	2	3	2	-	-	-	-	-	-	-	3
CO4	3	2	3	2	-	-	-	-	-	-	-	3
CO5	3	2	3	2	-	-	-	-	-	-	-	3
CO6	3	2	3	2	-	-	-	-	-	-	-	3

UNIT I : Data Structures, Recursion, Searching, and Sorting.

Data Structures: Definition, Types of Data Structures, Arrays, structures, self-referential structures, Operations, Algorithm analysis Time Complexity and Space Complexity.
Recursion: Definition, Linear and Binary recursions, Iteration vs. Recursion.

Searching: Linear Search, Binary Search.
Sorting: Basic concepts, Divide-and-Conquer approach, Insertion Sort, Merge Sort, Quick Sort, and Heap Sort.

UNIT II: Linked Lists, Stacks, and Queues.

Linked Lists: Introduction, types of Linked Lists, operations, inserting a node in Single Linked List, deleting a node in Single Linked List, searching a node in Single Linked List, inserting, deleting, and searching a node in Double Linked List.
Stacks: Introduction, operations, applications, Stacks implementation using Arrays, Stacks implementation using Linked List, Expression Conversion: Infix to Postfix, Infix to Prefix.
Queues: Introduction, operations, applications, Queues implementation using Arrays, Queues implementation using Linked Lists, Circular Queue, Priority Queues

UNIT III: Trees.

Basic Tree Concepts, Terminology, operations, Tree traversals, **Binary Trees:** definition, properties, Binary Tree representations, operations, **Binary Search Tree:** definition, properties, applications, Inserting, Deleting, and Searching element in Binary Search Tree,
Threaded Binary Tree: definition, properties, Inserting a Node into a Threaded Binary Tree,
Heaps: Definition of a Max Heap, properties.

UNIT IV: Graphs.

Graphs: Introduction, Terminology, Representation of graphs, types of graphs, applications, operations, Graph transversal techniques: Breadth First Search (BFS), Depth First Search (DFS), implementations. **Minimum Spanning Tree (MST):** definition, Prim's algorithm, Kruskal's algorithm, **Shortest paths:** Basic Concepts, Dijsktra's algorithm

TEXT BOOKS:

1. Fundamentals of DATA STRUCTURES in C, Horowitz,Sartaj Sahani, Susan Anderson – Freed, University Press
2.Data Structures, 2/e, Richard F, Gilberg , Forouzan, Cengage

REFERENCE BOOKS:

1 .Data Structures using C, 2nd Edition,by A. K. Sharma, Pearson India
2. Classic Data Structures, 2/e, Debasis, Samanta, PHI,2009
3. Data Structures and Algorithms, 2008, G.A.V.Pai, TMH
4. DATA STRUCTURE USING C,Udit Agarwal,KATSON Books
5. Data Structures using C,Reema Thareja, Oxford

E-RESOURCES:

1. https://en.wikipedia.org/wiki/Data_structure
2. https://www.tutorialspoint.com/data_structures_algorithms/data_structures_basics
3. http://nptel.ac.in/courses/106103069/

18A2105402- DATA BASE MANAGEMNET SYSTEMS

Lecture - Tutorial-Practical::	3-0-0	**Internal Marks:**	40
Credits:	3	**External Marks:**	60
Prerequisites:			

C- Programming, Mathematics

Course Objectives:

- Learn and practice data modeling using the entity-relationship and developing database designs
- Understand the use of Structured Query Language (SQL) and learn SQL syntax.
- Apply normalization techniques to normalize the database
- Understand the needs of database processing and learn techniques for controlling the consequences of concurrent data access
- Understand the indexing concepts and how help full in accessing data
- Learn the concepts of transaction management and how they provide security and consistency

Course Outcomes:

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

CO1	Ability to define, understand the database management system structure
CO2	Ability to apply SQL as well as relational algebra to find solutions to a broad range of queries.
CO3	Ability to design ER diagrams or database for given scenario
CO4	Ability to create applications using various normal forms, functional dependencies, validating and identifying anomalies.
CO5	Ability to design application using locking methods and recovery management.
CO6	Ability to conduct experiments of database using modern tools.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 - Low, 2- Medium, 3 - High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	-	-	-	-	-	-	-	-	-	-	-	-
CO2	3	-	-	-	-	-	-	-	-	-	-	-
CO3	-	3	-	-	-	-	-	-	-	-	-	-
CO4	-	-	3	-	-	-	-	-	-	3	-	-
CO5	-	-	-	3		-	-	-	-	-	-	-
CO6	-	-		-	3	-	-	-	-	3	-	-

UNIT I

Databases and Database Users: Introduction, Characteristics of the Database Approach, Actors on the Scene, Workers behind the Scene, Advantages of Using the DBMS Approach. **Database System Concepts and Architecture:** Data Models, Schemas, and Instances, Three-Schema Architecture and Data Independence, Database Languages and Interfaces, The Database System Environment, Centralized and Client/Server

Architectures for DBMSs

UNIT II

SQL: SQL Data Definition and Data Types, Specifying Constraints in SQL, Schema Change Statements in SQL , INSERT, DELETE, and UPDATE Statements in SQL, Basic Retrieval Queries in SQL, More Complex SQL Retrieval Queries, Views (Virtual Tables) in SQL. **The Relational Algebra:** Unary Relational Operations: SELECT and PROJECT, Relational Algebra Operations from Set Theory, Binary Relational Operations: JOIN and DIVISION. **Data Modeling Using the Entity-Relationship (ER) Model:** Using High-Level Conceptual Data Models for Database Design, A Sample Database Application, Entity Types, Entity Sets, Attributes, and Keys, Relationship Types, Relationship Sets, Roles, and Structural Constraints, Weak Entity Types, Relational Database Design Using ER-to-Relational Mapping.

UNIT III

Normalization: Functional Dependencies, Inference Rules, Equivalence, and Minimal Cover, Properties of Relational Decompositions, Algorithms for Relational Database Schema Design, Normal Forms Based on Primary Keys, General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form, Multivalued Dependency and Fourth Normal Form, Join Dependencies and Fifth Normal Form.

File Structures, Hashing and Indexing: Placing File Records on Disk, Operations on Files, Files of Unordered Records (Heap Files), Files of Ordered Records (Sorted Files), Hashing Techniques, Types of Single-Level Ordered Indexes, Multilevel Indexes, Dynamic Multilevel Indexes Using B-Trees and B+-Trees.

UNIT IV:

Transaction Processing: Transaction and System Concepts, Desirable Properties of Transactions, Characterizing Schedules Based on Recoverability, Characterizing Schedules Based on Serializability.

Concurrency Control Techniques: Two-Phase Locking Techniques for Concurrency Control, Concurrency Control Based on Timestamp Ordering, Validation (Optimistic) Concurrency Control Techniques

Database Recovery Techniques: Recovery Concepts, NO-UNDO/REDO Recovery Based on Deferred Update, Recovery Techniques Based on Immediate Update, Shadow Paging, The ARIES Recovery Algorithm

TEXT BOOKS:

1. Fundamentals of Database Systems, Elmasri Navrate, 6th edition, Pearson Education

REFERENCE BOOKS:

1. "Database System Concepts", . Korth, Slberchatz, Sudarshan, 6th Edition, McGraw – Hill
2. Peter Rob and Carlos Coronel, " Database Systems Design, Implementation and Management", Thomson Learning, 5th Edition.
3. Introduction to Database Systems, CJ Date, Pearson 4. DATA STRUCTURE USING C,Udit Agarwal,KATSON Books
4. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGraw Hill 3rd Edition

E-RESOURCES:

18A2105403- DIGITAL LOGIC DESIGN

Lecture - Tutorial-Practical:	2-0-2	**Internal Marks:**	40
Credits:	3	**External Marks:**	60

Prerequisites:

Number Systems, Mathematics-I , Mathematics-II

Course Objectives:

- To study the basic philosophy underlying the various number systems, negative number representation, binary arithmetic, binary codes and error detecting and correcting binary code.
- To study the theory of Boolean algebra and to study representation of switching functions using Boolean expressions and their minimization techniques.
- To study the combinational logic design of various logic and switching devices and their realization.
- To study some of the programmable logic devices and their use in realization of switching functions.
- To study the sequential logic circuits design both in synchronous and Asynchronous modes for various complex logic and switching devices, their minimization techniques and their realizations.
- To implement synchronous state machines using flip flops.

Course Outcomes:

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

CO1	Understand the numeric information in different forms and interpret different logic gates.
CO2	Minimize the given Switching functions in SoP and PoS forms using K-Map and Tabular Method.
CO3	Analyze and Design various combinational circuits like Encoders, Decoders, Multiplexers, De-multiplexers, and Arithmetic Circuits.
CO4	Design combinational logic circuits using different types of Programmable Logic Designs.
CO5	Design and Implement various sequential circuits like flip flops, registers.
CO6	Design the state diagrams with the knowledge of Mealy and Moore conversions, state machines using various flip flops.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2- Medium, 3 – High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	2	-	-	-	-	-	-	-	-	-	-
CO3	3	2	1	-	-	-	-	-	-	2	-	3
CO4	2	-	-	-	-	-	-	-	-	-	-	-
CO5	3	3	2	-	-	-	-	-	-	2	-	3
CO6	2	2	3	-	-	-	-	-	-	-	-	-

UNIT I

NUMBER SYSTEMS & BOOLEAN FUNCTIONS: Representation of numbers in different radix, conversation from one radix to another radix, r-1's compliments and r's compliments of signed numbers, weighted and non-weighted codes , Gray code, Error detection, error correction codes, parity checking, Hamming code, Boolean theorems, principle of complementation & duality, De-Morgans theorems, Basic logic gates and Universal gates, NAND-NAND and NOR-NOR realizations, Standard SOP and POS.

Practical's

1. Verification of Basic Logic Gates.
2. Implementing all individual gates with Universal Gates NAND & NOR.

Design a circuit for the given Canonical form, draw the circuit diagram and verify the De-Morgan laws

UNIT II

MINIMIZATION TECHNIQUES & COMBINATIONAL LOGIC DESIGN: Minimization techniques: minimization of logic functions using Boolean theorems, minimization of switching functions using K-Map up to 5 variables, tabular minimization, Design of Half adder, full adder half subtractor, full subtractor, 4-bit binary subtractor, adder-subtractor circuit, BCD adder circuit, Excess 3 adder circuit, 4 bit parallel adder, Carry look-a-head adder circuit, applications of adders and subtractors. Decoders, 7 segment decoder, Encoders, priority encoder, Multiplexer, Demultiplexer.

Practical's

1. Construct Half Adder and Full Adder using Half Adder and verify the truth table.
2. Design a Combinational Logic circuit for 4x1 MUX and verify the truth table.
3. Design a Combinational Logic circuit for 1x4 De- MUX and verify the truth table.

UNIT III

SEQUENTIAL LOGIC DESIGN: Classification of sequential circuits, Latches and Flipflops, Triggering, excitation tables, Asynchronous inputs, Conversion from one flip-flop to another flip flop. Registers-Types, modes of operations, bi-directional shift registers, universal shift register, Counters-synchronous & Asynchronous counters, design of Mod-counters, Counters using shift registers, Serial binary adder.

Practical's

1. Verification of truth tables of the basic Flip- Flops with *Synchronous* and *Asynchronous* modes
2. Implementation of Master Slave Flip-Flop with J-K Flip- Flop and verify the truth table for *race around* condition.
3. Design a Decade Counter and verify the truth table.
4. Design the Mod 6 counter using D-Flip –Flop.
5. Construct 4-bit ring counter with T-Flip –Flop and verify the truth table.
6. Design a 8 – bit right Shift Register using D-Flip -Flop and verify the truth table.

UNIT IV:

STATE MACHINES: Finite state machine, Analysis of clocked sequential circuits, state diagrams, state tables, reduction of state tables and state assignment, design procedures. Realization of circuits using various flip-flops. Melay to Moore conversion and vice-versa.

TEXT BOOKS:

1. Hill and Peterson "Switching Theory and Logic Design" Mc-Graw Hill TMH edition.

2. A. Anand Kumar "Switching Theory and Logic Design" PHI, 2009

EQUIPMENT REQUIRED:

Digital IC Trainer kit

REFERENCE BOOKS:

RP Jain, " Modern Digital Electronics", TMH, 2009.

Fundamentals of Logic Design by Charles H.Roth Jr, Cenage Learning, 2010

Digital Logic And Computer Design By M. Morris Mano

E-RESOURCES:

https://nptel.ac.in/courses/106108099/
https://swayam.gov.in/course/1392-digital-circuits-and-systems
http://www.nesoacademy.org/electronics-engineering/digital-electronics/digital
https://www.youtube.com/playlist?list=PLWPirh4EWFpHk70zwYoHu87uVsCC8E2S-
https://www.youtube.com/watch?v=X7M3rUxUpOc&list=PLbRMhDVUMngePP5JcezxImF-FzOC9wstz&index=1
https://www.youtube.com/watch?v=lDf2vEcyDfs
https://www.youtube.com/watch?v=HcH0khFGwS8&list=PLbRMhDVUMngfV8C6ElNAUaQQz06wEhFM5

18A2105493- INTERNET OF THINGS LAB

Lecture - Tutorial-Practical:	0-2-2	**Internal Marks:**	40
Credits:	3	**External Marks:**	60

Prerequisites:

Number Systems, Mathematics-I , Mathematics-II

Course Objectives:

Assess the genesis and impact of IoT applications, architectures in real world Illustrate diverse methods of deploying smart objects and connect them to network Compare different Application protocols for IoT

Expose the student to a variety of embedded boards and IoT Platforms

Identify sensor technologies for sensing real world entities and understand the role of IoT in various domains of Industry

Course Outcomes:

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

CO1	Interpret the impact and challenges posed by IoT networks leading to new architectural models.
CO2	Explain the basics of microcontrollers, architecture of Arduino and develop simple applications using Arduino.
CO3	Outline the architecture of Raspberry Pi and develop simple applications using Raspberry, select a platform for a particular embedded computing application
CO4	Interpret different protocols and compare them and select which protocol can be used for a specific application
CO5	Select IoT APIs for an application
CO6	Design and develop a solution for a given application using APIs and test for errors in the application

Contribution of Course Outcomes towards achievement of Program Outcomes (1 - Low, 2- Medium, 3 - High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	2	-	2	-	-	2	-	-	-	-	2	-
CO2	3	2	-	-	-	2	-	-	2	-	-	-
CO3	3	-	2	2	-	2	-	-	-	-	-	2
CO4	2	-	3	-	-	2	-	-	-	-	-	-
CO5	3	2	2	-	2	2	-	-	-	-	-	2
CO6	-	2	3	-	2	2	-	-	-	-	-	2

UNIT I

Overview of IoT:

The Internet of Things: An Overview; The Flavour of the Internet of Things, The "Internet" of "Things", The Technology of the Internet of Things, Design Principles for Connected Devices, Calm and Ambient Technology, Privacy; Keeping Secrets, Web Thinking for Connected Devices, Small Pieces, Loosely Joined, First-Class Citizens On The Internet

UNIT II

Embedded Computing Basics; Microcontrollers; System-on-Chips; Choosing Your Platform; Arduino; Developing on the Arduino; Some Notes on the Hardware; Openness; Raspberry Pi ; Cases and Extension Boards; Developing on the Raspberry Pi; Some Notes on the Hardware; Openness; Other notable platforms; Mobile phones and tablets; Plug Computing: Always-on Internet of Things

1. Select any one development board (Eg., Arduino or Raspberry Pi) and control LED using the board.
2. Using the same board as in (1), read data from a sensor. Experiment with both analog and digital sensors.
3. Control any two actuators connected to the development board using Bluetooth.
4. Create any cloud platform account, explore IoT services and register a thing on the platform.

UNIT III

Internet Principles; Internet Communications: An Overview of IP, TCP, The IP Protocol Suite (TCP/IP), UDP, IP Addresses, Static IP Address Assignment, Dynamic IP Address Assignment, IPv6.

1. Push sensor data to cloud.
2. Control an actuator through cloud.

Accesses the data pushed from sensor to cloud and apply any data analytics or visualization services.

UNIT IV:

Getting Started with an API, Mashing Up APIs, Scraping, Legalities, Writing a New API, MQ Telemetry Transport, Extensible Messaging and Presence Protocol, Constrained Application Protocol

1. Create a mobile app to control an actuator.
2. Identify a problem in your local area or college which can be solved by integrating the things you learned so far and create a prototype to solve it (Mini Project).

TEXT BOOKS:

1. 1. **Adrian McEwen, Hakim Cassimally - Designing the Internet of Things, Wiley Publications, 2012**

REFERENCE BOOKS:

1. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-on-Approach)", 1 stEdition, VPT, 2014. (ISBN: 978-8173719547)
2. **The Internet of Things, Enabling technologies and use cases - Pethuru Raj, Anupama C. Raman, CRC Press.**

E-RESOURCES:

https://www.arduino.cc/

https://www.raspberrypi.org/

18A2105491- DATA STRUCTURES LAB

Lecture - Tutorial-Practical:	0-0-2	**Internal Marks:**	40
Credits:	1	**External Marks:**	60

Prerequisites:

C Programming

Course Objectives:

- To understand and implement basic data structures
- To Apply linear and non linear data structures in problem solving.
- Have a good understanding of how several fundamental algorithms work, particularly those concerned with sorting and searching.
- Have a good understanding of the fundamental data structures used in computer science
- It enables them to gain knowledge in practical applications of data structures.

Course Outcomes:

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

CO1	Implement different searching and sorting techniques. Compare different searching and sorting techniques.
CO2	Design linear data structures stacks, queues and linked lists.
CO3	Design nonlinear data structures trees and Graphs, and implement their operations
CO4	Be capable to identity the appropriate data structure for given problem
CO5	Have practical knowledge on the applications of data structures

Contribution of Course Outcomes towards achievement of Program Outcomes (1 - Low, 2- Medium, 3 - High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	2	2	-	-	-	-	-	-	-	2
CO2	3	2	3	2	-	-	-	-	-	-	-	2
CO3	3	2	3	2	-	-	-	-	-	-	-	2
CO4	3	2	3	2	-	-	-	-	-	-	-	2
CO5	3	2	3	2	-	-	-	-	-	-	-	2

List of Experiments

Exercise 1:

a. Write a recursive C program to find the Factorial of an integer.
b. Write a recursive C program to calculate the GCD of two numbers.
c. Write a recursive C program for Towers of Hanoi: N disks are to be transferred from peg S to peg D with Peg I as the intermediate peg.
d. Write a recursive C program to display the Fibonacci Series: 0, 1, 1, 2, 3, 5, 8, ...N.

Exercise 2:

a. Write a recursive and non-recursive C program to implement Linear Search technique.

b. Write a recursive and non-recursive C program to implement Binary Search technique.

Exercise 3:

a. Write C program that implement Insertion sort, to sort elements in an ascending order.
b. Write C program that implement Merge sort, to sort elements in an ascending order.
c. Write C program that implement Quick sort, to sort elements in an ascending order.

Exercise 4:

a. Write a C program to insert a node in a Single Linked List.
b. Write a C program to delete a node in a Single Linked List.
c. Write a C program to reverse elements in a Single Linked List.
d. Write a C program to insert a node in a Doubly Linked List.

Exercise 5:

a. Write C program that implement Stack (its operations) using arrays.
b. Write C program that implement Queue (its operations) using arrays.
c. Write C program that implement Queue using Two Stacks.

Exercise 6:

a. Write C program that implement Stack using Linked List.
b. Write C program that implement Queue using Linked List.
c. Write a C program to implement the Circular Queue.

Exercise 7:

a. Write a C program to insert elements in a Binary Search Tree (BST).
b. Write a C program to delete element in a Binary Search Tree (BST).
c. Write a C program to implement BST traversals: Inorder, Preorder, and Postorder.

Exercise 8:

a. Write a C program to implement the Max Heap.
b. Write C program that implement Heap sort, to sort elements in an ascending order.

Exercise 9:

a. Write a C program to implement the Breadth First Search technique on a Graph.
b. Write a C program to implement the Depth First Search technique on a Graph.

Exercise 10:

a. Write a C program to implement the Prim's algorithm to construct Minimum Spanning Tree.
b. Write a C program to implement the Kruskal's algorithm to construct Minimum Spanning Tree.

TEXT BOOKS:

1 Data Structures using C,Reema Thareja, Oxford
2.DATA STRUCTURE USING C,Udit Agarwal,KATSON Books
3 Data Structures using C, 2nd Edition, by A. K. Sharma, Pearson India

REFERENCE BOOKS:

1. Keneth. H. Rosen, Discrete Mathematics and its Applications, 6/e, Tata McGraw-Hill, 2009.

18A2105492- DATABASE MANAGEMENT SYSTEMSLAB

Lecture - Tutorial-Practical:	0-2-2	**Internal Marks:**	40
Credits:	1	**External Marks:**	60
Prerequisites:			

C Programming, Mathematics

Course Objectives:

- Design and implement a database schema for a given problem-domain
- Populate and query a database using SQL DML/DDL commands.
- Declare and enforce integrity constraints on a database
- Programming PL/SQL including stored procedures, stored functions, cursors, packages.
- understand real time data base design models and can code the model
- understand and retrieve information from complex designed data bases using correlated nested queries

Course Outcomes:

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

CO1	Queries for Creating, Dropping, and Altering Tables, Views, and Constraints
CO2	Queries to Retrieve and Change Data: Select, Insert, Delete, and Update
CO3	Queries using Built-In Functions: String Functions, Numeric Functions, Date Functions and Conversion Functions.
CO4	Queries using Group By, Order By, and Having Clauses
CO5	Queries on Joins and Correlated Sub-Queries
CO6	Queries on Controlling Data: Commit, Rollback, and Save point

Contribution of Course Outcomes towards achievement of Program Outcomes (1 - Low, 2- Medium, 3 - High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	1	-	-	-	-	-	-	-	-	-	-
CO2	2	3	3	-	1	-	-	-	-	-	-	-
CO3	1	2	2	-	2	-	-	-	-	-	-	-
CO4	1	2	3	-	3	-	-	-	-	-	-	1
CO5	1	2	1	-	2	-	-	-	-	-	-	-
CO6	1	1	3	-	2	-	-	-	-	-	-	-

List of Experiments

SQL

1. Queries for Creating, Dropping, and Altering Tables, Views, and Constraints
2. Queries to Retrieve and Change Data: Select, Insert, Delete, and Update
3. Queries using operators in SQL
4. Queries using Built-In Functions: String Functions, Numeric Functions, Date Functions and Conversion Functions.
5. Queries using Group By, Order By, and Having Clauses

2. Richard Johnsonburg, Discrete mathematics, 7/e, Pearson Education, 2008

E-RESOURCES:

18A2105494- PYTHON PROGRAMMING LAB

Lecture - Tutorial-Practical:	0-1-2	**Internal Marks:**	40
Credits:	2	**External Marks:**	60
Prerequisites:			

C Programming, Mathematics

Course Objectives:

- **To learn the fundamentals of python programming**
- **To get a solid understanding of python functions and data structures**
- To demonstrate the use of python lists and dictionaries.
- To implement methods and functions to improve readability of programs.
- Students able to describe and apply object-oriented programming methodology.
- Students able to build software for real needs and prior introduction to testing software.

Course Outcomes:

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

CO1 Students able to experience with an interpreted Language and to build software for real needs.

CO2 Students able to use basic Decision structures, Boolean logic, variable types, assignments and operators.

CO3 Students able to describe and use of Python lists, dictionaries, tuples and sets.

CO4 To implement methods and functions to improve readability of programs.

CO5 Students able to describe and apply object-oriented programming methodology,top-down concepts in algorithm design.

CO6 Students should be able to design, code ,test and debug python language programs.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 - Low, 2- Medium, 3 - High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	-	-	3	-	-	-	3	-	3	-
CO2	-	3	2	-	-	-	-	-	-	-	-	-
CO3	-	-	-	2	3	-	-	-	3	-	-	-
CO4	-	-	-	3	3	-	-	-	3	-	-	-
CO5	-	-	-	3	-	-		-	-	-	3	-
CO6	-	-	-	-	2	-	-	-	3	-	3	-

List of Experiments

Exercise 1 - Basics

a) Running instructions in Interactive interpreter and a Python Script

b) Write a program to purposefully raise Indentation Error and Correct it

Exercise 2 - Operations

a) Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)

b) Write a program add.py that takes 2 numbers as command line arguments and

6. Queries on Controlling Data: Commit, Rollback, and Save point
7. Queries on Joins and Correlated Sub-Queries
8. Queries on Working with Index, Sequence, Synonym

PL/SQL

1. Write a PL/SQL Code using Basic Variable, Anchored Declarations, and Usage of Assignment Operation
2. Write a PL/SQL Code Bind and Substitution Variables. Printing in PL/SQL
3. Write a PL/SQL block using SQL and Control Structures in PL/SQL
4. Write a PL/SQL Code using Cursors, Exceptions and Composite Data Types
5. Write a PL/SQL Code using Procedures, Functions, Triggers and Packages

TEXT BOOKS:

1 Fundamentals of Database Systems, Elmasri Navrate, 6th edition, Pearson Education

REFERENCE BOOKS:

1. "Database System Concepts", . Korth, Slberchatz, Sudarshan, 6th Edition, McGraw – Hill
2. Peter Rob and Carlos Coronel, " Database Systems Design, Implementation and Management", Thomson Learning, 5th Edition.
3. Introduction to Database Systems, CJ Date, Pearson
4. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGraw Hill 3rd Edition

18A2100802- PROFESSIONAL ETHICS AND HUMAN VALUES

Lecture - Tutorial-Practical:	0-2-0	**Internal Marks:**	40
Credits:	0	**External Marks:**	60*
Prerequisites:			

Basic understanding about Engineering profession

Course Objectives:

- To create awareness on engineering ethics and human values.
- To understand social responsibility of an engineer.

To instill moral and social values and loyalty.

Course Outcomes:

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

CO1	Grooms themselves as ethical, responsible and societal beings.
CO2	Discuss ethics in society and apply the ethical issues related to engineering.
CO3	Exhibit the understanding of ethical theories in professional environment.
CO4	Recognize their role as social experimenters (engineers) and comprehend codes of ethics.
CO5	Identify the risks likely to come across in the professional world, analyzing them and find solutions.
CO6	Realize the responsibilities and rights of engineers in the society.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 - Low, 2- Medium, 3 - High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	-	-	-	-	-	1	1	2	-	-	-	1
CO2	-	-	-	-	-	1	1	2	-	-	-	1
CO3	-	-	-	-	-	1	1	2	-	-	-	1
CO4	-	-	-	-	-	1	1	2	-	-	-	1
CO5	-	-	-	-	-	1	1	2	-	-	-	1
CO6	-	-	-	-	-	1	1	2	-	-	-	1

UNIT I

Human Values: Objectives, Morals, Values, Ethics, Integrity, Work ethics, Service learning , Virtues, Respect for others, Living peacefully, Caring, Sharing, Honesty, Courage, Valuing time,Cooperation, Commitment, Empathy, Self-confidence, Challenges in the work place.

UNIT II

Engineering ethics

Senses of 'Engineering Ethics' – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg's theory – Gilligan's theory – Consensus and Controversy – Models of professional roles – Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories.

UNIT III

(a) The subject-matter of ethics
(b) *Puruṣārthas (dharma, artha, kāma, and mikṣa)*
(c) Law of *karma*
(d) Western Ethics: Hedonism, Utilitarianism, Categorical Imperative

Unit IV Knowledge as Invention

(a) Caraka, Suşruta Aryabhatta, Bhasakra
(b) Galileo, Copernicus, Kepler, Newton, Einstein

TEXT BOOKS:

C.D. Sharma, *A Critical Survey of Indian Philosophy*, Delhi: Motilal Banarsidass, 2000.

P.T.Raju, *Structural Depths of Indian Thought,* Delhi: South Asia Publishers,1985.

Frank Thilly, *History of Philosophy,* USA: Sagwan Press, 2015.

W.T.Grace,*A Critical History of Greek Philosophy,* Oregon: The Foating Press, 2010.

Bal Ram Singh (ed.), *Science and Technology in Ancient Indian Texts,* New Delhi: D.K. Printworld, 2012.

18A2100601- Professional Communication Skills

Lecture - Tutorial-Practical:	2-0-0	**Internal Marks:**	40
Credits:	1	**External Marks:**	60
Prerequisites:			

Basic understanding of English

Course Objectives:

- This course is expected to relate Soft Skills to real life scenario besides real time experiences. This provides an additional support in training students on already available practices. Attempt can be made to combine theory and practice enabling students learn more from experience.
- This course is expected to bridge the gap between theoretical knowledge and real time experiences while encountering challenges in the society.
- It is believed that the topics included in the course would enable the learner to develop a new perspective, to overcome a few current problems at the individual level and societal level.

Course Outcomes:

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

CO1	Develop effective familiarity with soft skills along with right attitude to eliminate conflict and strife in their presentation skills.
CO2	Develop awareness on setting suitable goals and planning accordingly by using the techniques of time management to climb the ladder of success.
CO3	Enhance the learners' analytical and logical skills besides lateral thinking and kindle the true professional spirit.
CO4	Interpret any situation positively by managing stress at all scenarios.
CO5	Become a responsible citizen by imbibing social etiquette and ethics.
CO6	Draft appropriate written documents using the acquired knowledge on writing.

UNIT I: KNOW YOUR SOFT SKILLS

Know your Soft Skills: What are soft skills?, Soft Skills vs Hard Skills, Why Soft Skills are important for success?, Can Soft Skills be cultivated?

Writing Skills: Creative Writing, Summarization of Mini Projects or Paper Presentations

UNIT II: ATTITUDE AND EMOTIONAL INTELLIGENCE

Attitude: What is attitude? Benefits of Positive Attitude and How to build Positive Attitude?

Emotional Intelligence: What is Emotional Intelligence? How to balance Emotional Intelligence? and Crisis Management.

Writing Skills: Memo Writing, Writing Technical Abstracts

UNIT III: GOAL SETTING AND ADAPTABILITY

Goal Setting: What is a Goal? What are smart goals? Goal as Commitment. Steps to reach one's goals.

Adaptability: What is Adaptability? What is its necessity? Adaptability as a tool to capture opportunities.

Writing Skills: Writing Circulars, Writing Agenda and Minutes of Meeting

UNIT IV: TIME MANAGEMENT AND SOCIAL CONSCIOUSNESS

Time Management: What is Time Management? Time Stealers. Strategies for effective Time Management. Time Management and Goal Setting go hand in hand.

Social Consciousness: Social Awareness and Civic Responsibility, Case Study based on Social Intelligence.

Writing Skills: Technical Reports, Writing Reviews of Projects or any Technical Topic

TEXT BOOKS:

1. Pillai Sabina, Fernandez Agna, Soft Skills and Employability Skills, Cambridge Publishers.
2. Khera Shiv, You Can Win, Bloomsbury India, 1998.
3. Covey Sean, Seven Habits of Highly Effective Teens, New York, Fireside Publiishers, 1998.
4. Thomas A Harris, I am OK, You Are OK, New York-Harper And Row, 1972
5. Daniel Coleman, Emotional Intelligence, Bantam Book, 2006.
6. Carnegie Dale, How to Win Friends and Influence People, New York; Simon & Schuster, 1998.

18A2100602- Visual Communications

Lecture - Tutorial-Practical:	2-0-0	**Internal Marks:**	40
Credits:	1	**External Marks:**	60

Prerequisites:

Basic understanding about communication components

Course Objectives:

The core objective of the paper is to create awareness about the theories and technical aspects of visualization process. The paper deals with visual communication theories and analysis of visuals. It also imparts knowledge of making visuals, video production skills and application of the software required for the purpose.

Unit - I of the syllabus focuses on understanding visuals based on theories and principles.

Unit - II introduces the techniques of shooting, framing, composition of visuals with still-camera and other techniques of visualization.

Unit - III imparts knowledge about planning and production techniques of camera, editing and post production.

Unit - IV introduces the basic concepts of software and its application required for making visual presentation.

Course Outcomes:

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

CO1	The students will acquire the fundamental and foundation knowledge on image and creating meaning through visuals. They will acquire skills to present ideas and design messages.
CO2	They will be familiarised with communication and presentation of ideas visually.
CO3	The students will study various theories and concepts in understanding the visuals. They will learn new ways of understanding and presentation for different purposes.
CO4	The students will learn the key aspects of visual aspects in art, camera, and filming as well as trade secrets in communication media business to gain an up- to-date understanding of the field.
CO5	After studying the course, the students will acquire production planning skills and application of technology for projects based on communication.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 - Low, 2- Medium, 3 - High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	-	2	-	3	3	2	2	1	1	1	1
CO2	3	-	2	-	3	3	2	2	1	1	1	1
CO3		-	2	-	-	-	-	-	-	1	1	1
CO4	3	-	1	3	3	-	-	1	1	1	1	1
CO5	2	-	1	-	3	3	2	2	1	1	1	1

CO6	3	-	2	-	3	3	2	2	1	1	1	1

UNIT- 1

Introduction to Visual Communication – Image and understanding – Semiotics – Signs, symbols, codes and meanings – Description of signs – Denotations and connotations – Theories of Visual communication – Elements of Visual Communication – Colour, form, depth, movement.

UNIT- 2

Still and Video images – Still Camera – Types of cameras – Different aspects of camera – Basic shots – Angles – Photo framing and composition – Camera movements – Lenses – Filters – Lighting – Technical and ethical perspectives of camera

UNIT- 3

Television camera Shots & angles – movements – mountings of video camera, Shooting – Lighting – Planning – Pre-production – Concept / story development – Script / Screenplay writing – Casting – Budget and Finance – Direction & Cinematography – Post-Production – Sound recording – Dubbing – Special effects and graphics – Final mixing

UNI 4

Audio Sound Editing software: Sound Forge **Video editing Software**: Adobe Premiere

TEXT BOOKS:

References:

1. Visual Communication – Images with messages 3rd Edition, Paul MartinLester, Thomson Wadsworth, USA 2003.
2. Herbert Zettl, Television Production Handbook, California, Thompson Wadsworth

Evaluation

At the end of the course students shall produce and submit a video capsule by applying the techniques which they learn based on the theoretical concepts.

Equipment required

Still cameras

1. Nikon D5600 Digital camera 18-55mm around Rs 40,000
2. Nikon D5600 with AF-P 70-300mm around Rs 50,000

Tripods

Digitek Professional Tripod around 6,000 (2min)

Video cameras

1. Canon XA11 Professional Camcorder around 80,000
2. Sony HXR-MC 2500 Camcorder around 75,000
3. Panasonic HC-MDH3GW professional Camcorder around Rs 65-75,000

18A2100603- Sanskrit

Lecture - Tutorial-Practical:	2-0-0	**Internal Marks:**	40
Credits:	1	**External Marks:**	60

Prerequisites:

Basic understanding of languages

Course Objectives:

1. Reading, Writing, understanding and conversational skills of Sanskrit language will be imparted (through lecture method, Questions and Answers, Test, Open text book study, Role play, Discussion, Debate or collaboration assignment or case study).
2. (As Sanskrit enriched all most all Indian Languages through it's rich vocabulary) proper understanding of one's mother tongue and usage are expected.
3. To enable the students for the proper understanding of the culture, Heritage, Traditions, Thinking, ethics and values of our country Bharath.

Course Outcomes:

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

CO1	Reading, Writing, understanding and conversational skills are developed.
CO2	Unity in diversity of our country is well understood.
CO3	The origin and development of Indian Languages is well understood
CO4	Proper usage of Language is achieved.
CO5	Sanskrit words that are familiar to us which we are using in our languages are identified.
CO6	The great Indian culture roots are well observed.

UNIT	TOPIC NAME	POEMS
I	(Vidhuraneethi)	1 - 16
II	(Bhartruhari – Neetisatakam)	1-16
III	(Prescribed Text by NRIIT)	1-16 Lesson From
IV	(Prescribed Text by NRIIT)	17-32 Lessons From

Reference Books:

1. from of
2. of
3. "TEACH YOURSELF SANSKRIT" (Graded Text Books) published by Rashtriya Sanskrit Sansthan, MHRD, Govt. of India, New Delhi.

18A2100604- Engineering Psychology

Lecture - Tutorial-Practical:	2-0-0	**Internal Marks:**	40
Credits:	1	**External Marks:**	60
Prerequisites:			

Basic understanding about communication components

Course Objectives:

1. Aware of different applications of psychology to everyday life.
2. Aware of different work place issues, behavioral issues
3. Understand how the knowledge gained from this course can be used in their personal and professional lives.

Course Outcomes:

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

CO1	The student will be able to understand the inter relationship of knowledge and our fund of knowledge
CO2	The students develops the discrimination between true and false knowledge
CO3	The students develops moral sense of Indian society
CO4	The students extends his mental horizons in understanding different stands of moral order
CO5	The students intuitively grasps the ways of understanding the world and our environment
CO6	The students gains an insight into the very nature of Science and Technology

Contribution of Course Outcomes towards achievement of Program Outcomes (1 - Low, 2- Medium, 3 - High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	1	2	-	-	-	2	-	3	-	-	-	2
CO2	1	2	-	2	-	2	-	2	-	-	-	2
CO3	1	-	-	-	-	3	-	3	-	-	-	-
CO4	1	-	-	-	-	3	-	3	-	-	-	-
CO5	1	-	=	-	-	2	-	-	-	-	-	2
CO6	3	3	3	3	3	3	3	-	-	3	3	3

UNIT- 1: Introduction

Psychology as a study of human behavior

Scope and fields of psychology

NRIA18 : ACADEMI CURRICULUM FOR B.TECH (INFORMATION TECHNOLOGY)

II YEAR II SEMESTER

L - LECTURE T – TUTORIAL P – PRACTICAL CIA – Continuous Internal Assessment SEA – Semester End Assessment

Sl. No	Course Code	Title of the Course	Scheme of Instruction (Periods Per Week)				Scheme of Examination (Maximum Marks)			No. of Credits
			L	T	P/D	Total	CIA	SEA	Total	
1	18A2200201	Probability and Statistics	3	1	0	4	40	60	100	4
2	18A2205401	Web Technologies and Advanced Java Programming	3	0	0	3	40	60	100	3
3	18A2205402	Software Engineering	3	0	2	5	40	60	100	4
4	18A2205403	Computer Organization	3	0	0	3	40	60	100	3
5	OE-1	Open Elective-1	3	0	0	3	40	60	100	3
6	18A2205491	Web Technologies and Advanced Java Programming Lab	0	0	3	3	40	60	100	1.5
7	18A2205492	Aptitude and Reasoning	0	0	2	2	40	60*	100	1
8	18A2205901	Mini project	0	0	2	2	40	60*	100	1
Total			**15**	**1**	**9**	**25**	**320**	**480**	**800**	**20.5**

* No External Evaluation

Head, IT Department
NRI Institute of Tech
POTHAVARAPPA
Agiripalli (M), Krish

18A2200203-
COURSE NAME-PROBABILITY AND STATISTICS

Lecture - Tutorial:	3-1	**Internal Marks:**	40
Credits:	4	**External Marks:**	60

Prerequisites:

Course Objectives:

1. To familiarize the techniques in central tendency, curve fitting ,correlation and regression.
2. To familiarize the techniques in probability and random variables.
3. To familiarize the techniques in probability distribution.
4. To familiarize the techniques in large and small sample tests.
5. To equip the students to solve problems in their disciplines.

Course Outcomes:

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

CO1	Student will be able to **Find the measures of central tendency and relation between them.(L1)**
CO2	Student will be able to **Evaluate the correlation coefficient, rank coefficient and regression.(L5)**
CO3	**element ary problems.(L2)**
CO4	Students will be able to **Solve problems related to binomial and passion distribution.(L3)**
CO5	Student will be able to Compare situations in which it is appropriate to consider the relevance of the No mal distribution.(L4)
CO6	Student will be able to Construct hypothesis and carryout appropriate tests to checks its accepta ility.(L3)

Contr ibutionofCourseOutcomestowardsachievementof am Progr Outcomes (1 - Low, 2- Medium, 3 - High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	2	2	--	--	--	--	--	--	--	--
CO2	3	3	2	2	--	--	--	--	--	--	--	--
CO3	3	3	2	2	--	--	--	--	--	--	-	--
CO4	3	3	2	2	--	--	--	--	--	--	-	--
CO5	3	3	2	2	--	--	--	--	--	--	--	--
CO6	3	3	2	2	--	--	--	--	--	--	--	--

UNIT I

Unit 1: Descriptive statistics and methods for data science

(Pre-requisite:Data science, Statistics Introduction, Population vs Sample, Collection of data, primary and secondary data, Type of variable: dependent and independent Categorical and Continuous variables, Data visualization.---No Question selects from the above part)

Measures of Central tendency: Arithmetic Mean – Median – Mode - Geometric Mean- Harmonic Mean and Relations between them- Merits and Demerits.

Measures of Dispersion: Range – Quartile Deviation – Variance, Standard Deviation – Skewness - Kurtosis.

Curve Fitting and Principles of Least Squares.

Correlation- correlation coefficient - rank correlation - Regression coefficients Regression lines.

Engineering as Social Experimentation: Engineering as experimentation, Engineers as responsible experimenters, Codes of ethics, Industrial standards, A balanced outlook on law, Case study: The challenger.

UNIT IV

Safety, Responsibilities and Rights: Safety and risk, types of risks, Assessment of safety and risk, Safe exit, Risk-benefit analysis, safety lessons from 'the challenger' , Case study: Power plants, Collegiality and loyalty, Collective bargaining, Confidentiality, Conflict of interests, Occupational crime, whistle blowing, Intellectual property rights, professional rights.

TEXT BOOKS:

- A Text book on Professional Ethics and Human Values by R.S Naagarazan- New Age International Publishers.
- " Engineering Ethics includes Human Values" by M. Govindarajan, S. Natarajan and V. S. Senthil Kumar- PHI Learning Pvt. Ltd-2009

REFERENCE BOOKS:

"Professional Ethics and Human Values" by A. Alavudeen, R. Kalil Rahman and M. Jayakumaran- Laxmi Publications.

E-RESOURCES:

- www.onlineethics.org
- www.nspe.org
- www.globalethics.org
- www.ethics.org

18A2205401- WEB TECHNOLOGIES AND ADVANCED JAVA PROGRAMMING

Lecture - Tutorial-Practical:	3-0-0	**Internal Marks:**	40
Credits:	3	**External Marks:**	60*
Prerequisites:			

Course Objectives:

To understand the concepts of HyperText Markup Language and Cascading Style Sheets
To learn JavaScript for creating dynamic websites
To learn JavaScript for creating dynamic websites
To learn Server-Side Programming using Servlets and Java Server Pages.
To learn the creation of pure Dynamic Web Application using JDBC

Course Outcomes:

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

CO1	Student able to Implement and design web based applications using features of HTML
CO2	Implement web based applications using features of XML
CO3	Student will Apply the concepts of server side technologies for dynamic web applications
CO4	Ability to design the web based applications using effective data base access with rich client interaction
CO5	Ability to Develop reusable component for Graphical User Interface applications

Contribution of Course Outcomes towards achievement of Program Outcomes (1 - Low, 2- Medium, 3 - High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	-	-	3	-	-	-	-	-	-	-	-	2
CO2	-	-	3	-	-	-	-	-	-	-	-	2
CO3	3	-	2	-	-	-	-	-	-	-	-	2
CO4	-	3	3	2	-	-	-	-	-	-	-	2
CO5	-	3	-	3	2	-	-	-	-	-	-	3

UNIT I

HTML tags, Lists, Tables, Images, forms, Frames, Cascading style sheets, Introduction to Java script, objects in Java Script, Dynamic HTML with Java Script.

UNIT II

Working with XML: Document Type Definition, XML schemas, Document object model, XSLT, DOM and SAX.

UNIT III

Web Servers and Servlets: Tomcat web server, Introduction to Servlets: Lifecycle of a Servlet, JSDK, The Servlet API, The javax.servlet Package, Reading Servlet parameters, and Reading Initialization parameters. The javax.servlet HTTP package, Handling Http Request & Responses, Using Cookies-Session Tracking, Security Issues.

UNIT IV

UNIT 2: Probability

Probability, probability axioms, addition law and multiplicative law of probability, conditional probability, Baye's theorem, random variables (discrete and continuous), probability density functions, properties, mathematical expectation.

Unit3: Distributions

Probability distribution - Binomial, Poisson approximation to the binomial distribution and normal distribution-their properties.

Unit 4: Estimation and Testing of hypothesis:Large sample tests Small sample tests

Population, sample distribution of mean, point estimation of mean and variance, confidence limits and intervals for mean, standard error, sample distribution of variance.

Formulation of null hypothesis, alternative hypothesis, the critical and acceptance regions, level of significance, two types of errors and power of the test.

Large Sample Tests: Test for single proportion, difference of proportions, test for single mean and difference of means. Confidence interval for parameters in one sample and two sample problems

Small Sample Tests: Student t-distribution (test for single mean, two means and paired t-test), testing of equality of variances (F-test), $\chi 2$ - test for goodness of fit, $\chi 2$ - test for independence of attributes.

Textbooks:

1 Miller and Freund, Probability and Statistics for Engineers,7/e, Pearson, 2008.
2 S.C. Gupta and V.K. Kapoor, Fundamentals of Mathematical Statistics, 11/e, Sultan Chand & Sons Publications, 2012.

Reference Books:

1 S. Ross, a First Course in Probability, Pearson Education India, 2002.
2 W. Feller, an Introduction to Probability Theory and its Applications, 1/e, Wiley, 1968.

18A2205402- SOFTWARE ENGINEERING

Lecture - Tutorial-Practical:	3-0-2*	**Internal Marks:**	40
Credits:	5	**External Marks:**	60*
Prerequisites:			

Course Objectives:

To understand the software requirements and SRS document
To design and develop correct and robust software products.
To understand the quality control and how to ensure good quality software.
To understand the planning and estimation of software projects.
To understand the implementation issues, validation and verification procedures

Course Outcomes:

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

CO1	Understand the basic concepts of Software engineering, applications, agile development and compare different software process models.
CO2	Analyze the principles of requirement engineering
CO3	Create architectural design for a given project.
CO4	Apply different testing techniques

Contribution of Course Outcomes towards achievement of Program Outcomes (1 - Low, 2- Medium, 3 - High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	3	3	3	--	--	2	2	2	3	2
CO2	3	3	3	3	3	--	--	2	2	2	3	2
CO3	3	3	3	3	3	--	--	2	2	2	3	2
CO4	3	3	3	3	3	--	--	2	2	2	3	2

UNIT I

Software and Software Engineering: The Nature of Software, Defining Software, Software Application Domains, Legacy Software, The Unique Nature of Web Apps, Software Engineering, The Software Process, Software Engineering Practice, The Essence of Practice, General Principles, Software Myths.

The Software Process: Process Models, A Generic Process Model, Process Assessment and Improvement, Prescriptive Process Models, Specialized Process Models, The Unified Process, Personal and Team Process Models, Process Technology, Product and Process.

Agile Development: What Is Agility? Agility and the Cost of Change, What Is an Agile Process? Extreme Programming (XP). Other Agile Process Models, A Tool Set for the Agile Process.

Practice Session:

1. Write down the problem statement for a suggested system of relevance

UNIT II

Understanding Requirements: Requirements Engineering, Establishing the Groundwork, Eliciting Requirements, Developing Use Cases, Building the Requirements Model, Negotiating Requirements, Validating Requirements.

Requirements Modeling: Scenarios, Information and Analysis classes: Requirements Analysis, Scenario-Based Modeling, UML Models That Supplement the Use Case, Data Modeling Concepts, Class-Based Modeling.

Requirements Modeling: Flow, Behavior, Patterns, And Web apps: Requirements Modeling Strategies, Flow-Oriented Modeling, Creating a Behavioral Model, Patterns for Requirements Modeling, Requirement modeling for WebApps.

Database Access: Database Programming using JDBC, studying javax.sql.* package, accessing a database from a JSP page,

Introduction to JSP: The Problem with Servlet. The Anatomy of a JSP Page, JSP Processing.

JSP application design with MVC

JSP Application Development: Generating Dynamic Content, Using Scripting ElementsImplicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations

TEXT BOOKS:

- The Complete Reference, Java 2 , 3ed, Patrik Naughton, Herbert Schildt, TMH
- Programming the World Wide Web, Robet W Sebesta, 7ed, Pearson.
- Web Technologies, Uttam K Roy, Oxford Java Server Pages , Hans Bergstan, Oreilly

REFERENCE BOOKS:

- Web Technologies, HTML< JavaScript, PHP, Java, JSP, XML and AJAX, Black book, Dream Tech.
- An Introduction to Web Design, Programming, Paul S Wang, Sanda S Katila, Cengage
- An introduction to Web Design and Programming, Wang Thomson
- Web application technologies concepts, Knuckles, John Wiley.
- Programming world wide web, Sebesta, Pearson
- Beginning Web Programming, Jon Duckett ,Wrox, Wiley Java server pages, Pekowsky, Pearson

E-RESOURCES:

1. https://www.w3schools.com/
2. https://www.tutorialspoint.com/perl/
3. https://www.railstutorial.org/book
4. https://www.cs.usfca.edu/~galles/visualization/Algorithms.html

18A2205403- COMPUTER ORGANIZATION

Lecture - Tutorial-Practical:	3-0-0	**Internal Marks:**	40
Credits:	3	**External Marks:**	60*
Prerequisites:			

Course Objectives:

Understand the architecture of a modern computer with its various processing units. Also the Performance measurement of the computer system.

In addition to this the memory management system of computer.

Course Outcomes:

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

CO1	Able to understand the basic components and the design of CPU, ALU and Control unit
CO2	Students can calculate the effective address of an operand by addressing modes
CO3	Ability to understand memory hierarchy and its impact on computer cost/performance..
CO4	Ability to understand the advantage of instruction level parallelism and pipelining for high performance Processor design.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 - Low, 2- Medium, 3 - High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	--	--	--	--	--	--	--	--	--	--
CO2	3	3	--	3	--	--	--	--	--	--	--	--
CO3	3	3	--	--	--	--	--	--	--	--	--	--
CO4	3	3	--	--	--	--	--	--	---	--	--	--

UNIT I

Basic Structure Of Computers : Computer Types, Functional unit, Basic Operational concepts, Bus structures, Software, Performance.

Register Transfer and Micro-Operations: Register Transfer Language, Register Transfer, Bus and memory Transfers, Arithmetic Micro-operations, Logic Microoperations, Shift Micro-operations, Arithmetic Logic Shift Unit.

Basic Computer Organization and Design: Instruction codes, Computer Registers, Computer Instructions, Timing and Control, Instruction cycle, Memory Reference Instructions, Input-Output and Interrupts

UNIT II

Central Processing Unit: General register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC).

Micro Programmed Control : Control memory, Address sequencing, microprogram example, design of control unit.

UNIT III

Computer Arithmetic : Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations.

Practice Session:

1. Do requirement analysis and develop Software Requirement Specification Sheet (SRS) for suggested system.

UNIT III

Design Concepts: Design within the Context of Software Engineering, the Design Process, Design Concepts, the Design Model. **Architectural Design**: Software Architecture, Architectural Genres, Architectural Styles, Architectural Design, Assessing Alternative Architectural Designs.

Modeling Component-Level Design: What Is a Component? Designing Class-Based Components, Conducting Component Level Design, and Component level design for Web Apps.

Performing User Interface Design: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps.

Practice Session:

1. Preparation of Design Documents for suggested system.
2. Study and usage of any Design phase CASE tool.

UNIT IV

Software Testing Strategies: A Strategic Approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, Test Strategies for Object-Oriented Software, Validation testing, System testing, the art of debugging.

Testing Conventional Applications: Software Testing Fundamentals, Internal and External Views of Testing, White Box Testing, Basis Path Testing, Control Structure Testing, Black-Box Testing, Model-Based Testing, Testing for Specialized Environments, Architectures, and Applications, Patterns for Software Testing.

Practice Session:

1. Preparation of Testing Phase related documents for some problems
2. To perform unit testing and integration testing
3. To perform various white box and black box testing techniques.

TEXT BOOKS:

Roger S.Pressman, "Software Engineering- A Practitioner's Approach". Tata McGraw-Hill International 7th ed, 2010

REFERENCE BOOKS:

Ian Somerville, "Software Engineering". 9th ed, Pearson Education. 2011.

Carlo Ghezzi, Mehdi Jazayeri and Dino Mandrioli, "Fundamentals of Software Engineering".2 ed, PHI. 2009

RajibMall, Fundamentals of Software Engineering. 3 ed, PHI. 2009.

Software Engineering, A Precise Approach, Pankaj Jalote, Wiley India,2010.

E-RESOURCES:

1. http://www.dcnicn.com/BusinessNews/WVU-MIS13Apr00/Software-Engineering.pdf
2. http://www.comp.lancs.ac.uk/computing/resources/IanS/SE7/Presentations/PDF/ch1.pdf
3. http://sites.computer.org/ccse/SE2004Volume.pdf
4. http://homepages.cs.ncl.ac.uk/brian.randell/NATO/nato1968.PDF
5. http://www.dau.mil/pubs/pdf/SEFGuide 01-01.pdf

OE- MICROPROCESSOR AND ITS APPLICATIONS

Lecture - Tutorial-Practical:	3-0-0	**Internal Marks:**	40
Credits:	3	**External Marks:**	60*

Prerequisites:
Number systems & digital logic design concepts, Basic compilation process

Course Objectives:
To demonstrate various families of Intel microprocessors and Significance of 8086 To explain Assembly language program development tools.
To know the architecture details of 8051 microcontroller.
To study and design the concepts of Counters/timers and serial port of 8051. To understand the architecture of ARM7 and its THUMB instruction set.
To discuss the interfacing of 8051 to various peripheral devices.

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

CO1	To Describe the basics of 8086 microprocessors architectures and its Functionalities
CO2	To Design and develop 8086 Microprocessor based systems for real time applications using low level language like ALP
CO3	To Analyze 8051 microcontrollers architectures and its functionalities
CO4	To Describe the importance of Timers/Counters and Serial ports of 8051 microcontroller
CO5	To Describe the basics of ARM and ARM7 architecture and its functionalities
CO6	To Interface external peripherals and I/O devices and program the 8051 microcontroller

Contribution of Course Outcomes towards achievement of Program Outcomes (1 - Low, 2- Medium, 3 - High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	-	-	-	-	-	-	-	-	-	-
CO2	3	3	2	-	3	-	-	-	-	-	2	-
CO3	3	2	3	2	2	-	-	-	-	-	2	-
CO4	2	2	2	-	-	-	-	-	-	-	-	-
CO5	3	2	2	2	3	-	-	-	-	-	2	-
CO6	2	2	2	3	2	-	-	-	-	-	-	-

UNIT I
UNIT-I

Microprocessor Architecture: Introduction to Microprocessors, Families of a Microprocessor, 8086 Microprocessor- Features, Architecture, Pin diagram of 8086.

8086 Architecture Modes: Register Organization, 8086 System Timing, Minimum Mode and Maximum Mode of Operation

Memory Organization: Memory Hierarchy, Main Memory, Auxiliary memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware.**Input Output**

UNIT IV

Organization: Peripheral Devices, Input-output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA), Input-Output Processor.,Serial Communication. Standard I/O Interfaces: PCI Bus, USB

Pipeline and vector processing: parallel processing, pipelining, Arithmetic pipeline, Instruction pipeline, RISC Pipeline, Vector Processing

TEXT BOOKS:

1 Morris M. Mano, Computer Systems Architecture.3 Ed, Pearson/PHI, 2013

[2] Carl Hamacher, Zvonko Vranesic, Safwat Zaky: Computer Organization, 5th Edition, Tata McGraw Hill, 2002.

REFERENCE BOOKS:

John P.Hayes, 'Computer architecture and Organisation', Tata McGraw-Hill, Third edition, 1998.

E-RESOURCES:

https://www.tutorialspoint.com/computer_organization/index.asp

https://www.geeksforgeeks.org/computer-organization-basic-computer-instructions/

18A2205491- WEB TECHNOLOGIES AND ADVANCED JAVA PROGRAMMING LAB

Lecture - Tutorial-Practical:	0-0-3	**Internal Marks:**	40
Credits:	3	**External Marks:**	60*
Prerequisites:			

JAVA PROGRAMMING, DBMS

Course Objectives:

HyperText Markup Language (HTML) and Cascading Style Sheets (CSS) for laying out (formatting) pages that contain text, images and graphics.

Extensible Markup Languages (XML is used to store and transport data among webpages), a mechanism for defining new tag sets and interchanging data among web applications.

Client-side Programming using JavaScript for validating the data.

Server-Side Programming using servlets are to generate static content and Java Server Pages are used to generate dynamic content.

Creating a pure Dynamic Web Application which retrieves the data from Database according to the client request using JDBC.

Course Outcomes:

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

CO1	Create a website statically or dynamically.
CO2	Get knowledge on displaying and decorating the contents in a webpage.
CO3	Learn the concepts of store and transport the data among webpages.
CO4	Generate static or dynamic content according to the client's request.
CO5	Create objects with which the client can communicate with server.
CO6	Provide User Authentication by using cookies and back end operations using JDBC.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 - Low, 2- Medium, 3 - High)

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	3	3	--	--	--	--	--	--	--	--	--	--
CO2	3	3	--	3	--	--	--	--	--	--	--	3
CO3	3	3	--	--	--	--	--	--	--	--	--	--
CO4	3	3	--	--	--	--	--	--	--	--	--	3
CO5	3	3	--	--	--	--	--	--	--	--	--	3
CO6	3	3	--	--	--	--	--	--	--	--	--	--

UNIT II
UNIT-II

Instruction Set: Addressing Modes, Instruction Set, Assembler Directives, and Program development steps.

Programming and Interrupts: Assembly Language Program Development Tools, Programs with an Assembler, Interrupt Structure, Interrupt Service Routine, Interrupt Vector Table,

UNIT III
UNIT-III

Microcontroller: 8051 Microcontroller Architecture, Pin Diagram, Addressing Modes, Instruction Set and Programs, 8051 Memory and I/O Interfacing.

8051 Interfacing: Modes of Timer Operation, Serial Port Operation, Interrupt Structure of 8051, Interfacing of Seven Segment Displays, Stepper Motor.

UNIT
IV
UNIT-
IV

ARM: Introduction to 16/32 Bit Processor, Internal Architecture of ARM 7, Register Organization, ARM and THUMB Operating Modes, Development Tools.

Peripherals and Interfacing: 8255 PPI – Various Modes of Operation and Interfacing to 8086, Keyboard and Seven Segment Displays, Stepper Motor, D/A and A/D Converter Interfacing.

TEXT BOOKS:
TEXT BOOKS:

1. Advanced Microprocessor and Peripherals (Architecture, Programming & Interfacing) by A.K. Ray & K.M. Bhurchandi – TMH Publication.
2. Microcontrollers [theory and applications] TMH publication by Ajay V. Deshmukh.
3. Microcontrollers: Architecture, Programming, Interfacing and System Design, 2nd Edition, by Raj Kamal, Pearson Publications.

REFERENCE BOOKS:

1. Microprocessor and Interfacing by Douglas Hall 2nd Edition.
2. The 8051 Microcontroller & Embedded Systems by Mazidi & Mazidi – Pearson / PHI publication.

E-RESOURCES:

https://freevideolectures.com/course/3018/microprocessors-and-microcontrollers/1
https://www.tutorialspoint.com/microprocessor
https://www.javatpoint.com/microprocessor

Week-1:
Design the following static web pages required for an online book store web site.

1) HOME PAGE:

The static home page must contain three **frames.**

Top frame : Logo and the college name and links to Home page, Login page, Registration page,

Catalogue page and Cart page (the description of these pages will be given below).

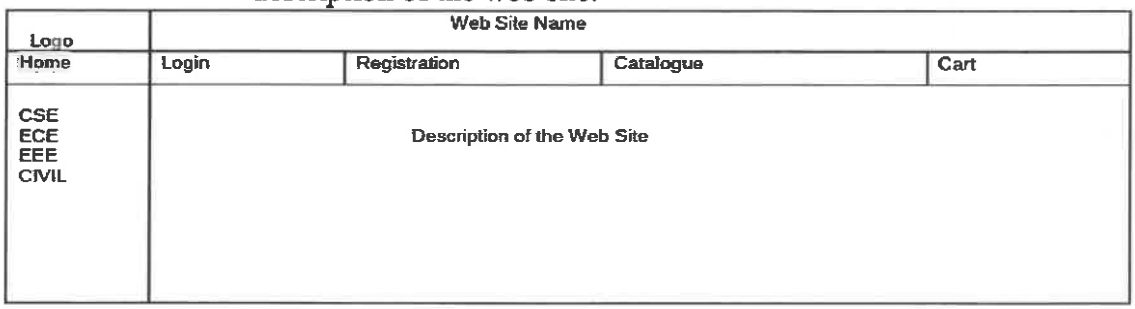
Left frame : At least four links for navigation, which will display the catalogue of respective links.

For e.g.: When you click the link **"CSE"** the catalogue for **CSE** Books should be

displayed in the Right frame.

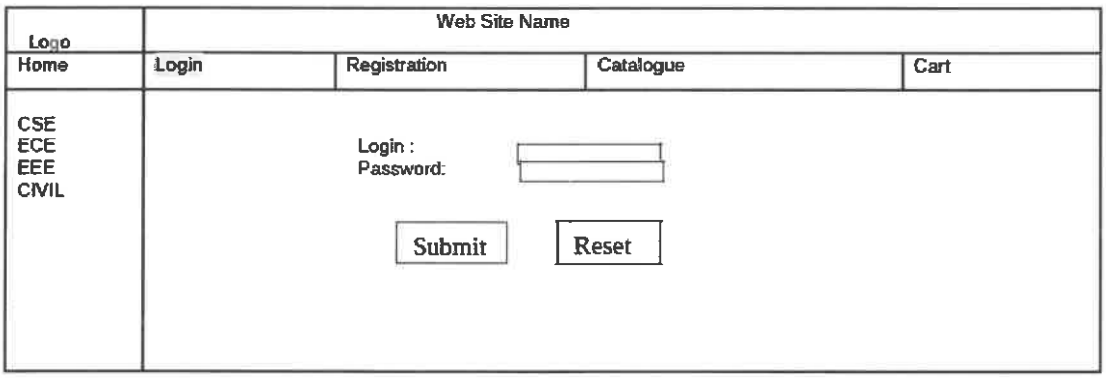
Right frame: The *pages to the links in the left frame must be loaded here.* Initially this page contains

description of the web site.



2) LOGIN PAGE:

This page looks like below:



3) CATOLOGUE PAGE:

The catalogue page should contain the details of all the books available in the web site in a table.

The details should contain the following:

1. Snap shot of Cover Page.
2. Author Name.
3. Publisher.
4. Price.
5. Add to cart button.

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	   	Book : XML Bible Author : Winston Publication : Wiely Book : AI Author-: S.Russel Publication : Princeton hall Book : Java 2 Author : Watson Publication : BPB publications Book : HTML in 24 hours Author : Sam Peter Publication : Sam publication	$ 40.5 $ 63 $ 35.5 $ 50	Add to cart Add to cart Add to cart Add to cart

Note: Week 2 contains the remaining pages and their description.

Week-2:

4) **CART PAGE:** The cart page contains the details about the books which are added to the cart.

The cart page should look like this:

Logo	Web Site Name			
Home	Login	Registration	Catalogue	Cart
CSE ECE EEE CIVIL	**Book name** Java 2 XML bible	**Price** $35.5 $40.5	**Quantity** 2 1 **Total amount**	**Amount** $70 $40.5 $130.5

5) REGISTRATION PAGE:

Create a "*registration form* "with the following fields

1) Name (Text field)
2) Password (password field)
3) E-mail id (text field)
4) Phone number (text field)
5) Sex (radio button)
6) Date of birth (3 select boxes)
7) Languages known (check boxes – English, Telugu, Hindi, Tamil)
8) Address (text area)

WEEK 3:

VALIDATION:

Write *JavaScript* to validate the following fields of the above registration page.

1. Name (Name should contains alphabets and the length should not be less than 6 characters).
2. Password (Password should not be less than 6 characters length).
3. E-mail id (should not contain any invalid and must follow the standard pattern name@domain.com)
4. Phone number (Phone number should contain 10 digits only).

Note : You can also validate the login page with these parameters.

Use PHP to connect with the database to store the above details.

Week-4:

Design a web page using **CSS (**Cascading Style Sheets) which includes the following:

1) Use different font, styles:

In the style definition you define how each selector should work (font, color etc.). Then, in the body of your pages, you refer to these selectors to activate the styles.

For example:

```
<HTML>
<HEAD>
<style type="text/css">
B.headline {color:red; font-size:22px; font-family:arial; text-decoration:underline}
</style>

</HEAD>
```

```
<BODY>
<b>This is normal bold</b><br>
Selector {cursor:value}

For example:

<html>
<head>
<style type="text/css">
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>

<body>
<b>
<a href="mypage.htm" class="xlink">CROSS LINK</a>
<br>
<a href="mypage.htm" class="hlink">HELP LINK</a>
</b>
</body>
</html>

<b class="headline">This is headline style bold</b>
</BODY>

</HTML>
```

2) Set a background image for both the page and single elements on the page.
You can define the background image for the page like this:

```
BODY {background-image:url(myimage.gif);}
```

3) Control the repetition of the image with the background-repeat property.
As background-repeat: repeat
Tiles the image until the entire page is filled, just like an ordinary background image in plain HTML.

4) Define styles for links as

A:link
A:visited
A:active
A:hover

Example:

```
<style type="text/css">
A:link {text-decoration: none}
A:visited {text-decoration: none}
A:active {text-decoration: none}
A:hover {text-decoration: underline; color: red;}
</style>
```

5) Work with layers:
For example:
LAYER 1 ON TOP:

```
<div style="position:relative; font-size:50px; z-index:2;">LAYER 1</div>
<div style="position:relative; top:-50; left:5; color:red; font-size:80px; zindex:
1">LAYER 2</div>
LAYER 2 ON TOP:
<div style="position:relative; font-size:50px; z-index:3;">LAYER 1</div>
<div style="position:relative; top:-50; left:5; color:red; font-size:80px; zindex:
4">LAYER 2</div>
```

6) Add a customized cursor:

Selector {cursor:value}

For example:

```
<html>
<head>
<style type="text/css">
.xlink {cursor:crosshair}
.hlink{cursor:help}
</style>
</head>

<body>
<b>
<a href="mypage.htm" class="xlink">CROSS LINK</a>
<br>
<a href="mypage.htm" class="hlink">HELP LINK</a>
</b>
</body>
</html>
```

Week-5:

Write an XML file which will display the Book information which includes the following:

1) Title of the book
2) Author Name
3) ISBN number
4) Publisher name
5) Edition
6) Price

Write a Document Type Definition (DTD) to validate the above XML file.

Display the XML file as follows.

The contents should be displayed in a table. The header of the table should be in color GREY. And the

Author names column should be displayed in one color and should be capitalized and in bold.

Use your own colors for remaining columns.

Use XML schemas XSL and CSS for the above purpose.

Note: Give at least for 4 books. It should be valid syntactically.

Hint: You can use some xml editors like XML-spy

Week-6:

1) Install TOMCAT web server and APACHE.

While installation assign port number 4040 to TOMCAT and 8080 to APACHE. Make sure that these ports are available i.e., no other process is using this port.

2) Access the above developed static web pages for books web site, using these servers by putting the web pages developed in week-1 and week-2 in the document root.

Access the pages by using the urls : http://localhost:4040/rama/books.html (for tomcat) http://localhost:8080/books.html (for Apache)

Week-7:

User Authentication :

Assume four users user1,user2,user3 and user4 having the passwords pwd1,pwd2,pwd3 and pwd4 respectively. Write a servelet for doing the following.
1. Create a Cookie and add these four user id's and passwords to this Cookie.
2. Read the user id and passwords entered in the Login form (week1) and authenticate with the values (user id and passwords) available in the cookies.
If he is a valid user(i.e., user-name and password match) you should welcome him by name(user-name) else you should display " You are not an authenticated user ".
Use init-parameters to do this. Store the user-names and passwords in the webinf.xml and access them in the servlet by using the getInitParameters() method.

Week-8:
Install a database(Mysql or Oracle).
Create a table which should contain at least the following fields: name, password, email-id, phone number(these should hold the data from the registration form).
Practice 'JDBC' connectivity.
Write a java program/servlet/JSP to connect to that database and extract data from the tables and display them. Experiment with various SQL queries.
Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page (week2).

Week-9:
Write a JSP which does the following job:
Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies).

Week-10:
Create tables in the database which contain the details of items (books in our case like Book name , Price, Quantity, Amount)) of each category. Modify your catalogue page (week 2)in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using JDBC.

18A2205492--Aptitude and Reasoning

Lecture – Tutorial-Practical:	0-0-2	**Internal Marks:**	40
Credits:	1	**External Marks:**	60*

UNIT – I

1. PERCENTAGES
2. SIMPLE INTEREST & COMPOUND INTEREST
3. PROFIT AND LOSS

UNIT – II

1. TIME AND WORK
2. PIPES AND CISTERN
3. TIME, SPEED AND DISTANCE

UNIT- III

1. DATA INTERPRETATION
2. SYLLOGISMS, AVERAGES

UNIT- IV

1. VISUAL /DIAGRAMATIC REASONING
2. CODING AND DECODING
3. NUMBER SERIES
4. PROBLEMS ON AGES

TEXT BOOKS:

1) **APTIPEDIA, WILEY**
2) **Quantitative Aptitude, RS AGARWAL, S.Chand Publishers**

REFERENCE BOOKS:

1. **HOW TO PREPARE FOR Quantitative Aptitude, ARUN SHARMA, Mc GRAW HILL**

18A2205901--Mini project

Lecture – Tutorial-Practical:	0-0-2	**Internal Marks:**	40
Credits:	1	**External Marks:**	60*

The mini project is designed to help students develop practical ability and knowledge about practical tools/techniques in order to solve real life problems related to the industry, academic institutions and computer science research. The course Mini Project is one that involves practical work for understanding and solving problems in the field of computing. Any computer science project usually consists of the following: analysis, design, coding/implementation and testing of some information system or subsystem, such as, a piece of software. The subsystem does not have to be a computer program; a design document might be the appropriate output from a design study. The design and development of hardware system/subsystem would also be an appropriate project, however, in this course we expect a software system or subsystem. This course will also develop your investigative, research and report writing skills and will provide an opportunity for you, to investigate a chosen topic in considerable depth. Mini Project provides the opportunity for students to demonstrate the application of their programming and research skills, and to apply their knowledge to complex computing problems.

Students can take up small problems in the field of Computer Science and Engineering as mini project.

Project can be related to solution to an engineering problem, verification and analysis of experimental data available, conducting experiments on various engineering subjects, material characterization, studying a software tool for the solution of an engineering problem etc.

A batch of 3 students can form it as group
The type of the project selection could be an application, product, a review or a research work.
Project Review Committee will conduct 3 internal Reviews and one Final Review for 100 Marks.

Review I (Project Synopsis ,analysis)	20 Marks
Review II(Project Design)	20 Marks
Review III(Project Implementation)	20 Marks
Final Review (Project Evaluation with conclusion and report)	40 Marks

OPEN ELECTIVE
I

I – Semester

S.No.	Course Name	Category	L	T	P	C	Marks
1	Elective 5: Program Elective /MOOCs** a) Design of Prestressed Concrete Structures b) Structural Health Monitoring c) Industrial Structures	Elective	3	0	--	3	100
2	Open Elective / MOOCS** a) Artificial Intelligence Technique b) Construction Management c) Green Technology	Elective	3	0	--	3	100
3	Dissertation Phase-I / Industrial Project (To be continued and Evaluated next Semester)*		--	--	20	10	
	Total Credits / Marks					**16**	**200**

* Evaluated and displayed in 4th Semester marks list

** Students Going for Industrial Project / Thesis will complete these courses through MOOCS. Students can also choose SWAYAM or NPTEL with a 12 weeks' course duration in PG level with 3 credits, but the chosen subject should not be covered in their M. Tech Course

IV - Semester

Sl No.	Course Name	Category	L	T	P	C	Marks
1	Project / Dissertation Phase II (Continued from III Semester)		0	0	32	16	100
	Total Credits / Marks					**16**	**100**

Audit course 1 & 2

1. English for Research PaperWriting
2. DisasterManagement
3. Sanskrit for TechnicalKnowledge
4. ValueEducation
5. Constitution of India
6. PedagogyStudies
7. Stress Management byYoga
8. Personality Development through Life Enlightenment Skills.

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POWER ELECTRONICS AND DRIVES

COURSE STRUTURE AND SYLLABUS FOR FIRST YEAR PG PROGRAMME

III SEMESTER

Sl. No.	Course Code	Title of the Course	L	P	Total	Total Marks	No. of Credits
1	18D2152791	COMPREHENSIVE VIVA	--	--	--	50	2
2	18D2152792	SEMINAR – I	--	--	--	50	2
3	18D2152793	RESEARCH PROJECT PART-I	--	--	--	100	16
Total			--	--	--	**200**	**20**

IV SEMESTER

Sl. No.	Course Code	Title of the Course	L	P	Total	Total Marks	No. of Credits
1	18D2252791	SEMINAR – II	--	--	--	50	2
2	18D2252792	RESEARCH PROJECT PART-II	--	--	--	100	18
Total			--	--	--	**150**	**20**

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Electrical & Electronics Engineering
NRI Institute of Technology

M. Tech

SEMESTER-III

S. No.	Subject	L	P	Credits
1	Comprehensive Viva-Voce	--	--	2
2	Seminar – I	--	--	2
3	Project Work Part - I	--	--	16
	Total Credits			**20**

SEMESTER-IV

S. No.	Subject	L	P	Credits
1	Seminar – II	--	--	2
2	Project Work Part - II	--	--	18
	Total Credits			**20**

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NRI Institute of Technology
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Agiripalli (Mdl), Krishna Dt.

COURSE STRUCTURE FOR SECOND YEAR M.TECH PROGRAMME

III SEMESTER

Sl. No	Subject Code	Subject	L	P	Total	Internal Marks	External Marks	Total Marks	Credits
1	18D2138791	COMPREHENSIVE VIVA	--	--	--	50	--	50	2
2	18D2138792	SEMINAR-I	--	--	--	50	--	50	2
3	18D2138793	RESEARCH PROJECT PART-I	--	--	--	100	--	100	16
		Total Credits	--	--	--	200	--	200	20

IV SEMESTER

Sl. No	Subject Code	Subject	L	P	Total	Internal Marks	External Marks	Total Marks	Credits
1	18D2238791	SEMINAR II	--	--	--	100	--	100	2
2	18D2238792	RESEARCH PROJECT PART II	--	--	--	40	160	200	18
		Total Credits	--	--	--	140	160	300	20

L- LECTURE P-PRACTICAL

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2 M.TECH 2 SEM (NRIA18)

SUBJECT CODES

SL.NO	YEAR	SEMESTER	BRANCH	REG	SL.ORDER	SUBJECT CODE	SUBJECT NAME	SHORT NAME	EXTERNAL	INTERNAL	TOTAL MARKS	CREDITS	L	T	P	C
1	2	2	CSE(P.G)	NRIA18	1	MD2258701	SEMINAR -II	SEMINAR-II	0	25	50	2	0	5	P	C
2	2	2	CSE(P.G)	NRIA18	2	MD2258702	RESEARCH PROJECT PART-II	PROJECT	24	56	100	18	0	P	P	C

2 M.TECH 1 SEM (NRIA18)

SUBJECT CODES

SL.NO	YEAR	SEMESTER	BRANCH	REG	SL.ORDER	SUBJECT CODE	SUBJECT NAME	SHORT NAME	EXTERNAL	INTERNAL	TOTAL MARKS	CREDITS	L	T	P	C
1	1	1	CSE(P.G)	NRIA18	1	MD2158201	COMPREHENSIVE VIVA	C.VIVA	0	25	50	2	0	V	P	C
2	1	1	CSE(P.G)	NRIA18	2	MD2158702	SEMINAR-I	SEMINAR-I	0	25	50	2	0	S	P	C
3	1	1	CSE(P.G)	NRIA18	3	MD2158703	RESEARCH PROJECT PART-I	PROJECT	50	50	100	16	0	P	P	C

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Ph : 0866 – 2469666 Website : nrigroupofcolleges.com

DEPARTMENT OF MASTER OF BUSINESS ADMINISTRATION

Course Structure for MBA

Applicable for the students of MBA (Regular) from the Academic Year 2019-20

I MBA I SEMESTER

Subject	Title	Contact Hrs		Marks			Credits
		L+T	P	I	E	T	
18E1198401	Principles of Management	4		40	60	100	3
18E1198402	Managerial Economics	4		40	60	100	3
18E1198403	Accounting for Managers	4+1		40	60	100	3
18E1198404	Managerial Communication & Soft skills	4		40	60	100	3
18E1198405	Business Environment	4		40	60	100	3
18E1198406	Quantitative Techniques for Business Decision	4+1		40	60	100	3
18E1198491	IT – LAB		4	40	60	100	3

I MBA II SEMESTER

Subject	Title	Contact Hrs		Marks			Credits
		L+T	P	I	E	T	
18E1298401	Financial Management	4+1		40	60	100	3
18E1298402	Human Resource Management	4		40	60	100	3
18E1298403	Marketing Management	4		40	60	100	3
18E1298404	Production and Operations Management	4		40	60	100	3
18E1298405	Business Research Methods	4+1		40	60	100	3
18E1298406	Organizational Behavior	4		40	60	100	3
18E1298491	Mini Project	4		100	--	100	4

***Mini Project Report:**
The student should do Mini Project under the guidance of Internal Faculty and submit the report before the completion of II Semester End Examinations.

Note:
Electives: The student has to choose any ONE Specialization from the following areas in the beginning of III Semester.

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I MBA I SEMESTER

Sub Code: 18E1198401		**Name of the Course: Principles of Management**	
Lecture – Tutorial - Practical:	4-0-0	**Internal Marks:**	40
Credits:	3	**External Marks:**	60

Course Objectives:

This course prepares students with a comprehensive introduction in order :

1. To extend management theories into management practices and identify the key competencies needed to be an effective manager.
2. To recall how the managerial principles of planning and organizing can be executed in a variety of circumstances.
3. To improve as managers with social and informal sources of influence to inspire the actions of other organizational members and formulate best control methods.
4. To make timely and well considered decisions and lead the team .
5. To Gather and analyse both qualitative and quantitative information to isolate issues and formulate best organizational practices.

Course Outcomes:

The students will be able to:

1. Develop knowledge of fundamental management concepts, theories and the practices of management in contemporary organizations from a conceptual, analytical, and pragmatic perspective.
2. Equip with various principles to develop short and long-range plans and to organize them to accomplish effectively organizational goals.
3. Evaluate leadership styles to anticipate the consequences of each leadership style and identify techniques managers use to influence and control the internal environment.
4. Expose the skills and tools that aid in problem solving and decision making.
5. Develop managerial skills and knowledge needed to create a productive work environment for managing contemporary issues.

Course Outcomes vs. POs Mapping:

Courses Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2										
CO2	1			2					2			
CO3	1		2								2	
CO4	1			2			1		2			
CO5	1			2		2				1		
Total	6	2	2	6		2	1		4	1	2	
Average	1.2	2	2	3		2	1		2	1	2	

1 – Low 2 – Medium 3 – High

Unit 1:

Introduction of Management: Management: Definition – Importance – Managerial Roles – Functions of management – Classical theory – Scientific management - Administrative theory – Behavioral Theory – Management science – Integrative perspective – System theory – Socio – technical theory – Contingency theory – Comparing theories

Unit 2:

Planning and Organizing: Nature and Definition of Planning – Principles of Planning – Objectives of planning – Planning process – Types of plans – Benefits and pitfalls of planning. Principles of organizing – Organization levels – Organizational designs and structure – Line and staff organizations – Approaches – Delegation of authority – Factors affecting delegation of authority – Span of management – Centralization and decentralization of Authority.

Unit 3:

Directing and controlling: Definition of Co-ordination – Significance and principles of Coordination– Leadership behavior and styles – Leadership in cross cultural environment. Nature and importance of controlling – Controlling process – Requirements of effective control – Establishing controlling system – Controlling techniques.

Unit 4 :

Decision making: Meaning of decision – types of decisions – Rationale decision making process – Models of decision making – Problem solving and decision making – increasing participation in decision making – Vroom's Participative decision making model – challenges and problems in decision making

Unit 5 :

Contemporary issues in Management: MBO - Management By Walking Around – Out of the Box Thinking – Balanced Score Card –Time Management –BPOs – Stress Management causes and remedies – JIT – TQM – Six Sigma – CMM levels Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

TEXT BOOKS:

1. Kumar ,Rao, Chhalill: Introduction to Management Science . Cengage Publications, NewDelhi
2. Dilip Kumar Battacharya, Principles of Management, Pearson,2012.
3. Harold Koontz, Heinz Weihrich, A.R.Aryasri, Principles of Management, TMH,2010.
4. V.S.P.Rao, Management Text and Cases, Excel, Second Edition,2012.
5. K.Anbuvelan, Principles of Management, University Science Press,2013.

REFERENCES:

1. Neeta Baporikar, Case Method – Cases in Management, Himalaya Publishing House (HPH) 2009.
2. Deepak Kumar Bhattacharyya, Principles of Management-text and cases, Pearson,2012.

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Sub Code: 18E1198402		**Name of the Course: Managerial Economics**	
Lecture – Tutorial-Practical:	4-0-0	**Internal Marks:**	40
Credits:	3	**External Marks:**	60

Course Objectives

Managerial Economics is concerned with thoroughly exposing the students:

1. To inculcate the basic knowledge about the concepts of managerial economics.
2. To apply demand theory to establish elasticity of demand and perform demand forecasting.
3. To understand and estimate the production function in finding out optimal combination of inputs.
4. To emphasize the quantitative and qualitative applications of economic principles for business analysis and decision making
5. To examine market behavior and focus on the actions and reactions of business firms and consumers in a variety of market environments.

Course Outcomes

The students will be able to:

1. Define micro, as well as macroeconomic concepts that are useful in business decision making.
2. Understand the importance of demand forecasting techniques and the impact of demand elasticity on revenue.
3. Apply the knowledge of production function to attain optimal production.
4. Examine the relationship of costs and profit to the volume of business to maximize profits.
5. Compare and contrast price-output decisions of various market structures.

Course Outcomes vs. POs Mapping:

Courses Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1		1		2							
CO2	1	2		2							2	
CO3	1			2	2							
CO4	1		2				2					
CO5	1					2		3				
Total	5	2	3	4	4	2	2	3			2	
Average	1	2	1.5	2	2	2	2	3			2	

1 – Low 2 – Medium 3 – High

UNIT 1:

Introduction to Managerial Economics: Definition, Nature and Scope, Relationship with other areas in Economics, The role of managerial economist. Concept of opportunity cost, Incremental concept, time Perfective, Discounting Principle, Risk & uncertainty.

UNIT 2:

Demand Analysis: Elasticity of demand, types and significance of Elasticity of Demand - Measurement of price Elasticity of Demand – Need for Demand forecasting, forecasting techniques, law of Supply, Elasticity of Supply.

UNIT 3:

Supply and Production Analysis: Production function, Marginal Rate of Technical Substitution, Production function with one/two variables, Cobb-Douglas Production Function, Returns to Scale and Laws of returns.

UNIT 4:

Cost theory and estimation: Cost concepts, determinants of cost, cost – output relationship in the short run and long run – Modern development in cost theory – Saucer shaped short – run Average cost curves – Average total cost curve – Cost - Volume – Profit analysis

UNIT 5:

Market Structure and Pricing practices: Features and Types of different Markets – Price-Output determination in Perfect competition, Monopoly, Monopolistic competition and Oligopoly both in the long run and short run. Pricing methods in practice – Bain's limit pricing theory-Managerial Theories of a firm – Marris & Williams Models.

Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

TEXT BOOKS:

1. Paul, Koushil: "**Managerial Economics**", Cengage Learning, New Delhi,
2. Siddiqui S A, Siddiqui A S: "**Managerial Economics**", and Financial Analysis", New Age International Publishers, New Delhi, 2008.
3. Vanita Agarwal: "**Managerial Economics**", Pearson, New Delhi,2013.
4. Dominick Salvatore: "**Managerial Economics**", Oxford University Press, NewDelhi,2010.
5. D.L. Ahuja: "**Managerial Economics**", S. Chand & Company ltd,NewDelhi-55.
6. O'Sullivan, Sheffrin, Perez "Micro Economics: Principles, Applications and Tools", Pearson Education.
7. Mithani D M: ''**Managerial Economics**", Himalaya Publishing House, Mumbai,2008.
8. Varshney, R.L and Maheswari, K L: ''**Managerial Economics**", Sultan Chand and Sons, New Delhi,2002.
9. P.L.Mehta," **'Managerial Economics-Analysis Problems and cases"** Sultan Chand and Sons, New Delhi,2018

REFERENCES:

1. Atmanand: "**Managerial Economics**", Excel Publications. New Delhi,2012.
2. Narayanan Nadar E, Vijayan S: ''**Managerial Economics**", PHI Private Limited, New Delhi,2009.

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Sub Code: 18E1198403	**Name of the Course: Accounting for Managers**		
Lecture – Tutorial-Practical:	4-1-0	**Internal Marks:**	40
Credits:	3	**External Marks:**	60

Course Objectives

The objectives of this course are:

1. To acquaint the students with basic accounting knowledge
2. To prepare a set of basic financial statements
3. To introduce prospective managers to analyze financial statements
4. To evaluate the costs and benefits of different conventional and contemporary cost concepts.
5. To make the student familiar with various cost accounting concepts and its application in managerial decision making.

Course Outcomes

Student shall be able to:

1. Make use of the concepts and principles of Accounting.
2. Understand the process of preparing financial statements.
3. Analyze the financial statements with various tools and techniques for Interpreting and decision making.
4. Equip the knowledge of cost concepts, preparation of cost sheet, methods and techniques of costing.
5. Enable the students understand the various cost accounting principles and their applicability

Course Outcomes vs. POs Mapping:

Courses Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2		2									
CO2	1	2	2	2								
CO3	1		2	2							2	
CO4	1				3						2	
CO5	2			2							3	
Total	7	2	6	6	3						7	
Average	1.4	2	2	2	3						2.3	

1 – Low 2 – Medium 3 – High

UNIT 1

Accenting process: Definition of accounting - Accounting Concepts and conventions - Accounting Cycle - Classification of accounts - Accounting equations – Static and dynamic nature of accounting - Users of accounting information - Books of original entry, ledger - Preparation of Trial balance

UNIT-2

Final Accounts: Preparation and Presentation of income statement - Balance Sheet with Adjustments Proforma of company Final Accounts as per companies Act,2013- Accounting standards – Limitations of Financial Statements

UNIT-3

Financial Analysis: The scope and purpose of financial analysis - financial statement analysis - Ratio analysis – liquidity, activity, structural, coverage and profitability ratios - Funds flow analysis - concepts of funds; ascertaining funds from operations ; Sources of funds - Uses of funds - Preparation and analysis of funds flow statement and cash flow statement.

UNIT-4

Cost accounting concepts: Methods of Costing, Techniques of Costing - Role of Cost accounting - Elements of cost - Financial accounting Vs Management Accounting - Basic Cost concepts - Determination of product cost - Preparation of cost sheet under different cost heads

UNIT-5

Cost behavior and Decision making: Behavioral classification of costs and methods for calculation of fixed, variable and semi variable costs - CVP analysis and decision making - Break Even analysis- Key factor distribution & analysis - Optimization of Product mix - Make or Buy decisions - Capacity utilization - Plant shutdown or continue decision CVP under conditions of uncertainty - sensitivity analysis.

Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

TEXT BOOKS:

1. Vijaya Kumar.P, Ravindra P.S., Kiran Kumar V: "**Accounting for Managers**", Himalaya Publishing House, New Delhi,2013
2. Shankarnarayana, Ramanath: "**Finanacial Accounting for Management**", Cengage Learning, NewDelhi.
3. Maheshwari, Maheashwari and Maheshwari, "**Financial Accounting**", Vikas publishing House, New Delhi,2013
4. Amberish Gupta:"**Financial Accounting for Management**", Pearson Education,2012.
5. Dr. Jawahar Lal: "**Accounting for management**", Himalaya Publishing house, NewDelhi, 2012.
6. Asish K. Bhattacharyya: "**Essentials of Financial Accounting**", PHI Learning, New Delhi, 2012.
7. Dr. V.R.Palanivelu: "**Accounting for Management**". University Science Press, New Delhi, 2009.
8. S.P.Jain and Narang **"Financial Accounting"Kalyani Publishers,2018**
9. S.P.Jain and Narang "**Advanced Cost Accounting" Kalyani Publishers,2018**

REFERENCES:

1. Ashok Banerjee: "**Financial Accounting**", a managerial Emphasis, Excel books, New Delhi,2012.
2. Ramachandran N, RamKumar Kakani: **Financial Accounting for Management**",McGraw Hill –2013.

Sub Code: 18E1198404 **Name of the Course: Managerial Communication & Soft Skills**

Lecture – Tutorial-Practical:	4-0-0	**Internal Marks:**	40
Credits:	3	**External Marks:**	60

Course Objectives:

The objectives of this course are:

1. Develop competence in oral, written, and visual communication.
2. To improve understanding in formal and informal communication.
3. To Develop inter personal and intra personal skills of the students.
4. To Enhance effectiveness of communication in letter and report preparation
5. Equip students in Presentation skills and interviews.

Course Outcomes:

Students shall be able to:

1. Define the role and process of business communication.
2. Compare and differentiate between formal and informal communication.
3. Take part in and manage inter and intra personal communications.
4. Make use of the techniques of effective communication in letter and report preparation.
5. Utilize communication skills effectively in presentations and interviews

Course Outcomes Vs POs Mapping:

Courses Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2								2	2		
CO2	1	2	2							2		
CO3	1								3		3	
CO4	1			2			3					
CO5	1		2								2	
Total	6	2	4	2			3		5	4	5	
Average	1.2	2	2	2			3		2.5	2	2.5	

1 – Low 2 – Medium 3 - High

UNIT 1

Role of Communication in Business: Objective of Communication – The Process of Human Communication – Media of Communication - Written Communication - Oral Communication - Visual Communication - Audio Visual Communication – Silence - Developing Listening Skills – Improving Non-verbal communication skills – Cross Cultural Communication – problems and challenges.

UNIT 2

Managing Organization Communication: Formal and Informal Communication– Intrapersonal Communication – Models for Inter Personal Communication - Exchange Theory.

UNIT 3

Managing Interpersonal Communication: Inter-Personal communication – Role of Emotion in Inter Personal Communication – Communication Styles – Barriers to Communication – Gateways to Effective Interpersonal Communication.

UNIT 4

Business Writing Skills: Significance of Business Correspondence - Essentials of Effective Business Correspondence - Business Letter and Forms - Meeting - Telephone Communication – Use of Technology in Business Communication. Report Writing – Meaning and Significance: Structure of Reports - Negative, Persuasive and Special Reporting: Informal Report – Proposals. Formal Report.

UNIT 5

Presentation skills – Techniques of Presentation – Types of Presentation – Video Conferencing and formats – Interview – formal and informal – Interview techniques –Communication etiquettes.

Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

TEXT BOOKS:

1. Mallika Nawal: "Business Communication", Cengage Learning, New Delhi,2012.
2. Kuberudu B and Srinivasa Krishna K: "***Business Communication and Soft Skills***", Excel Books,2008.
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, NewDelhi.

6. SathyaSwaroopDebasish, 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.

REFERENCES:

1. Sangita Mehta, Neety Kaushish: "**Business Communication**", University Science Press, New Delhi,2010.
2. Anjali Ghanekar: "**Business Communication Skills**", Everest Publishing House, New Delhi, 2011

Sub Code: 18E1198405	**Name of the Course: Business Environment**		
Lecture – Tutorial-Practical:	4-0-0	**Internal Marks:**	40
Credits:	3	**External Marks:**	60

Course Objectives:

The objectives of this course are:

1. To develop an understanding of how various environmental factors influence the business.
2. To create awareness about Structure of Indian economy, Economic systems, Economic reforms in various sectors
3. To acquaint students with the functioning of fiscal policy and the factors affecting Balance of Payment.
4. To familiarize students with the various important trade agreements and international trade agreements.
5. To familiarize students with the various important provisions of Consumer Protection Act and other environmental laws.

Course Outcomes:

Students shall be able to:

1. Understand the various environmental factors that influence the business
2. Able to know the development process in India after independence and understand the problems and measures in their contextual perspective
3. Application of the knowledge of various provisions of Budget, Taxation, Public Expenditure, public revenue, Public Debt, and Fiscal Deficit in the economy for smooth functioning of the business
4. Utilize the knowledge of trade agreements and international trade agreements for the business
5. Have a comprehensive understanding about the existing law on consumer protection in India and be aware of the basic procedures for handling consumer dispute.

Course Outcomes vs POs Mapping:

Courses Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1	3				2				1	1
CO2	2	2	2				2					
CO3	3	1	2	2								2
CO4	3	2	2	3			2	2		1		
CO5	3	2	2	1		1						1
Total	13	8	11	6		1	6	2		1	1	4
Average	2.6	1.6	2.2	2		1	2	2		2	2	1.3

1 – Low 2 – Medium 3 – High

UNIT 1

Business Environment: Importance at national and international level – problems and challenges– factors both internal and external influencing business environment. Industrial policies since independence and their significance – regulatory and promotional framework - Five-year plans and their importance.

UNIT 2

Structure of Indian economy: Nature and significance – Economic systems – structure of Indian industry – Economic reforms in various sectors – nature – challenges – social justice –Disinvestment mechanism – problems and procedures – Sickness in Indian industry, competition Act 2002.

UNIT 3

Fiscal Policy: Nature and significance – public revenues – expenditure- debt, development activities allocation of funds – Critical analysis of the recent fiscal policy of Government of India - Balance of Payments - Nature – Structure – major components – Causes for disequilibrium in Balance of Payments – Correction measures.

UNIT 4

India's Trade Policy: Nature – Magnitude and direction of Indian international trade – problems – bilateral and multilateral trade agreements. International business environment: Nature – significance– challenges and mechanisms. WTO: Agreements in the Uruguay round including TRIPS, TRIMS and GATS – disputes settlement mechanism – dumping and antidumping measures.

UNIT 5

Legal Frame: special features of the SICA (special provisions) 1985, BIFR, Consumer protection act 1986, Environmental laws (pertaining to the control and prevention of Air and Water pollution) and the Essential Commodities Act 1955.

Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

TEXT BOOKS:

1. Shaikh Saleem: "**Business Environment**", Pearsons, NewDelhi,
2. Veena Keshav Pailwar: "**Economic Environment of Business**", PHI Learning, New Delhi, 2012
3. Rosy Joshi, Sangam Kapoor: "**Business Environment**", Kalyani Publishers, New Delhi,2011.
4. Aswathappa K: "**Essentials of Business Environment**", Himalaya Publishing House, New Delhi,2011.
5. Vivek Mittal: "**Business Environment Text and Cases**", Excel Books New Delhi,2011.
6. Sundaram and Black: "***International Business Environment Text and Cases***", PHI Private Limited, New Delhi.
7. Avid W Conklin: "***Cases in Environment of Business***", Sage Publication India Private Ltd, NewDelhi.
8. Raj Kumar: "**International Business Environment**", Excel Publication, New Delhi,2012.

REFERENCES:

1. Palle Krishna Rao: "***WTO-Text and Cases***", Excel Publication, NewDelhi.
2. Government of India, ***Latest Economic Survey Report.***

Sub Code: 18E1198406 Name of the Course: Quantitative Techniques for Business Decisions

Lecture – Tutorial-Practical:	4-1-0	**Internal Marks:**	40
Credits:	3	**External Marks:**	60

Course Objectives

Quantitative analysis for business decisions introduces students to a collection of widely used quantitative tools and models. This course is intended to:

1. Provide basic knowledge of analyzing data using various statistical and mathematical techniques for business decisions.
2. Enable better reporting for decision making.
3. Learn the feasible solutions and optimum solutions for the resource management.
4. Enable interpretations in transportation problems and game theory.
5. Estimate time and critical path for project.

Course Outcomes:

Student shall be able to:

1. Acquire the knowledge about mean, median, mode and measures of dispersion and apply the concepts of probabilistic distributions in solving problems.
2. Relate a formal quantitative approach to problem solving and decision making
3. Extend the ability to solve linear programming problems by graphical and simple methods.
4. Outline quantitative models to decision making and problem analysis, and their interpretations in transportation problems and game theory.
5. Network techniques to solve problems by creating strong network structures for work

Course Outcomes vs POs Mapping:

Courses Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	2	2	2							2
CO2	1		2	3							2	
CO3	1			3	3							2
CO4	1	2	2	3	2						2	2
CO5	1		2	2	3						3	2
Total	5	4	8	13	10						7	8
Average	1	2	4	2.6	2.5						2.3	2

1 – Low 2 – Medium 3 - High

UNIT 1

Basic Mathematical & Statistical Techniques: Linear, Quadratic, Logarithmic and Exponential Functions- Permutations and Combinations – Matrices - Elementary operations of matrices. Measures of Central Tendency – Measures of Dispersion –Simple Correlation and Regression Analysis Concept of Probability- Probability Rules – Joint and Marginal Probability – Baye's Theorem- Probability Distributions- Binomial, Poisson, Normal and Exponential Probability Distributions.

UNIT 2

Introduction to Decision Theory: Steps involved in Decision Making, different environments in which decisions are made, Criteria for Decision Making, Decision making under uncertainty, Decision making under conditions of Risk-Utility as a decision criterion, Decision trees, Graphic displays of the decision making process, Decision making with an active opponent.

UNIT 3

Linear Programming: Formation of mathematical modeling, Graphical method, the Simplex Method; Justification, interpretation of Significance of All Elements In the Simplex Tableau, Artificial variable techniques: Big M method, Two phase method.

UNIT 4

Transportation, Assignment Models & Game theory: Definition and application of the transportation model, solution of the transportation problem, the Assignment Model, Traveling Salesman Problem. Game Theory: Introduction – Two Person Zero-Sum Games, Pure Strategies, Games with Saddle Point, Mixed strategies, Rules of Dominance, Solution Methods of Games without Saddle point – Algebraic, matrix and arithmetic methods.

UNIT -5

Pert& C.P.M. and Replacement Model: Drawing networks – identifying critical path – probability of completing the project within given time- project crashing – optimum cost and optimum duration. Replacement models comprising single replacement and group replacement

Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Text Books:

1. N.D.Vohra: "***Quantitative Techniques in Management***", Tata-McGraw Hill Private Limited, New Delhi,2011.
2. J. K. Sharma, "***Operations Research: Theory andApplications***",Macmillan Gupta S.P: "***Statistical Methods***", S. Chand and Sons, NewDelhi,
3. Anand Sharma: "**Quantitative Techniques for Business decision Making**", Himalaya Publishers, NewDelhi,2012;
4. Anderson: "**Quantitative Methods for Business**", Cengage Learning, New Delhi2013
5. Sancheti, Dc & VK Kapoor, "**Business Mathematics**", S Chand and Sons, NewDelhi

REFERENCES:

1. D P Apte: "***Operation Research and Quantitative Techniques***", Excel Publication, New Delhi, 2013
2. Hamdy, A.Taha: "***Operations Research: An Introduction***", Prentice-Hall of India, New Delhi 2003.

Sub Code: 18E1198491 **Name of the Course: Information Technology Lab**

Lecture – Tutorial-Practical:	0-0-4	**Internal Marks:**	40
Credits:	3	**External Marks:**	60

Course Objectives

The objectives of this course are:

1. To equip the students with the basic information technologies available for improving managerial performance
2. To identify and operate basic components of the computer, Microsoft word and Excel
3. To identify major components of PowerPoint window and create a presentation
4. To create, add, modify and analyze the data from a database

Course Outcomes:

Student shall be able to:

1. Develop technical skills in information technology
2. Work with the Micro Soft Word and Excel
3. Create presentation in Microsoft PowerPoint
4. Preparation of mini projects assigned for course work.

Course Outcomes vs POs Mapping:

Courses Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1											
CO2	1	2		3								
CO3	1				2							
CO4	1			2								
Total	4	2		5	2							
Average	1	0.5		1.25	0.5							

1 – Low 2 – Medium 3 - High

UNIT 1

Introduction of various software used for business: Significance in the current business environments - Introduction of software MS Office, SQL.

UNIT 2

Financial modeling: Present value of cash flows, Valuations, Financial ratio analysis, Forecasting, Trend analysis of data, Random input generations

UNIT 3

Statistics for Management - correlation and regression analysis data presentation techniques. Spread sheet showing the monthly payments with changing interest rate over a period of loan. (Using excel)

UNIT 4

Data Collection and analyzing techniques: Chats, Flow diagrams TQM methodologies

UNIT5

Preparation and presentations of Mini projects assigned for course work of first semester.

REFERENCES:

1. Shelly, Cashman: "Microsoft copies 2007", Cengage Learning, New Delhi. 2012

I MBA II SEMESTER

Sub Code: 18E1298401	**Name of the Course: Financial Management**		
Lecture – Tutorial-Practical:	4-1-0	**Internal Marks:**	40
Credits:	3	**External Marks:**	60

Course Objectives

The objectives of this course are to enable the students:

1. To understand the competencies, responsibilities, and tasks performed by financial managers in business organizations.
2. To help future managers in understanding the finances of an organisation and their interface with finance.
3. To explain financial tools and techniques, to help the firms to maximize its value by improving decisions relating to capital budgeting,
4. Application and analysis of dividend decision.
5. To analyse working capital management and cash management techniques.

Course Outcomes

By the end of this course the students will be able to:

1. Explain a foundation of financial management concepts and tools for achieving the business objectives.
2. Analyse a company's performance and make appropriate recommendations regarding its capital structure.
3. Relate how organizations make important investment decisions needs with the practical situations.
4. Summaries various dividend theories and their impact on effective decision-making.
5. Analyze the working capital requirements and cash problems effecting organizations to deal with more complex financial bottlenecks that arise from them

Course Outcomes vs. POs Mapping:

Courses Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1		2	2								
CO2	1			3							3	2
CO3	1			2	2							
CO4	1		3								3	
CO5	1		2	2	2							2
Total	5		7	9	4						6	4
Average	1		2.3	2.25	2						3	2

1 – Low 2 – Medium 3 – High

Syllabus:

UNIT-1

Financial Management: Concept-Nature and Scope-Evolution of financial Management- The new role in the contemporary scenario – Goals and objectives of financial Management-Firm's mission and objectives - Profit maximization Vs. Wealth maximization – Maximization Vs Satisfying - Major decisions of financial manager.

UNIT 2

Financing Decision: Sources of finance-Concept and financial effects of leverage–EBIT– EPS analysis. Cost of Capital: Weighted Average Cost of Capital– Theories of Capital Structure.

UNIT 3

Investment Decision: Concept of Time Value of money – Techniques of Time Value of Money – Nature and Significance of Investment Decision – Estimation of Cash flows – Capital Budgeting Process – Techniques of Investment Appraisal – Pay back period, Accounting Rate of Return, Time Value of Money – DCF Techniques- Net Present Value, Profitability Index and Internal Rate of Return.

UNIT 4

Dividend Decision: Meaning and Significance – Major forms of dividends – Theories of Dividends – Determinants of Dividend – Dividends Policy and Dividend valuation – Bonus Shares –Stock Splits – Dividend policies of Indian Corporate.

UNIT 5

Liquidity Decision: Meaning - Classification and Significance of Working Capital – Components of Working Capital – Factors determining the Working Capital – Estimating

Working Capital requirement – Cash Management Models – Cash Budgeting – Accounts Receivables – Credit Policies – Inventory Management.

Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Text Books

1. P. Vijaya Kumar, P.S. Ravindra, Kiran Kumar, "Financial Management", Himalaya Publishing House PVT.Ltd,2014
2. Rajiv Srivastava, Anil Misra: "**Financial Management**", Oxford University Press, NewDelhi,2012
3. I.M.Pandey:"**Financial Management**",Vikas Publishers,NewDelhi,2013.
4. Prasanna Chandra: "**Financial Management Theory and Practice**", Tata McGrawHill2011.
5. Khan and Jain: Financial Management, Tata Mc Graw Hill, New Delhi,
6. G. Sudarsana Reddy, "Financial Management", Himalaya Publishing House, 2012.

Reference Books

1. Brigham, E.F: "Financial Management Theory and Practice", Cengae Learning, New Delhi,2013.
2. RM Srivastava, Financial Management, Himalaya Publishing house, 4th edition.

Sub Code: 18E1298402 **Name of the Course: Human Resources Management**

Lecture – Tutorial-Practical:	4-0-0	**Internal Marks:**	40
Credits:	3	**External Marks:**	60

Course Objectives

The course aims:

1. To introduce the evolution in human resource management and its role in gaining sustainable competitive advantage through people.
2. To develop comprehensive skills in planning, selecting, motivating, and developing the human resources for organizational effectiveness.
3. To discuss theory and practice of compensation, employee benefits, performance development and retention.
4. To explain in detail how to establish pay rates.
5. To understand and apply the concept of industrial relations and the system in which its operates.

Course Outcomes

Student will be able to:

1. Relate how to strategically plan for the human resources needed to meet organizational goals and objectives.
2. Compare various methods of HR planning, recruitment, selection, placement and training.
3. Select and evaluate the right employee performance and compensation systems.
4. Appraise a job based compensation schemes that is consistent with organization goals .
5. Make use of various industrial relationship policies suitable to different situations.

Course Outcomes Vs POs Mapping:

Courses Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1		2									
CO2	1	2	2		2							
CO3	1								2			2
CO4	1			2				2				
CO5	1		2	2				2				
Total	5	2	6	4	2			4	2			2
Average	1	2	2	2	2			2	2			2

1 – Low 2 – Medium 3 - High

Syllabus:

UNIT 1

HRM: Significance - Definition and Functions – evolution of HRM- Principles - Ethical Aspects of HRM—HR policies, Strategies to increase firm performance-Role and position of HR department – aligning HR strategy with organizational strategy - HRM at global perspective-challenges–cross-culturalproblems–emergingtrendsinHRM.

UNIT 2

Investment perspectives of HRM: HR Planning –Recruitment - Sources of recruitment-Selection Process-Training and DevelopmentMethodsandtechniques–Trainingevaluation-retention-JobAnalysis–jobdescriptionandspecifications Management development-HRD concepts.

UNIT 3

Performance Apprisal: Importance – Methods – Traditional and Modern methods –Latest trends in performance appraisal - Career Planning and Development - Counseling-Compensation, ConceptsandPrinciples-InfluencingFactors-CurrentTrendsinCompensation-Methodsof Payments - compensation mechanisms at international level.

UNIT 4

Wage and Salary Administration: Concept- Wage Structure- Wage and Salary Policies-Legal Frame Work-Determinants of Payment of Wages-Wage Differentials-Job design and Evaluation- - Incentive Payment Systems. Welfare management: Nature and concepts – statutory and non-statutory welfare measures – incentive mechanisms

UNIT 5

Managing Industrial Relations: Trade Unions - Employee Participation Schemes-Collective Bargaining–Grievances and disputes resolution mechanisms – Safety at work – nature and importance – work hazards – safety mechanisms - Managing work place stress.

Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Text Books

1. K Aswathappa:"***Human Resource and Personnel Management***", Tata Mc Graw Hill, New Delhi,2013
2. N.Sambasiva Rao and Dr. Nirmal Kumar: "**Human Resource Management and Industrial Relations**", Himalaya Publishing House, Mumbai
3. Momoria & Momoria,"**Dynamics of Industrial Relations**",
4. Subba Rao P:"***Personnel and Human Resource Management-Text and Cases***", Himalaya Publications, Mumbai,2013.

Reference Books

1.Mathis,Jackson,Tripathy:"***Human Resource Management: A south - Asin Perspective***", Cengage Learning, New Delhi,2013

2. Madhurima Lall, Sakina Qasim Zasidi: "**Human Resource Management**", Excel Books,New Delhi, 2010

Sub Code: 18E1298403 **Name of the Course: Marketing Management**

Lecture – Tutorial-Practical:	4-0-0	**Internal Marks:**	40
Credits:	3	**External Marks:**	60

Course Objectives

The aim of the course is to enable students:

1. To provide an opportunity for analyzing the concepts and evolution of marketing.
2. To create an awareness on the various aspects relating to segmentation, target market and positioning strategy
3. To familiarize with the basic terms, concepts, approaches and problems of pricing decisions.
4. To understand marketing communications concepts and develop a promotional plan.
5. To understand organization of marketing management and its management.

Course Outcomes

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

1. Match the role and functions of marketing and utilise information of a firm's external and internal marketing environment to identify and prioritise appropriate marketing strategies.
2. Make use of the key analytical frameworks and tools used in marketing in relation to segmenting and targeting of products.
3. Understand tactical marketing issues and strategies related to pricing of products and services.
4. Communicate marketing information persuasively and accurately in oral, written and graphical format as per the need.
5. Understand evolution ,organizing implementation controlling and efficiency measurement of marketing management.

Course Outcomes vs POs Mapping:

Courses Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2	2			2	2					
CO2	1				2						2	2
CO3	1		2	3								
CO4	1								2		2	
CO5	1					2		2				
Total	5	2	4	3	2	4	2	2	2		4	2
Average	1	2	2	3	2	2	2	2	2		2	2

1 – Low 2 – Medium 3 - High

Syllabus:

UNIT 1

Introduction to Marketing : Needs - Wants – Demands - Products - Exchange - Transactions - Concept of Market and Marketing and Marketing Mix - Product and Production Concept - Sales and Marketing Concept - Societal Marketing Concept - Indian Marketing Environment.

UNIT 2

Market Segmentation and Targeting: Identification of Market Segments - Consumer and Institutional/corporate Clientele - Segmenting Consumer Markets - Segmentation Basis – Evaluation and Selection of Target Markets–Developing and Communicating a Positioning Strategy.

UNIT 3

Pricing Strategy : Objectives of Pricing - Methods of Pricing - Selecting the Final price - Adopting price - Initiating the price cuts - Imitating price increases - Responding to Competitor's price changes.

UNIT 4

Marketing Communication : Communication Process – Communication Mix-Managing Advertising Sales Promotion - Public relations and Direct Marketing - Sales force - Objectives of Sales force - Structure and Size - Sales force Compensation.

UNIT5

Marketing Organization and Control: Evolution of Marketing Department - Organizing the Marketing Department - , Marketing Implementation - Control of Marketing

Performance - Annual Plan Control - Profitability Control - Efficiency Control - Strategic Control.

Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Text Books

1. Lamb, Hair, Sharma:"**MKTG**"CengageLearning,NewDelhi,2013
2. Phillip Kotler: "**Marketing Management**", Pearson Publishers ,NewDelhi, 2013.
3. Rajan Sexena: "**Marketing Management**", Tata Mc Graw Hill, New Delhi,2012.
4. R.Srinivasan:"**Case Studies in Marketing**", PHI Learning, New Delhi, 2012

Reference

1. Tapan K Pand: " **Marketing Management** ", Excel Books,NewDelhi,2012
2. Paul Baines, Chris Fill, Kelly Page Adapted by SinhaK: "Marketing", Oxford University Press, Chennai,2013.

Sub Code: 18E1298404 **Name of the Course: Production & Operations Management**

Lecture – Tutorial-Practical:	4-0-0	**Internal Marks:**	40
Credits:	3	**External Marks:**	60

Course Objectives

The aim of this course is:

1. To provide an introduction to the functional area of production and operations management as practiced in manufacturing industries and the services sector.
2. To equip the students with the knowledge of production layout and Optimal Production Strategies
3. To familiarize the students about the use of control charts
4. Better understanding of quality management.
5. Plan and implement suitable materials handling principles and practices in the operations.

Course Outcomes

Upon completion of this course, students will be able:

1. To list an overall view of the decision-making process as it relates to the major areas of Production/ Operations Management.
2. To Analyze and evaluate various facility alternatives and their capacity decisions, develop a balanced line of production & scheduling and sequencing techniques in operation environments
3. To provide a basis for current decision on acceptances or rejections in manufacturing or purchasing using various control charts
4. To Plan and implement suitable quality control measures in production.
5. To understand the Materials Management function starting from Demand Management through Inventory Management.

Course Outcomes vs POs Mapping:

Courses Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1										2	
CO2	1				2							
CO3	1						2	2				
CO4	1	2	2									
CO5	1			2		2		2				2
Total	5	2	2	2	2	2	2	4			2	2
Average	1	2	2	2	2	2	2	2			2	2

1 – Low 2 – Medium 3 - High

UNIT 1

Introduction: Overview & Definition of Production and Operations Management- Nature and Scope of Production and Operations Management-Historical Evolution –Role & responsibilities of the production manager - Types of Manufacturing Processes and Product Design.

UNIT 2

Production Planning and Control: Stages in PPC – Gantt – PPC in Mass, Batch, and Job Order Manufacturing- Aggregate planning and Master Scheduling, MRP, CRP. Maintenance management & Industrial Safety. Plant Location & Layout Planning- Factors influencing location - types of layouts. Capacity Planning – Optimal Production Strategies: Scheduling And Sequencing of Operations. Work Design: Method Study and Work Measurement-Work Sampling.

UNIT 3

Managing of Work Environment:– Automation --Technology Management -Waste Management. Quality Assurance and Quality Circles – Statistical Quality Control –Control Charts for Variables- Average, Range and Control charts for Attributes. Acceptance Sampling Plans. Purchase functions and Procedure-

UNIT 4

Quality Improvement: Basic concepts of quality, dimensions of quality, Juran's quality trilogy, Deming's 14 principles, Quality improvement and cost reduction, ISO 9000-2000 clauses & coverage. TQM, Six Sigma, Productivity–factors affecting productivity, measurement& improvements in productivity - new product development and design - stages & techniques. Total Productive Maintenance (TPM).

UNIT 5

Stores Management: Objectives of Stores Management – Requirements for efficient. Management of Stores - Different Systems of Costs & Types of Inventory. – Inventory Control Systems, JIT,VMI, ABC, VED and FNSD analyses. Value Analysis– importance in cost reduction – concepts and procedures.

Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Text Books

1. PannerSelvem:"**ProductionandOperationManagement**",PrenticeHallofIndia, NewDelhi,2012.
2. K.Aswathappa, K. Shridhara: "**Production & Operation Management**", Himalaya Publishing House, New Delhi,2012
3. AjayKGarg:"**ProductionandOperationManagement**",TMH,NewDelhi,2012
4. Deepak Kumar Battacharya: "**Production & Operation Management**", University Press, New Delhi,2012

Reference

1. AlanMuhlemann, JohnOakland,jasti Katyayani:"**Production and Operation Management**", Pearson, NewDelhi,2013.

Sub code: 18E1298405 **Name of the course: Business Research Methods**

Lecture – Tutorial-Practical:	4-1-0	**Internal Marks:**	40
Credits:	3	**External Marks:**	60

Course Objectives

This course seeks:

1. To provide an understanding of different aspects associated with the research process relating to management, business and the social sciences.
2. To develop an understanding of various research designs and sampling techniques.
3. To organize and conduct research in a more appropriate manner through survey research and analyzing the data.
4. Have a basic awareness of hypothesis formulation and data analysis through statistical inference .
5. To familiarize the students with statistical techniques such as multi- variate, bi-variate t- test, z -test and ANOVA

Course Outcomes

Students will be able to:

1. Have basic awareness of social research, research process and testing of hypothesis.
2. Have adequate knowledge on research designs and measurement scaling techniques as well as quantitative data analysis.
3. Apply various methodologies including sampling questioning, empirical techniques in their research work reports.
4. Construct the data for hypothesis testing and statistical quality control charts
5. Construct the data using various multi-variate and bi-variate techniques and ANOVA for complex experimental designs.

Course Outcomes vs POs Mapping:

Courses Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	2		2								
CO2	1			2	3							
CO3	1				3						2	
CO4	1			2							2	3
CO5	1			2	2							3
Total	5	2		8	8						4	6
Average	1	2		2	2.6						2	3

1 – Low 2 – Medium 3 - High

Syllabus:

UNIT 1

Introduction : Nature and Importance of research, The role of business research, aims of social research. Research Process – Types of Research –Defining Research Problem – Formulation of Hypothesis – Testing of Hypothesis.

UNIT 2

DataBase: Discussion on primary data and secondary data,tools and techniques of collecting data. Methods of collecting data. Sampling design and sampling procedures. Random Vs. Non-random sampling techniques, Designing of Questionnaire –Measurement and Scaling – Nominal Scale – Ordinal Scale–IntervalScale–RatioScale–GuttmanScale–LikertScale–SchematicDifferential Scale.

UNIT 3

Survey Research and data analysis: media used to communicate with respondents, personal interviews, tele phone interviews, self-administered questionnaires, selection of an appropriate Survey research design, the nature of field work, principles of good interviews and fieldwork management.Editing–Coding–ClassificationofData–TablesandGraphicPresentation– Preparation and Presentation of Research Report.

UNIT 4

Statistical Inference & quality control: Tests of Hypothesis, Introduction to Null hypothesis vs alternative hypothesis, parametric vs. non-parametric tests, procedure for testing of hypothesis, tests of significance for small samples, application, t-test, Chi

Square test. Statistical Quality Control Upper quality chart S P charts, LCL UCL, BAR CHARTS. Attribute charts and industrial applications.

UNIT 5

Multivariate Analysis: Nature of multivariate analysis, classifying multivariate techniques, analysis of dependence, analysis of inter dependence. Bivariate analysis-tests of differences-t test for comparing two means and z-test for comparing two proportions and ANOVA for complex experimental designs.

Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Text Books

1. Navdeep and Guptha:"**Statistical Techniques & Research Methodology**", Kalyani Publishers
2. C.R.Kothari, Gaurav Garg,"**Research Methodology Methods And Techniques**" New Age International Publishers,2018
3. Willam G.Zikmund, Adhkari: "***Business Research Methods***", Cengage Learning, New Delhi,2013.
4. S.Shajahan: "***Research Methods for management***", JAICO Publishing House, New Delhi,2009.

Reference

1. UWEFLICK:"**Introducing*ResearchMethodology***",SAGE,New Delhi,2012.
2.CooperR.DonaldandSchindlerS.Pamela:"***BusinessResearchMethods***",9/e,Tata MCGraw Hill, NewDelhi.
3. M.V.Kulkarni: "**Research Methodology**", Everest Publishing House, New Delhi, 2010.

Sub code: 18E1298406	**Name of the course: Organizational Behavior**		
Lecture – Tutorial-Practical:	4-0-0	**Internal Marks:**	40
Credits:	3	**External Marks:**	60

Course Objectives

This course seeks:

1. To introduce organizational theory in relation to management practices.
2. To provide students with a sound knowledge and personal understanding of the impact of human behaviour on work in groups and organisation.
3. To explain the determinants of individual, group dynamics and their impact on organizational effectiveness.
4. To present the significance of key organizational processes in relation to current trends in the management of human resources.
5. To identify various strategies in resolving conflicts, negotiations and various ways of managing stress in organizations.

Course Outcomes

Upon completion of this course, the student will have reliably demonstrated the ability to:

1. Classify the developments in the field of organizational behavior and explain the micro and macro approaches.
2. Summarize the perceptions, learning, emotions, attitudes, and motivation in organizations
3. Identify the appropriateness of various leadership styles and conflict management strategies used in organizations.
4. Analyse the communication processes in teams and organizations.
5. Examine organizational culture and describe its dimensions for understanding various organizational designs for an effective organizationl performance.

Course Outcomes vs POs Mapping:

Courses Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1						2					
CO2	1		2								2	
CO3	1		2						2			
CO4	1									3		3
CO5	1		2				2		2			
Total	5		6				4		4	3	2	3
Average	1		2				2		2	3	2	3

1 – Low 2 – Medium 3 - High

UNIT 1

Introduction-Nature and scope–linkages with other social sciences-Individual Roles and Organizational Goals - Perspectives of Human Behavior, Approach to Organizational behavior - models of organizational behavior.

UNIT 2

Perceptual Management: Nature - Process – selection, organization and interpretation – Influencing factors -Motivation – Concepts - Needs and Motives and theories. Leadership and Motivating people - Leadership Theories. Attitudes and Values: formation - Types – Changes and Behavior Modification Techniques.

UNIT 3

Personality Development: Nature-Stages, Determinants of Personality,-JohariWindow-Transactional Analysis, Learning Processes - Theories, Creativity and Creative - Thinking. Leader ship nature and skills.-Decision Making Process: Behavioral Dimensions, Groups and their formation - Group Dynamics, Informal Organizations, Group versus Individual Interaction.

UNIT 4

Inter-Personal Communication: Listening, Feedback, Collaborative Processes in Work Groups, Team Building, Team Decision Making, Conflict Resolution in Groups and

Problem Solving Techniques.

UNIT 5

Organizations: Taxonomy, Elements of Structure, Determinants of Structure, Functional Aspects of Structure, Role Impingement, Stress in Organization. Principles and Design of Organizations, Organizational Culture, Power and Authority. . Organizational Development processes,Change–ResistancetoChange.-Interventions,ODtechniquesandapplications.

Relevant cases have to be discussed in each unit and in examination case is compulsory from any unit.

Text books

1. K.Aswathappa:"**Organizational Behavior Text, Cases and Games**",Himalaya Publishing House, New Delhi,2008,
2. Steven L Mc Shane, Mary Ann VonGlinow, Radha R Sharma: "***Organizational Behavior***", Tata McGraw Hill Education, New Delhi,2008.
3. Jerald Green berg and Robert A Baron: "***Behavior in Organizations***", PHI Learning Private Limited, New Delhi,2009.

References

1. Pareek Udai:"***Understanding Organizational Behavior***", Oxford University Press, New Delhi,2007.

2. Jai B.P.Sinha: "***Culture and Organizational Behavior***", Sage Publication,India Private Limited, New Delhi,2008.