Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E. / B.Tech. Semester III under Regulations 2019
Branch: Civil Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1	U19MAT301A	Fourier Analysis and Statistics	3	1	0	4
2	U19CE301	Mechanics of Fluids	2	1	0	3
3	U19CE302	Strength of Materials -I	2	1	0	3
4	U19CE303	Construction Materials and Practices	3	0	0	3
5	U19CE304	Surveying	3	0	0	3
6	U19GE302	**Mandatory Course :** Environment and Climate Science	2	0	0	0
Practical						
7	U19CE305	Materials Testing Laboratory	0	0	2	1
8	U19CE306	Survey Laboratory	0	0	2	1
9	U19ENG301	Communication Skill Laboratory	0	0	2	1
10	U19GE301	Soft Skills and Aptitude-I	0	0	2	1
					Total Credits	**20**

Approved By

Chairperson, Civil Engineering BoS
Dr.R.Malathy

Member Secretary, Academic Council
Dr.R.Shivakumar

Chairperson, Academic Council & Principal
Dr.S.R.R.Senthil Kumar

Copy to:-
HOD/Civil Engineering, Third Semester BE Civil Students and Staff, COE

U19MAT301A	FOURIER ANALYSIS AND STATISTICS	L	T	P	C
		3	1	0	4

COURSE OUTCOMES (At the end of the course, the students will be able to)

1 Express a periodic signal as an infinite sum of sine and cosine wave components using Fourier series.
2. Apply the Fourier transform techniques to convert the signal in terms of the frequencies of the waves.
3. Represent the data in the form of diagram and graph and analyze them
4. Apply the concepts of measure of central tendency, dispersion and skewness to the given data and analyze the results
5. Apply the concepts of correlation and regression to the data and analyze the result.

UNIT – I FOURIER SERIES 12

General Fourier series – Dirichlet's conditions – Change of intervals – Odd and even functions – Half range sine and cosine series – Root mean square – Parseval's identity – Harmonic analysis.

UNIT – II FOURIER TRANSFORMS 12

Fourier transform pair – Properties – Fourier sine and cosine transforms pair – Properties –Transforms of simple functions – Parseval's identity.

UNIT – III COLLECTION AND REPRESENTATION OF DATA 12

Collection of data – Primary and secondary data – Diagramatic representation – Simple, subdivided, multiple and bar diagram – Pie diagram – Pictograph – Graphs of frequency distribution – Histogram – Frequency polygon – Frequency curve – Cumulative frequency curve.

UNIT – IV MEASURES OF CENTRAL TENDENCY AND DISPERSION 12

Measure of central tendency (Simple arithmetic mean, median, mode) – Quartile's – Measure of dispersion (range, inter-quartile range, quartile deviation, mean deviation, standard deviation, coefficient of variation).

UNIT – V CORRELATION AND REGRESSION 12

Simple and rank correlations – Multiple and partial correlations – Linear regression – Curve fitting (straight line and parabola).

Theory: **45 Hours** Tutorial: **15 Hours** Total**: 60 Hours**

TEXT BOOKS:

1. T. Veerarajan, "Transforms and Partial Differential Equations", McGraw Hill Publishers, 3rd Edition, 2016.
2. S. P. Gupta, "Statistical Methods", Sultan Chand and Sons Publishers, 15th Edition, 2012.

REFERENCE BOOKS:

1. E. Kreyszig, "Advanced Engineering Mathematics", Wiley Publishers, 10th Edition, Reprint, 2017.
2. B. V. Ramana, "Higher Engineering Mathematics", McGraw Hill Publishers, 29th Reprint, 2017.
3. S. C. Gupta and V. K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons Publishers, 11th Edition, Reprint, 2019.
4. R. A. Johnson and C. B. Gupta, "Miller and Freund's, Probability and Statistics for Engineers", Pearson Publishers, 9th Edition, 2018.
5. P. G. Hoel, S. C. Port and C. J. Stone, "Introduction to Probability Theory", Universal Book Stall Publishers, Reprint, 2003.

U19CE301	MECHANICS OF FLUIDS	L	T	P	C
		2	1	0	3

COURSE OBJECTIVES(On completion of the course, the students will be able to):

1. Measure the basic properties of fluid.
2. Understand the concepts of statics and dynamics of fluid flow.
3. Compute the major and minor losses occurring in pipe flow.
4. Understand the concepts of boundary layer problem.
5. Physical laws in addressing problems in hydraulics

UNIT-I FLUID PROPERTIES AND FLUID STATICS 9

Definitions-Fluid and fluid mechanics-Dimensions and units-Fluid properties: Density, specific weight, specific volume, specific gravity, temperature, viscosity, compressibility, vapour pressure, capillarity and surface tension-Continuum concept of system and control volume. Fluid statics: concept of fluid static pressure, absolute, gauge, atmosphere and vacuum pressures - Measurements of pressure. Hydrostatic forces on surfaces -forces on planes – centre of pressure.

UNIT-II FLUID KINEMATICS AND DYNAMICS 9

. Fluid Kinematics: Classification and types of flow - continuity equation (one dimensional differential forms)-velocity field and acceleration- Velocity potential function and stream function-Equipotential line- Flow net. Fluid Dynamics : Equations of motion -Euler's equation of motion-Bernoulli's equation: Applications:- Venturi meter-Orifice meter and Velocity measurement (Pitot tube, Current meter, Hot wire and hot film anemometer, Float technique, Laser Doppler velocimetry)- linear momentum equation and its application to pipe bend.

UNIT-III FLOW THROUGH PIPES AND CHANNEL 9

Flow through Orifices and Mouth pieces. Reynold’s experiment -Laminar flow through circular pipe (Hagen poiseulle's). Flow through pipes -Losses of energy in pipes- Major Energy losses (Darcy - Weisbach's and Chezy’s Formula)- Minor Energy losses-Hydraulic gradient and total energy line- Flow through compound: Pipes in series and in parallel-Power transmission through pipes- Measurement of flow through notches and weir.

UNIT-IV BOUNDARY LAYER 9

Boundary layer - Definition- boundary layer on a flat plate - Laminar and turbulent boundary layer- Displacement, energy and momentum thickness - Momentum integral equation-Boundary layer separation and control - Drag on flat plate.

UNIT-V DIMENSIONAL ANALYSIS AND MODEL STUDIES 9

Fundamental dimensions - Dimensional homogeneity- Method of dimensional analysis: Rayleigh’s method and Buckingham π- theorem-Model analysis-Similitude- Types of similarities-Types of forces acting in moving fluid-Dimensionless numbers-Model Laws-Classification of models: Undistorted and distorted models.

TOTAL (L:30+T:15): 45 PERIODS

TEXT BOOKS:

1. Bansal R.K., “Fluid Mechanics and Hydraulic Machines”, Laxmi Publications, New Delhi, 2017.
2. Rajput R.K., “Fluid Mechanics and Hydraulic Machines”, S. Chand Publishing Ltd, New Delhi, 2013.

REFERENCES:

1. Kumar K.L, “Engineering Fluid Mechanics”, Eurasia Publishing House Pvt. Ltd, New Delhi, 1995.
2. Modi P.N and Seth, “Hydraulics and Fluid Mechanics including Hydraulic Machines”, Standard Book House New Delhi. 2004.
3. Subramanya K, “Fluid Mechanics and Hydraulic Machines-Problems and Solutions”, Tata McGraw Hill Education, New Delhi, 2010.

U19CE302	STRENGTH OF MATERIALS - I	L	T	P	C
		2	1	0	3

COURSE OUTCOMES (On completion of the course, the students will be able to):

1. Comprehend the state of stresses and strains in various structural components under all types of forces.
2. Determine principal stresses and planes for an element in two and three dimensional state of stress.
3. Draw the Shearing force and bending moment diagrams for beams subjected to all the types of loading.
4. Calculate bending and shearing stresses of beam under flexure and shear.
5. Ideas of torsional stresses and how to evaluate it in circular sections and its applications in spring analysis.

UNIT-I SIMPLE STRESSES **9**

Simple Stresses and strains -Elastic constants -Volumetric strain- Relationship between elastic constants-Stress Strain diagram for ductile and brittle materials-Analysis of axially loaded members-Composite Bars-Thermal Stresses.

UNIT-II COMPLEX STRESSES **9**

State of Stress in two dimensions-Stresses on inclined planes-Principal Stresses and Principal Planes-Maximum shear stress - Mohr's circle method. State of stree in three dimensions-Stress invariants - Determination of principal stresses and principal planes.

UNIT-III SHEARING FORCE AND BENDING MOMENT **9**

Types of loads, supports, beams-Concept of shearing force and bending moment - Relationship between intensity of load, Shearing Force and Bending moment - Shearing Force and Bending Moment Diagrams for Cantilever, simply supported and overhanging beams with concentrated load, uniformly distributed load, uniformly varying load and concentrated moment.

UNIT-IV STRESSES IN BEAMS **9**

Theory of simple bending-Assumptions and derivation of simple bending equation-Flexural rigidity- Bending and shearing stress distribution diagrams- Composite beams.

UNIT-V TORSION **9**

Theory of Torsion- Assumptions and derivation of torsional equation-Power transmitted-Stresses and Deformations in Solid and Hollow Circular Shafts- Compound shaft- Combined bending and torsion of shafts- Shaft in series and parallel. Open and Closed coiled helical springs- laminated springs - Springs in series and parallel. Design of buffer springs.

TOTAL (L:3+T:15): 45 PERIODS

TEXT BOOKS:

1. Rajput R.K, “Strength of Materials”, S.Chand and Co, New Delhi, 2014.
2. Bansal R.K, “Strength of Materials”, Laxmi Publications, New Delhi, 2017.

REFERENCES:

1. Chandramouli P.N, “Fundamentals of Strength of Materials”, PHI Learning Private Limited, New Delhi, 2013.
2. Subramanian R, “Strength of Materials”, Oxford University Press, New Delhi, 2010.

		L	T	P	C
U19CE303	CONSTRUCTION MATERIALS AND PRACTICES	3	0	0	3

COURSE OUTCOMES (On completion of the course, the students will be able to):

1. Familiarize the Building components and its function.
2. Choose effective brick, timber, roofing materials in the field.
3. Select suitable type of concrete making materials.
4. Practice various construction techniques in the field.
5. Understand the Function and location of doors, windows and stair case.

UNIT-I INTRODUCTION TO BUILDING CONSTRUCTION 9

General: Definition of Civil Engineering-Function of Civil Engineer-Division of Civil Engineering- Types of structure : Load Bearing Structure - Framed Structure. Components of building and its function. Site planning: Precaution in selection of sites-Situations and surrounding of site for various types of building-Procedure for site analysis. Sub structure: Functional requirement of a foundation- Bearing capacity of soil- Types of foundation and their construction-Suitability.

UNIT-II BUILDING MATERIALS 9

Bricks- Manufacturing process-Classification-Testing- Bricks for special use-Refractory bricks. Stone as building material-Criteria for selection-Tests on stones-Application. Timber- Market forms and Industrial forms-Properties-Seasoning and Preservative treatment - Structural steel-Shapes-Applications. Flooring and roofing: Materials-Suitability-Types. Pipes: Types-Sizes-Application. Paints - Varnishes - Distempers - Bitumens. Concrete blocks – Lightweight concrete blocks.

UNIT-III CONCRETE MAKING MATERIALS 9

Lime – Preparation of lime mortar. Cement - Ingredients - Manufacturing process - Types and Grades - Properties of cement and Cement mortar - Hydration - Compressive strength - Tensile strength - Fineness- Soundness and consistency - Setting time-Storage of cement. Aggregate: Classification-Fine aggregates - River sand – Artificial sand - Properties -Bulking of sand-Fineness modulus. Coarse Aggregates - Crushing strength - Impact strength - Flakiness Index - Elongation Index - Abrasion Resistance-Grading.

UNIT-IV CONSTRUCTION PRACTICES 9

Introduction about NBC-Specifications, details and sequence of activities and construction co-ordination - Site Clearance - Marking - Earthwork - Masonry: Bonds - Brick masonry-Stone masonry - concrete hollow block masonry - Flooring - Damp proof courses - Construction joints - Movement and expansion joints - Pre cast pavements - Fabrication and erection of steel trusses - Frames - Braced domes - Laying brick -Weather and water proof - Rroof finishes - Acoustic and fire protection.

UNIT-V CONSTRUCTION TECHNIQUES 9

Lintel: Functions of lintel and sunshade-Types of lintel; Arches: Construction-Elements-Classification. Doors and Windows: Technical terms-Types and their suitability. Stair and stair cases:Terminology-Location and classification of stairs-Requirement of good stair. Form works: Centering and shuttering - Scaffoldings, shoring and underpinning - Slip forms.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Rajput R K., “Engineering Materials”, S Chand and Company Ltd, 2014.
2. Arora S.P and Bindra S.P, “Building Construction”, Dhanpat Rai Publications (P) Ltd, 2015.

REFERENCES:

1. Shetty M.S, “Concrete Technology Theory and Practice”, S. Chand and Company Ltd, New Delhi, 2014.
2. Punmia B.C, “Building Construction”, Laxmi Publication, New Delhi, 2016.
3. Sahu G.C., Joygopal Jena., “Building Materials and Construction”, Mc Graw Hill Education (India) Private Limited, New Delhi, 2015.

U19CE304	SURVEYING	L	T	P	C
		3	0	0	3

COURSE OUTCOMES (On completion of the course, the students will be able to):

1. Conduct linear and angular measurement survey with the help of chain, tape and compass.
2. Determine the horizontal and vertical distance by traversing using theodolite and measure difference in elevation and produce reduced level of the given points.
3. Describe the methods of setting out curves in the field and to determine the area and volume of structures.
4. Handle total station instrument for making the horizontal and vertical measurements
5. Conduct the global positioning system for determining geographical location of the site.

UNIT-I FUNDAMENTALS OF CONVENTIONAL SURVEYING AND LEVELLING 9

Classifications and basic principles of surveying - Equipment and accessories for ranging and chaining - Methods of ranging - Compass - Types of Compass - Bearing - Types - True Bearing - Magnetic Bearing - Levelling- Principles and theory of Levelling - Datum- Bench Marks - Temporary and Permanent Adjustments- Methods of Levelling- Booking - Reduction - Sources of errors in Levelling - Curvature and refraction.

UNIT-II THEODOLITE AND TRIGNOMETRIC LEVELLING 9

Introduction- Classification of theodolite- Temporary and permanent adjustments –Measurements of horizontal and vertical angles- Theodolite traversing-Traversing computation-Balancing of traversing-Introduction to omitted measurements. Trignometrical leveling: Heights and distances - Base of the object accessible and inaccessible.

UNIT-III TACHEOMETRIC SURVEYING AND CONTOURS 9

Introduction-Instruments-Different systems of tachometric measurements- Tacheometer -Stadia Constants - Analytic Lens - Tangential and Stadia Tacheometry surveying-Substense method: Vertical and horizontal measurements. Contour - Contouring - Characteristics of contours - Methods of contouring- Direct method-Indirect method- Contour gradient -Uses of contour plan and map- Measurements of area and volume.

UNIT-IV CURVES AND TRIANGULATION 9

Curves-Classifications-Elements of curves-Designation of curves-Setting out of simple curves: Linear and instrument method. Triangulation- Classification-Basic systems-Operation-Signals and towers-Satellite station.

UNIT-V ADVANCED SURVEYING 9

Total station: Features-Recording-Advantages-Fields procedure. Photogrammetry: Aerial photogrammetry-Application. Remote sensing: Classification-principles- Resolution-Sensors-Methods of remote sensing-Image interpretation-Application- Remote sensing in India. Geographic Information Systems: Scope- Purposes- Hardware of GIS-Applications. Global Positioning Systems: GPS elements- Application and uses- Advantages. Introduction about Drone surveying

TOTAL: 45 PERIODS

TEXT BOOKS:

1. Punmia B.C, "Surveying, Vol. I and II", Laxmi Publications, 2016.
2. Basak N.N, "Surveying and Levelling", Tata Mc Graw Hill Publishing Company Ltd., New Delhi, 2014.
3. Kumar S., " Basics of Remote Sensing and GIS", Laxmi Publication (P) Ltd,2015

REFERENCES:

1. Arora K. R, "Surveying Vol. I and II", Standard Book House, 2015.
2. Duggal S.K, "Surveying Vol. I and II", Tata McGraw Hill, New Delhi, 2013.
3. Kanetkar T.P, "Surveying and Levelling Vols. I and II", United Book Corporation, Pune, 2014.

U19CE305	SURVEY LABORATORY	L	T	P	C
		0	0	3	1.5

COURSE OUTCOMES (On completion of the course, the students will be able to):

1. Use conventional surveying tools such as chain/tape, compass, dumpy level, theodolite in the field of civil engineering applications such as structural plotting and highway profiling.
2. Use modern surveying instruments like total station and GPS.
3. Apply the technical concepts and ways to solve engineering problems by conducting experiments.

COURSE CONTENT S

Chain Survey

1. Study of chains and its accessories, Aligning, Ranging, Chaining and Marking Perpendicular offset

Compass Survey

2. Compass Traversing – Measuring Bearings & arriving included angles

Levelling - Study of levels and levelling staff

3. Reduction of levels (Check and Fly leveling) - Height of collimation and Rise and Fall method.

Theodolite - Study of Theodolite

4. Measurements of horizontal angles by reiteration and repetition and vertical angles
5. Determination of elevation of an object using single plane method when base is accessible/inaccessible

Tacheometry – Tangential system – Stadia system

6. Measurement of height and distance using stadia and tangential system of tachometry.

Curve Setting

7. Setting out of a simple curve using linear method.

Total Station - Study of Total Station, Measuring Horizontal and vertical angles

8. Measurement of angles and height
9. Traverse using Total station and Area of Traverse
10. Determination of distance and difference in elevation between two inaccessible points using Total station

Global Positioning Systems

11. Calculation of latitude and longitude using GPS.

Drones

12. Advance surveying using Drones

Setting out works

13. Centre line marking for single Room and Double Room

U19CE306	MATERIAL TESTING LABORATORY	L	T	P	C
		0	0	3	1.5

COURSE OUTCOMES (On completion of the course, the students will be able to):

1. Determine the physical properties of given cement, fine aggregates coarse aggregates and wooden sample.
2. Evaluate Modulus of elasticity, torsional strength, hardness and tensile strength of given specimens.
3. Apply the technical concepts and ways to solve engineering problems through conducting experiments.

COURSE CONTENT S

Brick/Building blocks: Shape and Size-Efflorescence-Compressive strength-Water absorption- Field test.

Wood: Compressive strength.

Cement: Specific gravity test- Fineness -Consistency test- Setting time- Soundness -Compressive strength of cement mortar cubes- Field test.

Fine aggregate: Specific gravity test- Bulking of sand-Sive Analysis-Fineness modulus.

Coarse aggregate: Specific gravity test-Crushing strength-Impact strength-Shape test-Water absorption- Sive Analysis-Fineness modulus.

Steel: Stress-strain characteristics - Modulus of elasticity -Hardness -Impact strength-Shear strength.

Evaluation of Stiffness on helical spring.

Stiffness and modulus of rigidity of the specimen using torsion testing machine.

Deflection test on cantilever and simply supported beam.

Semester-III	U19 GE301- SOFT SKILLS AND APTITUDE – I	L T P C Marks 0 0 2 1 100
Course Outcomes **At the end of the course the student will be able to:**		
1. Demonstrate capabilities in specific soft-skill areas using hands-on and/or case-study approaches		
2. Solve problems of greater intricacy in stated areas of quantitative aptitude and logical reasoning		
3. Demonstrate higher levels of verbal aptitude skills in English with regard to specific topics		
1.Soft Skills	**Demonstrating soft-skill capabilities with reference to the following topics**: a. Attitude building b. Dealing with criticism c. Innovation and creativity d. Problem solving and decision making **e.** Public speaking **f.** Group discussions	
2. Quantitative Aptitude and Logical Reasoning	**Solving problems with reference to the following topics:** a. **Vedic Maths:** Fast arithmetic, multiplications technique, Criss cross, Base technique, Square root, Cube root, Surds, Indices, Simplification. b. **Numbers:** Types, Power cycle, Divisibility, Prime factors & multiples, HCF & LCM, Remainder theorem, Unit digit, highest power. c. **Averages:** Basics of averages and weighted average. d. **Percentages**: Basics of percentage and Successive percentages. e. **Ratio and proportion:** Basics of R &P, Alligations, Mixture and Partnership. f. **Profit ,Loss and Discount**: Basic & Advanced PLD g. **Data Interpretation**: Tables, Bar diagram, Venn diagram, Line graphs, Pie charts, Caselets, Mixed varieties, Network diagram and other forms of data interpretation. h. **Syllogism:** Six set syllogism using Venn diagram and tick and cross method	
3. Verbal Aptitude	**Demonstrating English language skills with reference to the following topics:** a. Verbal analogy b. Tenses c. Prepositions d. Reading comprehension e. Choosing correct / incorrect sentences f. Describing pictures g. Error spotting	

Department of Placement Training
Sona College of Technology.
Salem-636 005.

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester III under Regulations 2019
Branch: Mechanical Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1	U19MAT301B	Probability and Statistics	3	1	0	4
2	U19ME301	Engineering Mechanics - Statics and Dynamics	3	1	0	4
3	U19ME302	Engineering Thermodynamics	3	1	0	4
4	U19ME303	Fluid Mechanics and Machinery	3	0	0	3
5	U19ME304	Conventional and Smart Manufacturing	3	0	0	3
6	U19ME305	Instrumentation and Control Systems	3	0	0	3
7	U19GE302	**Mandatory course**: Environment and Climate Science	2	0	0	0
Practical						
8	U19ME306	Fluid Mechanics and Machinery Laboratory	0	0	2	1
9	U19ME307	Special Machines Laboratory	0	0	2	1
10	U19GE301	Soft Skills and Aptitude – I	0	0	2	1
					Total Credits	**24**

Approved By

Chairperson, Mechanical Engineering BoS Dr.D.Senthilkumar

Member Secretary, Academic Council Dr.R.Shivakumar

Chairperson, Academic Council & Principal Dr.S.R.R.Senthil Kumar

Copy to:-

HOD/Mechanical Engineering, Third Semester BE Mechanical Students and Staff, COE

COURSE CODE	**U19MAT301B**	L T P C
COURSE NAME	**PROBABILITY AND STATISTICS**	3 1 0 4

Course Outcomes

Upon completion of this course the students will be able to

CO1 Apply the concepts in measure of central tendency, dispersion, correlation and regression for the given data and analyze the results.

CO2 Apply the concepts of random variables and their properties to generate the moments.

CO3 Fit the suitable distribution and its properties to the real world problems and interpret the results.

CO4 Apply the concepts of joint probability distribution and its properties to find the covariance.

CO5 Test the hypothesis of the population using sample information.

Unit – I BASIC STATISTICS L 9 T 3

Measures of central tendency (simple arithmetic mean, median, mode) – Quartiles – Measures of dispersion (range, inter-quartile range, quartile deviation, mean deviation, standard deviation, coefficient of variation) – Simple correlation – Curve fitting (straight line and parabola).

Unit – II RANDOM VARIABLES L 9 T 3

Discrete and continuous random variables – Probability mass function, probability density function, moments, moment generating function and their properties.

Unit – III THEORETICAL DISTRIBUTIONS L 9 T 3

Binomial, Poisson, geometric, uniform, exponential and normal distributions and their properties. Applications.

Unit – IV TWO DIMENSIONAL RANDOM VARIABLES L 9 T 3

Joint distributions, marginal and conditional distributions – Covariance – Correlation – Central limit theorem.

Unit – V TESTING OF SIGNIFICANCE L 9 T 3

Sampling distributions - Testing of hypothesis for mean, standard deviation, variance, proportion and differences using normal and t distributions - χ^2- tests for independence of attributes and goodness of fit and F distribution.

Total Number of hours: 60

Learning Resources

Text Books

1. S. C. Gupta, V. K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons, 11th Edition, Reprint, 2019.
2. T. Veerarajan, "Probability, Statistics and Random Processes with Queueing Theory and Queueing Networks", McGraw Hill Publishers, 4th Edition, 7th Reprint, 2018.

Reference Books

3. R. A. Johnson and C. B. Gupta, "Miller and Freund's, Probability and Statistics for Engineers", Pearson Publishers, 9th Edition, 2018.
4. S. Ross, "A first course in probability", Pearson Publishers, 9th Edition, 2019.
5. P. G. Hoel, S. C. Port and C. J. Stone, "Introduction to Probability Theory", Universal Book Stall Publishers, Reprint, 2003.
6. W. Feller, "An Introduction to Probability Theory and its Applications", Vol. 1, 3rd Edition, Wiley Publishers, 2008.
7. S. P. Gupta, "Statistical Methods", Sultan Chand and Sons Publishers, 15th Edition, 2012.

COURSE CODE	**U19ME301**	L T P C
COURSE NAME	**ENGINEERING MECHANICS – STATICS AND DYNAMICS**	3 1 0 4

Course Outcomes

Upon completion of this course the students will be able to

CO1 Provide an introduction to the basic quantities and idealizations of mechanics and examine the standard procedures for performing numerical calculations.

CO2 Solve particle equilibrium problems using the equations of equilibrium and analyze the forces acting on the members of frames.

CO3 Compute the centroid of plane surfaces and develop a method for determining the moment of inertia.

CO4 Examine the principles of relative motion of two particles and to analyze the mechanics of elastic body impact

CO5 Analyze the mechanics of friction

Unit – I FUNDAMENTAL CONCEPTS OF MECHANICS L 9 T 3

Introduction to mechanics – Fundamental concepts, units and dimensions – Scalars & vectors - General procedure for analyses – unit conversion – Laws of Mechanics (parallelogram law, Lami's theorem and triangular law of forces) – Types of forces acting on a body – Equilibrium of a particle - Equivalent system of forces and computation of resultant forces – Principle of transmissibility.

Unit – II EQUILLIBRIUM OF RIGID BODIES & STRUCTURAL ANALYSIS L 9 T 3

Conditions for Rigid-Body Equilibrium – Free-Body Diagrams – Equations of Equilibrium – Two and Three-Force Members – Equations of Equilibrium – Constraints and Statical Determinacy – Introduction to truss elements – Analysis of simple trusses by the method of joints.

Unit – III CENTRIODS AND AREA MOMENT OF INERTIA L 9 T 3

Introduction – Centroids of simple Plane Areas and Curves (rectangle, triangle, circle, hollow circle, T-section & I-section) – Area moment of inertia for rectangle, circle, hollow circle, triangle, I-Section and T-Section.

Unit – IV KINETICS AND KINEMATICS OF PARTICLES L 9 T 3

Concept of displacement, velocity and acceleration – Newton's laws of motion(fundamentals) – Work–Energy principle – introduction to Impulse and momentum – analyses of impact of elastic bodies – Introduction to principle of virtual work (Qualitative treatment only).

Unit – V FRICTION L 9 T 3

Types of friction – laws of sliding friction – Equilibrium analyses of simple systems with sliding friction – Angle of friction – cone of friction – Equilibrium of bodies on inclined plane – Ladder friction - Wedge Friction

Total Number of hours: 60

Learning Resources

Text Books

1. R. C. Hibbler, Engineering Mechanics: Statics & Dynamics, Person Prentice hall, 12th edition
2. Meriam J.L. and Kraige L.G., "Engineering Mechanics - Statics – Volume 1, Dynamics - Volume 2", Third Edition, John Wiley & Sons.

Reference books:

3. Irving H. Shames and Krishna Mohana Rao. G., "Engineering Mechanics – Statics and Dynamics", 4th Edition, Pearson Education.
4. Beer, F.P and Johnston Jr. E.R., "Vector Mechanics for Engineers (In SI Units): Statics and Dynamics", 8th Edition, Tata McGraw-Hill Publishing company, New Delhi.
5. Kumar, K.L., "Engineering Mechanics", 3rd Revised Edition, Tata McGraw-Hill Publishing Company.

COURSE CODE	**U19ME302**	L T P C
COURSE NAME	**ENGINEERING THERMODYNAMICS**	3 1 0 4

COURSE OUTCOME:

Upon completion of this course the students will be able to

CO1 Discuss the thermodynamic properties of system and apply the first Law of Thermodynamics to solve engineering problems.

CO2 Apply the Second law of Thermodynamics and entropy principle to various processes and thermodynamic cycles.

CO3 Determine the thermodynamic properties of pure substance in flow and non-flow processes.

CO4 Compare the ideal and real gases and its thermodynamic relations and formulate Maxwell's relation, Clausius Clapeyron equations.

CO5 Calculate the cooling, heating and humidifier capacities for air-conditioner using psychrometric chart.

UNIT I BASIC CONCEPTS AND FIRST LAW OF THERMODYNAMICS L 9 T 3

Basic concepts of thermodynamics, macroscopic and microscopic concepts, system, surroundings, Concept of Universe and control volume, properties of system-Intensive and Extensive, state, process and cycle, Definition of Thermodynamic Work -- Units for Work -- Forms of Work – Definition of Heat -- Inter Convertibility of Heat/work into Work/heat -- Governing Principles -- Sign Convention, temperature, law of conservation of mass, momentum and energy, - Concept of Quasi static process, thermodynamic equilibrium, zeroth law of thermodynamics, Statement of First Law of Thermodynamics , The Constant Volume and Constant Pressure Specific Heats -- The internal Energy, Enthalpy and Specific Heats of An Ideal Gas, application of first law to non-flow processes and steady flow systems.

UNIT II SECOND LAW OF THERMODYNAMICS AND CONCEPTS OF ENTROPY L 9 T 3

Definition of Heat Engine and Reservoirs -- Kelvin-Planck and Clausius Statements of the Second Law -- Reversible and Irreversible Engines and processes -- Causes of Irreversibility -- Internal and External Irreversibility, heat pump and refrigerator, The Efficiency of a Carnot Cycle -- The Thermodynamic Temperature Scale -, Clausius theorem and third law of thermodynamics, Clausius Inequality -- Entropy -- A Property of A System -- The Entropy of A Pure Substance -- Entropy Change in Reversible Process -- Principle of Increase of Entropy, availability and irreversibility (theory only).

UNIT III PROPERTIES OF PURE SUBSTANCE L 9 T 3

Properties of pure substance, thermodynamic properties of pure substance in solid, liquid and vapour phases, phase rule, Formation of steam and its thermodynamic properties, p-v, p-T, T-v, T-s, h-s diagrams. p-v-T surface. Use of Steam Table and Mollier Chart. thermodynamic properties of steam. Calculations of work done and heat transfer in non flow and flow processes. Determination of steam quality.

UNIT IV IDEAL AND REAL GASES, THERMODYNAMIC RELATIONS L 9 T 3

Properties of Ideal gas- Ideal and real gas comparison- Equations of state for ideal and real gases- Reduced properties. Compressibility factor-.Principle of Corresponding states. –Generalized Compressibility Chart and its use-. Maxwell relations, Tds Equations, Difference and ratio of heat capacities, Joule-Thomson Coefficient, Clausius Clapeyron equation.

UNIT V PSYCHROMETRY L 9 T 3

Psychrometric properties, Psychrometric charts. Property calculations of air vapour mixtures by using chart and expressions. Psychrometric process – adiabatic saturation, sensible heating and cooling, humidification, dehumidification, evaporative cooling and adiabatic mixing.

Total Number of hours: 60

Text book:

1. Chattopadhya,P. Engineering Thermodynamics, Oxford university press, New Delhi,2016.
2. Cengel, 'Thermodynamics – An Engineering Approach' eighth Edition, Tata McGraw Hill, New Delhi, 2014.

REFERENCES

1. Sonntag, R.E., Borgnakke, C., and Van Wylen, G.J., Fundamentals of Thermodynamics, 6th ed., John Wiley, 2003.
2. Nag.P.K., "Engineering Thermodynamics", Tata McGraw-Hill, New Delhi, 2015.
3. Holman.J.P., "Thermodynamics", 4th Ed. McGraw-Hill, 2008.
4. Michael J Moran, Howard N. Shapiro, Daisie D. Boettner, Margaret B. Baily, "Fundamentals of Engineering Thermodynamics" 8th Edition, John Wiley& sons, 2014
5. Arora C.P, "Thermodynamics", Tata McGraw-Hill, New Delhi, 2004.

COURSE CODE	**U19ME303**	L T P C
COURSE NAME	**FLUID MECHANICS AND MACHINERY**	3 0 0 3

Pre-requisites subject: Engineering Physics and Transforms & Partial differential equations

Course Outcomes

Upon completion of this course the students will be able to

CO1 Apply mathematical knowledge to predict the properties and concept of pressure measurement.

CO2 Analyze the fluid flow problems using continuity equation and Bernoulli's equation with their applications.

CO3 Distinguish laminar and turbulent flow through circular pipes and power transmission through pipes.

CO4 Solve the real time problems with help of dimensional analysis by using Buckingham's ∏ theorem.

CO5 Analyze the performance of hydraulic turbines and pumps.

Unit – I FLUID PROPERTIES AND PRESSURE MEASUREMENT L 9

Definitions – Fluid - Properties of fluids- mass density, specific weight, specific volume, specific gravity, viscosity, compressibility, vapor pressure, surface tension, cavitation and capillarity - Pressure measurement- manometry, buoyancy, stability of floating bodies, forces on submerged bodies.

Unit – II FLUID KINEMATICS AND DYNAMICS L 9

Types of fluid flow - application of continuity equation, Continuity equations in Cartesian coordinates. Euler's equation of motion along streamline, Bernoulli's equation, and its applications- Orifice meter, Venturimeter, Pitot tube.

Unit – III FLOW THROUGH PIPES L 9

Laminar flow though circular pipes – Hagen Poiseuille equation - Boundary layer concept- Turbulent flow through circular pipes - Darcy Weisbach equation – friction factor - Moody diagram - Energy losses, pipes in series and parallel - Power transmission through pipes.

Unit – IV DIMENSIONAL ANALYSIS L 9

Need for dimensional analysis – methods of dimensional analysis – Buckingham's π theorem, Dimensionless parameters - application of dimensionless parameters. Models and Similitude - Model laws.

Unit – V HYDRAULIC TURBINES AND PUMPS L 9

Hydraulic turbines-classification and working principle. Pelton wheel turbine -Francis turbine -Kaplan turbine- Velocity triangle-work done- Efficiencies- Performance calculations.

Centrifugal pumps– working principle – work done by the impeller – performance curves – Reciprocating pump- working principle – comparison.

Total Number of hours: 45

Learning Resources

Text Books

1. Sukumar Pati., "Fluid Mechanics and Hydraulics Machines", Tata McGraw Hill publications (P) Ltd, New Delhi, 2012.
2. Bansal, R.K., Fluid Mechanics and Hydraulics Machines, (9th edition), Laxmi publications (P) Ltd, New Delhi, 2017

Reference Books

3. C.S.P.Ojha, R.Berndtsson, P.N.Chandramouli., Fluid Mechanics and Machinery, Oxford University Press, New Delhi, 2010
4. Modi P.N. and Seth, S.M. "Hydraulics and Fluid Mechanics", Standard Book House 20th edition, New Delhi 2015.
5. Streeter, V. L. and Wylie E. B., "Fluid Mechanics", McGraw Hill Publishing Co. 2010.9th edition.
6. Kumar K. L., "Engineering Fluid Mechanics", Eurasia Publishing House(p) Ltd., New Delhi 2004.
7. Ramamritham. S, Hydraulics, Fluid Mechanics and Fluid Machines, Dhanpat Rai & Sons, Delhi, edition 2012.

COURSE CODE	**U19ME304**	L T P C
COURSE NAME	**CONVENTIONAL AND SMART MANUFACTURING**	3 0 0 3

Pre-requisites subject: Manufacturing Process

Course Outcomes

Upon completion of this course the students will be able to

CO1 Acquire knowledge about principle of special machine tools and its operating mechanisms.

CO2 Demonstrate the working of various bulb deformation processes involving drawing, forging, rolling, and extrusion process.

CO3 Acquire knowledge and analyze the various sheet metal processes.

CO4 Classify additive manufacturing process and identify suitable RP process for product manufacturing.

CO5 Enhance and adopt smart manufacturing knowledge towards industry development.

Unit – I SPECIAL MACHINE TOOLS L 9

Construction, Types, Operations and mechanisms of Shaper, Planner, Slotter and Broaching. Operations: drilling –Reaming, Boring- Tapping. Milling operations-types of milling cutter. Gear: cutting, forming, milling, hobbing and gear shaping. Grinding: cylindrical grinding, surface grinding, Centreless grinding – honing, lapping and buffing.

Unit – II SHEET METAL PROCESSES L 9

Sheet metal: characteristics-typical shearing operations-bending and drawing operations – stretch forming operations – formability of sheet metal – test methods–working principle and application of special forming processes –hydro forming - Rubber pad forming - Metal spinning-Introduction to Explosive forming - Magnetic pulse forming-peen forming - super plastic forming.

Unit – III BULK DEFORMATION PROCESSES L 9

Hot and Cold working Process- Drawing Process: Wire drawing, Tube drawing, Metal Spinning, Embossing- Coining- **Forging Process**: Open and closed die forging- operations- Forging machine, **Rolling**: Type of rolling mills- Principle of rod and wire drawing – Tube drawing- Defects in rolling parts, **Extrusion**:- Principles of Extrusion – Types – Hot and Cold extrusion.

Unit – IV DIGITAL MANUFACTURING L 9

Introduction, Classification, Fusion Deposition Modeling, Stereo-lithography, Solid Ground Curing, Selective Laser Sintering, 3D printers: Principle – process parameters – process details – machine details, Software's, Applications.

Unit – V SMART MANUFACTURING L 9

Introduction, Industry 4.0, Internet of Things (IoT) for manufacturing, IoT enabling technologies, IoT design methodology, logical design, IoT physical devices. Cloud computing-introduction, Cloud services and platforms, Case studies: Industrial automation, Production Monitoring, Applications.

Total Number of hours: 45

Learning Resources

Text Book:

1. Mikell P Groover, " Principles of Modern Manufacturing" Wiley India Pvt Ltd. 2014.
2. S. Jeschke, C Brecher, H. Song and D.B Rawat, "Industrial Internet of Things: Cyber manufacturing Systems", Springer, 1st edition, 2013.
3. Pham D.T. & Dimov.S.S., "Rapid manufacturing", Springer-Verlag, London, 2001.

Reference Books:

1. P.N. Rao, "Manufacturing Technology: Metal Cutting and Machine Tools, Volume 2"
2. Published by Tata McGraw-Hill Education Pvt. Ltd (2013)
3. B.L. Juneja,G.S. Sekhon, Nitin Seth, "Fundamentals of Metal Cutting and Machine Tools" Published by New Age International (P) Limited (2014)
4. P.C. Sharma, "A Text Book of Production Engineering", S. Chand and Company Ltd, revised edition, 2011.
5. Rajput R.K, 'A text book of Manufacturing Technology', Lakshmi Publications, 2007.
6. Ian Gibson, "Advanced Manufacturing Technology for Medical applications: Reverse Engineering, Software conversion and Rapid Prototyping", Wiley, 2006

COURSE CODE **U19ME305** L T P C

COURSE NAME **INSTRUMENTATION AND CONTROL SYSTEM** 3 0 0 3

Pre-requisites subject: Physics for Mechanical Engineering

Course outcome:

Upon completion of this course the students will be able to

CO1 Explain the fundamental elements of instrumentation, measurement and control systems.

CO2 Measure the parameters and performance of transducers.

CO3 Develop the measurement techniques used for mechanical systems.

CO4 Apply control engineering techniques to the automatic control systems found in modern manufacturing, processing and transportation environments.

CO5 Design the mechanical control system for automation.

Unit – I MEASURING SYSTEM L 9

General concepts of Mechanical measuring instruments – Elements of a measuring system – Requirements of measuring instruments – Static and dynamic characteristics of measuring instruments – Errors in measurements - Loading effect and impedance matching- statistical analysis-Least square method- uncertainty analysis- Zero and first order system- step response and impulse response.

Unit – II TRANSDUCER ENGINEERING L 9

Transducers and Sensors–Classification and types- Mathematical model of transducer-static and dynamic characteristics- resistive transducers- Inductive and capacitive transducers -Transducer Troubleshooting- special transducers-Smart sensors-Nano sensors.

Unit – III INDUSTRIAL INSTRUMENTATION L 9

Measurement of vibrations – Accelerometer – Measurement of Low, Medium, and High pressures- Measurement of temperature: pyrometer, Fiber optics sensor for temperature measurement - Measurement of flow- hot wire anemometer – magnetic flow meter– ultrasonic meter. Measurement of displacement – Measurement of Force –Strain gauge, Load cells- Measurement of torque – Measurement of Speed – Case study assignments.

Unit – IV CONTROL SYSTEM L 9

Introduction to Control systems – Open and Closed loop systems – servomechanisms. Transfer function: Block diagram reduction algebra, signal flow graphs – Pollution Control system- Basics of Controllers and response analysis- Problems.

Unit – V DESIGN OF AUTOMATION AND CONTROLS SYSTEM L 9

Automated systems- introduction to systems –design of hydraulic and pneumatic control system controls- sequence operations- Applications of relays/switches- design of – electro pneumatics - Programmable controllers - Design of components for assembly - Cost considerations - programmable logic controllers - PLC languages- case studies.

Total Number of hours: 45

Learning Resources

Text Book:

1. Ernest O. Doebelin, Dhanesh N. Manik (2019) Doebelin's Measurement Systems: 7th Edition, McGraw-Hill; Seventh edition, ISBN-13: 978-9353168711.
2. Alan S. Morris, Reza Langari (2016) Measurement and Instrumentation: Theory and application, Academic Press, ISBN No. 978-0-12-3819604.

Reference Books:

1. D Patranabis (2017) Transducers and Instrumentation, McGraw Hill education; 3 edition, ISBN-13: 978-0070699717
2. Arun K. Ghosh (2012) Introduction to measurements and instrumentation, PHI Learning Pvt. Ltd.
3. U.A.Bakshi A.V. Bakshi (2009) Measurements and instrumentation, Technical Publications, ISBN No. 9788184315295
4. Zoran Gajić, M. Lelic (2013) Modern control systems Engineering, Dover Publications.

COURSE CODE	U19ME306	L	T	P	C
COURSE NAME	FLUID MECHANICS AND MACHINERY LABORATORY	0	0	2	1

Course Outcomes

Upon completion of this course the students will be able to

CO1 Calibrate the various flow measuring instruments.

CO2 Analyze the energy losses occur in flow of fluid through pipes.

CO3 Analyze the performance of the various pumps and turbines (Pelton, Francis and Kaplan turbine).

LIST OF EXPERIMENTS

1. Determination of the Coefficient of discharge of given Orifice meter.
2. Determination of the Coefficient of discharge of given Venturi meter.
3. Determination of friction factor for a given set of pipes.
4. Determination of minor losses for a given set of pipes.
5. Determination of velocity of air using pitot tube.
6. Conducting experiments and drawing the characteristic curves of Pelton wheel.
7. Conducting experiments and drawing the characteristics curves of Francis turbine.
8. Conducting experiments and drawing the characteristic curves of Kaplan turbine.
9. Conducting experiments and drawing the characteristic curves of centrifugal pump.
10. Conducting experiments and drawing the characteristic curves of Reciprocating pump.

List of Equipment's: (for a batch of 30 students)

1. Orifice meter setup.
2. Venturi meter setup.
3. Friction loss setup.
4. Fitting loss setup.
5. Pitot-tube setup.
6. Pelton wheel turbine setup.
7. Francis turbine setup.
8. Kaplan turbine setup.
9. Centrifugal pump.
10. Reciprocating pump.

Total Number of hours 30

		L	T	P	C
COURSE CODE	**U19ME307**				
COURSE NAME	**SPECIAL MACHINES LABORATORY**	0	0	2	1

Pre-requisites subject: Manufacturing technology Laboratory

Course Outcomes

Upon completion of this course the students will be able to

CO1 Perform various metal cutting operations to generate gears.

CO2 Do grinding operations using commonly used machine tools.

CO3 Demonstrate shaping and slotting operations using commonly used machine tools.

LIST OF EXPERIMENTS

1. Exercises on Horizontal milling machine –gear generating.
2. Exercises on Vertical milling machine –key way generating.
3. Grinding of flat surface using surface grinder machine.
4. Grinding of cylindrical surfaces using cylindrical grinding machine.
5. Shaping operations- two or more Exercises (Round to square, Hexagonal Shape and dovetail)
6. Internal key way slotting in slotting machine.
7. Exercises on capstan or turret lathe and study of bar feed mechanism in turret lathe.

List of Equipment's: (for a batch of 30 students)

1.	Turret and Capstan Lathes	-	1 No
2.	Horizontal Milling Machine	-	1 No
3.	Vertical Milling Machine	-	1 No
4.	Surface Grinding Machine	-	1 No
5.	Cylindrical Grinding Machine	-	1 No
6.	Shaper	-	2 Nos.
7.	Slotter	-	1 No

Total Number of hours 30

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Semester-III	U19 GE301- SOFT SKILLS AND APTITUDE – I	L T P C Marks 0 0 2 1 100
Course Outcomes **At the end of the course the student will be able to:**		
1. Demonstrate capabilities in specific soft-skill areas using hands-on and/or case-study approaches		
2. Solve problems of greater intricacy in stated areas of quantitative aptitude and logical reasoning		
3. Demonstrate higher levels of verbal aptitude skills in English with regard to specific topics		
1.Soft Skills	**Demonstrating soft-skill capabilities with reference to the following topics**: a. Attitude building b. Dealing with criticism c. Innovation and creativity d. Problem solving and decision making **e.** Public speaking **f.** Group discussions	
2. Quantitative Aptitude and Logical Reasoning	**Solving problems with reference to the following topics:** a. **Vedic Maths:** Fast arithmetic, multiplications technique, Criss cross, Base technique, Square root, Cube root, Surds, Indices, Simplification. b. **Numbers:** Types, Power cycle, Divisibility, Prime factors & multiples, HCF & LCM, Remainder theorem, Unit digit, highest power. c. **Averages:** Basics of averages and weighted average. d. **Percentages**: Basics of percentage and Successive percentages. e. **Ratio and proportion:** Basics of R &P, Alligations, Mixture and Partnership. f. **Profit ,Loss and Discount**: Basic & Advanced PLD g. **Data Interpretation**: Tables, Bar diagram, Venn diagram, Line graphs, Pie charts, Caselets, Mixed varieties, Network diagram and other forms of data interpretation. h. **Syllogism:** Six set syllogism using Venn diagram and tick and cross method	
3. Verbal Aptitude	**Demonstrating English language skills with reference to the following topics:** a. Verbal analogy b. Tenses c. Prepositions d. Reading comprehension e. Choosing correct / incorrect sentences f. Describing pictures g. Error spotting	

Department of Placement Training
Sona College of Technology.
Salem-636 005.

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester III under Regulations 2019
Branch: Electrical and Electronics Engineering

S. No.	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1	U19EE301	Network Analysis and Synthesis	3	1	0	4
2	U19EE302	Analog Electronics	3	0	0	3
3	U19EE303	Electromagnetic Fields	3	1	0	4
4	U19EE304	Electrical Machines – I	3	0	0	3
5	U19EE305	Applied Thermodynamics	3	0	0	3
6	U19CS309	Object Oriented Programming in C++	3	0	0	3
7	U19GE302	**Mandatory Course:** Environment and Climate Science	2	0	0	0
Practical						
8	U19EE306	Analog Electronics Laboratory	0	0	2	1
9	U19EE307	Electrical Machines Laboratory – I	0	0	2	1
10	U19CS310	Object Oriented Programming in C++ Laboratory	0	0	2	1
11	U19GE301	Soft Skills and Aptitude – I	0	0	2	1
					Total Credits	**24**

Approved By

Chairperson, Electrical and Electronics Engineering BoS	**Member Secretary, Academic Council**	**Chairperson, Academic Council & Principal**
Dr.S.Padma	**Dr.R.Shivakumar**	**Dr.S.R.R.Senthil Kumar**

Copy to:-

HOD/Electrical and Electronics Engineering, Third Semester BE EEE Students and Staff, COE

U19EE301 NETWORK ANALYSIS AND SYNTHESIS 3 1 0 4

COURSE OUTCOMES:

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

- Analyse the transient response of circuits.
- Define various network topologies and analyse circuits.
- Solve and analyse one port and two port networks.
- Analyse coupled circuits and design of filters.
- Synthesize RL, RC and LC networks

UNIT I CIRCUIT TRANSIENT ANALYSIS 12

Introduction – transient response of RL & RC for step input and sinusoidal input – transient response of RLC series circuit for step input using Laplace transform method – problems.

UNIT II NETWORK TOPOLOGY 12

Introduction – graph of a network – definitions associated with graph – incidence matrix –loop matrix – cut set matrix – KVL – KCL – network equilibrium equations – applications to network solutions.

UNIT III ONE PORT AND TWO PORT NETWORKS 12

One port network – driving point impedance and admittance – two port network – Z parameters – Y parameters – ABCD parameters – h parameters – inter relationship between parameters – interconnection of two port networks – equivalent networks (T & π networks) – problems.

UNIT IV COUPLED CIRCUITS AND FILTERS 12

Coupled circuits: Inductive coupling in series and parallel circuits – tuned circuits – single and double tuned coupled circuits – problems.

Filters: Types - Characteristics of ideal filters – low pass and high pass filters – attenuation and phase shift constants – design of constant-k and m-derived filters – problems.

UNIT V ELEMENTS OF NETWORK SYNTHESIS 12

Introduction – Hurwitz polynomials – properties of Hurwitz polynomials – PR functions –necessary and sufficient conditions of PR function – synthesis of RL, RC and LC functions – problems.

Lecture: 45, Tutorial: 15, Total: 60

TEXT BOOKS:

1. Ravish R Singh, "Electrical Networks", McGraw Hill, 2011.
2. Shyam Mohan S.P., Sudhakar A, "Circuits and Network Analysis & Synthesis", Tata McGraw Hill, 5th edition, 2015.

REFERENCES BOOKS

1. Chakrabarti A, "Circuits Theory (Analysis and Synthesis)", Dhanpath Rai & Sons, 2013.
2. Arumugam M and Premkumar N, "Electric Circuit Theory", Khanna & Publishers, 2006.
3. Soni M.L and Gupta J.C, "Electrical circuit Analysis", Dhanpat Rai and Sons, Delhi, 1990.
4. Kuo F.F., "Network Analysis and Synthesis", Wiley International Edition, Second Edition, 1996.

U19EE302 ANALOG ELECTRONICS 3 0 0 3

COURSE OUTCOMES

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

- Analyze the small signal model for the configurations of transistor and FET.
- Discuss and analyze the various types of large signal and feedback amplifiers.
- Design various types of multistage amplifiers and oscillators.
- Infer the DC and AC characteristics of op-amp and its effect on output and their compensation techniques.
- Elucidate and design circuits for various applications of op-amp.

UNIT I TRANSISTOR ANALYSIS 9

Transistor as an amplifier- h–parameters – forward Ai, Zi, reverse Av and Yo – BJT h-model – Analysis of h-parameters for CE, CB, CC configurations – RF amplifier – Bias stability – dc load line, ac load line, operating point, stability factor, thermal runaway – Methods of transistor biasing – Bias compensation – Small signal analysis of CS amplifier.

UNIT II LARGE SIGNAL AND FEEDBACK AMPIFIERS 9

Differential amplifier – Common mode and Difference mode analysis - analysis of Class A,B,C and AB Power amplifiers –- Feedback Amplifiers - Concept of feedback, General characteristics of negative feedback amplifiers - Effect of feedback on I/O resistance- types of negative feedback amplifiers – stability of feedback amplifier.

UNIT III MULTISTAGE AMPLIFIERS AND OSCILLATORS 9

Introduction – different coupling schemes in amplifiers – operation, advantages and disadvantages of RC coupled, transformer coupled, cascade, direct coupled and darlington amplifiers - Condition for Oscillations - RC phase shift Oscillators with transistor and FET- Hartley and Colpitts Oscillators - Wein-Bridge Oscillator - Crystal Oscillator- Frequency and Amplitude Stability Oscillators.

UNIT IV CHARACTERISTICS OF OP-AMP 9

Block diagram of operational amplifier, packing characteristics, ideal op-amp – ideal operational amplifier – differential mode, common mode, CMRR – ideal op-amp characteristics – practical op-amp characteristics – open loop and closed loop configuration of ideal and practical op-amp as an inverting amplifier, non-inverting amplifier, voltage follower, DC characteristics, AC characteristics – frequency response, slew rate, frequency compensation.

UNIT V APPLICATIONS OF OP-AMP 9

summing amplifier – adder, subtractor, low pass and high pass filters, three op-amp instrumentation amplifier, log and antilog amplifiers, waveform generator (triangular, saw tooth and stair case waveforms), sample and hold circuit, differentiator, integrator, comparators & its characteristics, Schmitt trigger, peak detector, precision rectifiers.

Lecture: 45, Tutorial: 0, TOTAL: 45 Hours

TEXT BOOKS

1. S Salivahanan, N Sureshkumar and A Vallavaraj, “Electronic Devices and Circuits”, Tata Mcgraw Hill, 6th reprint 2015.
2. D.Roy Choudhry, Shail Jain, “Linear Integrated Circuits”, New Age International Pvt. Ltd., 4th Edition ,2012.

REFERENCE BOOKS

1. David A Bell, “Electronic Devices and Circuits”, Oxford University Press, Fifth edition, 2010.
2. Ramakant A.Gayakwad, “Op-amp and Linear ICs”, Prentice Hall, 4th Edition, 2010.
3. J Millman, CC Halkias and SathyabrathaJit , “Electronic Devices and Circuits”, Tata Mcgraw Hill, 2nd Ed, 2012.
4. Robert F. Coughlin, Frederick F. Driscoll, “Operational Amplifiers and Linear Integrated Circuits”, PHI, 2015.

U19EE303 ELECTROMAGNETIC FIELDS 3 1 0 4

COURSE OUTCOMES

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

- Describe the Electromagnetic quantities in spatial distribution of different coordinate systems.
- Describe the behavior of Electric field intensity and Electric flux density due to various charge distributions.
- Apply the principles of magnetostatics to magnetic field, boundary condition and inductance.
- Understand the concepts related to faraday's law, induced emf and Maxwell's equation.
- Illustrate the concepts of electromagnetic wave equation, wave propagation and Poynting theorem.

UNIT I VECTOR CALCULAS 12

Scalar and vector fields - Coordinate systems; cartesian, cylindrical and spherical coordinate systems - relationship between coordinate systems - types of integral related to EMF - Gradient - Curl - Divergence theorem – Stoke's theorem – simple problems.

UNIT II ELECTROSTATICS 12

Coulombs' law - Electric field intensity, electric flux density and electric potential due to various charge distributions - Electric field intensity due to infinite line charge, charged circular ring, infinite sheet of charge - Gauss's law and applications - Electric dipole - Boundary conditions - Poisson's and Laplace's equations - Capacitance; capacitance of parallel conductors, capacitance of an isolated sphere, concentric spheres and coaxial cables – simple problems.

UNIT III MAGNETOSTATICS 12

Lorentz law of force - Biot-savart law - Ampere's circuital law - Magnetic field intensity and magnetic flux density - B and H due to finite length of conductor, at any point along the axis of circular coil, at any point along the axis of solenoid, at the centre of toroidal coil - Magnetic dipole - Magnetization - Boundary conditions at the magnetic surface - Magnetic torque - Inductance; self and mutual inductance, inductance of solenoid and toroid, coaxial cable, two transmission lines – simple problems.

UNIT IV ELECTRODYNAMIC FIELDS 12

Faraday's law of electromagnetic induction - Coefficient of coupling - Point form of Gauss's law - Maxwell's equation (differential and integral form) - Conduction current - Displacement current – Current densities - Equation of continuity - Energy stored in electric and magnetic fields; energy density - Relation between field theory and circuit theory – simple problems.

UNIT V ELECTROMAGNETIC WAVES 12

Derivation of Electromagnetic wave equations - Wave equations for free space - Wave parameters; velocity, intrinsic impedance - Wave propagation in a lossless medium, wave propagation in a conducting medium, wave propagation in good dielectrics and good conductors - Skin effect - Poynting theorem – simple problems.

Lecture: 45, Tutorial: 15, Total: 60 Hrs.

TEXTBOOKS

1. Matthew N.O. Sadiku, "Principles of Electromagnetics", 5th Edition, International Version, Oxford University Press 2015.
2. W.H.HaytJ.A.Buck and M.Jallel Akhtar, "Engineering Electromagnetics", 8th Edition, McGraw Hill Education (India) Private Limited, Special Indian Edition 2014.

REFERENCEBOOKS

1. K A Gangadhar, 'Electromagnetic Field Theory', Khanna Publishers; Eighth Reprint :2015.
2. Kraus/Fleisch, "Electromagnetics with Applications", 5th Edition, McGraw Hill Education (India) Edition 2010.
3. S C Mahapatra, SudiptaMahapatra, "Principles of Electromagnetics", Mc Graw Hill Education (India) Private Limited, New Delhi,2nd Edition 2015.
4. S.P.Ghosh, LipikaDatta, 'Electromagnetic Field Theory', First Edition, McGraw HillEducation (India) Private Limited, second reprint 2015.

U19EE304 ELECTRICAL MACHINES – I 3 0 0 3

COURSE OUTCOMES:

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

- Explain the fundamentals of energy conversion and single-phase transformer.
- Classify different types of polyphase connections of transformer and find the efficiency of transformer.
- Explain the constructional details and principle of operation of DC generator and analyse its performance.
- Explain the constructional details and principle of operation of DC motor and analyse its performance.
- Calculate the efficiency of DC machines using direct and indirect testing.

UNIT I MAGNETIC CIRCUITS AND SINGLE PHASE TRANSFORMER 9

Principles of Electromechanical energy conversion –. Single Phase Transformer – principle of operation – construction – classification of transformers –EMF equation – transformation ratio – transformer on no-load and load – phasor diagrams – equivalent circuit – voltage regulation – auto transformer – applications – simple problems.

UNIT II THREE PHASE TRANSFORMER AND TESTING 9

Three-phase transformers – principle – construction – three phase transformer connections – star, zig-zag, open-delta, Scott connection– three-phase to single-phase conversion – parallel operation – testing of transformers – polarity test, load test – phasing out test – Sumpner's test – condition for maximum efficiency, all day efficiency - applications – simple problems.

UNIT III DC GENERATORS 9

Principle of operation, constructional details, armature windings, EMF equation- voltage build up process-methods of excitation – separate, shunt, series and compound excitations – no-load and load characteristics – armature reaction – commutation –inter poles, compensating windings – applications – simple problems.

UNIT IV DC MOTORS 9

Principle of operation –types of motors - torque equation – electrical and mechanical characteristics of DC shunt, series and compound motors – power flow – starting and braking of DC Shunt motors – starting and braking of DC Series motors - introduction to soft starter - speed control – applications – simple problems.

UNIT V TESTING OF DC MACHINES 9

Losses and efficiency in DC machines – condition for maximum efficiency – testing of DC machines – brake test, Swinburne's test and Hopkinson's test – Field's test - separation of losses – simple problems.

Lecture: 45 Hours; Tutorial: 0 Hours; Total: 45 Hours

TEXT BOOKS

1. D.P. Kothari and I.J. Nagrath, "Electric Machines", McGraw Hill Publishing Company Ltd, Fourth Edition, 2014.
2. B.L. Theraja and A.K. Theraja, "A Text Book of Electrical Technology", S.Chand Publisher, Vol 2, 2014.

REFERENCE BOOKS

1. Samarajit Ghosh, “Electrical Machines”, Pearson Education, second edition, 2012.
2. Stephen J Chapman, “Electric Machinery Fundamentals”, Tata McGraw-Hill Education Private Ltd, Fifth Edition, 2012.
3. M.Ramamoorthy, O. Chandra Sekhar, “Electrical Machines”, PHI Learning Pvt.Ltd., 2018.
4. S.K.Sahdev, “ Electrical Machines”, Cambridge University Press,2018.

U19EE305 APPLIED THERMODYNAMICS 3 0 0 3

COURSE OUTCOMES

At the end of each unit, the students will be able to -

- Discuss the thermodynamic properties of system and apply zeroth and First Law of Thermodynamics to solve engineering problems.
- Determine the thermal efficiency of steam power plant and discuss the various components of thermal power plant
- Explain the types of Refrigeration system and calculate the cooling, heating and humidifier capacities for various air-conditioning components by using psychrometric charts.
- Analyze the performances of hydraulic turbines.
- Evaluate the performance of centrifugal pumps and identify the various types of pumps and compressor for specific application.

UNIT I FUNDAMENTALS OF THERMODYNAMICS 9

Introduction to Thermodynamics – Concept of a System – Types of Systems – Thermodynamic Equilibrium – Properties - State - Process and Cycle – Zeroth Law – Energy Interactions – Heat and Work – Types of Work – First Law: Cycle and Process – Heat and work Interactions in a Closed System for Various Processes – Limitations of First Law - Non-flow and flow processes.

UNIT II STEAM POWER PLANT AND ITS COMPONENTS 9

Thermal Power Plant Layout – Four Circuits – Rankine Cycle – Steam properties- quality of steam - simple problems. Boilers: -Classification- Fire Tube vs Water Tube boilers-Babcock & Wilcox – Cochran Boilers. Steam Turbines: Impulse and. Reaction Turbines –Condensers: Types – Jet & Surface Condensers. Cooling Towers - Dust collector – Draught system.

UNIT III REFRIGERATION SYSTEM AND AIR CONDITIONING 9

Refrigeration – ton of refrigeration - Vapour compression refrigeration system - cycle, p-h chart, Vapour absorption system- comparison- properties of refrigerants.

Air conditioning - types of Air conditioning system and working principles- - Study on psychrometric charts, psychrometric processes - Properties of Air (DBT, %RH, WB, DPT, and enthalpy) - simple Problems.

UNIT IV HYDRAULIC TURBINES 9

Hydraulic turbines - classification and working principle.Pelton wheel turbine - Francis turbine -Kaplan turbine - Velocity triangle - work done – Efficiencies - Performance calculations.

UNIT V PUMPS & COMPRESSOR 9

Centrifugal pumps– working principle - Velocity triangle - work done- Efficiencies- Performance calculations. Reciprocating pump- working principle – Comparison

Compressor - Classification- Applications - Reciprocating compressor and Rotary Compressor– working principle – Comparison.

Lecture: 45 Hours; Tutorial: 0 Hours; Total: 45 Hours

TEXT BOOKS

1. R.K.Rajput, "Thermal Engineering" ,Laxmi Publications, New Delhi, Sixth edition, 2005.
2. Bansal, R.K., Fluid Mechanics and Hydraulics Machines, (9th edition), Laxmi publications (P) Ltd,New Delhi, 2017.

REFERENCE BOOKS

1. Sarkar B.K., “Thermal Engineering”, Tata McGraw-Hill, New Delhi New Delhi, 2001
2. Arora C.P., “Refrigeration and Air conditioning”, Tata McGraw-Hill, New Delhi, 2000.
3. Rudramoorthy R, “Thermal Engineering”, Tata McGraw Hill Book Company, New Delhi, 2003
4. P. L. Ballaney, “Thermal Engineering: Engineering Thermodynamics and Energy Conversion Techniques”, Khanna Publishers, 5th Edition, 2010.

U19CS309 OBJECT ORIENTED PROGRAMMING IN C++ 3 0 0 3

COURSE OUTCOMES

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

- Explain fundamental programming concepts such as variables, conditional statements, looping constructs.
- Apply derived data types and methods (procedures), inline function, friend function in applications.
- Describe how the class mechanism supports encapsulation and information hiding.
- Apply operator overloading and inheritance in solving real time problems.
- Write C++ programs for applications using files and exceptions.

UNIT I INTRODUCTION TO OOPS AND C++ 9

Introduction to Object Oriented Programming and C++: Object oriented concepts and its characteristics - History of C++ - Applications of C++ - Structure of C++ - Tokens – Keywords – Identifiers - Basic data types - Input and output statements - C++ Operators and control statements.

UNIT II DERIVED DATA TYPES AND FUNCTIONS 9

Derived data types: Arrays – Structures - Unions - Type casting - Symbolic constants - Scope resolution operator -Functions: Function Prototyping - Function components - Passing parameters – Call by value - Call by reference - Inline function - Default arguments - Overloaded function- Introduction to friend function.

UNIT III CLASSES AND OBJECTS 9

Classes and Objects: Class specification - Member function definition - Access qualifiers - Instance creation - Static data members and member functions - Array of objects - Objects as arguments - Returning objects – Constructors - Parameterized Constructors - Overloaded Constructors - Constructors with default arguments - Copy constructors – Destructors.

UNIT IV OPERATOR OVERLOADING AND INHERITANCE 9

Operator Overloading - Operator function – Overloading unary and binary operator – Inheritance Introduction – Types of Inheritance - Constructors in derived class - Abstract classes - Runtime Polymorphism– Array of pointers to base class – Virtual functions - Pure virtual functions – Virtual Destructors.

UNIT V STREAMS AND EXCEPTION HANDLING 9

Streams: Streams in C++ - Stream classes - Formatted and unformatted data – Manipulators - File streams - File pointer and manipulation - File open and close - Sequential and random access - Name Space.

Exception Handling: Principle of exception handling - Exception handling mechanism - Multiple catch statements - Nested try statements.

Total: 45 hours

TEXT BOOK

1. Robert Lafore, “Object-Oriented Programming in C++” Pearson Education, 4 Edition, 2008.
2. K R Venugopal, RajkumarBuyya “Mastering C++” Tata McGraw Hill, New Delhi, Second edition 2015.

REFERENCES

1. H. M. Deitel, P. J. Deitel, " C++ How to Program", Fifth Edition, Deitel& Associates, Inc.
2. Nicholas A. Solter, Scott J. Kleper, "Professional C++", 3rd Edition, Wiley Publishing,
3. Ira Pohl, "Object Oriented Programming using C++", Pearson Education, Second Edition Reprint 2004.
4. S. B. Lippman, Josee Lajoie, Barbara E. Moo, "C++ Primer", Fourth Edition, Pearson Education, 2005.
5. B. Stroustrup, "The C++ Programming language", 3rd edition, Pearson Education, 2004.
6. E. Balaguruswamy, "Object-Oriented Programming with C++" Tata McGraw Hill, New Delhi, Sixth edition 2015.

1. B. Stroustrup, "The C++ Programming language", 3rd edition, Pearson Education, 2004.
2. E. Balaguruswamy, "Object-Oriented Programming with C++" Tata McGraw Hill, New Delhi, Sixth edition 2015.

U19EE306 ANALOG ELECTRONICS LABORATORY 0 0 2 1

COURSE OUTCOMES:

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

- Design different amplifier circuits and verify their output waveforms.
- Verify the output waveforms of various types of oscillators.
- Construct circuits for various applications using op-amp and verify their output waveforms.

LIST OF EXPERIMENTS

1. Design the differential Amplifier
2. Verify the output of feedback Amplifier
3. Verify the output waveforms of Hartley and Colpitts Oscillator
4. Verify the output waveforms of Phase shift and Wein-bridge Oscillator.
5. Design of inverting and non-inverting amplifiers.
6. Design of instrumentation amplifier using op-amp.
7. Design of integrator and differentiator (IC741).
8. Designs of Schmitt trigger using op-amp.
9. Design of precision rectifiers using op-amp.
10. Design of adder and subtractor.
11. Design of clipper and clamper circuits using op-amp.

Total: 30 Hours

U19EE307 ELECTRICAL MACHINES LABORATORY – I 0 0 2 1

COURSE OUTCOMES:

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

- Analyse the characteristics and determine the efficiency of DC machines.
- Pre-determine the losses on no-load and determine the efficiency and regulation of transformer.
- Control the speed of shunt motor to above and below rated speed using rheostat.

List of Experiments

1. Analyse the open circuit and load characteristics of separately excited DC shunt generator.
2. Analyse the load characteristics of DC compound generator.
3. Analyse the load characteristics of DC shunt motor.
4. Analyse the load characteristics of DC series motor.
5. Analyse the load characteristics of DC compound motor.
6. Speed control on a DC shunt motor by field and armature control method.
7. Analyse the characteristics of DC motor by Swinburne's test and Hopkinson's test on DC motor-generator set.
8. Analyse the load characteristic of single-phase transformer.
9. Predetermine the efficiency of transformer by Sumpner's test and open circuit and short circuit tests.
10. Analyse the no-load losses in single-phase transformer by separation method.
11. Determine the efficiency of Scott connected transformer using load test.

Total: 30 Hours

U19CS310 OBJECT ORIENTED PROGRAMMING IN C++ LAB 0 0 2 1

COURSE OUTCOMES

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

- Apply the control structures and functions in C++ to solve problems.
- Develop applications using object oriented concepts.
- Demonstrate the concept of file and exception handling mechanism.

LIST OF EXPERIMENTS

1. Simple C++ programs to implement various control structures
    a. if statement
    b. switch case statement and do while loop
    c. for loop
    d. while loop
2. Programs to implement single and multi-dimensional arrays.
3. Programs to implement Structures.
4. Programs to understand Functions
    a. Built-in and user defined functions
    b. Functions with default arguments
    c. Inline functions
    d. Overloaded Functions
5. Programs to understand different function call mechanism.
    a. call by reference
    b. call by value
6. Programs to understand friend function & friend class.
    a. friend function
    b. friend class
7. Programs to understand constructors, destructors and this pointer.
8. Programs to overload unary & binary operators as member function & non-member function.
    a. unary operator as member function
    b. binary operator as non-member function
9. Programs to implement inheritance and it types.
10. Programs to implement run-time polymorphism.
11. Programs to demonstrate file manipulation.
12. Programs to apply exception handling.

TOTAL: 30 Hours

Semester-III	U19 GE301- SOFT SKILLS AND APTITUDE – I	L T P C Marks 0 0 2 1 100

Course Outcomes

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

1. Demonstrate capabilities in specific soft-skill areas using hands-on and/or case-study approaches
2. Solve problems of greater intricacy in stated areas of quantitative aptitude and logical reasoning
3. Demonstrate higher levels of verbal aptitude skills in English with regard to specific topics

1.Soft Skills	**Demonstrating soft-skill capabilities with reference to the following topics:** a. Attitude building b. Dealing with criticism c. Innovation and creativity d. Problem solving and decision making **e.** Public speaking **f.** Group discussions
2. Quantitative Aptitude and Logical Reasoning	**Solving problems with reference to the following topics:** a. **Vedic Maths:** Fast arithmetic, multiplications technique, Criss cross, Base technique, Square root, Cube root, Surds, Indices, Simplification. b. **Numbers:** Types, Power cycle, Divisibility, Prime factors & multiples, HCF & LCM, Remainder theorem, Unit digit, highest power. c. **Averages:** Basics of averages and weighted average. d. **Percentages**: Basics of percentage and Successive percentages. e. **Ratio and proportion:** Basics of R &P, Alligations, Mixture and Partnership. f. **Profit ,Loss and Discount**: Basic & Advanced PLD g. **Data Interpretation**: Tables, Bar diagram, Venn diagram, Line graphs, Pie charts, Caselets, Mixed varieties, Network diagram and other forms of data interpretation. h. **Syllogism:** Six set syllogism using Venn diagram and tick and cross method
3. Verbal Aptitude	**Demonstrating English language skills with reference to the following topics:** a. Verbal analogy b. Tenses c. Prepositions d. Reading comprehension e. Choosing correct / incorrect sentences f. Describing pictures g. Error spotting

Department of Placement Training
Sona College of Technology.
Salem-636 005.

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester III under Regulations 2019
Branch: Electronics and Communication Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1.	U19MAT301C	Probability and Stochastic Processes	3	1	0	4
2.	U19EC301	Signals and Systems	3	1	0	4
3.	U19EC302	Digital Electronics	3	0	0	3
4.	U19EC303	Electronic circuits	3	0	0	3
5.	U19CS307	Programming in C	3	0	0	3
6.	U19GE303	**Mandatory Course :** Essence of Indian Traditional knowledge	2	0	0	0
Practical						
7.	U19EC304	Digital Electronics laboratory	0	0	2	1
8.	U19EC305	Electronic Circuits and Simulation laboratory	0	0	2	1
9.	U19CS308	C programing laboratory	0	0	2	1
10.	U19GE301	Soft Skills and Aptitude – I	0	0	2	1
					Total Credits	**21**

Approved By

Chairman, Electronics and Communication Engineering BoS
Dr.R.S.Sabeenian

Member Secretary, Academic Council
Dr.R.Shivakumar

Chairperson, Academic Council & Principal
Dr.S.R.R.Senthil Kumar

Copy to:-
HOD/Electronics and Communication Engineering, Third Semester BE ECE Students and Staff, COE

U19MAT301C	**PROBABILITY AND STOCHASTIC PROCESSES**	L	T	P	C
		3	1	0	4

COURSE OUTCOMES

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

1. apply the concepts of probability, random variable and their properties to generate the moments.
2. fit the suitable distribution and its properties to the real world problems and interpret the results.
3. apply the concepts of joint probability distribution and its properties to find the covariance and transformation of random variables.
4. make a probabilistic model for characterizing a random signal.
5. find the expected frequency of the random process and analyze the response of random inputs to linear time invariant systems.

UNIT – I ONE DIMENSIONAL RANDOM VARIABLE 12

One dimensional random variable (Discrete and continuous) – Probability mass function, probability density function, moments, moment generating function and their properties.

UNIT – II THEORETICAL DISTRIBUTIONS 12

Binomial, Poisson, Uniform, Exponential and Normal distributions - Function of one dimensional random variable – Applications.

UNIT – III TWO DIMENSIONAL RANDOM VARIABLES 12

Joint distributions – Marginal and conditional distributions – Covariance – Correlation – Transformation of two dimensional random variables – Central limit theorem (for independent and identically distributed random variables).

UNIT – IV RANDOM PROCESSES 12

Classification – First order, second order, strictly stationary, wide sense and ergodic processes – Poisson process.

UNIT – V SPECTRAL DENSITIES AND LINEAR SYSTEMS WITH RANDOM INPUTS 12

Auto correlation functions – Cross correlation functions – Properties – Power spectral density – Cross spectral density – Properties.

Linear time invariant system – System transfer function – Linear systems with random inputs – Auto correlation and cross correlation functions of input and output.

Theory: **45 Hours** Tutorial: **15 Hours** Total**: 60 Hours**

TEXT BOOKS:

1. T. Veerarajan, "Probability, Statistics and Random Processes with Queueing Theory and Queueing Networks", McGraw Hill Publishers, 4th Edition, 7th Reprint, 2018.
2. P. Z. Peebles Jr., "Probability, Random Variables and Random Signal Principles", McGraw Hill Publishers, 4th Edition, 37th Reprint, 2016.

REFERENCE BOOKS:

1. S. C. Gupta and V. K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons Publishers, 11th Edition, Reprint, 2019.
2. R. A. Johnson and C. B. Gupta, "Miller and Freund's, Probability and Statistics for Engineers", Pearson Publishers, 9th Edition, 2018.
3. S. Ross, "A First Course in Probability", Pearson Publishers, 9th Edition, 2019.
4. P. G. Hoel, S. C. Port and C. J. Stone, "Introduction to Probability Theory", Universal Book Stall Publishers, Reprint, 2003.
5. W. Feller, "An Introduction to Probability Theory and its Applications – Volume – I", Wiley Publishers, 3rd Edition, 2008.
6. S. S. Haykin and B. Van Veen, "Signals and Systems," Wiley Publishers, 2nd Edition, 2007.

U19EC301 **SIGNALS AND SYSTEMS** **3 1 0 4**
(Common for ECE& BME)

COURSE OUTCOMES

At the end of each unit, the students will be able to -

1. Classify the signals as continuous time and discrete time signals and classify systems based on their properties
2. Determine the response of LTI system using convolution sum for DT system and Convolution Integral for CT system
3. Apply Fourier series and Fourier Transform for periodic Signals
4. Analyze system using Laplace transform and realize the structure for CT system
5. Analyze system using Z transform and realize the structure for DT system

UNIT I : CLASSIFICATION OF SIGNALS AND SYSTEMS **12**

Continuous-Time and Discrete-Time signals–The Unit Impulse Unit Step, Unit Ramp Signals and other Basic Signals – Operation of Signals -Time Shifting – Time Reversal – Amplitude Scaling – Time Scaling – Signal Addition – Multiplications –Classification of signals- Continuous-Time and Discrete-Time Systems– Basic System Properties - Systems With and Without Memory – Causality – Stability – Time Invariance – Linearity.

UNIT II: LINEAR TIME- INVARIANT SYSTEMS **12**

Continuous-Time LTI Systems: The Convolution Integral - graphical and analytical approach – Properties of Linear Time-Invariant Systems – Solution of Differential Equations.

Discrete-Time LTI system: The Convolution sum-tabulation method-matrix multiplication method-graphical and analytical approach – Solution of Difference Equations.

UNIT III: ANALYSIS OF CT SIGNALS USING FOURIER SERIES & FOURIER TRANSFORM **12**

Fourier Series Representation (Trigonometric and Exponential) of Continuous-Time Periodic Signals – Properties of Continuous-Time Fourier Series – Representation of Aperiodic Signals: The Continuous-Time Fourier Transform – The Fourier Transform for Periodic Signals – Properties of the Continuous-Time Fourier Transform.

UNIT IV: ANALYSIS OF SIGNALS AND SYSTEMS USING LAPLACE TRANSFORM **12**

The Laplace Transform – The Region of Convergence for Laplace Transform– The Inverse Laplace Transform using Partial fraction– Properties of the Laplace Transform–System Function and Block Diagram Representations-Direct Form I and Direct Form II.

UNIT V: ANALYSIS OF SIGNALS AND SYSTEMS USING Z-TRANSFORM **12**

The Z-Transform – The Region of Convergence for the Z-Transform –The Inverse Z-Transform using Partial fraction and Long division method– Properties of the Z-Transform – System Function and Block Diagram Representations-Direct Form I and Direct Form II.

Lecture: 45 Tutorial:15 Total hours : 60

TEXT BOOKS

1. Alan V. Oppenheim, Alan S. Willsky, S. Hamid Nawab, "*Signals and Systems*", 2nd E, Prentice Hall India, 2010
2. A.Anand Kumar, "*Signals and Systems*", 3rd Edition, Prentice Hall India,2013

REFERENCE BOOKS

1. M .J. Roberts, "*Signals & Systems Analysis using Transform Methods & MATLAB*", Tata McGraw Hill, 2007
2. Haykin, Simon, and Barry Van Veen. "*Signals and systems",* John Wiley & Sons, 2007.
3. A. NagoorKani, "*Signals & Systems*", Tata McGraw Hill, 2010
4. John G. Proakis, Dimitris G. Manolakis, "*Digital Signal Processing, Principles, Algorithms, and Applications*", 4th E, PHI, 2007
5. Robert A. Gable, Richard A. Roberts, "*Signals & Linear Systems*", 3rd E, John Wiley, 1995
6. Edward W Kamen& Bonnie's Heck, "*Fundamentals of Signals and Systems*", Pearson Education, 2007

U19EC302 **DIGITAL ELECTRONICS** **3 0 0 3**

COURSE OUTCOMES:

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

1. Explain number systems, logic gates, logic functions and simplify Boolean expressions
2. Design and analyze combinational logic circuits
3. Design of sequential logic circuits
4. Design and implement shift registers and counters.
5. Implementation of combinational circuits using Programmable Logic Devices

UNIT I NUMBER SYSTEM, BOOLEAN ALGEBRA AND LOGIC GATES **09**

Review of Number systems – Boolean Algebra – Basic Theorems and Properties of Boolean Algebra – Boolean Functions – Canonical and Standard Forms – Digital Logic Gates - NAND and NOR Implementation – Simplification of Boolean functions using K-Map Method – Four Variable K-map – POS Simplification – Don't Care Conditions – Tabulation method– TTL – ECL – CMOS Logic Circuits.

UNIT II COMBINATIONAL LOGIC CIRCUITS **09**

Analysis Procedures – Design Procedures – BCD to Excess-3-Parallel Adders and Subtractors – BCD Adder –Binary Multiplier – Magnitude Comparator – Decoders – Encoders – Multiplexers – Demultiplexers – Introduction to Verilog HDL – Verilog HDL code for 2 bit adder – 2:1 Multiplexer.

UNIT III SEQUENTIAL LOGIC CIRCUITS **09**

Flip-Flops – SR – D- JK-T– Master Slave JK Flip-Flop – Conversion of Flip Flops – Design of Clocked Sequential Circuits – State Diagram – State Table – State Reduction and Assignment

UNIT IV REGISTERS AND COUNTERS **09**

Registers – Shift Registers – SISO – SIPO – PIPO — Synchronous Counters – Up-down Binary Counter – Ring Counter – Johnson Counters – Asynchronous Counters – Asynchronous Design Procedure – Race Free State Assignment – Hazards

UNIT V MEMORY AND PROGRAMMABLE LOGIC **09**

Classification of memories: RAM - Static and Dynamic RAM, ROM - PROM, EPROM, EEPROM - Memory Decoding – Read/Write access - Implementation of combinational logic using PROM - Programmable Logic Array – Programmable Array Logic.

Lecture: 45, Tutorial: 00, Total: 45 Hours

TEXT BOOK

1. M. Morris Mano and Michael D. Ciletti – '*Digital Design with an Introduction to the Verilog HDL*', 6th Edition, Pearson Education, 2018

REFERENCE BOOKS

1. John F Wakerly – '*Digital Design Principles and Practices*', 4th Edition, Prentice Hall India, 2008.
2. Schilling, Herbert Taub and Donald, 'Digital Integrated Electronics', Tata McGraw-Hill, 2008.
3. A.Anandkumar, 'Fundamentals of digital circuits, 4th Edition, Prentice Hall India, Paper back'2016.
4. Jayaram Bhasker, '*A Verilog HDL Primer'*, 2nd E, BS publications, Paper back'2008.

U19EC303 **ELECTRONIC CIRCUITS** **3 0 0 3**

COURSE OUTCOMES:

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

1. Design negative feedback amplifier circuits.
2. Analyze tuned amplifiers circuits and describe the working of Signal Generators.
3. Analyze the operation of multivibrators and wave shaping circuits.
4. Design and analyze multistage amplifiers.
5. Describe the types of power amplifiers.

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UNIT I : FEEDBACK AMPLIFIERS **09**

Classification of amplifiers – Feedback concept – Transfer gain with feedback – General characteristics of negative feedback –Negative feedback topologies -Voltage Series feedback – Current Series feedback – Voltage Shunt feedback – Current Shunt feedback - Input resistance – Output resistance – Method of identifying of feedback topology and feedback factor – Nyquist criterion for stability of feedback amplifiers

UNIT II : TUNED AMPLIFIERS AND OSCILLATORS **09**

Tuned amplifiers - Q factor – Single tuned – Double tuned – Stagger tuned – Class C tuned - Classification of Oscillators – Barkhausen criterion – General form of LC oscillators – Hartley oscillator-Colpitts oscillators - Clapp oscillators – Analysis of RC oscillators-RC phase shift oscillators-Wien bridge oscillators – Crystal oscillators – Frequency stability of oscillators.

UNIT III : WAVE SHAPING AND MULTIVIBRATOR CIRCUITS **09**

RC and RL integrator and differentiator circuits - Diode clippers – series and parallel – Diode clampers – positive and negative - Schmitt trigger circuit – Collector coupled multivibrators – Astable multivibrator – Monostable multivibrator - Bistable multivibrator – waveform analysis.

UNIT IV : MULTISTAGE AMPLIFIERS **09**

Different coupling schemes – General analysis of cascade amplifier - Bandpass of cascaded stages – RC coupled amplifier – Low frequency response of RC coupled stage – Effect of an emitter bypass capacitor on low frequency response – Transformer coupled amplifier – Direct coupled amplifier – Differential amplifier.

UNIT V : LARGE SIGNAL AMPLIFIERS **09**

Classification based on biasing condition - Class A large signal amplifiers – Transformer coupled audio power amplifier – Efficiency – Push-Pull amplifiers – Class B amplifiers – efficiency - Class AB operation – Class D amplifier – Class S amplifier.

Lecture: 45, Tutorial: 00, Total: 45 Hours

TEXT BOOKS

1. Salivahanan, Suresh Kumar and Vallavaraj, “Electronic Devices and Circuits”, TMH, 3rd edition 2012.

REFERENCE BOOKS

1.Dr.Sanjay Sharma – “Electronic Principles”- S.K.Kataria and sons-third edition 2014.

2.J. Millman and A.Grabel, “Micro Electronics”, second edition, 2009

3.A.S.Sedra and K.C. Smith, “Micro Electronic Circuits”, Oxford press, fourth edition, 1998.

4.J. Millman and Halkias, “Integrated Electronics”, second edition, 2010.

U19CS307 PROGRAMMING IN C 3 0 0 3

COURSE OUTCOMES

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

1. Write simple C programs using console input and output functions
2. Write C programs using arrays, decision making and looping statements
3. Design and develop simple application using functions and pointers.
4. Design and develop real-time applications using structures and unions
5. Design and develop real-time applications using file operation

UNIT I BASICS OF C PROGRAMMING 9

Introduction to programming paradigms - Structure of C program - C programming: Data Types – Storage classes - Constants – Enumeration Constants - Keywords – Operators: Precedence and Associativity - Expressions - Input/Output statements, Assignment statements – Decision making statements - Switch statement - Looping statements – Pre-processor directives - Compilation process

UNIT II ARRAYS AND STRINGS 9

Introduction to Arrays: Declaration, Initialization – One dimensional array – Two dimensional arrays – multi-dimensional array- String – string built-in functions – Sorting- Searching

UNIT III FUNCTIONS AND POINTERS 9

Introduction to functions: Function prototype, function definition, function call-Call by Value-Call by reference – Recursion – user defined functions versus built-in functions- Pointers – Pointer operators – Pointer arithmetic – Arrays and pointers – pointers to an array – function pointer-indirect pointer.

UNIT IV STRUCTURES 9

Structure – Structure definition-Nested structures – Pointer and Structures – Array of structures – Self-referential structures – bit fields- Union-Dynamic memory allocation - Singly linked list – typedef.

UNIT V FILE PROCESSING 9

Files – Types of file- File Primitives- File access mode- Sequential file access - Random file access - Command line arguments-introduction to TSR programs

TEXT BOOK

1. Ben Clemens “21st Century C ”, Second Edition ,Oreilly Media Inc,2014
2. Deitel and Deitel, “C How to Program”, Pearson Education, New Delhi, 2011.

REFERENCE BOOKS

1. Kernighan,B.W and Ritchie,D.M, “The C Programming language”, Second Edition, Pearson Education, 2006.
2. Yashavant P. Kanetkar. “Let Us C”, BPB Publications, 14th edition, 2016.
3. Byron S Gottfried, “Programming with C”, Schaum’s Outlines, Second Edition, Tata McGraw-Hill, 2006.
4. Anita Goel and Ajay Mittal, “Computer Fundamentals and Programming in C”, Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.
5. E. Balagurusamy, “Programming in ANSI C”, seventh edition, Tata McGraw Hill, 2016.

U19EC304 DIGITAL ELECTRONICS LABORATORY 0 0 2 1

COURSE OUTCOMES

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

1. Design and implement combinational circuits using logic gates and breadboards
2. Design and implement counter circuits using Flip flops and breadboards
3. Design and implement Shift Registers using Flip flops and breadboards

List of Experiments:

1. Design and implementation of
   (a) Half Adder and Full Adder, Half Subtractor and Full Subtractor
   (b) 4-bit Parallel Adder cum Subtractor
   (c) BCD adder
   (d) Magnitude Comparator

2. Design and implementation of
   (a) Code Converters – Binary to Gray and Gray to Binary
   b) BCD to Excess 3 and Excess 3 to BCD

3. Design and implementation of
   (a) 4:1 / 8:1 Multiplexer
   (b) 1:4 / 1:8 Demultiplexer
   (c) Decoder – BCD to Seven Segment
   (d) Encoder – 4×2 Priority Encoder
   (e) Parity Generator and Checker

4. Design and implementation of
   (a) 3-bit Asynchronous Counter
   (b) 3-bit Synchronous Counter
   (c) 4-bit Ring Counter
   (d) 4-bit Johnson Counter

5. Design and implementation of
   (a) Shift Registers – SISO, SIPO and PIPO

U19EC305 ELECTRONIC CIRCUITS AND SIMULATION LABORATORY 0 0 2 1

Course outcomes

At the end of each experiment, the students will be able to –

1. Realize feedback amplifiers and power ampliifers from various parameters.
2. Design and test Oscillator, multivibrator and wave shaping circuits using BJT
3. Obtain the frequency response from single stage, two stage amplifiers and differential amplifier.

List of experiments

1. Design the current series feedback amplifier and calculate the parameters (Gain, Input impedance, Output Impedance, Bandwidth) with and without feedback condition.
2. Design the Voltage shunt feedback amplifier and calculate the parameters (Gain, Input impedance, Output Impedance, Bandwidth) with and without feedback condition.
3. Design RC Phase shift oscillator and obtain the waveform for the frequency of 5 KHz.
4. Design Wien Bridge oscillator and obtain the waveform for the frequency of 10 KHz
5. Design LC oscillator(Hartley and Colpitts) and obtain the waveform for the frequency of 250 KHz.
6. Construct differentiator and integrator circuit by using passive element. Obtain waveform for following input signal
   (i) Sine waveform
   (ii) Square waveform
   (iii) Triangular waveform
7. Design and construct the following passive clipper and clamper circuit. Obtain the output waveform
   (i) Series clipper
   (ii) Shunt clipper
   (iii) Combinational clipper
   (iv) Clamping circuit
8. Design multivibrators (Astable ,Monostable and Bistable) using BJT and Obtain the output waveform for the time period of 250 μs.
9. Obtain the frequency response of' a two stage RC coupled amplifier
10. Design and test a differential amplifier in
    (i) Common mode
    (ii) Difference mode
11. Design Class A amplifier and Class B power amplifiers. Observe the output waveform and measure its efficiency.
12. Simulation using PSPICE:
    RC phase shift, Hartley, Colpitts oscillators,
    Integrator, differentiator,
    Clippers and Clampers,
    Astable multivibrator, Monostable multivibrator

U19CS308 C PROGRAMMING LABORATORY 0 0 2 1

COURSE OUTCOMES:

After successful completion of the course, the students would be able to

1. Design and develop simple programs using branching, looping statements
2. Develop programs using functions, arrays, structures and string handling
3. Write programs using pointers and dynamic memory allocation and file handling

List of Experiments:

1. Programs using Input, Output and assignment statements.
2. Programs using Branching statements
3. Programs using Looping statements
4. Programs using Functions
5. Programs using Arrays
6. Programs using Structures
7. Programs using Strings
8. Programs using Pointers (both data pointers and function pointers)
9. Programs using dynamic memory allocation
10. Programs using Recursion
11. Programs using Files

TOTAL : 30 hours

Semester-III	U19 GE301- SOFT SKILLS AND APTITUDE – I	L T P C Marks 0 0 2 1 100
Course Outcomes **At the end of the course the student will be able to:**		
1. Demonstrate capabilities in specific soft-skill areas using hands-on and/or case-study approaches		
2. Solve problems of greater intricacy in stated areas of quantitative aptitude and logical reasoning		
3. Demonstrate higher levels of verbal aptitude skills in English with regard to specific topics		
1.Soft Skills	**Demonstrating soft-skill capabilities with reference to the following topics**: a. Attitude building b. Dealing with criticism c. Innovation and creativity d. Problem solving and decision making **e.** Public speaking **f.** Group discussions	
2. Quantitative Aptitude and Logical Reasoning	**Solving problems with reference to the following topics:** a. **Vedic Maths:** Fast arithmetic, multiplications technique, Criss cross, Base technique, Square root, Cube root, Surds, Indices, Simplification. b. **Numbers:** Types, Power cycle, Divisibility, Prime factors & multiples, HCF & LCM, Remainder theorem, Unit digit, highest power. c. **Averages:** Basics of averages and weighted average. d. **Percentages**: Basics of percentage and Successive percentages. e. **Ratio and proportion:** Basics of R &P, Alligations, Mixture and Partnership. f. **Profit ,Loss and Discount**: Basic & Advanced PLD g. **Data Interpretation**: Tables, Bar diagram, Venn diagram, Line graphs, Pie charts, Caselets, Mixed varieties, Network diagram and other forms of data interpretation. h. **Syllogism:** Six set syllogism using Venn diagram and tick and cross method	
3. Verbal Aptitude	**Demonstrating English language skills with reference to the following topics:** a. Verbal analogy b. Tenses c. Prepositions d. Reading comprehension e. Choosing correct / incorrect sentences f. Describing pictures g. Error spotting	

Department of Placement Training
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Salem-636 005.

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester III under Regulations 2019
Branch: Computer Science and Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1	U19MAT301B	Probability and Statistics	3	1	0	4
2	U19CS301	Data Structures	3	0	0	3
3	U19CS302	Computer Architecture	3	0	0	3
4	U19CS303	Computer and Information Ethics	3	0	0	3
5	U19CS304	Object Oriented Programming	3	0	0	3
6	U19EC306	Communication Systems	3	0	0	3
7	U19GE302	**Mandatory Course :** Environment and Climate Science	2	0	0	0
Practical						
8	U19CS305	Data Structures Laboratory	0	0	4	2
9	U19CS306	Object Oriented Programming Laboratory	0	0	4	2
10	U19GE301	Soft Skills and Aptitude- I	0	0	2	1
					Total Credits	**24**

Approved By

Chairperson, Computer Science and Engineering BoS **Member Secretary, Academic Council** **Chairperson, Academic Council & Principal**
Dr.B.Sathiyabhama **Dr.R.Shivakumar** **Dr.S.R.R.Senthil Kumar**

Copy to:-

HOD/Computer Science and Engineering, Third Semester BE CSE Students and Staff, COE

U19MAT301B PROBABILITY AND STATISTICS 3 1 0 4

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

- Apply the concepts of measure of central tendency, dispersion, correlation and regression to the given data and analyze the results.
- Apply the concepts of probability, random variable and their properties to generate the moments.
- Fit the suitable distribution and its properties to the real world problems and interpret the results
- Apply the concepts of joint probability distribution and its properties to find the covariance and transformation of random variables.
- Test the hypothesis of the population using sample information

UNIT I BASIC STATISTICS 12

Measures of central tendency (simple arithmetic mean, median, mode) – Quartile's – Measures of dispersion (range, inter-quartile range, quartile deviation, mean deviation, standard deviation, coefficient of variation) – Simple correlation – Curve fitting (straight line and parabola).

UNIT II RANDOM VARIABLES 12

Discrete and continuous random variables – Probability mass function, probability density function, moments, moment generating function and their properties.

UNIT III STANDARD DISTRIBUTIONS 12

Binomial, Poisson, geometric, uniform, exponential and normal distributions and their properties.

UNIT IV TWO DIMENSIONAL RANDOM VARIABLES 12

Joint distributions, marginal and conditional distributions – Covariance – Correlation – Central limit theorem

UNIT V TESTING OF SIGNIFICANCE 12

Sampling distributions - Testing of hypothesis for mean, standard deviation, variance, proportion and differences using normal and t distributions - χ^2- tests for independence of attributes and goodness of fit and F distribution

Theory: **45 Hours** Tutorial: **15 Hours** Total**: 60 Hours**

TEXT BOOKS:

1. S. C. Gupta, V. K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons, 11^{th} Edition, Reprint, 2019.

2. T. Veerarajan, "Probability, Statistics and Random Processes with Queueing Theory and Queueing Networks", McGraw Hill Publishers, 4th Edition (7th reprint), 2018

REFERENCES:

1. R. A. Johnson and C. B. Gupta, "Miller and Freund's, Probability and Statistics for Engineers", Pearson Publishers, 9th Edition, 2018.
2. S. Ross, "A first course in probability", Pearson Publishers, 9th Edition, 2019.
3. P. G. Hoel, S. C. Port and C. J. Stone, "Introduction to Probability Theory", Universal Book Stall Publishers, (Reprint), 2003
4. W. Feller, "An Introduction to Probability Theory and its Applications", Vol. 1, 3rd Edition, Wiley Publishers, 2008.

U19CS301 DATA STRUCTURES 3 0 0 3

COURSE OUTCOMES

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

- Implement abstract data types for linear data structures
- Solve real world problems using stack and queue linear data structures
- Apply various non-linear tree data structures in real time applications
- Design algorithms to solve common graph problems
- Analyze various searching, sorting and hashing techniques

UNIT I LINEAR DATA STRUCTURES – LIST 9

Abstract Data Types (ADTs) – List ADT – Array-based implementation – Linked list implementation - Singly linked lists - Circularly linked lists - Doubly-linked lists – Applications of lists – Polynomial Manipulation.

UNIT II LINEAR DATA STRUCTURES – STACKS, QUEUES 9

Stack ADT – Operations – Applications – Evaluating arithmetic expressions - Conversion of Infix to postfix expression – Queue ADT – Operations – Circular Queue – Double ended queue – Applications of queues.

UNIT III NON LINEAR DATA STRUCTURES – TREES 9

Trees – Traversals – Binary Trees – Expression trees – Applications of trees – Binary search trees - AVL Trees – B-Tree – Heap – Applications of heap -Tries.

UNIT IV NON LINEAR DATA STRUCTURES – GRAPHS 9

Graphs - Representation of graph – Graph traversals – Breadth-first traversal – Depth-first traversal – Minimum Spanning Trees: Prim's algorithm, Kruskal's algorithm – Shortest path algorithms: Dijkstra's algorithm, Floyd Warshall algorithm - Applications of Graphs: Topological Sort.

UNIT V SEARCHING, SORTING AND HASHING TECHNIQUES 9

Searching - Linear Search – Binary Search, Sorting – Bubble sort – Selection sort – Insertion sort – Merge sort, Hashing - Hash Functions – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing.

TEXT BOOKS

1. Mark Allen Weiss, "Data structures and Algorithm Analysis in C", Pearson Education, New Delhi, Second Edition, 2012.

REFERENCES

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest , Clifford Stein, "Introduction to Algorithms" ,3rd Edition, MIT Press, 2010.

2. Jean Paul Tremblay and Sorenson, "An Introduction to Data Structures with Applications", McGraw Hill Publishing Company, New Delhi, Second Edition, 2007.

3. Yedidyah Langsam, Moshe J Augenstein and Aaron M Tanenbaum, "Data Structures using C and C++", Prentice Hall of India/ Pearson Education, New Delhi, 2006.

4. Ellis Horowitz, SartajSahni, Susan Anderson-Freed, "Fundamentals of Data Structures in C", Silicon Press, New Jersey, Second Edition, 2005.

U19CS302 COMPUTER ARCHITECTURE 3 0 0 3

COURSE OUTCOMES:

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

- Demonstrate the operational concepts of computers and classify instruction set architectures
- Identify the mechanism of control signals generation in Hardwired control and micro programmed control unit
- Apply the various arithmetic operations and discuss the design of ALU
- Evaluate the performance of a pipelined processors
- Analyze the various performance measures for memory and IoT.

UNIT I BASIC STRUCTURE OF COMPUTERS 9

Functional units – Basic operational concepts – Bus structures – Instructions and instruction sequencing – Hardware – Software Interface – Translation from a high level language to the Hardware language- Instruction set architecture – Styles and features-Addressing modes – RISC – CISC- Amdhal's law- Performance and metrics.

UNIT II BASIC PROCESSING UNIT 9

Components of the processor-Data path and control- Execution of a complete instruction – Multiple bus organization – Hardwired control – Micro programmed control.

UNIT III ARITHMETIC FOR COMPUTERS 9

Signed and Unsigned number representations - Arithmetic operations: Addition and Subtraction – Fast Adders – Binary Multiplication – Booth algorithm-Binary Division – Floating Point Numbers – Representation and operations.

UNIT IV PIPELINING 9

Basic concepts – Data hazards – Instruction hazards – Influence on instruction sets – Data path and control considerations – Performance considerations – Exception handling.

UNIT V MEMORY AND I/O 9

Need for a hierarchical memory system – Types and characteristics of memories – Cache memories – Improving cache performance – Virtual memory – Memory management techniques - Accessing I/O devices – Programmed Input/Output – Interrupts – Direct Memory Access – Need for Standard I/O Interfaces like PCI, SCSI, USB.

TOTAL: 45 hours

TEXT BOOK:

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, "Computer Organization", Fifth Edition, Tata McGraw Hill, 2002.

REFERENCES

1. John L. Hennessey and David A. Patterson, "Computer Architecture – A Quantitative Approach", Morgan Kaufmann / Elsevier Publishers, Fifth Edition, 2012.
2. William Stallings, "Computer Organization and Architecture – Designing for Performance", Sixth Edition, Pearson Education, 2003.
3. John P. Hayes, "Computer Architecture and Organization", Third Edition, Tata McGraw Hill, 1998.
4. V.P. Heuring, H.F. Jordan, "Computer Systems Design and Architecture", Second Edition, Pearson Education

U19CS304 OBJECT ORIENTED PROGRAMMING 3 0 0 3

COURSE OUTCOMES

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

- Analyze a problem and identify classes, objects and the relationships among them.
- Develop applications using various types of Inheritance and Interfaces.
- Develop applications or programs using polymorphism and multithreading.
- Analyze an application and make use of object oriented concepts for its implementation.
- Develop programs using collections, files and streams in java.

UNIT I INTRODUCTION 7

Introduction to OOP– Object Oriented Programming Concepts - Java Fundamentals - Characteristics of Java - Data Types, Variables, and Arrays - Operators-Control Statements – Classes – Methods – access specifies – static members - Constructors- Garbage Collection.

UNIT II INHERITANCE INTERFACES AND EXCEPTION HANDLING 10

Inheritance: Super classes- sub classes –Protected members – constructors in sub classes- the Object class – abstract classes and methods- final methods and classes – Interfaces: Defining an interface, Implementing interface, differences between classes and interfaces and extending interfaces - Exception Handling Fundamentals – Java's Built-in Exceptions-Creating new Exception subclasses.

UNIT III POLYMORPHISM AND MULTITHREADING IN JAVA 10

Polymorphism- Abstract classes and methods-Overloading-Overriding-final methods and classes – Multithreaded programming –The Thread class and the Runnable Interface-Creating multiple threads-Synchronization.

UNIT IV STRING HANDLING AND COLLECTION FRAMEWORK 11

String Constructors-String Operations-Generic classes and methods-The Collection Framework Collections-List-ArrayList, Linked List, Set-HashSet, Linked HashSet, Queue-PriorityQueue, Map-HashMap, SortedMap, TreeMap.

UNIT V FILES AND STREAMS IN JAVA 7

Files and streams –Byte Stream-I/O Stream, File I/O Stream, ByteArray I/O Stream-Character Stream-File Reader and Writer, CharArrayReader and Writer-Serialization.

TOTAL: 45 HOURS

TEXT BOOKS

1. Herbert Schildt, "Java the Complete Reference", Ninth edition Tata Mc Graw Hills, 2014.
2. Cay S. Horstmann, Gary cornell, —Core Java Volume –I Fundamentals, 9th Edition, Prentice Hall, 2013.

REFERENCES

1. Paul Deitel and Harvey Deitel, —"Java How to Program (Early Objects)", Tenth Edition, Pearson Prentice Hall 2014.
2. Timothy Budd, —"An Introduction to Object-Oriented Programming", Third Edition, Pearson Education, 2008.
3. E.Balaguruswamy,"Programming with Java", Second Edition, TMH, 2009

U19EC306 COMMINICATION SYSTEMS 3 0 0 3

COURSE OUTCOMES:

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

- Explain basics of communication systems and its working principles.
- Illustrate the generation and detection methods of various AM systems.
- Describe the transmission and demodulation methods of angle modulation systems
- Examine the fundamentals of analog and digital pulse modulation methods.
- Summarize the principles of spread spectrum methods, satellite and cellular mobile communication systems.

UNIT I FUNADMENTALS OF COMMUNICATION SYSTEMS 9

Basic elements of a communication systems- Modulation and demodulation- Need for modulation-types of modulation - Radio Communication spectrum-Types of signals-analog and digital- Concept of Frequency spectrum and bandwidth-Channel and noise- Types of noise- SNR-Merits and demerits of analog communication systems**.**

UNIT II AMPLITUDE MODULATION SYSTEMS 9

Principles of amplitude modulation-waveforms- Modulation index- Bandwidth and Power relations in AM-Types of AM - Generation and detection methods-Comparison of various AM systems- AM Transmitters, super-heterodyne radio receivers.

UNIT III ANGLE MODULATION SYSTEMS 9

Phase and Frequency modulation-waveforms- Frequency analysis of angle modulated waves-Bandwidth requirement of FM-Types of FM- NBFM and WBFM -Direct method and Indirect method of FM generation-FM receivers-Comparison between AM and FM.

UNIT IV PULSE MODULATION SYSTEMS AND DATA TRANSMISSION 9

Digital communication systems-Sampling theorem- Analog pulse modulation: PAM, PWM,PPM- Digital Pulse modulation: PCM, DM, ADM- transmitter and receiver- Pass band data transmission- ASK, FSK, PSK- Generation and detection-Performance comparison between different digital modulation methods.

UNIT V ADVANCED COMMUNICATION SYSTEMS 9

Spread Spectrum Techniques: Pseudo-noise sequence-Direct sequence spread spectrum - Frequency hopping spread spectrum-Satellite Communication systems: Uplink and downlink frequencies-Multiple Access techniques-FDMA,TDMA and CDMA- Mobile communication systems: Cellular concept and its fundamentals- Comparison between various mobile generation standards.

Total: 45 Hours

TEXT BOOKS

1. R.P. Singh and S.D. Sapre, “Communication Systems- Analog and Digital”, Tata McGrawHill, 3rd Edition, 2014..
2. Wayne Tomasi, “Electronic Communication Systems”, 6th edition, Pearson Education, 2015.

REFERENCES

1. Simon Haykin, “Communication Systems”, 4th Edition, John Wiley & Sons, 2016.
2. B.P.Lathi,”Modern Analog and Digital Communication systems”, 3/e, Oxford University Press, 2011
3. Martin S.Roden, “Analog and Digital Communication System”, 3rd Edition, PHI, 2012.
4. Sam Shanmugam “Digital and Analog Communication systems” John Wiley& Sons, 2014.

U19CS303 COMPUTER AND INFORMATION ETHICS

COURSE OUTCOMES

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

- Identify the core values that mold the ethical behavior of an IT engineer
- Describe the ethical principles that should be followed by all the stake holders of IT
- Analyze the ethical issues related to freedom of expression
- Describe the intellectual property rights and biometric technologies
- Exercise the ethical principles that should be followed while handling advance computer technologies

UNIT I INTRODUCTION 9

Introduction - Ethics in the Business World - Including Ethical Considerations in Decision Making - Ethics in Information Technology - IT Security Incidents - Implementing Trustworthy Computing

UNIT II ETHICS IN INFORMATION TECHNOLOGY 9

Ethics for IT Professionals – Ethics for IT Users - Ethics for IT Organizations - The Impact of IT on the Standard of Living and Worker Productivity - The Impact of IT on HealthCare Costs

UNIT III FREEDOM OF EXPRESSION 9

Introduction – Anonymity – Security – Privacy - Ethical and Legal Framework for Information - Social Context of Computing

UNIT IV INTELLECTUAL PROPERTY RIGHTS 9

Introduction – Copyrights – Patents - Trade Secrets - Key Intellectual Property Issues - Biometric Technologies Ethics: Introduction and Definitions - The Biometric Authentication Process - Biometric System Components - Types of Biometric Technologies - Ethical Implications of Biometric Technologies - The Future of Biometrics

UNIT V COMPUTER CRIMES AND NEW FRONTIERS FOR COMPUTER ETHICS 9

Computer Crimes: Introduction - History of Computer Crimes - Types of Computer System Attacks - Motives of Computer Crimes - Costs and Social Consequences - Computer Crime Prevention Strategies - New Frontiers for Computer Ethics**:** Artificial Intelligence – Cyberspace - Social Network Ecosystems - Mobile Systems

TOTAL HOURS: 45

TEXT BOOKS:

1. George W. Reynolds, “Ethics in Information Technology”, Fifth Edition, Cengage Learning, 2014.
2. Joseph Migga Kizza, “Ethical and Social Issues in the Information Age”, Fifth Edition, Springer, 2013.

REFERENCE BOOKS:

1. Gerard Ian Prudhomme, "The Handbook of Information and Computer Ethics", First edition, Arcler Education Inc, 2016.
2. Luciano Floridi, "The Cambridge Handbook of Information and Computer Ethics" , First edition, Cambridge University Press, 2010.
3. Kenneth E. Himma and Herman T. Tavani, "The Handbook of Information and Computer Ethics", First Edition, Wiley-Blackwell, 2008.
4. Robert N. Barger, "Computer Ethics: A Case-based Approach", First edition, Cambridge University Press, 2008.
5. Deborah G. Johnson, "Computer Ethics (Occupational Ethics)", Second Edition, PHI,1993

COURSE OUTCOMES:

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

- Design and develop simple programs using data structures
- Apply non-linear data structures for various real time applications
- Design shortest path algorithm for various real life applications

LIST OF EXPERIMENTS

1. Implementation of Lists ,Stacks and Queues

2. Implementation of Binary Tree and Traversal Techniques

3. Implementation of Binary Search Trees

4. Implementation of AVL Trees

5. Implementation of B-trees

6. Implementation of graphs using BFS and DFS.

7. Implementation of Prim's algorithm.

8. Implementation of Kruskal's algorithm

9. Implementation of Dijkstra's algorithm

10. Implementation of Floyd's algorithm

11. Implementation of Hashing and Collision Resolution Technique.

12. Implementation of Heap

13. Implement the operations on Trie structure

TOTAL : 30 hours

U19CS306 OBJECT ORIENTED PROGRAMMING LABORATORY 0 0 4 2

COURSE OUTCOMES:

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

- Design and develop simple programs using OOPS concepts
- Apply thread and collection class for various real time applications
- Develop java program using IO streams and File class

LIST OF EXPERIMENTS

1. Develop simple programs in java using classes and methods

2. Implement user defined Exception Handling

3. Implement method overloading and method overriding in Java

4. Develop java programs using inheritance and interfaces

5. Create Threads in java using Thread Class and Runnable Interface

6. Create an application using multiple threads

7. Develop programs using inbuilt methods of String class

8. Implement collections like List, Set, Queue, Map in Java

9. Implement Input streams and Output streams in Java

10. Develop java programs to access and perform various operations in file content

11. Implement the given use case/project using various Object oriented concepts in Java

TOTAL : 30 hours

Semester-III	U19 GE301- SOFT SKILLS AND APTITUDE – I	L T P C Marks 0 0 2 1 100
Course Outcomes **At the end of the course the student will be able to:**		
1. Demonstrate capabilities in specific soft-skill areas using hands-on and/or case-study approaches		
2. Solve problems of greater intricacy in stated areas of quantitative aptitude and logical reasoning		
3. Demonstrate higher levels of verbal aptitude skills in English with regard to specific topics		
1.Soft Skills	**Demonstrating soft-skill capabilities with reference to the following topics**: a. Attitude building b. Dealing with criticism c. Innovation and creativity d. Problem solving and decision making **e.** Public speaking **f.** Group discussions	
2. Quantitative Aptitude and Logical Reasoning	**Solving problems with reference to the following topics:** a. **Vedic Maths:** Fast arithmetic, multiplications technique, Criss cross, Base technique, Square root, Cube root, Surds, Indices, Simplification. b. **Numbers:** Types, Power cycle, Divisibility, Prime factors & multiples, HCF & LCM, Remainder theorem, Unit digit, highest power. c. **Averages:** Basics of averages and weighted average. d. **Percentages**: Basics of percentage and Successive percentages. e. **Ratio and proportion:** Basics of R &P, Alligations, Mixture and Partnership. f. **Profit ,Loss and Discount**: Basic & Advanced PLD g. **Data Interpretation**: Tables, Bar diagram, Venn diagram, Line graphs, Pie charts, Caselets, Mixed varieties, Network diagram and other forms of data interpretation. h. **Syllogism:** Six set syllogism using Venn diagram and tick and cross method	
3. Verbal Aptitude	**Demonstrating English language skills with reference to the following topics:** a. Verbal analogy b. Tenses c. Prepositions d. Reading comprehension e. Choosing correct / incorrect sentences f. Describing pictures g. Error spotting	

Department of Placement Training
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Salem-636 005.

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester III under Regulations 2019
Branch: Information Technology

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1	U19MAT301D	Discrete And Combinatorial Mathematics	3	1	0	4
2	U19IT301	Data Structures	3	0	0	3
3	U19IT302	Digital Logic Design	3	0	0	3
4	U19IT303	Computer Architecture	3	0	0	3
5	U19IT304	Object Oriented Programming in C++	3	0	0	3
6	U19GE303	Mandatory Course- Essence of Indian Traditional Knowledge	2	0	0	0
Practical						
7	U19IT305	Data Structures using C++ Laboratory	0	0	4	2
8	U19IT306	Digital Logic Design Laboratory	0	0	2	1
9	U19ENG301	Communications Skill Laboratory	0	0	2	1
10	U19GE301	Soft Skills and Aptitude - I	0	0	2	1
					Total Credits	**21**

Approved By

Chairperson, Information Technology BoS
Dr.J.Akilandeswari

Member Secretary, Academic Council
Dr.R.Shivakumar

Chairperson, Academic Council & Principal
Dr.S.R.R.Senthil Kumar

Copy to:-

HOD/Information Technology, Third Semester B.Tech IT Students and Staff, COE

U19MAT301D DISCRETE AND COMBINATORIAL MATHEMATICS 3 1 0 4

COURSE OUTCOMES

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

1. Check the validity of the arguments in the field of data base and artificial intelligence using the rules of logic
2. Apply the concept of logical theory to validate the correctness of software specifications.
3. Apply the combinatorics techniques to count, enumerate, or represent possible solutions in the process of solving application problems in the field of communication networks and string searching algorithm.
4. Analyze and simplify the digital (logic) circuits using the concept of lattices.
5. Produce an output for each input in computer programming and Turing machine.

UNIT – I PROPOSITIONAL CALCULUS 12

Propositions – Logical connectives – Compound propositions – Conditional and biconditional propositions – Truth tables – Tautologies and contradictions – Contra positive – Logical equivalences and implications – DeMorgan's laws – Normal forms – Principal conjunctive and disjunctive normal forms – Rules of inference – Arguments – Validity of arguments.

UNIT – II PREDICATE CALCULUS 12

Predicates – Statement function – Variables – Free and bound variables – Quantifiers – Universe of discourse – Logical equivalences and implications for quantified statements – Theory of inference – Rules of universal specification and generalization – Validity of arguments.

UNIT – III COMBINATORICS 12

Counting principle – Sum and product rule – Pigeonhole principle – Permutations and combinations – Mathematical induction – Recurrence relation – Solution of recurrence relation using generating functions.

UNIT – IV RELATIONS AND LATTICES 12

Relations - Types of relations and their properties – Equivalence relations – Partial order relation – Equivalence Classes – Partition of a set – Matrix representation of a relation – Representation of relations by graphs – Poset – Hasse diagram – Lattices and their properties.

UNIT – V FUNCTIONS 12

Functions – Classification – Types of functions and examples – Composition of functions – Inverse functions – Characteristic function of a set - Permutation functions.

Theory: **45 Hours** Tutorial: **15 Hours** Total**: 60 Hours**

TEXT BOOKS:

1. K. H. Rosen, "Discrete Mathematics and its Applications", McGraw Hill Publishers, 8th Edition, 2019.
2. J. P. Trembly and R. Manohar, "Discrete Mathematical Structures with Applications to Computer Science", McGraw Hill Publishers, 35th Reprint, 2008.

REFERENCES:

1. T. Veerarajan, “Discrete Mathematics with Graph Theory and Combinatorics”, McGraw Hill Publishers, 19th Reprint, 2014.
2. R. P. Grimaldi, “Discrete and Combinatorial Mathematics: An Applied Introduction”, Pearson Publishers, 5th Edition, 2004.
3. https://nptel.ac.in/courses/106/106/106106094/

U19IT301 DATA STRUCTURES 3 0 0 3

COURSE OUTCOMES

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

1. Apply and implement linear data structure
2. Apply different nonlinear data structures.
3. Implement variants of different tree data structure.
4. Analyze simple algorithms and develop algorithms using hashing.
5. Develop and apply algorithms for real time applications using graph.

UNIT I LINEAR STRUCTURES 9

Abstract Data Types (ADT) - List ADT - Array-Based Implementation - Linked List Implementation - Doubly Linked Lists - Applications Of Lists - Stack ADT - Queue ADT - Circular Queue Implementation - Applications of Stacks And Queues

UNIT II TREE STRUCTURE 9

Preliminaries of Trees - Implementation of Tree ADT - Tree Traversals - Binary Tree ADT - Expression Trees - Binary Search Tree ADT - AVL Trees - Applications of Trees.

UNIT III TREE VARIANTS AND BINARY HEAP 9

Splay Trees - Splaying - B Trees - Priority Queue: Model - Simple Implementation - Binary Heap - Basic Heap Operations - Applications of Priority Queue.

UNIT IV ALGORITHM ANALYSIS & HASHING 9

Algorithm Analysis - Asymptotic Notations - Time complexity - Space complexity - Hashing -General idea - Hash Function - Separate Chaining - Open Addressing - Linear Probing - Quadratic Probing - Double Hashing - Rehashing - Extendible Hashing

UNIT V GRAPH 9

Definitions - Representation of Graphs - Traversals - Breadth First Search - Depth-first Search - Topological Sort – Shortest path Algorithms - Unweighted Shortest Paths - Dijkstra's Algorithm- Minimum Spanning Tree - Prim's and Kruskal's.

Total : 45 hours

TEXT BOOK

1. M. A. Weiss, "Data Structures and Algorithm Analysis in C++", Fourth Edition, Pearson Education, 2014.

REFERENCES

1. D.S. Malik, "Data Structures Using C++", 2nd edition , Cengage, 2012.
2. Yedidyah Langsan, Moshe J. Augenstein And Aoron M. Tanenbaum," Data Structures using C and C++", Pearson, 2006
3. Sartaj Sahni, " Data Structures, Algorithm and Application in C++", 2nd edition, Universities Press, 2005.
4. Michael T.Goodrich, R.Tamassia and Mount "Data structures and Algorithms in C++", 2nd edition, Wiley , 2016.

U19IT302 DIGITAL LOGIC DESIGN 3 0 0 3

COURSE OUTCOMES

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

1. Simplify the Boolean expression using K-Map and tabulation techniques.
2. Use Boolean simplification techniques to design a combinational circuit.
3. Analysis and Design of a given combinational digital/logic circuits.
4. Analysis and Design of a given sequential digital/logic circuits.
5. Design for Hazard free combinational and sequential circuits.

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES 9

Review of Number systems – Complements - Digital Logic gates - Basic theorems and properties of Boolean algebra - Boolean functions – Canonical and Standard forms -Simplifications of Boolean functions using Karnaugh map – three variable, Four variable and Five variable – Product of sum simplification- Don't care conditions – Quine McCluskey(QM) method.

UNIT II COMBINATIONAL LOGIC 9

Combinational circuits – Analysis and design procedures - Code conversion – Binary to Gray, Gray to Binary – BCD to Excess - 3, Excess - 3 to BCD- Circuits for arithmetic operations –Half Adder – Full Adder - Binary Adder– Half subtractor – Full subtractor – Binary subtractor- BCD adder- Binary Multiplier – Magnitude comparator.

UNIT III MSI LOGIC CIRCUITS AND PROGRAMMABLE LOGIC 9

Decoders – combinational logic implementation using decoder – Encoders- Priority encoder-Multiplexers- Boolean function Implementation using multiplexer – Demultiplexer - Programmable logic Array – Implementation of Boolean functions with PLA - Programmable Array logic. Implementation of Boolean functions with PAL.

UNIT IV SYNCHRONOUS SEQUENTIAL LOGIC 9

Sequential circuits – Flip flops – RS, JK, D, T - Analysis of clocked sequential circuits –State equations, State Table, State diagram - Analysis with D, JK and T Flip flops – State reduction and state assignment - Design procedures – Synthesis using D, JK and T – Sequence detector – Parallel counter design using flip-flops.

UNIT V HAZARDS AND FPGA LOGIC 9

Introduction- Hazards –Hazards in Combinational Circuits -Hazards in Sequential Circuits – FPGA – Basics – FPGA Vs CPLD – FPGA Architecture – Configurable Logic Block – Basic Architecture of Xilinx XC 4000 series- Design flow –Design entry – Logic Synthesis – Design implementation – Design verification – Types of FPGA based on Application .

TOTAL: 45 HOURS

TEXT BOOK

1. M.Morris Mano, Michel D. Ciletti, and John F.Walerly "Digital Design", 5th edition, Pearson Education, 2013.

REFERENCES

1. Larry L Kinney and Charles H.Roth Jr, "Fundamentals of Logic Design", 5th edition, Jaico Publishing House, 2015.
2. Ananda Natarajan, "Digital Design", PHI learning private Ltd, 2015.
3. Donald P.Leach, Albert Paul Malvino and Saha, "Digital Principles and Applications", 8th edition, TMH, 2014.
4. G.K.Kharate, "Digital Electronics", Oxford University press, 2012.
5. John F.Wakerly, "Digital Principles and practices", 4th edition, Pearson Education, 2013.

U19IT303 COMPUTER ARCHITECTURE 3 0 0 3

COURSE OUTCOMES:

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

1. Explain the processor design concepts in modern computer architecture.
2. Explain the operations and instruction sequences in a basic computer.
3. Apply the concepts of pipelining to solve performance related problems.
4. Explain the hierarchical memory system including cache memory and virtual memory.
5. Choose appropriate I/O devices for embedded system applications.

UNIT I BASIC STRUCTURE OF COMPUTERS 9

Functional units – Basic operational concepts – Bus structures – Software – Performance and metrics – Multiprocessors and Multicomputer – Memory Locations and Addresses– Instructions and instruction sequencing – Addressing modes – Fixed point and Floating point representations.

UNIT II BASIC PROCESSING UNIT 9

Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Micro programmed control: Micro Instructions- Micro Instructions with next address field.

UNIT III PIPELINING 9

Basic concepts – Data hazards – Instruction hazards – Influence on instruction sets –Data path and control considerations – Superscalar operation– Performance considerations.

UNIT IV MEMORY SYSTEM 9

Basic concepts – Semiconductor RAM – ROM – Speed Size and cost – Cache memories – performance consideration – Virtual memory – Memory management requirements – Associative memories – Secondary storage devices.

UNIT V I/O ORGANIZATION AND EMBEDDED SYSTEMS 9

I/O devices - Accessing I/O devices –Interrupts – Direct Memory Access –Interface circuits – Standard I/O Interfaces (USB, Fire wire, SCSI Bus, SATA) – Examples of Embedded Systems - Microcontroller Chips for Embedded Applications – Introduction to SoC.

TOTAL: 45 HOURS

TEXT BOOK

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky and Naraig Manjikian "Computer Organization and Embedded Systems", 6th edition, McGraw Hill Education, 2017.

REFERENCES

1. William Stallings, "Computer Organization and Architecture – Designing for Performance", 10th edition, Pearson Education, 2015.
2. David A. Patterson and John L. Hennessy, "Computer Organization and Design: The Hardware/Software interface", 5th edition, Elsevier, 2013.
3. B. Govindarajalu, "Computer Architecture and Organization: Design Principles and Applications", 2nd edition, McGraw Hill Education, 2010.

U19IT304 OBJECT ORIENTED PROGRAMMING IN C++ 3 0 0 3

COURSE OUTCOMES

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

- Explain fundamental programming concepts such as variables, conditional statements, looping constructs, and methods (procedures), inline function, friend function.
- Describe how the class mechanism supports encapsulation and information hiding
- Apply the concept of constructors, destructors and operator overloading.
- Apply templates and inheritance mechanism in applications.
- Write C++ programs for applications using files and exceptions.

UNIT I OBJECT ORIENTED CONCEPTS 9

Introduction to Object Oriented Programming and C++: Object oriented concepts and its characteristics: abstraction, encapsulation, inheritance, and polymorphism. History of C++ - Structure of C++-Applications of C++- Tokens- Keywords- Identifiers-Basic data types- Derived data types- Symbolic constants- Dynamic initialization -Reference variables- Scope resolution operator-Type modifiers- Type casting.

C++ Operators and control statements- Input and output statements- Function Prototyping-Function components- Passing parameters - call by reference, return by reference- Inline function- Default arguments - Overloaded function- Introduction to friend function.

UNIT II CLASSES AND OBJECTS, CONSTRUCTORS AND DESTRUCTORS 9

Classes and Objects: Class specification- Member function definition- Nested member function- Access qualifiers- Static data members and member functions - Instance creation- Array of objects- Dynamic objects-Static Objects- Objects as arguments- Returning objects.

Constructors and Destructors: Constructors – Parameterized constructors- Overloaded Constructors-Constructors with default arguments-Copy constructors- Dynamic constructors-Dynamic initialization using constructors- Destructors.

UNIT III OPERATOR OVERLOADING AND TEMPLATES 9

Operator Overloading: Operator function – Overloading unary and binary operator-Overloading binary operator using friend function - Type Conversion.

Generic Programming with Templates: Introduction, class templates – class templates with multiple parameters - Function templates, Function templates with multiple parameters- overloading of function templates, Member function Templates, Non-Type Template Arguments- Inheritance of class template.

UNIT IV INHERITANCE AND VIRTUAL FUNCTIONS 9

Inheritance: Defining Derived classes- Single Inheritance- Protected Data with private inheritance- Multiple Inheritance- Multi level inheritance- Hierarchical Inheritance- Hybrid Inheritance-Multipath inheritance-Virtual Base Classes- Abstract classes -Constructors in derived class- Member Classes

Virtual Function: Definition – Runtime Polymorphism – Array of pointers to base class – virtual functions - Pure virtual functions – Virtual Destructors.

UNIT V STREAMS AND EXCEPTION HANDLING 9

Streams: Streams in C++- Stream classes- Formatted and unformatted data- Manipulators- User defined manipulators- File streams-File pointer and manipulation-File open and close- Sequential and random access-Name Space.

Exception Handling: Principle of exception handling-Exception handling mechanism, multiple catch, nested try, rethrowing the exception – specifying exceptions.

Total: 45 hours

TEXT BOOK

1. Robert Lafore, "Object-Oriented Programming in C++" Pearson Education, 4 Edition, 2008.
2. K R Venugopal, Rajkumar Buyya "Mastering C++" Tata McGraw Hill, New Delhi, Second edition 2015.

REFERENCES

1. H. M. Deitel, P. J. Deitel, " C++ How to Program", Fifth Edition, Deitel & Associates, Inc.
2. Nicholas A. Solter, Scott J. Kleper, "Professional C++", 3rd Edition, Wiley Publishing,
3. Ira Pohl, "Object Oriented Programming using C++", Pearson Education, Second Edition Reprint 2004.
4. S. B. Lippman, Josee Lajoie, Barbara E. Moo, "C++ Primer", Fourth Edition, Pearson Education, 2005.
5. B. Stroustrup, "The C++ Programming language", 3rd edition, Pearson Education, 2004.
6. E. Balaguruswamy, "Object-Oriented Programming with C++" Tata McGraw Hill, New Delhi, Sixth edition 2015.

U19IT305 DATA STRUCTURES USING C++ LABORATORY 0 0 4 2

COURSE OUTCOMES

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

1. Implement the basic concept of C++ such as Polymorphism, Inheritance, Friend and virtual Function
2. Implement operations of linear and tree data structures.
3. Implement hashing and graph data structure.

LIST OF EXPERIMENTS

1. Design C++ classes with static members, methods with default argument
2. Practice of dynamic memory allocation using constructor, destructor, copy constructor.
3. Practice of C++ concepts such as polymorphism, inheritance, friend and virtual function.
4. Implement streams and exception handling concept.
5. Implementation of singly linked lists and doubly linked lists.
6. Implement stack and queue data structure using linked list
7. Implement binary search tree and B tree.
8. Implement hashing techniques.
9. Implement depth first traversal and breadth first traversal using STL.
10. Implementation of Prim's and Kruskal's algorithm using STL.

TOTAL: 60 HOURS

U19IT306 DIGITAL LOGIC DESIGN LABORATORY 0 0 2 1

COURSE OUTCOMES

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

1. Use Boolean simplification techniques to design and construct simple Boolean theorems and functions.
2. Design and implement combinational and sequential circuits.
3. Design the different functional units in a digital computer system.

LIST OF EXPERIMENTS

1. Verification of Boolean theorems using digital logic gates
2. Design and implementation of combinational circuits using basic gates for arbitrary functions.
3. Design and implementation of Binary to Gray and Gray to Binary code converters.
4. Design and implementation of Half adder / Half subtractor, Full adder / Full subtractor using basic gates.
5. Design and implementation of 4-bit binary adder / subtractor using basic gates and MSI devices.
6. Design and implementation of parity generator / checker using basic gates and MSI devices.
7. Design and implementation of magnitude comparator.
8. Design and implementation of Decoders and encoders.
9. Design and implementation of Multiplexers/Demultiplexers.
10. Design and implementation of Shift registers.
11. Design and implementation of Synchronous counters.
12. Design and implementation of Asynchronous counters.

TOTAL: 30 HOURS

Semester-III	U19 GE301- SOFT SKILLS AND APTITUDE – I	L T P C Marks 0 0 2 1 100
Course Outcomes **At the end of the course the student will be able to:**		
1. Demonstrate capabilities in specific soft-skill areas using hands-on and/or case-study approaches		
2. Solve problems of greater intricacy in stated areas of quantitative aptitude and logical reasoning		
3. Demonstrate higher levels of verbal aptitude skills in English with regard to specific topics		
1.Soft Skills	**Demonstrating soft-skill capabilities with reference to the following topics**: a. Attitude building b. Dealing with criticism c. Innovation and creativity d. Problem solving and decision making **e.** Public speaking **f.** Group discussions	
2. Quantitative Aptitude and Logical Reasoning	**Solving problems with reference to the following topics:** a. **Vedic Maths:** Fast arithmetic, multiplications technique, Criss cross, Base technique, Square root, Cube root, Surds, Indices, Simplification. b. **Numbers:** Types, Power cycle, Divisibility, Prime factors & multiples, HCF & LCM, Remainder theorem, Unit digit, highest power. c. **Averages:** Basics of averages and weighted average. d. **Percentages**: Basics of percentage and Successive percentages. e. **Ratio and proportion:** Basics of R &P, Alligations, Mixture and Partnership. f. **Profit ,Loss and Discount**: Basic & Advanced PLD g. **Data Interpretation**: Tables, Bar diagram, Venn diagram, Line graphs, Pie charts, Caselets, Mixed varieties, Network diagram and other forms of data interpretation. h. **Syllogism:** Six set syllogism using Venn diagram and tick and cross method	
3. Verbal Aptitude	**Demonstrating English language skills with reference to the following topics:** a. Verbal analogy b. Tenses c. Prepositions d. Reading comprehension e. Choosing correct / incorrect sentences f. Describing pictures g. Error spotting	

Department of Placement Training
Sona College of Technology.
Salem-636 005.

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester III under Regulations 2019
Branch: Fashion Technology

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1	U19MAT301E	Operations Research and Statistical Methods	3	1	0	4
2	U19FT301	Knitted Fabric Manufacture and Structure (lab integrated)	3	0	2	4
3	U19FT302	Chemical Processing of Textiles and Garments (Lab Integrated)	3	0	2	4
4	U19FT303	Fashion Art and Design	3	0	0	3
5	U19FT304	Pattern Making and Garment Construction - I	3	0	0	3
6	U19GE304	**Mandatory Course** : Constitution of India	2	0	0	0
Practical						
7	U19FT305	Pattern Making and Garment Construction Laboratory - I	0	0	2	1
8	U19FT306	Digital Fashion Design Laboratory	0	0	4	2
9	U19ENG301	Communication Skills Laboratory	0	0	2	1
10	U19GE301	Soft Skills and Aptitude – I	0	0	2	1
					Total Credits	**23**

Approved By

Chairman, Fashion Technology BoS	**Member Secretary, Academic Council**	**Chairperson, Academic Council & Principal**
Dr.D.Raja	**Dr.R.Shivakumar**	**Dr.S.R.R.Senthil Kumar**

Copy to:-

HOD/Fashion Technology, Third Semester B.Tech FT Students and Staff, COE

U19MAT301E OPERATIONS RESEARCH AND STATISTICAL METHODS 3 1 0 4

COURSE OUTCOMES

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

1 solve the linear programming problem using suitable methods.
2. apply the optimization technique to the transportation and assignment problems
3. analyze project management problems using critical path method and project evaluation and review technique
4. test the hypothesis for proportions, mean and standard deviation using – test
5. test the significance of the hypothesis using and distributions.

UNIT – I LINEAR PROGRAMMING PROBLEM 12

Linear programming problem - Mathematical formulation – Graphical solution method – Canonical and standard forms of Linear Programming Problem – Simplex method (using slack variables only) – Use of artificial variables – Big-M method.

UNIT – II TRANSPORTATION AND ASSIGNMENT PROBLEMS 12

Transportation problem – Initial basic feasible solution – North west corner rule – Least cost method – Vogel's approximation method – Modified distribution method – Assignment problem – Hungarian method.

UNIT – III CPM AND PERT 12

Network construction – Critical Path Method (CPM) – Computations of total, free and independent floats – Project Evaluation and Review Technique (PERT) Analysis – Computation of expected time and standard deviation

UNIT – IV TESTING OF SIGNIFICANCE FOR LARGE SAMPLES 12

Parameter and statistic – Null and alternative hypothesis – Errors in sampling, critical region and level of significance – One tailed and two tailed tests – Testing of hypothesis for proportions, mean, and standard deviation using Z – test.

UNIT – V EXACT SAMPLING DISTRIBUTIONS 12

t-test for single mean, difference between means and paired -test – X^2-tests for independence of attributes, goodness of fit – X^2 -test for population variance –F -test for variance.

Theory: 45 Hours Tutorial: 15 Hours Total: 60 Hours

Text books:

1. P. K. Gupta and D. S. Hira, "Problems in Operation Research", Sultan Chand and Sons Publishers, 4th Edition, 2015.
2. T. Veerarajan, "Probability, Statistics and Random Processes with Queueing Theory and Queueing Networks", McGraw Hill Publishers, 4th Edition (7th reprint), 2018.

Reference books:

1. H. A. Taha, "Operation Research: An Introduction", Pearson Publishers, 9th Edition, 2014.
2. P. K. Gupta and Manmohan, "Problems in Operations Research", Sultan Chand and Sons Publishers, 8 th Edition, 2003.
3. S. P. Gupta, "Statistical Methods", Sultan Chand and Sons Publishers, 15th Edition, 2012.
4. S. C. Gupta, V. K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons Publishers, 11th Edition (Reprint), 2019.
5. R. A. Johnson and C. B. Gupta, "Miller and Freund's, "Probability and Statistics for Engineers", Pearson Publishers, 9th Edition, 2018.

U19FT301 KNITTED FABRIC MANUFACTURE AND STRUCTURE (Lab Integrated) 3 0 2 4

COURSE OUTCOMES

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

1. Describe the basic terms, specifications and functions of weft and warp knitting machines.
2. Develop a clear understanding of different stitches and pattern mechanisms used for the production of weft knitted fabrics
3. Identify the different structures of the basic weft knitted structures and its derivatives
4. Identify and explain the representation of weft and warp knitted fabrics
5. Discuss the methods of production and the applications of common types of nonwoven fabrics

UNIT I Weft Knitting 10

Introduction: Introduction and basic concepts of Knitting, Principles of weft and warp knitting – comparison of weft and warp knitting

Weft Knitting: Functional Elements: Needles, Loop forming sequence, Sinkers, Cylinder, Dial, Cams, Creel, Feeder, Fabric Spreader, Take down and winding Mechanism. Machine description - Single Jersey, Rib, Purl and Interlock machine –Fully fashioned garments: socks, gloves, sweaters

UNIT II Knit Stitches, Basic weft Knit Structures and Pattern Mechanism 14

Knit stitch, float stitch, tucks stitch: Properties, Symbolic and diagrammatic representation of stitches.

Basic Weft Knitted Structures: Single Jersey, Rib, Purl and Interlock. Line, Symbolic and diagrammatic notations of basic weft knitted structures, Characteristics and application areas of basic weft knit structures.

Patterning mechanism: Pattern wheel, Pattern drum, Peg drum machine, pattern jack, computerized jacquard knitting machines, Electronic devices for needle selection

UNIT III Derivatives of Plain Jersey, Rib and Interlock Structures 14

Derivatives of plain knit: Pique, honeycomb, Lacoste, cross tuck, satin, Knitted twill, Jersey blister, Plaiting, seer sucker effect, accordion fabrics.

Derivatives of Rib knit: 2x2 Rib, 3x2 Rib, 5x1 Derby rib, Regular and irregular rib fabrics, half cardigan, Full cardigan Milano rib, Waffle, Flat back rib.

Derivatives of Purl knit: 2x2 Purl, 4x2 Purl, and Basket Purl

Derivatives of Interlock Structure: Eight lock, Ponte-di-roma, Texi-pique, Milano rib, plated structure

Striped patterns: Horizontal stripe patterns, Vertical stripe patterns, Square patterns. Fabric structure and its commercial name.

UNIT IV Warp knitting and Structures **14**

Warp knitting: Classification, Functional Elements: Overlap and Underlap, Machine elements: Needle bar, Sinker bar, Guide bar, Presser bar, Warp beam, Pattern wheel, Chain links, Latch wire, Trick plate, Knitting Cycle of Tricot and Raschel machine.

Principle stitches of warp knitting: 1 and 1 lapping – pillar or chain stitch – in lay stitch – blind stitch – 2 and 1 lapping – longer lapping – atlas stitch.

Study and representation: Full Tricot, Locknit, Reverse Locknit, Satin, Shark Skin, Queen's cord. Fabric structure and its commercial name. Application areas of warp knit structure

UNIT V Interlining Fabrics (Non-Woven Fabric) **9**

Interlining: Types (Woven, knit and non-woven) , Properties, and end uses. Non-woven Interlining: Method of non-woven fabric manufacture: Mechanical bonded, Chemical bonded, Thermal bonded, Spun bonded and Melt blown. Applications of non-woven fabrics.

Total: 75 hours (45 L + 30 P)

LIST OF EXERCISES

Analysis of KNIT FABRIC PARAMETERS: CPI, WPI, LOOP LENGTH, GSM,

YARN COUNT, FABRIC THICKNESS for the following knit samples.

Analyse the given single jersey structure and its derivatives (2 session)

1. Analyse the given rib structure and its derivatives (2 session)
2. Analyse the given interlock structure and its derivatives (2 session)
3. Analyse the given jacquard knitted structure (1 session)
4. Analyse the basic geometrical properties of knitted fabrics (1 session)
5. Experiment on Settings of machine parameters to attain different GSM of knitted fabric

TEXT BOOK

1. Anbumani N., Knitting-Fundamentals, Machines, Structures and Developments, New Age International Publishers, 2007.

REFERENCES

1. Ajgaonkar D.B., Knitted Technology, Universal Publishing Corporation, Mumbai, 1998.
2. Spencer D.J., Knitting Technology: A Comprehensive Handbook, Woodhead Publishing Limited, England, 3rd Edition, 2001.

U19FT302 CHEMICAL PROCESSING OF TEXTILES AND GARMENTS (Lab Integrated) 3 0 2 4

COURSE OUTCOMES

At the end of the study of this course the students should be able to,

1. Explain the various grey preparatory processes for woven and knitted fabrics.
2. Describe the process of dyeing of cotton with direct, reactive and vat dyes.
3. Describe the process of dyeing of Polyester and PC Blends with disperse dyes.
4. Explain various methods and styles of printing.
5. Describe the evaluation procedure of dyed and printed materials

UNIT - I Grey Preparation 9

Singeing: Objectives of singeing.

Desizing: Objectives, enzyme desizing, their relative advantages and disadvantages.

Principle and working of machines used in grey preparation: padding mangles, jigger, winch, J-box.

Scouring: Purpose and process, continuous methods of scouring.
Bleaching: Bleaching of cotton goods with hydrogen peroxide.
Mercerisation: Objective and principle of fabric mercerisation; outline of pad-less chainless fabric mercerisation.

UNIT - II Dyeing of Natural Fibres 9

Fundamentals: Classification of colorants, difference between dye and pigment, common terms used in textile colouration.
Direct dyes: Properties and classification, dyeing of cotton with direct dyes.
Reactive dyes: Properties and classification, dyeing of cotton with M and VS reactive dyes
Acid Dyes: Dyeing of silk and wool.

UNIT - III Dyeing of Polyester and PC Blends 9

Disperse dyes: Properties and classification, dyeing of polyester with disperse dyes using Jet dyeing machine and continuous methods.
Dyeing of PC Blends: Polyester/cellulosic blends dyeing by one and two bath process.
Dyeing equipment: Principles of working of soft-overflow jet dyeing machine, garment dyeing machines.

UNIT - IV Printing 9

Methods of printing: Principles of block, batik, flat-bed, rotary screen and transfer printing; study of chest printing machine for knitted goods, Digital printing.
Styles of printing: Principles of direct, discharge and resist styles of printing; printing with reactive dyes and pigments.

UNIT – V Fabric finishes, Dyeing, Printing and Quality Evaluation 9

Computer colour matching: Principles of computer colour matching system; pass/fail decision making.

Colour fastness: Assessment of colour fastness of dyed goods to washing, rubbing, light and perspiration.
Banned dyes and Chemicals.
Dyeing and Printing faults: Dyeing and printing faults.

Fabric Finishes: Basic principles of calendaring, raising, sanforising, compacting of knitted fabric and softening finish.

LIST OF EXERCISES

1. Bleaching of cotton using hydrogen peroxide. (1 session)
2. Dyeing of cotton with M brand reactive dyes. (1 session)
3. Dyeing of silk / wool with acid dyes (1 sessions)
4. Printing of fabric (Screen, block and resist) (1 session)
5. Printing of fabric (tie & dye, batik, transfer) (1 session)
6. Determination of colour fastness to washing, rubbing and light fastness. (2 sessions)
fabric – To be added in testing laboratory.

Total: 75 hours (45 L + 30 P)

TEXTBOOKS

1. Koushik C. V., and Antao Irwin Josico, "Chemical Processing of Textiles – Grey Preparation and Dyeing" – NCUTE Publication, New Delhi, 2004 (Units 1, 2 and 5)
2. Shenai V. A., "Technology of Finishing", Sevak Publications, Mumbai, 1995, Nitra, "Pollution Control in Textile"
3. D G Dugg and S Sinclair, "Giles's Laboratory Course in Dyeing", Woodhead Publishing Limited (Fourth edition) December 1989

REFERENCES

1. Shenai V. A., "Technology of Textile Processing – Vol. III, IV, V, VII and VIII", Sevak Publications, Mumbai, 1995
2. Palmer John W., "Textile Processing and Finishing Aids: Recent Advances", Mahajan Book Distributors, 1996
3. Ronald James W., "Printing and Dyeing of Fabrics and Plastics", Mahajan Book Distributors, 1996
4. Sivaramakrishnan C. N. " A compilation of 10 papers", Colorage
5. L. W. C Wiles, "Textile Printing", Merrow Monographs. Textile Technology.

U19FT303 FASHION ART AND DESIGN 3 0 0 3

COURSE OUTCOMES:

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

1. Classify and define the fashion, art and design related terms.
2. Describe different types of fashion and life cycles of fashion.
3. Design the elements and principles of the design, with the effects in the apparel.
4. Stretch an account of the various concepts of colour theory and the applications of colours.
5. Develop a theme and prepare a portfolio.

UNIT I INTRODUCTION TO FASHION ART DESIGN 9

Definition: Fashion, Art, Design, Costume and Clothing

Origin and history: Fashion, Art, Design, Clothing and costumes; Importance of Clothing; Types of clothing, Factors to be considered in the selection of clothing.

UNIT II CLASSIFICATION AND TYPES OF FASHION 9

Nature of Fashion: Principles of Fashion, Classification of fashion

Movements on Fashion: Fashion cycle, Stages of fashion cycle, Length of fashion cycle business of fashion, theories of Fashion; Fashion trends, Boutique, Haute Couture

Study of leading fashion designers: French, Italian, American, Indian and English, Role of Fashion Designers, Types of designers

UNIT III ELEMENTS OF DESIGN 9

Introduction: Garment Design**:** structural t design and decorative t design

Elements of design: Line, Size, Shape, Texture, Form, Colour and light - effects of elements in the apparel. Silhouettes, types and their application

Principles of Design: Introduction to principles of designs - Balance, Proportion, Emphasis, Rhythm, Harmony. Illusion effects, Principles on functionality and aesthetics

UNIT IV COLOUR 9

Colour Theories: Primary, secondary, tertiary, intermediate colours

Color Scheme: colour contrast and colour harmony

Dimensions of colours: Hue, Value and intensity, Warm and cool colours, psychology of colours, application of colours to different components and seasons.

UNIT V PORTFOLIO DEVELOPMENT 9

Fashion Illustration: Illustration techniques, strokes, hatching, shading.

Colouring techniques: Media for colouring, Rendering techniques for different fabrics (Plain, Chambrey, Satin, Denim, Velvette, Fur).
Portfolio presentation: Designer boards, Mood board, Fabric board, Colour board, Illustration board, accessory board practicalities and style of presentation,.

Total: 45 Hours

TEXT BOOKS

1. Marian L Davis, "**Visual Design and Dress**", Third edition, Prentice Hall, New Jersey, 1996.
2. Elaine Stone, "**Fashion Merchandising – An Introduction**", McGraw-Hill 5th Edition, 1990

REFERENCES

1. Anderson B and Anderson C, "**Costume Design**", Harcourt Brace Second Edition, 1990.
2. Caroline Tatham and Julian Seaman, "**Fashion Designing and Drawing course**" Thames and
Hudson Publishers, 2003.
3. HarroldCarr,"**Fashion Design and Product Development**" John Wiley and Sons Inc. NewYork,1992.
4. Ralph Lauren, **"In His Own Fashion"**, Alan Flusser 2019.

U19FT304 PATTERN MAKING AND GARMENT CONSTRUCTION - I 3 0 0 3

COURSE OUTCOMES

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

1. Describe the various pattern making tools in the workroom and the measuring techniques
2. Explain the method of drafting basic body slopers and types of fullness
3. Explain the various types of seams, seam finishes, stitches and sewing threads
4. Describe the pattern drafting and construction procedure for different types sleeves and collars
5. Explain the types and techniques involved in the construction of garment closures

Unit -I Measurements and Workroom Practices 8

Flow process chart of garment manufacturing.

Pattern: Definition, Importance, Types: basic pattern, working pattern and production pattern

Pattern making: Definition, Techniques: drafting and draping, Merits and demerits. Pattern making tools and workroom terms and definitions. Types: Industrial and bespoke patterns.

Figure analysis: Head theory: Seven and Half and Eight.

Measuring techniques: Introduction; Standard Measurement charts for male, female and kids, Body measurements: circumference measurement, Vertical measurements and horizontal measurements.

Unit -II Block preparation and Fullness 10

Drafting of basic bodice, Skirt blocks and sleeve

Fullness: Definition types, Darts–single, Double, Pointed darts, Tucks- pin tucks, Cross tucks, Piped tucks, Shell tucks, Pleats,- knife pleats, Box pleats, Invertible box pleats, Kick pleats, Flare, Godets, Gathers, Shirrings, Single and Double frills. **Dart manipulation:** Pivotal method, Slash and spread method, designing with fullness.

Unit III Seams and Stitches 9

Seams: Definition, Federal classification of seams, Seam quality, Seam performance, Factors to be considered in the selection of Seam, Seam finishes.

Stitches: Definition, Federal classification of Stitches, Stitch parameters, Factors to be considered in the selection of stitches.

Sewing thread: Selection of sewing thread for woven and knitted garments.

Unit -IV Sleeves and Collars 10

Sleeves: Drafting and construction of Set–in–sleeves: Plain, Puff, Bell, Circular and Leg-o-mutton; Sleeves combined with bodice: Kimono and Raglan.

Collars: Drafting and construction of Convertible, Shirt, Mandarin, Peter pan, Sailor, Shawl and Notch collar.

Unit V **Fasteners** **8**

Introduction and construction techniques of garment closures: Applications of zippers, Types of button and button holes and their applications, Types and applications of hooks and eye snaps; Velcro, Eyelets, Cords.

Total: 45 hours

TEXT BOOKS

1. Halen Josep Armstrong "**Pattern Making for Fashion Design"** 5 th Edition, Pretence Hall, New Jercey , 2014.
2. Marie Clayton, **"Ultimate Sewing Bible – A Complete Reference with Step-by-Step Techniques",** Collins & Brown, London, 2008.
3. Claire Schaeffer, "**The Complete Book of Sewing Shortcuts**", Sterling Publishing (NY), 2009.

REFERENCE BOOKS

1. Winifred Aldrich, "**Pattern Cutting for Menswear**", 4th edition, Blackwell Science Publisher, USA, 2006.
2. Winifred Aldrich, "**Metric Pattern Cutting**", Blackwell Publishing, , 2008.
3. Claire Shaeffer, "**Sewing for Apparel Industry**", Prentice Hall, 2000.
4. Cooklin Gerry, "**Garment Technology for Fashion Designers**", Blackwell Science Ltd., 1997.
5. Laing, Webster J "**Stitches and Seams**" Woodhead Publishing Ltd., 1998.
6. Leila Aitken, "**Step by Step Dress Making Course**", BBC Books, 1992.

U19FT305 PATTERN MAKING AND GARMENT CONSTRUCTION LABORATORY - I **0 0 2 1**

COURSE OUTCOMES

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

1. Draft and construct samples for basic blocks, seam and seam finishes and fullness.
2. Draft and construct samples for sleeves and collars.
3. Solve real time problem related to pattern making and construction of blocks, seams, fullness, sleeves and collars.

List of Experiments

Drafting and construction of following components

1. **Bodice blocks, Skirt blocks and sleeve block** (2 sessions)
2. **Seam and Seam Finishes** (1 session)
3. **Fullness:** Darts, Tucks and Pleats (1 session)
4. **Sleeves:** Plain, Puff and Raglan (1 session)
5. **Collars:** Shirt, Peter pan, Sailor and Shawl (1 session)

Total: 30 hours

U19FT306 DIGITAL FASHION DESING LABORATORY 0 0 4 2

COURSE OUTCOMES

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

1. Develop the basic creative and manipulative skills necessary for fashion design through various shading techniques and Sketching various elements and principles of designing and Draw fashion figures and visually communicate apparel design details, understanding of the color theory using various color schemes and Illustrate different styles of garment components and reproduce it to fit fashion figures
2. Develop basic fashion figure models and design various fashion designs using software
3. Illustrate different fashion figures incorporating all the illustrating techniques and designing high end fashion garments

LIST OF EXPERIMENTS

Manual Practice

1. Illustration of lines and strokes using pencil shading techniques; lettering and numbering styles
2. Illustration of human body shapes (Indian and International standards)
3. Illustration of human face
4. Illustration of different postures of human head, hand, leg and feet
5. Illustration of different hair styles
6. Sketching of lay figure using head theory
7. Preparation of Prang's colour wheel
8. Preparation of different colour schemes
9. Rendering different fabric textures

Digital Practice

10. Illustration of sleeves, cuffs, necklines, skirts, pockets, trousers, and skirt tops
11. Illustration of elements and principles of design
12. Draping of garments for men, women and kids on fashion figure
13. Designing of accessories for men, women and kids.
14. Development of flat sketches for men, women and kids.
15. Development of technical pack.

Total: 60 hours

Semester-III	U19 GE301- SOFT SKILLS AND APTITUDE – I	L T P C Marks 0 0 2 1 100
Course Outcomes **At the end of the course the student will be able to:**		
1. Demonstrate capabilities in specific soft-skill areas using hands-on and/or case-study approaches		
2. Solve problems of greater intricacy in stated areas of quantitative aptitude and logical reasoning		
3. Demonstrate higher levels of verbal aptitude skills in English with regard to specific topics		
1.Soft Skills	**Demonstrating soft-skill capabilities with reference to the following topics**: a. Attitude building b. Dealing with criticism c. Innovation and creativity d. Problem solving and decision making **e.** Public speaking **f.** Group discussions	
2. Quantitative Aptitude and Logical Reasoning	**Solving problems with reference to the following topics:** a. **Vedic Maths:** Fast arithmetic, multiplications technique, Criss cross, Base technique, Square root, Cube root, Surds, Indices, Simplification. b. **Numbers:** Types, Power cycle, Divisibility, Prime factors & multiples, HCF & LCM, Remainder theorem, Unit digit, highest power. c. **Averages:** Basics of averages and weighted average. d. **Percentages**: Basics of percentage and Successive percentages. e. **Ratio and proportion:** Basics of R &P, Alligations, Mixture and Partnership. f. **Profit ,Loss and Discount**: Basic & Advanced PLD g. **Data Interpretation**: Tables, Bar diagram, Venn diagram, Line graphs, Pie charts, Caselets, Mixed varieties, Network diagram and other forms of data interpretation. h. **Syllogism:** Six set syllogism using Venn diagram and tick and cross method	
3. Verbal Aptitude	**Demonstrating English language skills with reference to the following topics:** a. Verbal analogy b. Tenses c. Prepositions d. Reading comprehension e. Choosing correct / incorrect sentences f. Describing pictures g. Error spotting	

Department of Placement Training
Sona College of Technology.
Salem-636 005.

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester III under Regulations 2019
Branch: Mechatronics Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1	U19MC301	Fluid Mechanics and Machinery	3	0	0	3
2	U19MC302	Strength of Materials	3	0	0	3
3	U19MC303	Manufacturing Technology	3	0	0	3
4	U19MC304	Electrical Drives and Control	3	0	0	3
5	U19MC305	Digital Electronics	3	0	0	3
6	U19GE304	**Mandatory course:** Constitution of India	2	0	0	0
Practical						
7	U19MC306	Fluid Mechanics and Strength of Materials Laboratory	0	0	4	2
8	U19MC307	Manufacturing Technology Laboratory	0	0	3	1.5
9	U19MC308	Electrical Drives and Control Laboratory	0	0	3	1.5
10	U19GE301	Soft Skill and Aptitude – I	0	0	2	1
					Total Credits	**21**

Approved By

Chairman, Fashion Technology BoS	**Member Secretary, Academic Council**	**Chairperson, Academic Council & Principal**
Dr.P.Suresh	**Dr.R.Shivakumar**	**Dr.S.R.R.Senthil Kumar**

Copy to:-

HOD/ Mechatronics Engineering, Third Semester BE MCT Students and Staff, COE

U19MC301	FLUID MECHANICS AND MACHINERY	L	T	P	C
		3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1:	Apply mathematical knowledge to predict the properties of fluid and analyse the pressure measurement.
CO2:	Evaluate the fluid flow problems using continuity equation and Bernoulli's equation with their applications. Distinguish laminar and turbulent flow through circular pipes.
CO3:	Perform the dimensional analysis by using Buckingham's ∏ theorem.
CO4:	Analyze the performances of the hydraulic turbines.
CO5:	Describe the working principle of centrifugal pumps & reciprocating pumps and analyze their performances.

Pre-requisite

1. Engineering Physics
2. Transforms & Partial differential equations

CO/PO, PSO Mapping

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	2	1	1				1			3	2
CO2	3	3	2	2		2				1			3	2
CO3	3	3	3	2	1	1				1			3	2
CO4	3	3	3	2		2	1	1		1		1	3	2
CO5	3	3	3	2		2	1	1		1		1	3	2

Course Assessment methods

Direct		Indirect
Internal test I (8) Internal test II (8) Internal test III (8) Moodle (6)	Assignment/Seminar (5) Attendance (5) End semester Examination (60)	Course end survey

Unit 01: FLUID PROPERTIES AND PRESSURE MEASUREMENT — **09 Hours**

Units & Dimensions. Properties of fluids – mass density, specific weight, specific volume, viscosity, capillarity and surface tension, compressibility, vapor pressure and cavitation. Pressure Measurement- Pascal law-measurement of pressure through simple and differential manometers

Unit 02: FLOW CHARACTERISTICS AND FLOW THROUGH PIPES — **09 Hours**

Types of fluid flow- application of continuity equation, Euler's equation-Bernoulli's equation-Orifice meter, Venturi meter.

Boundary layer concept-Laminar flow though circular pipes -Hagen-Poiseuille equation- Turbulent flow though circular pipes- Darcy Weisbach equation –friction factor-Energy losses in flow through pipes (description only)-Power transmission through pipes.

Unit 03: DIMENSIONAL ANALYSIS — **09 Hours**

Need for dimensional analysis – methods of dimensional analysis – Buckingham's ∏ theorem, Dimensionless parameters- application of dimensionless parameters. Models and Similitude.

Unit 04: HYDRAULIC TURBINES	**09 Hours**
Turbines: definition and classification – impulse and reaction- Pelton turbine - Francis turbine - Kaplan turbine - working principles - velocity triangles - work done - efficiencies and performance calculations-specific speed.	
Unit 05: HYDRAULIC PUMPS	**09 Hours**
Pumps: Definition and classifications. Centrifugal pump- working principle, velocity triangle, head and efficiencies, performance calculations. Reciprocating pump – classification, working principle-performance calculations, function of air vessel-Rotary pumps- gear and vane pump- working principle.	

Theory: 45Hrs	**Tutorial: -**	**Total Hours: 45 Hrs**

Text Books

1. Bansal, R.K., Fluid Mechanics and Hydraulics Machines, (9th edition), Laxmi publications (P) Ltd, New Delhi, 2015

REFERENCES

1. Sukumar Pati., "Fluid Mechanics and Hydraulics Machines", Tata McGraw Hill publications (P) Ltd, New Delhi, 2012.
2. C.S.P.Ojha, R.Berndtsson, P.N.Chandramouli., Fluid Mechanics and Machinery, Oxford University Press, New Delhi, 2010.
3. Modi P.N. and Seth, S.M. "Hydraulics and Fluid Mechanics", Standard Book House, New Delhi 2004
4. Streeter, V. L. and Wylie E. B., "Fluid Mechanics", McGraw Hill Publishing Co. 2010
5. Ramamritham. S, Fluid Mechanics, Hydraulics and Fluid Machines, Dhanpat Rai & Sons, Delhi, 2011

U19MC302	STRENGTH OF MATERIALS	L	T	P	C
		3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1:	Analyse the state of stresses and strains in engineering components as a result of different loading conditions in the machine members and structures.
CO2:	Investigate the effect of various loading combinations by determining the principal stresses, principal planes and maximum shear stress u on machine and structural parts using Mohr's circle.
CO3:	Apply the principles and equations, necessary tools to analyze structural members under axial loads, bending, shear, and torsion.
CO4:	Evaluate the material behaviour under pure torsion on circular shafts.
CO5:	Design the structural beams, columns, long mechanical members under compression and different loading condition.

Pre-requisite

1.Engineering Mechanics

CO/PO, PSO Mapping

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	1	2				1			3	2
CO2	3	3	3	2	1	2				1			3	2
CO3	3	3	3	2	1	2	1	1		1		1	3	2
CO4	3	3	3	2	1	2	1			1			3	2
CO5	3	3	3	2	1	2	1	1		1		1	3	2

Course Assessment methods

Direct		Indirect
Internal test I (8) Internal test II (8) Internal test III (8) Moodle (6)	Assignment/Seminar (5) Attendance (5) End semester Examination (60)	Course end survey

Unit 01: Stress, Strain and Deformation of Solids	**09 Hours**

Simple stress and strain – Stresses and strains due to axial force - Mechanical properties of materials – Stress-strain curve –- Hooke's law - Factor of safety – Stepped shafts – Uniformly varying sections – Stresses in composite sections - Temperature stresses – Poisson's ratio - shear modulus, bulk modulus, relationship between elastic constants.

Unit 02: Analysis of Stresses in Two Dimensions	**09 Hours**

State of stresses at a point – Normal and tangential stresses on inclined planes - Principal planes and stresses – Plane of maximum shear stress - Mohr's circle for biaxial stresses –Hoop and longitudinal stresses in thin cylinders and shells – under internal pressure – deformation of thin cylinders and shells.

Unit 03: Beams - Loads and Stresses	**09 Hours**
Beams – types of supports – simple and fixed, types of load – concentrated, uniformly distributed, varying distributed load, combination of above loading – relationship between bending moment and shear force – bending moment, shear force diagram for simply supported, cantilever and over hanging beams – Point of contra flexure. Introduction to Theory of simple bending.	
Unit 04: Torsion in Shafts and springs	**09 Hours**
Analysis of torsion of circular bars – Shear stress distribution – Bars of Solid and hollow circular section – Stepped shaft – Twist and torsion stiffness – Compound shafts Springs: Classification – Leaf springs, closed coil helical springs - Application of various springs – Maximum shear stress in spring – Deflection of helical coil springs under axial loads.	
Unit 05: columns and Deflection of Beams	**09 Hours**
Columns: Buckling of long columns due to axial load - Equivalent length of a column – Euler's and Rankine's formulae for columns of different end conditions – Slenderness ratio Deflection of beams – double integration method – Macaulay's method – slope and deflection using moment area method.	

Theory: 45 Hrs	**Tutorial: -**	**Total Hours: 45 Hrs**

Text Books

1. R K Bansal, "A text book of Strength of Materials", Lakshmi Publications (P) Limited, New Delhi, 2007.
2. R K Rajput, "Strength of Materials", S Chand & Co., New Delhi, 2006.

REFERENCES

1. Nash W.A, "Theory and problems in Strength of Materials", Schaum Outline Series, McGraw-Hill Book Co, New York, 1995.
2. Singh D.K "Mechanics of Solids" Pearson Education 2002.
3. Ryder G.H, "Strength of Materials", Macmillan India Ltd., Third Edition, 2002.
4. Popov E.P, "Engineering Mechanics of Solids", Prentice-Hall of India, New Delhi, 1997.

U19MC303	MANUFACTURING TECHNOLOGY	L	T	P	C
		3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1:	Elaborate the sand casting, pattern materials and welding, different welding processes.
CO2:	Describe the various bulk deformation processes, different sheet metal operations and shaping of plastics using different moulding methods.
CO3:	Identify the cutting tool materials and its specific purpose and explain about lathe details, main dissimilarity of capstan and turret lathes.
CO4:	Illustrate the principle of reciprocating machine tools.
CO5:	Explain the working principle of milling and grinding processes.

Pre-requisite

1. Engineering Physics

CO/PO, PSO Mapping

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	1	1	2	1	1		1		1	3	2
CO2	3	3	3	1	1	2	1	1		1		1	3	2
CO3	3	3	3	2	1	2	1	1		1		1	3	2
CO4	3	3	3	2	1	2	1	1		1		1	3	2
CO5	3	3	3	2	1	2	1	1		1		1	3	2

Course Assessment methods

Direct		Indirect
Internal test I (8) Internal test II (8) Internal test III (8) Moodle (6)	Assignment/Seminar (5) Attendance (5) End semester Examination (60)	Course end survey

Unit 01: METAL CASTING AND METAL JOINING PROCESS	**09 Hours**

Sand Casting- Moulding Tools- Types of Patterns- Pattern Materials- Moulding Sand- Properties- Melting Furnaces: Cupola, Crucible and Electric arc furnace- Special Casting Process: Shell, Investment Casting - Lost Wax Process- Gas welding- Arc welding -TIG welding- MIG welding.

Unit 02: SHEET METAL AND PLASTIC COMPONENTS	**09 Hours**

Drawing Process: Wire drawing, Tube drawing, Metal Spinning, Rolling: Type of rolling mills- Extrusion: Principles of Extrusion – Types – Hot and Cold extrusion, Sheet metal: Rubber pad forming- Explosive forming. Moulding of thermoplastics- injection moulding- blow moulding – Rotational moulding

Unit 03: CENTRE LATHE	**09 Hours**

Centre lathe: constructional features- various operations, tool and work holding devices- taper turning methods, thread cutting, special attachments. Special Purpose Lathe: Capstan and turret lathes – automats – single spindle- Swiss type- automatic screw type, multi spindle, Bar feed mechanism

Unit 04: SPECIAL MACHINE TOOLS	**09 Hours**
Construction, Types, Operations and mechanisms of Shaper, Planner and Slotter. Hole making: drilling – Reaming, Boring- Tapping operations. Broaching machines: broach construction – push, pull, surface and continuous broaching machines.	
Unit 05: MILLING AND GEAR PROCESS	**09 Hours**
Milling operations-types of milling cutter. Gear cutting – forming and generation principle and construction of gear milling, hobbing and gear shaping processes –finishing of gears. Grinding: types of grinding process- types of grinding wheel – Abrasives - cylindrical grinding, surface grinding, centreless grinding – honing, lapping and buffing.	

Theory: 45Hrs	**Tutorial: -**	**Total Hours: 45 Hrs**

Text Books

1. Hajra Choudhury, "Elements of Workshop Technology, Vol. I and II", Media promoters Pvt Ltd., Mumbai, 2001.
2. Mikell P Groover, " Principles of Modern Manufacturing" Wiley India Pvt Ltd. 2014.

REFERENCES

1. B.S. Magendran parashar & R.K. Mittal, "Elements of Manufacturing Processes", Prentice Hall of India, 2003.
2. P.N. Rao, Manufacturing Technology", Tata McGraw-Hill Publishing Limited, II Edition, 2002.
3. J.P .Kaushish "Manufacturing Processes" PHI Learning Private limited, second edition 2010.
4. P. C. Sharma, "A text book of production technology", S. Chand and company, IV Edition, 2003.
5. Begma, 'Manufacturing process", John Wilely & sons, VII Edition, 2005.
6. Serope Kalpajian, Steven R.Schmid, Manufacturing Engineering and Technology, Pearson Education, Inc. 2002 (Second Indian Reprint)
7. Beddoes. J and Bibby M.J. 'Principles of Metal Manufacturing Processes', Elsevier, 2006.
8. Rajput R.K, 'A text book of Manufacturing Technology', Lakshmi Publications, 2007.

U19MC304	ELECTRICAL DRIVES AND CONTROL	L	T	P	C
		3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1:	To learn the General characteristics of different types of electrical AC & DC Motors with respect to the applications.
CO2:	Explain the nature of speed torque characteristic of various types of loads and drive motor
CO3:	Describe the different starting methods of AC & DC motors.
CO4:	Explain various solid-state speed controls of single and three phase DC drives.
CO5:	Explain the working of various 3 phase induction motor drives for precise variable speed control.

Pre-requisite

1. Basic Electrical Engineering

CO/PO, PSO Mapping

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	3	3	3	2	1	1	2	1	1	2			3	2
CO2	3	3	3	2	1	1	2	1	1	2			3	2
CO3	3	3	3	2	1	1	2	1	1	2			3	2
CO4	3	3	3	2	1	1	2	1	1	2			3	2
CO5	3	3	3	2	1	1	2	1	1	2			3	2

Course Assessment methods

Direct		Indirect
Internal test I (8) Internal test II (8) Internal test III (8) Moodle (6)	Assignment/Seminar (5) Attendance (5) End semester Examination (60)	Course end survey

Unit 01: INTRODUCTION OF ELECTRIC DRIVES — **9 Hours**

Basic Elements – Types of Electric Drives – factors influencing the choice of electrical drives – heating and cooling curves – Loading conditions and classes of duty – Selection of power rating for drive motors with regard to thermal overloading and Load variation factors. Drive consideration for Textile mills, Steel rolling mills, Cement mills, Paper mills

Unit 02: Starting and speed Control of Drives — **9 Hours**

Types of D.C Motor starters – Braking of Electrical motors –Induction Motor starters- Speed control of DC series and shunt motors – Armature and field control, Ward- Leonard control system applications. Conventional Speed Control of Induction Motors: Stator Voltage Control, Stator Frequency Control, Rotor Resistance Control.

Unit 03: CONVENTIONAL AND SOLID-STATE SPEED CONTROL OF DC DRIVES — **9 Hours**

Single Phase and Three Phase Fully Controlled Converter: Principle of operation and waveforms of single phase and three phase fully controlled converter fed DC drive – Choppers Fed DC Motor Drive – Applications.

Unit 04: CONVENTIONAL AND SOLID-STATE SPEED CONTROL OF AC DRIVES — **9 Hours**

Speed control of three phase induction motor-Voltage control, Voltage/ frequency control, Slip power recovery scheme- VSI fed Three Phase Induction Motors–CSI Fed Three Phase Induction Motors- and AC voltage regulators-Applications.

Unit 05: SPECIAL MOTOR DRIVES			9 Hours
Speed control of Stepper motors – Permanent magnet, Variable reluctance, Single and multi-stack configurations, Hybrid motor. Speed control of Switched reluctance motor – AC & DC Servo motors – Brushless DC motors			
Theory: 45 Hrs	**Tutorial: --**	**Practical: -- Hr**	**Total Hours: 45 Hrs**
Text Books			
1. U.A.Bakshi, M.V.Bakshi, "Electrical Drives and Control", Technical Publications, 2009.			
2. G.K dubey , "Fundamentals of Electrical Drives ",Narosa Publishing House, New Delhi ,2 nd Edition, 2001			
REFERENCES			
1. M. D. Singh, "Power electronics", Tata McGraw-Hill Education, 2011.			
2. Bimbhra, P.S., "Power Electronics", Second edition, Khanna Publishers, New Delhi 5 th Edition, 2015.			
3. P.C.Sen "Principles of Electric Machines and Power Electronics" John Wiley & Sons, 2007.			
4. VEDAM SUBRAMANIAM "Electric drives", Tata McGraw-Hill.2001.			

U19MC305	DIGITAL ELECTRONICS	L	T	P	C
		3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1:	Discuss the different number systems, error correcting codes and implement Boolean functions using logic gates
CO2:	Design and analyse the combinational logic circuits
CO3:	Design and analyse synchronous sequential circuits using flip flops
CO4:	Design and implement various logic functions using ROM, PLA and PAL
CO5:	Discuss the different types of basic electronics circuits.

Pre-requisite

Physics for Electron devices

CO/PO, PSO Mapping

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO 7**	**PO 8**	**P0 9**	**PO 10**	**PO 11**	**PO 12**	**PSO 1**	**PSO 2**
CO1	3	3	3	2	2				2				3	2
CO2	3	3	3	2	2				2				3	2
CO3	3	2	3	2	2				2				3	2
CO4	3	3	3	2	2				2				3	2
CO5	3	3	3	2	2				2				3	2

Course Assessment methods

Direct		Indirect
Internal test I (8) Internal test II (8) Internal test III (8) Moodle (6)	Assignment/Seminar (5) Attendance (5) End semester Examination (60)	Course end survey

Unit 01: BINARY SYSTEMS AND BOOLEAN ALGEBRA — **09 Hours**

Number systems – Base conversion – Binary codes – Parity and hamming code – Logic gates – Boolean laws and theorems – Minimization of Boolean expressions – SOP and POS forms, minterms and maxterms – Karnaugh map minimization (up to 5 variables) – Realization of circuits using logic gates.

Unit 02: COMBINATIONAL CIRCUITS — **09 Hours**

Design of Half and Full Adder, Half and Full Subtractor, Parallel Adder / Subtractor, Comparator, Parity generator and checker – Priority Encoder, Decoder, Demultiplexer and Multiplexer – Implementation of combinational logic circuits using decoder, de-multiplexer and multiplexer.

Unit 03: **DESIGN OF SYNCHRONOUS SEQUENTIAL CIRCUITS** — **09 Hours**

Flip flops – SR, JK, D and T – Master-Slave flip-flop – Realization of one flip flop using other flip flops – Analysis and Design of synchronous sequential circuits – Asynchronous Up / Down counter – Design of synchronous counters – Shift registers.

Unit 04: **MEMORIES AND PLDs** — **09 Hours**

Classification of memories – Random Access Memory (RAM) – Read Only Memory (ROM) – Memory decoding– Programmable Array Logic (PAL) – Programmable Logic Array (PLA) – Field Programmable Gate Arrays (FPGA) – Implementation of logic functions with PROM, PLA and PAL.

Unit 05: DIGITAL CIRCUIT APPLICATIONS — **09 Hours**

Digital to analog and Analog to digital convertors – R-2R Ladder and Successive approximation techniques – Multivibrators – Logic gates in timing circuits – Operational amplifier – Schmitt trigger – 555 timer – Introduction to Arduino and Raspberry Pi boards.

Theory: 45 Hours	Tutorial: -	Total Hours: 45 Hours

TEXT BOOKS
M. Morris Mano and Michael D. Ciletti, "Digital Design: With an Introduction to the Verilog HDL, VHDL, and System Verilog", Pearson Education, 6th edition, 2018.
D.P. Kothari and J.S. Dhillon, "Digital Circuits and Design", Pearson Education, 2015.
REFERENCES
A. Anand Kumar, "Fundamentals of Digital Circuits", PHI India, 4th edition, 2016.
Charles H.Roth and Larry L. Kinney "Fundamentals of Logic Design", 7th Edition, Cengage Learning, 2014.
Donald D. Givone, "Digital Principles and Design", McGraw Hill Education, 2016

U19MC306	FLUID MECHANICS AND STRENGTH OF MATERIALS LABORATORY	L	T	P	C
		0	0	4	2

Course Outcomes

After successful completion of this course, the students should be able to

CO1:	Understand the working principles of flow measuring instruments, determine the Coefficient of discharge of orifice/venturi meters and evaluate the fluid machines performance.
CO2:	Investigate the mechanical properties of materials.
CO3:	Evaluate the real time problems in the fluid flow and material strength analysis.

Pre-requisite

Engineering Physics

CO/PO, PSO Mapping

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	2	2			1	3	2	1	2	3	2
CO2	3	3	3	2	2			1	3	2	1	2	3	2
CO3	3	3	3	2				1	3	2			3	2

Course Assessment methods

Direct		Indirect
CIE TEST-I (20) Quiz-I (5) CIE TEST-II (20) Quiz-II (5)	RTPS (10) End semester Examination (40)	Course end survey

List of Experiments

Part-A: Fluid Mechanics laboratory

1. Determination of the Coefficient of discharge of given Orifice meter / Venturi meter.
2. Conducting experiments and drawing the characteristic curves of centrifugal pump / submersible pump
3. Conducting experiments and drawing the characteristic curves of reciprocating pump / Gear pump.
4. Conducting experiments and drawing the characteristic curves of Pelton wheel.
5. Conducting experiments and drawing the characteristics curves of Francis turbine.
6. Conducting experiments and drawing the characteristic curves of Kaplan turbine.

Part-B: Strength of Materials laboratory

1. Tension Test on MS Steel.
2. Compression test – MS Steel.
3. Double shear test in UTM.
4. Tests on spring – Tension and Compression.
5. Hardness test on various machines.
6. Impact test – Charpy and Izod.

Total Hours: 60 Hrs

U19MC307	MANUFACTURING TECHNOLOGY LABORATORY	L	T	P	C
		0	0	3	1.5

Course Outcomes

After successful completion of this course, the students should be able to

CO1:	Demonstrate the working of general purpose machine tools and do turning process for a given job
CO2:	Work on drilling machine and make drilling on steel plate.
CO3:	Perform an ARC welding equipment and make various joints

Pre-requisite

1. Workshop practice laboratory

CO/PO, PSO Mapping

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	3	3						2			3	2
CO2	3	3	3	3						2			3	2
CO3	3	3	3	3						2			3	2

Course Assessment methods

Direct		Indirect
CIE TEST-I (20) Quiz-I (5) CIE TEST-II (20) Quiz-II (5)	RTPS (10) End semester Examination (40)	Course end survey

List of Experiments

1. Exercise on simple facing & Turning.
2. Exercise on Step turning.
3. Exercise on taper turning.
4. Exercise on thread cutting operation.
5. Exercise on Knurling and Grooving.
6. Exercise on Drilling, Boring and Chamfering.
7. Exercise on radial drilling (Drilling, Tapping, Reaming and Counter Sink).
8. Exercise on surface machining using shaper.
9. Exercise on Gear milling.
10. Exercise on cylindrical grinding.

Total Hours: 45 Hrs

U19MC308	ELECTRICAL DRIVES AND CONTROL LABORATORY	L	T	P	C
		0	0	3	1.5

Course Outcomes

After successful completion of this course, the students should be able to

CO1:	Understand the concept of starters and starting of motor and experiment the Controlling of DC and AC motors.
CO2:	Test the motors and generators and draw the speed torque performance curves. Discuss the Speed and torque control of DC motors and AC motors.
CO3:	Give the solution for real time problems in electrical machines.

Pre-requisite

1.Basic Electrical Engineering Laboratory

CO/PO, PSO Mapping

(3/2/1 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

COs	Programme Outcomes (POs) and Programme Specific Outcome (PSOs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	P09	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	3	3	3	3						2			3	2
CO2	3	3	3	3						2			3	2
CO3	3	3	3	3						2			3	2

Course Assessment methods

Direct		Indirect
CIE TEST-I (20) Quiz-I (5) CIE TEST-II (20) Quiz-II (5)	RTPS (10) End semester Examination (40)	Course end survey

List of Experiments

1. Speed control of DC shunt motor (Armature, Field control).
2. Study of V/f control operation of induction motor drive.
3. Speed control of three phase slip ring Induction Motor.
4. Speed control of chopper-controlled DC series motor.
5. Speed control of Chopper controlled DC shunt motor.
6. Speed control of PWM inverter-based induction motor drive.
7. PLC based Speed control of induction motor.
8. Speed control steeper motor.
9. DSP controller-based speed control of induction motor drive.
10. Speed control of controlled rectifier-based DC motor drive.
11. Speed control of Brushless Dc Motor.

Total Hours: 45 Hrs

Semester-III	U19 GE301- SOFT SKILLS AND APTITUDE – I	L T P C Marks 0 0 2 1 100
Course Outcomes **At the end of the course the student will be able to:**		
1. Demonstrate capabilities in specific soft-skill areas using hands-on and/or case-study approaches		
2. Solve problems of greater intricacy in stated areas of quantitative aptitude and logical reasoning		
3. Demonstrate higher levels of verbal aptitude skills in English with regard to specific topics		
1.Soft Skills	**Demonstrating soft-skill capabilities with reference to the following topics**: a. Attitude building b. Dealing with criticism c. Innovation and creativity d. Problem solving and decision making **e.** Public speaking **f.** Group discussions	
2. Quantitative Aptitude and Logical Reasoning	**Solving problems with reference to the following topics:** a. **Vedic Maths:** Fast arithmetic, multiplications technique, Criss cross, Base technique, Square root, Cube root, Surds, Indices, Simplification. b. **Numbers:** Types, Power cycle, Divisibility, Prime factors & multiples, HCF & LCM, Remainder theorem, Unit digit, highest power. c. **Averages:** Basics of averages and weighted average. d. **Percentages**: Basics of percentage and Successive percentages. e. **Ratio and proportion:** Basics of R &P, Alligations, Mixture and Partnership. f. **Profit ,Loss and Discount**: Basic & Advanced PLD g. **Data Interpretation**: Tables, Bar diagram, Venn diagram, Line graphs, Pie charts, Caselets, Mixed varieties, Network diagram and other forms of data interpretation. h. **Syllogism:** Six set syllogism using Venn diagram and tick and cross method	
3. Verbal Aptitude	**Demonstrating English language skills with reference to the following topics:** a. Verbal analogy b. Tenses c. Prepositions d. Reading comprehension e. Choosing correct / incorrect sentences f. Describing pictures g. Error spotting	

Department of Placement Training
Sona College of Technology.
Salem-636 005.

Sona College of Technology, Salem
(An Autonomous Institution)
Courses of Study for B.E/B.Tech. Semester III under Regulations 2019
Branch: Biomedical Engineering

S. No	Course Code	Course Title	Lecture	Tutorial	Practical	Credit
Theory						
1.	U19MAT301B	Probability and Statistics	3	1	0	4
2.	U19BM301	Electronic Devices and Circuits	3	0	0	3
3.	U19EC301	Signals and Systems	3	1	0	4
4.	U19BM302	Anatomy and Human Physiology	3	0	0	3
5.	U19CS307	Programming in C	3	0	0	3
6.	U19GE303	**Mandatory Course :** Essence of Indian Traditional Knowledge	2	0	0	0
Practical						
7.	U19BM303	Electronic Devices and Circuits Laboratory	0	0	2	1
8.	U19BM304	Anatomy and Human Physiology Laboratory	0	0	2	1
9.	U19CS308	C Programming Laboratory	0	0	2	1
10.	U19GE301	Soft Skills and Aptitude – I	0	0	2	1
					Total Credits	**21**

Approved By

Chairman, Fashion Technology BoS **Member Secretary, Academic Council** **Chairperson, Academic Council & Principal**
Dr.R.S.Sabeenian **Dr.R.Shivakumar** **Dr.S.R.R.Senthil Kumar**

Copy to:-

HOD/ Biomedical Engineering, Third Semester BE BME Students and Staff, COE

U19MAT301B PROBABILITY AND STATISTICS

L	T	P	C
3	1	0	4

COURSE OUTCOMES

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

1. apply the concepts of measures of central tendency, dispersion, correlation to the given data and analyze the results.
2. apply the concepts of random variables and their properties to generate the moments.
3. fit the suitable distribution and its properties to the real world problems and interpret the results.
4. apply the concepts of joint probability distribution and its properties to find the covariance.
5. test the hypothesis of the population using sample information.

UNIT – I BASIC STATISTICS 12

Measures of central tendency (simple arithmetic mean, median, mode) – Quartiles – Measures of dispersion (range, inter-quartile range, quartile deviation, mean deviation, standard deviation, coefficient of variation) – Simple correlation – Curve fitting (straight line and parabola).

UNIT – II RANDOM VARIABLES 12

Discrete and continuous random variables – Probability mass function, probability density function, moments, moment generating function and their properties.

UNIT – III THEORETICAL DISTRIBUTIONS 12

Binomial, Poisson, geometric, uniform, exponential and normal distributions and their properties - Applications.

UNIT – IV TWO DIMENSIONAL RANDOM VARIABLES 12

Joint distributions, marginal and conditional distributions – Covariance – Correlation – Central limit theorem.

UNIT – V TESTING OF SIGNIFICANCE 12

Sampling distributions - Testing of hypothesis for mean, standard deviation, variance, proportion and differences using normal and t distributions - χ^2- tests for independence of attributes and goodness of fit and F distribution.

Theory: **45 Hours** Tutorial: **15 Hours** Total**: 60 Hours**

TEXT BOOKS:

1. S. C. Gupta and V. K. Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons Publishers, 11th Edition, Reprint, 2019.
2. T. Veerarajan, "Probability, Statistics and Random Processes with Queueing Theory and Queueing Networks", McGraw Hill Publishers, 4th Edition, 7th Reprint, 2018.

REFERENCE BOOKS:

1. R. A. Johnson and C. B. Gupta, "Miller and Freund's, Probability and Statistics for Engineers", Pearson Publishers, 9th Edition, 2018.
2. S. Ross, "A First Course in Probability", Pearson Publishers, 9th Edition, 2019.
3. P. G. Hoel, S. C. Port and C. J. Stone, "Introduction to Probability Theory", Universal Book Stall Publishers, Reprint, 2003.
4. W. Feller, "An Introduction to Probability Theory and its Applications – Volume I", Wiley Publishers, 3rd Edition, 2008.
5. S. P. Gupta, "Statistical Methods", Sultan Chand and Sons Publishers, 15th Edition, 2012.

U19BM301 ELECTRONIC DEVICES AND CIRCUITS 3 0 0 3

COURSE OUTCOMES

At the end of each unit, the students will be able to -

1. Bias the transistors for amplification purpose
2. Analysis the mid-frequency operation of BJT amplifier circuits
3. Calculate cut-off frequencies and bandwidth of BJT amplifier circuit
4. Analysis the Woking principle of FETs
5. Design different types power supplies.

UNIT I TRANSISTOR BIAS STABILITY 9

BJT – Need for biasing – Stability factor - Fixed bias circuit, Load line and quiescent point. Variation of quiescent point due to h FE variation within manufacturers tolerance - Stability factors - Different types of biasing circuits - Method of stabilizing the Q point - Advantage of Self bias (voltage divider bias) over other types of biasing- self bias as a constant current circuit

UNIT II MID-BAND ANALYSIS OF SMALL SIGNAL AMPLIFIERS 9

CE, CB and CC amplifiers - Method of drawing small-signal equivalent circuit - Miller's theorem - Comparison of CB, CE and CC amplifiers and their uses - Methods of increasing input impedance using Darlington connection and bootstrapping – Differential amplifier, Basic BJT differential pair – CMRR.

UNIT III FREQUENCY RESPONSE OF AMPLIFIERS 9

General shape of frequency response of amplifiers - Definition of cut-off frequencies and bandwidth - Low frequency analysis of amplifiers to obtain lower cut-off frequency Hybrid equivalent circuit of BJTs - High frequency analysis of BJT amplifiers to obtain upper cut-off frequency – Gain Bandwidth Product.

UNIT IV FIELD EFFECT TRANSISTORS 9

JFETs – Drain and Transfer characteristics - Current equations - Pinch off voltage and its significance- MOSFET- Characteristics- Threshold voltage -Channel length modulation, Characteristics – Comparison of MOSFET with JFET.

UNIT V RECTIFIERS AND POWER SUPPLIES 9

Classification of power supplies, Rectifiers - Half-wave, full-wave and bridge rectifiers with resistive load. Analysis for V dc and ripple voltage with C, L, LC and CLC filters.

Lecture : 45 Tutorial : 00 Total hours : 45

TEXT BOOKS

1 Millman and Halkias, "*Integrated Electronics*", 2nd Edition, Tata Mc Graw Hill, 2010.

2 Anil K. Maini and Varsha Agrawal, "*Electronics Devices and Circuits"*, First Edition, Wiley Publications, 2009.

REFERENCE BOOKS

1 Y.N. Bapat, "*Electronic devices and circuits, Discrete and Integrated*", 3rd Edition, Tata Mc Graw Hill, 2011

U19EC301 SIGNALS AND SYSTEMS 3 1 0 4
(Common for ECE& BME)

COURSE OUTCOMES

At the end of each unit, the students will be able to -

1. Classify the signals as continuous time and discrete time signals and classify systems based on their properties
2. Determine the response of LTI system using convolution sum for DT system and Convolution Integral for CT system
3. Apply Fourier series and Fourier Transform for periodic Signals
4. Analyze system using Laplace transform and realize the structure for CT system
5. Analyze system using Z transform and realize the structure for DT system

12

UNIT I : CLASSIFICATION OF SIGNALS AND SYSTEMS

Continuous-Time and Discrete-Time signals–The Unit Impulse Unit Step, Unit Ramp Signals and other Basic Signals – Operation of Signals -Time Shifting – Time Reversal – Amplitude Scaling – Time Scaling – Signal Addition – Multiplications –Classification of signals- Continuous-Time and Discrete-Time Systems– Basic System Properties - Systems With and Without Memory – Causality – Stability – Time Invariance – Linearity.

12

UNIT II: LINEAR TIME- INVARIANT SYSTEMS

Continuous-Time LTI Systems: The Convolution Integral - graphical and analytical approach – Properties of Linear Time-Invariant Systems – Solution of Differential Equations.

Discrete-Time LTI system: The Convolution sum-tabulation method-matrix multiplication method-graphical and analytical approach – Solution of Difference Equations.

12

UNIT III: ANALYSIS OF CT SIGNALS USING FOURIER SERIES & FOURIER TRANSFORM

Fourier Series Representation (Trigonometric and Exponential) of Continuous-Time Periodic Signals – Properties of Continuous-Time Fourier Series – Representation of Aperiodic Signals: The Continuous-Time Fourier Transform – The Fourier Transform for Periodic Signals – Properties of the Continuous-Time Fourier Transform.

12

UNIT IV: ANALYSIS OF SIGNALS AND SYSTEMS USING LAPLACE TRANSFORM

The Laplace Transform – The Region of Convergence for Laplace Transform– The Inverse Laplace Transform using Partial fraction– Properties of the Laplace Transform–System Function and Block Diagram Representations-Direct Form I and Direct Form II.

12

UNIT V: ANALYSIS OF SIGNALS AND SYSTEMS USING Z-TRANSFORM

The Z-Transform – The Region of Convergence for the Z-Transform –The Inverse Z-Transform using Partial fraction and Long division method– Properties of the Z-Transform – System Function and Block Diagram Representations-Direct Form I and Direct Form II.

Lecture: 45 Tutorial:15 Total hours : 60

TEXT BOOKS

1. Alan V. Oppenheim, Alan S. Willsky, S. Hamid Nawab, "*Signals and Systems*", 2nd E, Prentice Hall India, 2010
2. A.Anand Kumar, "*Signals and Systems*", 3rd Edition, Prentice Hall India,2013

REFERENCE BOOKS

1. M .J. Roberts, "*Signals & Systems Analysis using Transform Methods & MATLAB*", Tata McGraw Hill, 2007
2. Haykin, Simon, and Barry Van Veen. "*Signals and systems",* John Wiley & Sons, 2007.
3. A. NagoorKani, "*Signals & Systems*", Tata McGraw Hill, 2010
4. John G. Proakis, Dimitris G. Manolakis, "*Digital Signal Processing, Principles, Algorithms, and Applications*", 4th E, PHI, 2007
5. Robert A. Gable, Richard A. Roberts, "*Signals & Linear Systems*", 3rd E, John Wiley, 1995
6. Edward W Kamen& Bonnie's Heck, "*Fundamentals of Signals and Systems*", Pearson Education, 2007

U19BM302 ANATOMY AND HUMAN PHYSIOLOGY 3 0 0 3

COURSE OUTCOMES

At the end of each unit, the students will be able to –

1. Describe the basic concepts of anatomy and physiology.
2. Recognize the ways the body undergoes change throughout the life span related to cell and organ development.
3. Analyze how the development and progression of structural systems contributes to the body's overall function.
4. Identify basic characteristics of each body system and how they work together as a whole.
5. Differentiate between organ systems of the body and their various functions.

09

UNIT I ORGANIZATION OF HUMAN BODY

Structure of Cell – levels of structural organization - Polarization and Depolarization of Cell, Tissue: Types – Homeostasis -Specialized tissues – functions – Positive and Negative Feedback Mechanism - Muscle Physiology: Muscle physiology and aspects of Skin Resistance.

09

UNIT II RESPIRATORY SYSTEM AND URINARY SYSTEM

Respiratory System: Physiological aspects of respiratory system – Trachea and Lungs - Exchange of gases - Respiratory Mechanism. Types of respiration - Oxygen and carbon dioxide transport and acid base regulation.
Urinary system: Structure of Kidney and Nephron - Mechanism of Urine formation – Urinary reflex – urethra - internal/external sphincters - Homeostasis and blood pressure regulation by urinary system – Storage and elimination.

09

UNIT III BLOOD AND CARDIOVASCULAR SYSTEM

Blood composition - functions of blood – functions of RBC.WBC types and their functions Blood groups – importance of blood groups – identification of blood groups. Blood vessels – Electrical simulation – blood clotting - Wound healing - Anatomy of heart – Properties of Cardiac muscle – Conducting system of heart – Cardiac cycle – Heart sound- Volume and pressure changes and regulation of heart rate –Coronary Circulation. Factors regulating Blood flow – ECG – Einthoven's Triangle.

09

UNIT IV SKELETAL AND SPECIAL SENSORY SYSTEM

Skeletal system: Bone types and functions – Axial Skeleton and Appendicular Skeleton. Joint - Types of Joint – Cartilage structure, types and functions. Special Sensory system- Optics of vision – receptor and neural function of the retina – photochemistry of vision – central neurophysiology of vison – EOG – Physiology of hearing mechanism – hearing loss – audiograms – hearing tests – taste and smell sensors.

09

UNIT V NERVOUS SYSTEM

Structure of a Neuron – Neuroglial Cells - Synapses - Reflex actions of sympathetic and parasympathetic nervous system – Nerve conduction and action potentials - Brain – Electroencephalograph (EEG) - Divisions of brain lobes - Cross Sectional Anatomy of Brain - Cortical localizations and functions. Spinal cord – Tracts of spinal cord – Spinal Nerve - Reflex mechanism – Types of reflex. Autonomic nervous system and its functions.

Lecture : 45 Tutorial : 00 Total hours : 45

TEXT BOOKS

1 Elaine.N. Marieb, “Essential of Human Anatomy and Physiology”, Pearson Education New Delhi, 8th Edition, 2016.

2 Gillian Pocock, Christopher D. Richards, "The Human Body An introduction for Biomedical and Health Sciences", Oxford University Press, USA, 2013.

REFERENCE BOOKS

1 William F. Ganong,"Review of Medical Physiology”, Mc Graw Hill, New Delhi, 25th Edition, 2015.

2 Eldra Pearl Solomon. "Introduction to Human Anatomy and Physiology", W.B.Saunders Company, 2003.

3 Arthur C. Guyton, "Text book of Medical Physiology", Elsevier Saunders, 11th Edition, 2006.

U19CS307 PROGRAMMING IN C 3 0 0 3

COURSE OUTCOMES

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

1. Write simple C programs using console input and output functions
2. Write C programs using arrays, decision making and looping statements
3. Design and develop simple application using functions and pointers.
4. Design and develop real-time applications using structures and unions
5. Design and develop real-time applications using file operation

UNIT I BASICS OF C PROGRAMMING 9

Introduction to programming paradigms - Structure of C program - C programming: Data Types – Storage classes - Constants – Enumeration Constants - Keywords – Operators: Precedence and Associativity - Expressions - Input/Output statements, Assignment statements – Decision making statements - Switch statement - Looping statements – Pre-processor directives - Compilation process

UNIT II ARRAYS AND STRINGS 9

Introduction to Arrays: Declaration, Initialization – One dimensional array – Two dimensional arrays – multi-dimensional array- String – string built-in functions – Sorting- Searching

UNIT III FUNCTIONS AND POINTERS 9

Introduction to functions: Function prototype, function definition, function call-Call by Value-Call by reference – Recursion – user defined functions versus built-in functions- Pointers – Pointer operators – Pointer arithmetic – Arrays and pointers – pointers to an array – function pointer-indirect pointer.

UNIT IV STRUCTURES 9

Structure – Structure definition-Nested structures – Pointer and Structures – Array of structures – Self-referential structures – bit fields- Union-Dynamic memory allocation - Singly linked list – typedef.

UNIT V FILE PROCESSING 9

Files – Types of file- File Primitives- File access mode- Sequential file access - Random file access - Command line arguments-introduction to TSR programs

TEXT BOOK

1. Ben Clemens “21st Century C ”, Second Edition ,Oreilly Media Inc,2014
2. Deitel and Deitel, “C How to Program”, Pearson Education, New Delhi, 2011.

REFERENCE BOOKS

1. Kernighan,B.W and Ritchie,D.M, “The C Programming language”, Second Edition, Pearson Education, 2006.
2. Yashavant P. Kanetkar. “Let Us C”, BPB Publications, 14th edition, 2016.
3. Byron S Gottfried, “Programming with C”, Schaum’s Outlines, Second Edition, Tata McGraw-Hill, 2006.
4. Anita Goel and Ajay Mittal, “Computer Fundamentals and Programming in C”, Dorling Kindersley (India) Pvt. Ltd., Pearson Education in South Asia, 2011.
5. E. Balagurusamy, “Programming in ANSI C”, seventh edition, Tata McGraw Hill, 2016.

U19GE303 Essence of Indian Traditional Knowledge 2 0 0 0

Course Outcomes

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

1. Understand, connect up and explain basics of Indian traditional knowledge in modern scientific perspective.
2. Show an ability to comment critically on curriculum proposals that aim to promote science citizenship/scientific literacy
3. Communicate using common medical and psychological terminology, including the skill to discuss commonly used medications, supplements, and surgical procedures
4. Use effective oral and written language skills to communicate scientific data and ideas

Unit I

- Introduction to Vedas 6
- Traditional methodology of Veda – Sat Angas
- Types of Vedas and their application
- Sub Veda – Ayurveda - their modern day application

Unit II

- Basics of Applied Vedic Science 6
- Modern day application of Vedas and procedure
- Ancient Indian Scientific thoughts
- Introduction to the Vedic language "Sanskrit"

UNIT – III- Modern science 6

- Introduction – modern science
- Objectives – modern science
- Architecture in ancient India

UNIT – IV Technology

- India's contribution to science and technology (from ancient to modern) 6
- Nobel laureates of Indian origin and their contribution
- India in space
- Latest achievement from Jan – 2017

UNIT – V- Yoga and Holistic Health Care 6

- Fundamentals of yoga and holistic health
- Human biology
- Diet and nutrition
- Life management
- Contemporary yogic models – case study

Reference Books

1. V. Sivaramakrishna (Ed.), Cultural Heritage of India-Course Material, Bharatiya Vidya Bhavan, Mumbai, 5th Edition, 2014
2. Swami Jitatmanand, Modern Physics and Vedant, Bharatiya Vidya Bhavan
3. RN Jha, Science of Consciousness Psychotherapy and Yoga Practices, Vidyanidhi Prakasham, Delhi, 2016.
4. Roshan Dalal The Vedas: An Introduction to Hinduism's Sacred Texts, Penguin Books 2014. ISBN 13: 9780143066385
5. Raja Ram Mohan Roy, Vedic Physics, Mount Meru Publication ISBN : 9781988207049

Total: 30 hours

U19BM303 ELECTRONIC DEVICES LABORATORY 0 0 2 1

COURSE OUTCOMES

At the end of each experiment, the students will be able to -

1. Operate electronic test equipment and hardware tools to use and the same for conducting experiments
2. Plot the characteristics of given bipolar BJT, Diodes and special diodes to understand their behavior
3. Design, construct and test amplifier circuits and interpret the results

Exp. No.	**List of Experiments**
1.	V-I Characteristics of given Si and Ge Diodes
2.	V-I Characteristics of Zener Diode and Prove that the output voltage gets regulated after the breakdown voltage for variable input voltage in the range of 0.5 V to 8 V of a given Zener Diode
3.	Design Power Supply circuit using half wave and Full wave rectifier with simple capacitor filter.
4.	Analyse Characteristics of the following Special Diodes i. Photo diode ii. Light emitting diode
5.	Analyse the Input and Output Characteristics of BJT (NPN)
6.	Analyse Frequency Response of BJT (CE) using Fixed Bias Amplifier Circuit
7.	Analyse Frequency Response of BJT (CE) using Voltage Divider Bias (self-bias) with and without bypassed Emitter Resistor (CE)
8.	Analyse the frequency response of the Common Collector BJT Amplifier.
9.	Design a Differential amplifier using BJT and Measurement of CMRR.
10	Analyse the Input and Output Characteristics V-I Characteristics of FET.

U19BM304 ANATOMY AND HUMAN PHYSIOLOGY LABORATORY 0 0 2 1

COURSE OUTCOMES

At the end of each experiment, the students will be able to -

1. Estimation and quantification of biomolecules.
2. Separation of macromolecules.
3. Interpreting the metabolic changes in pathological conditions.

List of Experiments

1. Preparation of serum and plasma from blood using Neubaur's Chamber.
2. Measure the amount of blood using blood glucose estimation.
3. Measure the level of creatinine in the blood to check kidney function.
4. Determination of urea in blood and urine by Urease method.
5. Estimation of cholesterol in serum.
6. Separation of proteins by SDS electrophoresis.
7. Separation of amino acids by thin layer chromatography.
8. Separation of DNA by agarose gel electrophoresis.
9. ESR, PCV, MCH, MCV, MCHC, total count of RBCs and hemoglobin estimation.
10. Differential count of different WBCs and blood group identification.
11. Measurement of pH of solutions using pH meter.
12. Ishihara chart for color blindness and Snellen"s chart for myopia and hyperopia - by letters reading and ophthalmoscope to view retina.
13. Determination of percentage Transmittance, Absorbance and concentration of given solution using spectrophotometer.

U19CS308 C PROGRAMMING LABORATORY 0 0 2 1

COURSE OUTCOMES:

After successful completion of the course, the students would be able to

4. Design and develop simple programs using branching, looping statements
5. Develop programs using functions, arrays, structures and string handling
6. Write programs using pointers and dynamic memory allocation and file handling

List of Experiments:

12. Programs using Input, Output and assignment statements.
13. Programs using Branching statements
14. Programs using Looping statements
15. Programs using Functions
16. Programs using Arrays
17. Programs using Structures
18. Programs using Strings
19. Programs using Pointers (both data pointers and function pointers)
20. Programs using dynamic memory allocation
21. Programs using Recursion
22. Programs using Files

TOTAL : 30 hours

Semester-III	U19 GE301- SOFT SKILLS AND APTITUDE – I	L T P C Marks 0 0 2 1 100
Course Outcomes **At the end of the course the student will be able to:**		
1. Demonstrate capabilities in specific soft-skill areas using hands-on and/or case-study approaches		
2. Solve problems of greater intricacy in stated areas of quantitative aptitude and logical reasoning		
3. Demonstrate higher levels of verbal aptitude skills in English with regard to specific topics		
1.Soft Skills	**Demonstrating soft-skill capabilities with reference to the following topics**: a. Attitude building b. Dealing with criticism c. Innovation and creativity d. Problem solving and decision making **e.** Public speaking **f.** Group discussions	
2. Quantitative Aptitude and Logical Reasoning	**Solving problems with reference to the following topics:** a. **Vedic Maths:** Fast arithmetic, multiplications technique, Criss cross, Base technique, Square root, Cube root, Surds, Indices, Simplification. b. **Numbers:** Types, Power cycle, Divisibility, Prime factors & multiples, HCF & LCM, Remainder theorem, Unit digit, highest power. c. **Averages:** Basics of averages and weighted average. d. **Percentages**: Basics of percentage and Successive percentages. e. **Ratio and proportion:** Basics of R &P, Alligations, Mixture and Partnership. f. **Profit ,Loss and Discount**: Basic & Advanced PLD g. **Data Interpretation**: Tables, Bar diagram, Venn diagram, Line graphs, Pie charts, Caselets, Mixed varieties, Network diagram and other forms of data interpretation. h. **Syllogism:** Six set syllogism using Venn diagram and tick and cross method	
3. Verbal Aptitude	**Demonstrating English language skills with reference to the following topics:** a. Verbal analogy b. Tenses c. Prepositions d. Reading comprehension e. Choosing correct / incorrect sentences f. Describing pictures g. Error spotting	

Department of Placement Training
Sona College of Technology.
Salem-636 005.

Sona College of Technology, Salem — Department of Sciences (Chemistry)

SEMESTER – III

MANDATORY COURSE

U19GE302 - ENVIRONMENT AND CLIMATE SCIENCE

(Common for CSE, CIVIL, EEE, MECH)

L	T	P	C
2	0	0	0

Course Outcomes:

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

1. state the importance of the acute need for environmental awareness and discuss significant aspects of natural resources like forests, water and food resources.
2. explain the concepts of an ecosystem and provide an overview of biodiversity and its conservation.
3. explain environmental based pollution their causes, effects and their remedial measures
4. discuss their causes, effects and the control measures of Global Warming, Acid Rain, Ozone Layer Depletion
5. describe the effect of climate change due to pollution

UNIT I INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES 6

Definition, Scope and Importance Forest Resources:- Use and over - exploitation, deforestation, Case Studies, Water Resources:- Use and Over-Utilization of Surface and ground water , Floods, Drought, Food Resources- Effects of Modern Agriculture, Fertilizer- Pesticide Problems–Role of an Individual in Conservation of Natural Resources.

UNIT II ECOSYSTEMS AND BIODIVERSITY 6

Structure and Function of an Ecosystem– Energy Flow in the Ecosystem -Food Chains, Food Webs and Ecological Pyramids.

Introduction to Biodiversity –Value of Biodiversity: Consumptive Use, Productive Use, Social, Ethical, Aesthetic and Option Values –India as a Mega-Diversity Nation — Threats to Biodiversity: Habitat Loss, Poaching of Wildlife, Man-Wildlife Conflicts – Endangered and Endemic Species of India – Conservation of Biodiversity: In-Situ and Ex-Situ conservation of Biodiversity.

UNIT III ENVIRONMENTAL POLLUTION 6

Definition – Causes, Effects and Control Measures of:- (A) Air Pollution (B) Water Pollution (C) Soil Pollution (D) Marine Pollution (E) Noise Pollution (F) Thermal Pollution, Solid Waste Management- Effects and Control Measures of Acid Rain,– Role of an Individual in Prevention of Pollution..

20.05.2020 — B.E. / B.Tech. Regulations 2019

UNIT IV CLIMATE CHANGE ON THE ENVIRONMENT 6

Sustainable Development- - Climate Change- Causes and effects of Global Warming - Effect of global warming in food supply, plants, sea, coral reef, forest, agriculture, economy - Kyoto Protocol in reduction of greenhouse gases - Ozone Layer Depletion - mechanism, effects and control measures- Montreal Protocol to protect ozone layer depletion - Rain Water Harvesting - .Effect of climate change due to air pollution Case study - CNG vehicles in Delhi

UNIT V EFFECT OF CLIMATE CHANGE ON POLLUTION 6

Fungal diseases in forests and agricultural crops due to climatic fluctuations - Growing energy needs - effect of climate change due to non-renewable energy resources. Renewable energy resources in the prevention of climatic changes- Effect of climatic changes in ground water table, garments, monuments, buildings, consumption of energy, agriculture and in electric power sector - Carbon credit - carbon footprint - disaster management -Role of an individual to reduce climate change.

TOTAL: 30 HOURS

Text Books:

1. Miller, T.G. Jr., "Environmental Science", Wadsworth Pub. Co. 2018
2. Anubha Kaushik and Kaushik, "Environmental Science and Engineering" New Age International Publication, 4th Multicolour Edition, New Delhi, 2014.

References:

1. S. Radjarejesri et al., "Environmental Science" Sonaversity, Sona College of Technology, Salem, 2018.
2. Masters, G.M., "Introduction to Environmental Engineering and Science", Pearson Education Pvt., Ltd., 2nd Edition, 2004.
3. Erach, B., "The Biodiversity of India", Mapin Publishing P.Ltd.,Ahmedabad, India.
4. Erach Bharucha, "Textbook of Environmental Studies for Undergraduate Courses", 2005, University Grands Commission, Universities Press India Private Limited, Hyderguda, Hyderabad – 500029.

20/5/20

Dr. M. Raja
Course Coordinator / Sciences

20.5.2020

Dr. C. Shanthi
HOD / Sciences

20/5

Dr. M. Renuga
Chairperson BOS,
Science and Humanities

20.05.2020

B.E. / B.Tech. Regulations 2019

SEMESTER – III

MANDATORY COURSE

U19GE303 - ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

(Common for IT, ECE and BME)

L	T	P	C
2	0	0	0

Course Outcomes

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

1. understand, connect up and explain basics of Indian traditional knowledge in modern scientific perspective.
2. show an ability to comment critically on curriculum proposals that aim to promote science citizenship/scientific literacy
3. communicate using common medical and psychological terminology, including the skill to discuss commonly used medications, supplements, and surgical procedures
4. use effective oral and written language skills to communicate scientific data and ideas
5. describe the fundamentals of yoga and its importance

Unit I 6

- Introduction to Vedas
- Traditional methodology of Veda – Sat Angas
- Types of Vedas and their application
- Sub Veda – Ayurveda - their modern day application

Unit II 6

- Basics of Applied Vedic Science
- Modern day application of Vedas and procedure
- Ancient Indian Scientific thoughts
- Introduction to the Vedic language "Sanskrit"

UNIT – III- Modern science 6

- Introduction – modern science
- Objectives – modern science
- Architecture in ancient India

UNIT – IV Technology 6

- India's contribution to science and technology (from ancient to modern)
- Nobel laureates of Indian origin and their contribution
- India in space
- Latest achievement from Jan – 2017

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UNIT – V- Yoga and Holistic Health Care 6

- Fundamentals of yoga and holistic health
- Human biology
- Diet and nutrition
- Life management
- Contemporary yogic models – case study

References

1. V. Sivaramakrishna (Ed.), Cultural Heritage of India-Course Material, Bharatiya Vidya Bhavan, Mumbai, 5th Edition, 2014
2. Swami Jitatmanand, Modern Physics and Vedant, Bharatiya Vidya Bhavan
3. RN Jha, Science of Consciousness Psychotherapy and Yoga Practices, Vidyanidhi Prakasham, Delhi, 2016.
4. Roshan Dalal The Vedas: An Introduction to Hinduism's Sacred Texts, Penguin Books 2014. ISBN 13: 9780143066385
5. Raja Ram Mohan Roy, Vedic Physics, Mount Meru Publication ISBN : 9781988207049

Total: 30 HOURS

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SEMESTER – III

MANDATORY COURSE

U19GE304- CONSTITUTION OF INDIA

(Common for MCT and FT)

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Course Outcomes

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

1. demonstrate a capacity to work efficiently and with critical engagement with complex and sophisticated primary constitutional law texts
2. exhibit the capacity to craft coherent and persuasive constitutional law arguments in an adversarial context ,also recognizing the limitations of such argumentation
3. apply a contextual understanding of (i) the function of the High Court as the final arbiter of constitutionality and (ii) the techniques of judicial review as applied
4. practice a thorough and contextual knowledge of constitutional law doctrine particularly in its application to real or hypothetical constitutional law problems
5. demonstrate a high level of skill on academic and professional legal writing

UNIT – I Introduction to Constitution of India 6

Constitutional law – meaning – importance
Constitutionalism – features – elements
Constitution of India – concept – importance – historical perspective – characteristics

UNIT – II Fundamental Rights and Equality 6

Fundamental rights – scheme – benefits
Fundamentals duties – importance – and its legal status

UNIT – III Structure, Policies, Principles 6

State policy – the directive principles and its importance-The implementation of directive principles- Parliamentary form of government in India- Constitution power and status of the President- Federal structure and distribution of legislative

UNIT –IV Emergency rule 6

Financial powers between the union and the states- Amendment of the constitutional powers – procedure- Emergency provisions : articles of Indian constitution that has provisions to proclaim emergency- Emergency powers of President – national emergency President rule, financial emergency

UNIT – V Types and Concepts of Local Self Government 6

The concept of local self –government and its types
Comparison of the Indian constitutional scheme

Directive principles of state policy and fundamental duties noted in the Indian constitution

Scheme of the fundamental rights to certain freedom under Article 19
Scope of the right to life and personal liberty under Article 21

References:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.
3. M. P. Jain, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. D.D. Basu, Introduction to the Constitution of India, Lexis Nexis, 2015.

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