MIT WORLD PEACE UNIVERSITY, PUNE
B. TECH. (FIRST YEAR) (Batch 2017-18)

Subject Code	Name of Subject	Weekly Workload			Credits	
		Th	Tut	Pract	Th	Pr
ES101	Applied Mathematics - I	3	1	--	3	--
ES102	Applied Mathematics - II	3	1	--	3	--
ES103	Applied Physics	3	-	2	2	1
ES104	Applied Chemistry	3	-	2	2	1
EE101	Basic Electrical Engineering	3	-	2	2	1
ECE101	Introduction to Electronics Engineering	4	-	2	3	1
ME101	Basics of Mechanical Engineering	3	-	2	2	1
ME102	Engineering Graphics	2	-	2	1	1
ME103	Introduction to Engineering Design Principles	3	-	2	2	1
ME104	Engineering Material Science	3	-	2	2	1
ME105	Workshop skills	-	-	2	-	1
CE101	Applied Mechanics	3	-	2	2	1
CE102	Civil Engineering &Survey Methods	3	-	2	2	1
CSE101	Computer Science & Information Technology-I	--	--	4	--	2
CSE102	Computer Science & Information Technology-II	-	-	2	-	1
WP101	Classical Languages, Effective Communication and Human Dynamics	1	--	2	1	1
WP102	Philosophy of science, Religion, Spirituality	3	-	-	2	-
WP103	Social Immersion Internship Report	-	-	-	-	1

	Practicing Yoga and Meditation					
	Total :	**40**	**02**	**30**	**29**	**16**

ES101 **Applied Mathematics-I** **3-1-3**

Examination Scheme: Class Continuous Assessment: 50 marks
Tutorial: 50 marks
End-term test: 50 marks

Course Objectives:

Students will have adequate background, conceptual clarity and knowledge of mathematical principles related to

1) theory of matrices and its applications to understand the concept of Eigen values and Eigen vectors which are used in theory of vibrations.
2) complex numbers and functions of complex numbers which are useful in various branches of engineering.
3) differential equations and its engineering applications.
4) the fundamental series such as Taylor's and Maclaurin's Series which form the basis of studies of Numerical Analysis.

Course outcomes:

After completion of this course students will be able to

1) develop the algorithms for solving the system of linear equations using Matrices.
2) solve the problems of circuit analysis which involve Complex Numbers.
3) apply the knowledge of differential calculus in solving dynamical systems and boundary value problems.
4) maximize and minimize the function of real variables to solve problems in estimation of errors and approximation.

Theory of Matrices: Rank of a matrix, Normal Form, Linear dependence and Independence of vectors, Vector space, Dimension, Basis, System of Linear Equations, Linear and Orthogonal Transformations, Eigen values, Eigen Vectors, Caley-Hamilton Theorem, Application of Matrices.

Complex Numbers and Applications: Argand diagram, De Moivre's Theorem and its application to find roots of algebraic equations, Basics of Hyperbolic functions, Logarithm of Complex Numbers, Separation into real and imaginary parts of Complex functions.

Differential Calculus: nth derivative of standard functions, Leibnitz's Theorem and problems, Partial derivatives of first and higher order, Total Differentials, Differentiation of Composite and Implicit functions, Euler's Theorem for Homogeneous functions with two and three Independent variables, Deductions from Euler's Theorem, Errors and approximations.

Application of Partial differentiation, Expansion of functions, Indeterminate forms: Maxima and Minima of a function of two independent variables, Lagrange's method of undetermined multipliers, Jacobian, Jacobian of Implicit function. Partial derivative of implicit

function using Jacobian. Functional Dependence, Taylor's series and Maclaurin's series, Expansion of functions, L'Hospital's Rule, Evaluation of limits.

Tutorial Details: Tutorials will be based on topics given below:
(Two Tutorials will be conducted using Mathematical Software)

1. Vector Space, Rank of a matrix, Normal Form of a matrix.
2. System of Linear Equations, Linear Dependence and Independence of vectors, Linear and Orthogonal Transformations, Eigen values, Eigen Vectors.
3. Argand diagram, Roots of algebraic equations.
4. Hyperbolic functions & Logarithm of Complex Numbers.
5. n^{th} derivative of standard functions, Leibnitz's Theorem and problems.
6. Partial Differentiation, Euler's Theorem, Errors and Approximations.
7. Maxima and Minima, Jacobian.
8. Taylor's series and Maclaurin's series, Indeterminate forms.

Assessment

Components of Class Continuous assessment: (50 Marks)
Attendance and Initiative (10 Marks), Assignments I and II (05+05 Marks),
Mid-term Test (15 Marks), Group Activity (15 Marks)

Tutorial: (50 Marks)
Component of Tutorial Assessment can be known from evaluation rubric for the tutorial evaluation

End Term Test: (50 Marks)
Duration 2 hrs: Based on entire syllabus

Reference Books:

1. Greenberg Michael D., "Advanced Engineering Mathematics", 2nd edition, Pearson 2009.
2. Kreyszig Erwin, "Advanced Engineering Mathematics", 10th edition, Wiley Eastern Limited 2015.

ES 102 **Applied Mathematics-II** **3-1-3**

Examination Scheme: Class Continuous Assessment: 50 marks
Tutorial: 50 marks
End-term test: 50 marks

Course Objectives:

Students will have adequate background, conceptual clarity and knowledge of mathematical principles related to

1) differential equations and applications to various Engineering fields.

2) Fourier series and the tools for integration.

3) solid coordinate geometry to understand three dimensional objects useful in engineering practices like designing and molding.

4) double and triple integrations with their applications which are fundamentals to most of the engineering branches.

Course outcomes:

After completion of this course, students will be able to;

1) solve the differential equations which occur as models in circuit theory, heat transfer, projectile motion, chemical reactions, etc.
2) express periodic wave forms in series of sines and cosines of multiple angles and carry out practical analysis.
3) trace the curves which define different types of areas occurring in definite integrals involving important applications.
4) design three dimensional objects and robotics.

Ordinary Differential Equations and Applications: Definition, Order and Degree of Differential Equations, Formation of Differential Equations, Solutions of Differential Equations by Separation of Variables, Exact Differential Equation, Linear Differential Equation , Reducible to these types, Applications of Differential Equations to orthogonal trajectories, Newton's law of cooling, Kirchhoff's law of electrical circuits, One-dimensional conduction of heat problems.

Fourier series and Curve Tracing: Introduction to Fourier Series,Definition, Dirichlet's conditions, Full range Fourier series, Half range Fourier series, Harmonic Analysis , Applications to problems in Engineering, Tracing of curves, Cartesian, Polar, Parametric curves and rectification of curves.

Solid Geometry and Tools for Integration: Cartesian, Spherical polar and cylindrical polar coordinate systems, Sphere, Right circular Cone and Right Circular Cylinder, Reduction formulae, Beta, Gamma functions, Differentiation under integral sign, Error functions.

Multiple Integrals and their Applications: Double and Triple integrations, Applications of double and triple integrals to Area, Volume, Center of gravity and Moment of Inertia.

Tutorial Details: Tutorials will be based on topics given below:
(Two Tutorials will be conducted using Mathematical Software)

1. Formation and solution of Differential Equations.
2. Applications of Differential Equations.
3. Fourier series, Reduction formulae, beta, gamma functions, Differentiation under integral sign, Error functions.
4. Tracing of curves and their rectification.
5. Sphere.
6. Right circular Cone and Right Circular Cylinder.
7. Double and Triple integration.
8. Area and Volume.

Assessment

Components of Class Continuous assessment: (50 Marks)
Attendance and Initiative (10 Marks), Assignments I and II (05+05 Marks),
Mid Term Test (15 Marks), Group Activity (15 Marks)

Tutorial: (50 Marks)
Component of Tutorial Assessment can be known from evaluation rubric for the tutorial evaluation

End Term Test: (50 Marks)
Duration 2 hrs: based on entire syllabus

Reference Books

1. Greenberg Michael D., "Advanced Engineering Mathematics", 2nd edition, Pearson 2009.
2. Kreyszig Erwin, "Advanced Engineering Mathematics", 10th edition, Wiley Eastern Limited 2015.

ES 103 **Applied Physics** **3-2-3**

Examination Scheme: Class Continuous Assessment: (50 Marks)
Laboratory continuous Assessment (50 Marks)
End Term Test (50 marks)

Course Objectives:

To equip engineering students with the fundamentals of and latest trends in Physics required for Engineering and to inculcate a scientific and analytical aptitude in them

Course outcomes:

After learning Applied Physics, the engineering students shall demonstrate ability to;

1. Apply principles of ultrasonic waves in engineering applications such as SONARs, cavitation, non-destructive testing, etc.
2. Explain the use of fundamentals of optics in precision measurements and other relevant engineering applications
3. Identify the use of lasers and photonic devices in emerging frontiers of engineering
4. Summarize applications of quantum mechanics in advanced engineering instrumentation.
5. Relate to developments and new applications of superconductivity, semiconductors and nanoparticles.

Acoustics, Optics and Photonics: Ultrasonics (generation, detection and applications of ultrasonic waves), a brief review of interference due to thin films and its applications (interferometers and their applications, antireflection and anti-transmission coatings), use of interference in measurements and analysis, Diffraction (basics of single slit diffraction and its correlation with diffraction grating and its applications, Polarization (types of polarization, principles and devices involved in producing and detecting polarized light, applications of polarization in LCD, polarizing sunglasses, photoelesticity etc., Physics behind lasers, design and applications of a number of lasers

Preparatory Quantum Mechanics: Wave nature of matter at subatomic level, De Broglie's hypothesis and its applications, Heisenberg's uncertainty principle, wave function, Schrodinger's equations, quantum mechanics of subatomic particles entrapped in rigid and non-rigid traps, tunnel effect and its applications, applications of quantum mechanics in understanding matter and energy at subatomic level, some quantum-mechanics- based instruments such as electron microscope, electron diffractometer, tunneling microscope, tunnel diode, SQUIDs etc.

Condensed Matter Physics: Band theory of solids, discussion of the semiconductors and semiconducting devices such as diodes, transistors and solar cell on the basis of energy band diagrams and Fermi levels, Hall effect and its applications, superconductivity, characteristics of superconductors, BCS theory, applications of superconductors in superconducting electromagnets, motors generators, MAGLEV etc, Josephson junctions and their applications, Physics involved in nano-particles, their properties, synthesis and applications.

Laboratory work:

Outcomes

After performing the Physics experiments, students shall demonstrate ability to

1. Analyze some properties and a few applications of light, mainly measurements and analysis
2. Evaluate the performance of some semiconductors and devices, especially band gap, characteristics of photodiode, LED, solar cells etc.

List of experiments (any 10 out of following 15 experiments)

1. Determination of Radius of Curvature of plano-convex lens by Newton's rings
2. Determination of wavelengths of spectral lines of Mercury (Hg) source by using diffraction grating
3. Law of Malus
4. Brewster's law
5. Double refraction (determination of refractive indices, identification of type of doubly refracting crystals (positive, negative)
6. Half shade polarimeter
7. Ultrasonic interferometer (determination of the velocity of ultrasonic waves and compressibility of a given liquid)
8. Laser based experiment (beam divergence)
9. Laser based experiment (measuring width of a narrow slit, diameter of a thin wire, counting number of slits of grating)
10. Determination of energy gap of semiconductor
11. Characteristics of Solar cell and determination of fill factor
12. Hall effect
13. Study of LED and Photodiode
14. Electron Diffraction
15. Determination of Planck's constant

Assessment

Components of Class Continuous assessment: (50 Marks)
Attendance and Initiative (10 Marks), Assignments I and II (05+05 Marks),
Mid Term Test (15 Marks), Group Activity (15 Marks)

Laboratory Continuous Assessment (50 Marks)
Component of Laboratory Continuous Assessment can be known from evaluation rubric for Laboratory Continuous Assessment.

End Term Test: (50 Marks)
Duration 2 hrs: based on entire syllabus

Reference Books

1. Halliday D., Resnick R., Walker J., "Fundamentals of Physics", 10th Edition, (John Wiley and Sons) 2014.
2. Feynman R. P., Leighton R. B., Sands M., "The Feynman Lectures on Physics", Volume I, II and III, revised and extended edition, (Narosa Publihing House) 2008.
3. Avadhanulu M. N., Kshirsagar P.G., "A Textbook of Engineering Physics", 10th Edition S. Chand 2016.

ES 104 **Applied Chemistry** **3-2-3**

Examination Scheme: Class Continuous Assessment: (50 Marks)
Laboratory continuous Assessment (50 Marks)
End Term Test: (50 marks)

Course Objectives:

1. To gain knowledge of basic concepts of chemistry.
2. To understand chemistry of materials used for engineering applications.
3. To inculcate creativity, problem solving skills using principles of chemistry.

Course Outcomes:

After completion of this course students will be able to;

1. State water quality parameters and technology for its improvement.
2. Assess quality of fossil fuels for given applications.
3. Anticipate and prevent corrosion.
4. Understand chemical structure of polymers and their applications as engineering materials.
5. Explain need of green chemistry and types and applications of new generation fuels.

Water Technology: Specifications for drinking water. Water analysis - hardness, alkalinity, chloride, sulphate and dissolved oxygen. Ill effects of hard water in boilers. Boiler feed water treatments. Desalination techniques, reverse osmosis and electrodialysis.

Fuels and Combustion: Introduction, classification of chemical fuels, calorific value and its determination. Solid fuel - Coal - proximate and ultimate analysis. Liquid fuels - Petroleum - composition and refining. Quality parameters. Combustion: chemical reactions, calculations for air required. Reduction of carbon emission and carbon credit.

Corrosion Science: Galvanic series, Types of corrosion - Dry corrosion - mechanism, Pilling-Bedworth rule. Wet corrosion - mechanism, factors influencing corrosion. Methods of corrosion control. Protective coatings: surface preparation, Metallic coatings: types of coatings, methods of applications, Electroless coatings, Non-metallic coatings: chemical conversion coatings, powder coatings.

Polymer Chemistry: Polymers in day-to-day life, polymerization mechanisms, average molecular weight, crystallinity in polymers, Tm and Tg. Thermoplastic and thermosetting polymers, compounding of plastics. Techniques of polymerization. Specialty polymers. Recycling of polymers.

New Generation Fuels and Green Chemistry: Biofuels – Definition, types, biodiesel, power alcohol, advantages and disadvantages. Fuel Cells – Definition, types, advantages and limitations. Green Chemistry – Definition, goals, principles, need and industrial applications. Traditional and green pathways of synthesis of adipic acid and polycarbonate.

Laboratory Work

Course outcomes:

After completion of Laboratory work students will be able to;

1. Access quality of water, fuels and physical properties of polymers.
2. Demonstrate practical competence to successfully participate in research and development of innovative technology programmes.

List of Experiments

1. Estimation of total hardness of water by EDTA method.
2. Determination of alkalinity of water.
3. Determination of chloride content from a given water sample by Mohr's method.
4. Estimation of Dissolved Oxygen (DO) in a given water sample.
5. Estimation of moisture and ash content in a given sample of coal.
6. Determination of calcium percentage in cement.
7. Determination of electrochemical equivalent (ECE) of copper.
8. Study of corrosion of metals in medium of different pH.
9. Determination of unknown concentration of iron in a given sample using colorimeter.
10. Determination of molecular weight of macromolecule by Ostwald's viscometer.
11. Preparation of nylons and to draw them in the form of thread.
12. Identification of polymers.

Assessment

Components of Class Continuous assessment: (50 Marks)
Attendance and Initiative (10 Marks), Assignments I and II (05+05 Marks),
Mid Term Test (15 Marks), Group Activity (15 Marks)

Laboratory Continuous Assessment: (50 Marks)
Component of Laboratory Continuous Assessment can be known from evaluation rubric for Laboratory Continuous Assessment.

End Term Test :(50 Marks)
Duration 2 hrs: based on entire syllabus

Reference Books

1. Dara S. S., Umare S. A., "Textbook of Engineering Chemistry", 12th Ed, S. Chand and Company Ltd., 1986.
2. Billmeyer F. W., "Textbook of polymer science", 3rd Ed, John Wiley and Sons, 1984.
3. Mendham J., Denney R. C., Barnes J. D., Thomas M. J. K., "Vogel's Text book of Quantitative Chemical Analysis", 6th Ed, Pearson Education Ltd., 2000.

EE 101 Basics of Electrical Engineering 3-2-3

Examination Scheme: Class Continuous Assessment (50 Marks)
Laboratory continuous Assessment (50 Marks)
End Term Test (50 marks)

Course Objectives:

1. To impart the basic knowledge about electric and magnetic circuits
2. To impart understanding of fundamentals of AC and DC circuits
3. To develop appreciation for the role of electrical engineering in other branches of engineering and technology

Course Outcomes:

After completion of this course students will be able to;

1. Predict the behavior and characteristics of basic electrical and magnetic circuits.
2. Identify components/equipment required for any particular application related to electrical engineering.
3. Build basic electrical circuits and perform the measurements.

D.C. Circuits: Basic passive circuit elements, dependent and independent sources, star to delta and delta to star conversion, KCL, KVL, Superposition theorem, Thevenin's theorem,

Magnetic Circuits and Electromagnetic Induction: Magnetic circuits, series and parallel magnetic circuits, Inductance, Self Inductance, Mutual Inductance, Coefficient of coupling, Energy stored in magnetic field

Single Phase Transformer: Working principle, Construction, Types, Ideal transformer, Practical transformer, Equivalent circuit, Losses, Efficiency, Regulation, Condition for maximum efficiency, Introduction to Autotransformer and poly-phase transformer

A.C. Circuits: Generation of alternating emf, Equation of alternating quantity, waveforms, phasor representation, j-operator, series RL, RC, RLC circuits, Series resonance, parallel circuits, Concept of impedance, admittance, Powers

Generation of three phase emf, equations, AC analysis to symmetrical 3-phase systems, star and delta connections,

Applications of Electrical Energy: Basics of Illumination, working principle of commonly used electrical lamps such as fluorescent, CFL, LED, sodium vapor lamp, etc. Introduction to tariffs, grounding and lightening protection.

Laboratory Work

Course outcomes:

After completion of Laboratory work, students will be able to handle basic electrical instruments and test simple electric circuits with safety precautions.

List of Experiments

1. Introduction of Electrical Safety precautions, earthing and Tariffs
2. Introduction to Energy conservation and renewable energy.
3. Verification of KVL, KCL
4. Verification of Superposition Theorem.

5. Finding Resonant Frequency of series R-L-C circuit.
6. Finding efficiency and regulation of Single phase Transformer using Direct Loading method.
7. Study of Electric Lamps
8. Study of three phase R-L series system
9. Three phase power measurement using two wattmeters method
10. Measurement of energy using single phase of Energy meter

Assessment

Components of Class Continuous assessment: (50 Marks)
Attendance and Initiative (10 Marks), Assignments I and II (05+05 Marks),
Mid Term Test (15 Marks), Group Activity (15 Marks)

Laboratory Continuous Assessment: (50 Marks)
Component of Laboratory Continuous Assessment can be known from evaluation rubric for Laboratory Continuous Assessment.

End Term Test :(50 Marks)
Duration 2 hrs: based on entire syllabus

Reference Books

1. Cotton H., "Electrical Technology", 7th Ed., C.B.S. Publication.
2. Theraja B.L., "Electrical Technology", Vol. I and II, 2005, S. Chand.
3. Nagrath I.J. and Kothari D.P., "Theory and Problems of Basic Electrical Engineering", 1998, PHI Learning Pvt. Ltd.

ECE 101 Introduction to Electronics Engineering 4-2-4

Examination Scheme: Class Continuous Assessment (100 Marks)
Laboratory continuous Assessment (50 Marks)
End Term Test (50 marks)

Course Objectives:

1. Create awareness amongst the students about working of basic electronic devices
2. To prepare students for testing and performing measurements on basic analog and digital circuits
3. To impart knowledge of applications of electronics in various engineering and technology domains

Course outcomes:

After completion of this course students will be able to

1. Identify and explain basic electronic devices such as diodes, transistors, and simple integrated circuits
2. Test basic electronic circuits
3. Make use of analog and digital integrated circuits technology
4. Describe basics of sensors, transducers and their usage in various electronic measurement systems
5. Understand fundamental aspects of electronic communication systems

Semiconductor Diodes and Transistors: Semiconductor diode characteristics, rectifiers: half wave and full wave, types such as Zener and light emitting diodes, Zener diode as a voltage regulator, regulated power supply, transistor: working principle, operation, configurations and common emitter (CE) characteristics, biasing circuits, small signal low frequency CE amplifier.

Field Effect Transistors and CMOS: Introduction to field effect transistors (FET), JFET: construction, working and characteristics, MOSFET: construction, working and characteristics of D-MOSFET and E-MOSFET, introduction to CMOS, MOSFET as amplifier, MOSFET as switch.

Fundamentals of Digital Electronics: Introduction to digital signals, number systems, basic digital gates and universal gates, Boolean algebra, De-Morgan's theorems, SOP, POS, arithmetic circuits, multiplexer, de-multiplexer, flip flops: basic latch, gated SR, JK flip flop, D flip flop, T flip flop, shift registers, counters.

Introduction to Integrated Circuits Technology: Discrete circuits, integrated circuits, applications: digital, analog, mixed, types based on number of components, IC fabrication and packaging, examples: OPAMP, timer, logic gates, microprocessors and micro-controllers, memories, embedded systems, MEMS.

Sensors, Transducers and Applications: Definition, classification, selection criteria, specifications, sensors and transducers for displacement, force, speed, temperature measurement, actuators, introduction to smart sensors, data acquisition system, application of transducers such as digital thermometer, electronics weighing machine.

Electronic Communication Systems: Introduction to electronic communication systems: block schematics, types of communication systems, modulation techniques (AM and FM), introduction to telephony and cellular communication, data networks and internet…

Laboratory work

After completion of the laboratory course students will be able to handle basic electronic instruments and test simple electronic circuits.

1. Study of electronic components and electronic instruments.
2. Study of diode rectifier circuit by observing input-output waveforms.
3. Testing the circuit of Zener diode as a voltage regulator.
4. Measurement of transistor amplifier gain in CE configuration.
5. Demonstration of simulation software with simple electronic circuit.
6. Verification of truth table for different types of logic gates and its application as half adder on digital circuit board.
7. Testing of inverting and non-inverting amplifier using OPAMP circuit board.
8. Testing of astable multi-vibrator using IC 555 circuit board.
9. Verification of transducer circuit.
10. Design and simulation of simple electronic circuit.

Assessment

Components of Class Continuous assessment: (100 Marks)
Attendance and Initiative (20 Marks), Assignments I and II (10+10 Marks),
Mid Term Test (30 Marks), Group Activity (30 Marks)

Laboratory Continuous Assessment: (50 Marks)
Component of Laboratory Continuous Assessment can be known from evaluation rubric for Laboratory Continuous Assessment.

End Term Test: (50 Marks)
Duration 2 hrs: based on entire syllabus

Reference Books

1. Floyd Thomas, "Electronic Devices", Prentice Hall, 9th Edition 2012
2. Kalsi H. S., "Electronics Instrumentation", Tata McGraw Hill, 2nd Edition 2004
3. Frenzel Louies E., "Principles of Electronic Communication Systems", McGraw Hill Education, 4th Edition 2014

ME 101 Basics of Mechanical Engineering 3-2-3

Examination Scheme: Class Continuous Assessment: (50 Marks)
Laboratory continuous Assessment (50 Marks)
End Term Test (50 marks)

Course Objectives

1. Understand scope of mechanical engineering in multi-disciplinary industry.
2. Identify machine elements and power transmission devices with functions and applications.
3. Learn concept of manufacturing techniques and conventional machine tools.
4. Gain concepts of thermodynamics applied to industries.
5. Utilise energy sources and energy conversion systems effectively.

Course Outcomes

After completion of this course students will be able to;

1. Apply principles of thermodynamic in engineering systems.
2. Identify different machine elements in power transmission for industrial applications.
3. Select appropriate manufacturing process / technique as required.
4. Identify correct machine tools for production of machine parts.
5. Effectively apply and use of different energy sources and conversion systems.

Concepts of Thermodynamics: Introduction, Macroscopic and microscopic approach, Thermodynamic System, surroundings and boundary, Thermodynamic Property, Thermodynamic Equilibrium, State, path, process and cycle, Quasi-static process, Reversible and irreversible process, temperature , Zeroth and 1st law of thermodynamics, Heat and work, Internal energy, Enthalpy, Limitations of first law, concept of heat sink , source, heat engine, Heat pump, Second law of thermodynamics statements (Kelvin Plank, Clausius), Introduction to Modes of heat transfer.

Mechanical Elements: Function, Sketch, Description, and Uses of Shafts, Axles, Keys, Couplings, Bearings, Clutches, and Brakes.

Mechanisms: Links, Pairs, Joints, Mechanism and Machine, Four bar Mechanism, Slider Crank Mechanism, Double Crank Mechanism, Quick Return Mechanism.

Power Transmission Devices: Construction, Working, Comparison and Applications of: Belt Drive, Rope Drive, Chain Drive and Spur Gear Drive arranged with simple Gear Train. Safety Precautions**.**

Manufacturing Processes: Manufacturing Processes-Primary and Secondary manufacturing Processes, Casting, Sand Casting, Sheet Metal Working and Metal Joining Processes, Sheet Metal Forming (Shearing, Bending, Drawing), Forging (Hot Working and Cold Working), Electric Arc Welding, Comparison of - Soldering, Brazing. Advancement in Manufacturing Processes/Methods.

Machine Tools: Basic Elements, Working Principle, Types of Operations of: Lathe Machine - Centre Lathe, Drilling Machines, Milling Machine, Shaping Machine, Grinding Machines.

Power Producing Devices: Boiler- Types of Boiler, Internal Combustion Engine- S.I. & C.I. Engine (Two stroke and four stroke), Turbines-Hydraulic Turbine and Steam Turbine

Power Absorbing Devices: Pump – Reciprocating and Centrifugal, Compressor, Reciprocating Air Compressor, Refrigeration Process, Domestic Refrigerator, Air-Conditioner.

Power Plant Engineering: Introduction, Types, location-Selection, cost/Kwh, working principle and operational details

Conventional Power Plant –working principle and operational details of Hydro-Electric, Thermal Nuclear Power Plant

Non-Conventional Power Plant –constructional and operational details of solar, wind, biomass, power plants.

Laboratory Work

1) Demonstration of Power Transmitting Elements: Keys, Axle, Shafts, Belts, Chains, Couplings, Gears and Bearings.
2) Demonstration of Mechanisms: Links, Joints, Four Bar Mechanism, Slider Crank Mechanism.
3) Demonstration of Centre Lathe and Drilling Machine operation.
4) Demonstration Measurement of Temperature, Speed, Pressure, Flow, Force, Level.
5) Demonstration of Two Stroke and Four Stroke Engines operation.
6) Demonstration of Domestic Refrigerator and Air Conditioner operation.
7) Demonstration Working of a Boiler.
8) Demonstration Working of a Power Plant.

Assessment

Components of Class Continuous assessment: (50 Marks)
Attendance and Initiative (10 Marks), Assignments I and II (05+05 Marks),
Mid Term Test (15 Marks), Group Activity (15 Marks)

Laboratory Continuous Assessment (50 Marks)
Component of Laboratory Continuous Assessment can be known from evaluation rubric for Laboratory Continuous Assessment.

End Term Test: (50 Marks)
Duration 2 hrs: based on entire syllabus

Reference Books

1) Shanmugam G. and Ravindran S., "Basic Mechanical Engineering", 3rd Ed., Tata McGraw-Hill 2000.
2) Nag P.K., "Engineering Thermodynamics", 4th Ed, Tata McGraw-Hill 1999.

3) Chaudhari and Hajra, “Elements of Workshop Technology”, Volume-I and II, 5th Ed, Media Promoters and Publishers 2001.

ME102 **Engineering Graphics** **2-2-2**

Examination Scheme: Class Continuous Assessment: (25 Marks)
Laboratory continuous Assessment (50 Marks)
End Term Test: (25 Marks)

Course Objectives

1. Apply knowledge of mathematics, geometry and drawing techniques as basic communication and methodology of engineering.
2. Visualize and draw the points, lines, planes, solids, and engineering curves using correct drafting procedure / technique.
3. Develop skills of drawing the objects for accurate documentation in engineering design works.
4. Draw the sectional views to explain the interior details of a complex part / component.
5. Create drawings like multi-view drawings, orthographic projections and isometric views.

Course Outcomes

After completion of this course students will be able to

1. Prepare detailed drawings with drafting tools / instruments.
2. Use the drawing procedure and conventional standards.
3. Read and draw projections of points, lines, planes and solids, engineering curves.
4. Visualize section of solid and development of lateral surfaces.
5. Read and draw isometric views & orthographic projections of objects.

Projections of Point: Theory of Projections (Reference Planes and Auxiliary Planes, First Angle of Projections), Projections of Point only in First Quadrant

Projections of Line: Projections of Line by First Angle Method, inclined to Horizontal Plane, Vertical Plane and Both i.e. Oblique Lines, on Reference and Auxiliary Planes. True Length of a Line by Rotation of View and Rotation of Plane Methods, Horizontal and Vertical Traces of Line.

Projections of Plane: Projections of Plane on Reference and Auxiliary Planes, Projection of Planes [Triangle, Quadrilateral, Pentagon, Hexagon and Circle] by Reference and Auxiliary Plane Methods, Planes inclined to Horizontal Plane, Vertical Plane, and Oblique Plane, Angle made by the Plane with Principle Planes.

Projections of Solid: Introduction to Solids, Types of Solid, and Projections of Solid inclined to One and Both Reference Plane, Projections of Solid (Tetrahedron, Cube, Prisms, Pyramid, Cylinder and Cone).

Engineering Curves: Conic Sections-Ellipse, Parabola, Hyperbola by Focus-Directrix and Rectangle Method, Helix on Cylinder, Involute of Circle, Cycloid, and Archimedean Spiral.

Development of Solids: Development of Prism, Pyramid, Development of Cone.

Orthographic Projections: Introduction to Orthographic Projections of a Pictorial View by First Angle Method, Types of Sections, and Sectional Orthographic Projections.

Isometric Projections: Introduction toIsometric View of Cube, Isometric Axes, Scale, Isometric Projections and Isometric Views, Isometric, Non-Isometric Lines, Angles, Circles, Sphere, Arc etc. Isometric Views of Solids and Objects. Dimensioning.

Laboratory work

The following sheets to be drawn and submitted based on the above topics. All sheets should be drawn on the "A2" Size (594X420mm) (Half Imperial) Sheet.

1. Projection of Lines [Minimum Two Problems]
2. Projection of Planes [Minimum Two Problems]
3. Projection of Solids [Minimum Two Problems]
4. Engineering Curves [Minimum Five Problems]
5. Development of Solids [Minimum Two Problems]
6. Orthographic Projections [Minimum Two Problems]
7. Isometric Views [Minimum Two Problems]

Assessment

Components of Class Continuous assessment: (25 Marks)
Attendance and Initiative (10 Marks), Assignment (05 Marks),
Mid-term Test (10 Marks)

Laboratory Continuous Assessment (50 Marks)
Component of Laboratory Continuous Assessment can be known from evaluation rubric for Laboratory Continuous Assessment.

End Term Test: (25 Marks)
Duration 2 hrs: based on entire syllabus

Reference Books

1. John K.C., "Engineering Graphics for Degree", PHI Learning Pvt. Ltd..
2. Bhatt N.D. and Panchal V.M., "Engineering Drawing, Plane and Solid Geometry", Charotor Publication House.
3. Jolhe D.A., "Engineering Drawing with an Introduction to AutoCAD", Tata McGraw-Hill Publishing Co. Ltd..

ME 103 Introduction to Engineering Design Principles 3-2-3

Examination Scheme: Class Continuous Assessment: (50 Marks)
Group Design Project: (50 Marks)
End Term Test: (50 marks)

Course Objectives

1. To introduce design as engineer's basic role in society and introduce them to various frontiers of engineering
2. To introduce various steps in engineering design and understand design parameters and constraints
3. To apply scientific knowledge to offer solution to problems
4. To provide context for curriculum studies and to motivate students to develop interest in engineering

Course Outcomes

After completion of this course students will be able to

1. Identify needs and formulate design problem
2. Follow engineering design process with due consideration to all requirements and constraints and make decisions
3. Apply scientific principles to design problem
4. Work in a team and communicate design output
5. Relate curricular courses to real life engineering

What Engineers Do: What is engineering, Science as a foundation for engineering, Engineering tasks, Multidisciplinary nature of engineering problems

Overview of Engineering Disciplines: Conventional and emerging disciplines, applications, case studies

Introduction to Engineering Design: What is design, Engineering design process, It's importance, Types of design- Innovative, adaptive, redesign, selection. Design as iterative problem solving methodology, Considerations of a good design, CAE, Designing to codes and standards

Problem Definition and Need Identification: Identification of need, gathering information, Design and analysis of survey instrument, technical literature, internet, patent literature, scientific base, product design specifications

Generation and Evaluation of Alternative Concepts and Decision Making: Data and information sources, Concept generation: Creative thinking, creativity and problem solving, Refinement and evaluation of ideas, Biomimetic design, Functional decomposition and synthesis, Decision matrix, Concept evaluation process

Product architecture, Industrial design, Human factors design, Life cycle design, Design for Sustainability and the environment

Prototyping and modeling, Rapid prototyping, Testing, DFX

Detailed Design: Activities and decisions in detailed design, Make/Buy decision, Complete engineering drawings, Communicate design and manufacturing, Design for sustainability, Reporting

Emerging Engineering fields: Introduction and applications

Laboratory Work

List of Experiments

1. Introduction to Engineering Design
2. Case studies in groups
3. Assignment I
   Writing the features/characteristics and scientific foundation for any product/ products
4. Assignment II
   Brainstorming on product concept and developing the concept.
5. Design Project (Part I): Identification of need and problem definition,
   Theme based product concept development
6. Design Project (Part II): Working on different alternatives and decision making
7. Design Project (Part III): Design considerations like design for sustainability, cost evaluation
8. Design Project (Part IV): Detail design
9. Design Project (Part V): Detail design
10. Design Project (Part V): Design communication
11. Design Project (Part VI): Presentation and Peer assessment
12. Design Project (Part VII): Group discussion on all projects, Feedback and conclusion

Assessment

Components of Class Continuous Assessment: (50 Marks)
Attendance and Initiative (10 Marks), Five Assignments (25 Marks),
Mid Term Test (15 Marks)

Laboratory Continuous Assessment:
Group Design Project: (50 Marks)
Components of Group Design Project Assessment can be known from evaluation rubric for Group Design Activity

End Term Test: (50 Marks)
Duration 2 hrs: based on entire syllabus

Reference Books

1) Kosky P.G.,Wise G., Balmer R.G., Keat W.D., “Exploring Engineering: An Introduction for Freshman to Engineering and to the Design Process”, Academic Press Publication, Fourth Edition 2016.
2) Dieter George, Schmit Linda, “Engineering Design”, McGraw Hill Publication -Fourth Edition 2013.
3) Dym Clive, Little Patrick, Orwin Elizabeth, “Engineering Design: A Project-Based Introduction”, Wiley Publication, Fourth Edition 2014.

ME 104 Engineering Material Science 3-2-3

Examination Scheme: Class Continuous Assessment: (50 Marks)
Laboratory continuous Assessment (50 Marks)
End Term Test: (50 marks)

Course Objectives

1. To acquaint students with the basic concepts and properties of materials.
2. To emphasize the significance of materials selection in the design process.
3. To acquire basic understanding of advanced materials, their functions and properties for technological applications.
4. To develop futuristic insight into materials.

Course outcomes

On completion of the course, learner will be able to;

1. Understand the basic concepts and properties of materials.
2. Describe the fundamental structure and related properties of individual materials
3. Select proper metal, alloys and nonmetallic materials for specific requirement.

Nature of metals and nonmetals: Resent development in material science, selection process of engineering materials (general aspects), chemical and physical properties of metals & nonmetals, classification of materials, structures of metals (BCC, FCC & HCP systems), definition & classification of metals (ferrous &non-ferrous.), applications of different metals & nonmetals, types of deformation:- plastic, elastic. Imperfection in crystal structure, definition, types, properties & applications of various non-metallic materials (polymers, ceramics, composite, FRP, GRP, RCC, refractories).

Properties of metals & nonmetals: Study of different properties of metals (hardness, strength, toughness, stiffness, ductility, brittleness, malleability, bending strength), stress- strain curve of ductile and brittle materials, study of different properties of nonmetals such as strength, high temperature strength, insulator (heat resistance), wear resistance, electrical conductivity, magnetic materials and its properties.

Introduction to various non-ferrous metals & its alloy: Classification of non-ferrous metals, common non-ferrous metals - Aluminum, Copper & its alloys like Brass, Bronze, Babbitt, Hindalium, LM-6, LM-12, aerospace materials, their properties & related applications , soldering & brazing materials, recent developments in non-ferrous alloys.

Modern engineering and biomaterials: Modern Engineering Materials: smart materials, shape memory alloys, chromic materials (thermo, photo & electro), rheological fluids, classification of bio-materials (based on tissue response),comparison of properties of some common biomaterials: metallic implant materials (stainless steel, cobalt-based and titanium-based alloys), polymeric implant materials (polyamides, polypropylene, acrylic resins & hydrogels), tissue replacement implants, biosensors, dielectric materials, piezoelectric, pyro electric and ferroelectric materials and their applications.

Materials characterization: Importance of characterizations, different methods of characterization, classification & applications of x-ray diffraction (XRD), scanning electron microscope (SEM), transmission electron microscopy (TEM).

Laboratory Work

1. Study of crystal structure of metals.
2. Trial on Rockwell Hardness Tester, & hardness checking of 5 different metals.
3. Tensile test for different materials.
4. Impact test for different materials.
5. To determine the density of the polyolefin.
6. Observation of hardness variation in different ceramics.
7. Study of isostress & isostrain conditions of non-metals.
8. Guest Lecture / Case study on selection of materials according to applications.

Assessment

Components of Class Continuous assessment: (50 Marks)
Attendance and Initiative (10 Marks), Assignments I and II (05+05 Marks),
Mid Term Test (15 Marks), Group Activity (15 Marks)

Laboratory Continuous Assessment (50 Marks)
Component of Laboratory Continuous Assessment can be known from evaluation rubric for Laboratory Continuous Assessment.

End Term Test :(50 Marks)
Duration 2 hrs: based on entire syllabus

Reference Books

1. Callister William D. "Material Science and Engineering an Introduction", 9th Ed, John Wiley & Sons Inc., 2013.
2. Askeland Donald R, Phule Pradeep, "The Science and Engineering of materials", 5th Ed, Thomson Brooks/cole, 2005.
3. Avner Sidney H., "Introduction to Physical Metallurgy", 2nd Ed, McGraw-Hill, 1997.

ME105 **Workshop Skills** **0-2-1**

Examination Scheme: Laboratory continuous Assessment (50 Marks)

Course Objectives:

1. Introduction to basic manufacturing practices.
2. To use basic workshop hand tools.
3. To develop hand skills by practices.

Course Outcomes:

After completion of this course students will be able to;

1. Explain engineering workshop practices.
2. Select and apply hand tools according to engineering work.
3. Apply workshop skills in different engineering sections
4. Take necessary safety measures while working in industry/workshop.

Perform following jobs (Any three):

a) **Carpentry Job:** Introduction to wood working process, kinds of woods, different hand tools and machines used for wood working, types of joints, wood turning process.

Term work Include one job involving joint and wood working operations.
(e.g. wooden door panel /wooden chair/ house hold furniture, Dove tail, Tenon and Mortise joint)

b) **Fitting Job:** Types of fits, different types of files, fitting tools, different operations on metal plate: datum selection, layout and marking, cutting shearing, sizing of metal, drilling and tapping.

Term work includes one job involving metal plate fitting to size, male female joint including drilling and tapping operation.

c) **Sheet Metal Job:** Introduction to sheet metal materials, standard sheet metal sizes, and tools used, different sheet metal operations: development of sheet metal, manual Bending/ Punching and Riveting**.**

Term work includes one utility job in sheet metal. (e. g. tray, grain scoop, funnels etc.)

d) **Welding Job:** Introduction to joining process, joining of materials, welding setup and working principles.

Term work includes one job consisting of arc welding processes like lap joint, butt joint, T joint etc.

Demonstration (Any two):

a) **Safety in Workshop:** Importance of safety measures in workshop practices, safety/ accident prevention habits, human protection and machine protection, safety charts, fire hazards, fire extinguishers, Introduction to environmental and safety standards (OHAS).

b) **Assembly and Inspection of Components:** Assembly and dismantle of Components/ Products /Tooling for machines. Video demonstration of assembly of any automobile/ mechanism with latest technologies, Importance of fit and interchangeability.

c) **Forging Process:** Hot and cold working process, forging procedure and materials, tooling for forging, hand and machine forging, forging applications.

d) Fasteners: Types of fasteners, fastener materials, applications, fasteners for machine tools.

e) Foundry: Introduction to Foundry process, development of sand mould and casting for specific application, Advancement in castings.

Term work Submission:

1. Three jobs as mentioned above
2. Two demonstration write – up with illustrations / sketches

Assessment:

Laboratory Continuous Assessment (50 Marks)
Component of Laboratory Continuous Assessment can be known from evaluation rubric for Workshop Skills.

Reference Books:

1. Serope Kalpakjain "Manufacturing Engineering and Technology", Pearson Publications., 7th Edition, 2014.
2. S. K. Hajra Choudhary, "Element of Workshop technology Vol.1 and 2", Media Promoters and Publishers Pvt. Ltd., 15th Edition, 2012.

CE 101 **Applied Mechanics** **3-2-3**

Examination Scheme: Class Continuous Assessment (50 Marks)
Laboratory continuous Assessment (50 Marks)
End Term Test (50 marks)

Course Objectives

1. To develop the ability to identify and formulate elementary level engineering problems related to particle and rigid body mechanics, in conceptual form as well as in terms of mathematical and physical models.
2. To develop the concepts of centroid, moment of inertia, equilibrium of simple plane structure and friction.
3. To demonstrate use of the concepts of kinematics and kinetics and its application to dynamics of particles and rigid body.

Course Outcomes

After successfully completing this course, student will be able to:

1. Identify, formulate and analyze engineering problems related to particle and rigid body mechanics by mathematical and physical models.
2. Analyse the different force systems in simple engineering problems.
3. Identify the type of motion and its kinematic and kinetic parameters.
4. Apply energy and momentum methods to bodies in motion.

Resultant and Equilibrium of Force Systems: Introduction to Engineering Mechanics, Basic Concepts [Space, Time, Mass, Force], Idealization of bodies in Engineering Mechanics, Axioms in Engineering Mechanics, Resolution and Composition of Forces, Moment of a force about a point and about a line, Varignon's theorem of moments, couples, Different types of force systems,, Resultant of coplanar force systems [concurrent, parallel and general force system] equivalent force systems, Moment of Inertia of plane lamina . Concept of equilibrium, free body diagram, Types of supports, equilibrium of two forces, Equilibrium of three forces, equilibrium of concurrent, parallel and general force systems in a plane. Reactions of determinate beams with different types of transverse loads.

Space Forces and Analysis of Plane Structures: Resultant and equilibrium of space force systems [concurrent, parallel and general] Concept of two force member and multi-force member, analysis of plane trusses using method of joints and method of sections, analysis of plane frames using method of members.

Friction and Virtual Work: Introduction to frictional force, preliminary concepts, laws of friction, analysis of equilibrium of bodies including frictional forces; block and wedge friction, belt friction, band brakes. Principle of virtual work, Application of Principle of virtual work to the problems of beams and simple mechanisms.

Kinematics of Particles: Rectilinear motion: motion with variable acceleration, motion curves, dependent motion, relative motion. Curvilinear Motion: Rectangular coordinate system,

path variable [tangential and normal components], polar coordinates [radial and transverse components].

Kinematics of Rigid Bodies: Translation, Rotation of a rigid body about a fixed axis, General plane motion. Instantaneous center of rotation in plane motion. Absolute and relative velocity and acceleration in plane motion.

Kinetics of particles &Rigid Bodies: Newton's second law of motion and the concept of Dynamic Equilibrium for rectilinear and curvilinear motion D'Alembert's principle. Principle of work and energy, power and efficiency, conservative forces, conservation of energy. Principle of impulse and momentum; conservation of momentum, direct central impact, coefficient of restitution.

Vibrations: Introduction to vibration. Different definitions, type, free vibrations, forced vibrations, causes effects and remedies of vibrations.

Laboratory Work

Course outcomes:

After completion of the laboratory work students will:

1. be able to demonstrate simple principles of Applied Mechanics experimentally
2. acquire practical competence required for participation in mechanics related experimentation

Part A: List of Experiments

1. To find the reactions of simple and compound beams.
2. Determination of coefficient of friction between flat belt and pulley.
3. To find the law of machine of a simple lifting machine.
4. Determination of forces in a space force system.
5. Study of curvilinear motion.
6. Determination of the Moment of Inertia of flywheel.
7. Determination of coefficient of restitution.

Part B: To solve Mechanics problems by Graphical methods and validate analytically.

1. Four problems on statics [on topics like resultant of concurrent forces, reaction of beams, friction, Analysis of trusses] to be solved graphically and checked analytically.
2. Three problems on dynamics [on topics like motion diagram, relative velocity, ICR] to be solved graphically and checked analytically.

Assessment

Components of Class Continuous assessment: (50 Marks)
Attendance and Initiative (10 Marks), Assignments I and II (05+05 Marks),
Mid Term Test (15 Marks), Group Activity (15 Marks)

Laboratory Continuous Assessment (50 Marks)
Component of Laboratory Continuous Assessment can be known from evaluation rubric for Laboratory Continuous Assessment.

End Term Test: (50 Marks)
Duration 2 hrs: based on entire syllabus

Reference Books

1. Vector Mechanics for Engineers: Statics and Dynamics, by Ferdinand P. Beer and E.Russell Johnston, 9th Edition ,2011, Tata McGraw-Hill.
2. Engineering Mechanics: Statics and Dynamics by J.L.Meriam and Craige, 6th Edition,2011,John Wiley and sons.
3. Engineering Mechanics: Statics & Dynamics by R.C. Hibbeler, 11th Edition,2012, McMillan.

CE102 Civil Engineering & Survey Methods 3-2-3

Examination Scheme: Class Continuous Assessment (50 Marks)
Laboratory continuous Assessment (50 Marks)
End Term Test (50 marks)

Course Objectives

1. To impart inter-disciplinary approach essential for an engineer.
2. To prepare engineering students with modern techniques used in surveying.
3. To prepare students to make drawings using different surveying software.
4. To prepare engineering graduates with the knowledge of bye laws of construction and sustainable development using concept of environment.

Course outcomes

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

1. Differentiate between various branches of civil engineering and understand the significance of an interdisciplinary approach needed for an engineer.
2. Apply modern survey methods in relevant field applications.
3. Understand the role of a civil engineer in planning, regulating constructions and achieving sustainable development.

Branches of Civil Engineering: Basic areas in civil engineering: Surveying, Construction engineering, Fluid Mechanics, Transportation engineering, Irrigation engineering, Project management, Structural engineering, Geotechnical & Foundation engineering, Environmental engineering, Quantity surveying, Town planning , Earthquake engineering, Infrastructure Development. Role of Civil Engineer in national development, Importance of an interdisciplinary approach in engineering.

Study of different survey methods: Principles of survey, Plane Surveying and Geodetic Surveying, Types of Surveying Methods: Triangulation, Traversing, Trilateration (only Introduction), Introduction to scale, R.F, Study of prismatic compass, types of bearings and reference meridians, measurement of bearings and angles, Simple and differential leveling for setting out various benchmarks, determining the elevations of different points using Collimation plane method and Rise and Fall Method and preparation of contour maps.

Conventional and Advanced survey techniques: Types of maps and their uses, Google Maps, Modern survey methods using levels, Theodolite, EDM, laser, total station and GPS, GIS, Measuring areas from maps using digital planimeter, Surveying software, Surveying Methods based upon instruments: Chain Surveying, Compass Survey, Theodolite Survey, Plane table survey, surveying by total station, Photographic and Aerial Surveys, Introduction to automation in construction.

Basics of Construction: Substructure - Shallow foundation, types. Deep foundation, types. Superstructure - Components. Types of construction - load bearing, Framed, composite

Integrated built environment and byelaws : Principles of Planning(only Introduction), Byelaws, Concept of built up area, carpet area, plinth area, Plot area, FSI, Role of byelaws in regulating the environment, Concept of Green building, eco-friendly materials in construction.

Sustainable development and waste management: Methods of Harnessing the energies, Effect of pollution on environment, Engineer's role in achieving sustainable development, Environmental Impact Assessment (EIA), Solid waste management, e waste management.

Laboratory work:

Course Outcomes

At the end of the course, students will be able to
Use surveying software for computations and generation of survey drawings.

List of experiments

1) Study of any 4 types of maps and explaining their uses, study from Google earth.
2) Computation of Reduced Levels using Dumpy Level.
3) Comparative analysis between collimation plane method and Rise and Fall Method.
4) Application of Digital Level in contouring.
5) Measurement of angles using prismatic compass.
6) Measurement of area by Digital Planimeter.
7) Developing and Drawing of plan, elevation and Section of a building.
8) Use of various functions provided in the Total Station.
9) Visit to any construction site and preparation of visit report.
10) Use of GPS in Survey.
11) Use of survey software.
12) Exercise on sustainable development.

Assessment

Components of Class Continuous assessment: (50 Marks)
Attendance and Initiative (10 Marks), Assignments I and II (05+05 Marks),
Mid Term Test (15 Marks), Group Activity (15 Marks)

Laboratory Continuous Assessment (50 Marks)
Component of Laboratory Continuous Assessment can be known from evaluation rubric for Laboratory Continuous Assessment.

End Term Test: (50 Marks)
Duration 2 hrs: based on entire syllabus

Reference Books

1. Shah M.G., Kale C. M., Patki S. Y., "Building Drawing with an integrated approach to Built Environment", Tata McGraw-Hill, 2012.
2. Kanetkar T. P., KulkarniS. V., "Surveying and Levelling (Vol. I)", Pune Vidyarthi Griha Prakashan, 2006.
3. Dugal K. N., "Elements of Environmental Engineering", 8th ed, S. Chand 2008.

CSE101 Computer Science & Information Technology-I 0-4-2

Examination scheme: Laboratory Continuous Assessment (100 Marks)

Course Objectives:

1. To understand the concepts of Programming languages.
2. To learn the fundamentals of Procedural and Object Oriented programming.
3. To apply programming skills for problem solving.

Course Outcomes:

After completion of this course students will be able to:

1. Understand the importance of good programming practices.
2. Design and develop programming constructs using Procedural and Object Oriented paradigms.
3. Develop logic for problem solving.

Preliminary Concepts: Introduction to Operating System, Algorithms, Flowcharts, Types of programming languages- Machine level, Assembly level, High Level (Assemblers, Compilers, Linker, Loader).

Excel: Quick Analysis Features of Excel: Tables and Formatting, charts, graphs and Macros.

Introduction to C language: Structure of a C Program, Declarations, Constants, Variables, Data types, Operators & Expressions, Conditional Expressions- if else, nested if, switch case, Looping Constructs- while, for, do, do-while, break & continue.

Arrays and Functions in C: Arrays: Defining and processing an array, Two-Dimensional Arrays. Strings: String Manipulation functions. Parameter list, return type, function call, block structure, passing parameters to a function: call by reference, call by value, recursion.

Structures and Pointers in C: Structures & Unions: Definition, Processing structures. Pointers: Address operators, pointer type declaration, pointer assignment, pointer initialization, pointer arithmetic.

File Handling: File pointer, File processing, Operations-open, close, read and write, command line arguments.

Introduction to Object Oriented Programming (OOP): OOP Overview: Need of OOP, OOP Paradigms.

Classes in C++: Defining classes in C++, abstraction and encapsulation, member functions, class scope and accessing class members, Constructors and destructors, Function overloading. Overview of Inheritance: Defining base and derived classes, function overriding.

Laboratory work:

List of Assignments

1. Execution of basic Linux commands like ls, pwd, cat, mkdir, touch, cd, cp, rm etc.
2. Create a student database and perform result analysis in excel.
3. Write a C program to find the greatest of three numbers.
4. Write a menu driven program in C to implement the basic arithmetic calculator.
5. Write a C program to generate a Fibonacci series.
6. Write a C program to perform addition and subtraction of two matrices.
7. Write a C program to implement String operations using built in functions.
8. Write a C function to compute factorial of a given number using recursion.
9. Write a C program to accept student details and display their result using structures.
10. Write a C program to swap two numbers using pointers.
11. Write a C program to read and write contents to a file.
12. Write a C program to accept file name using command line arguments and copy contents of one file to another.
13. Write a C++ program create a calculator for arithmetic operations.
14. Write a C++ class to perform operations on complex numbers (use Constructors and Destructors).
15. Write a base class 'shape' and derive classes as rectangle, triangle and circle to display area of different shapes.

Assessment:

Laboratory Continuous Assessment (100 Marks)
Component of Laboratory Continuous Assessment can be known from evaluation rubric for CSIT.

Reference Books :

1) Kernighan Brian W. and Ritchie Dennis M., "C Programming Language", 2nd Edition, Prentice-Hall 2015.
2) Schildt Herbert, "C++ The Complete Reference", Fifth Edition, McGraw Hill Professional, 2014.
3) Fischer William, "Excel: Quick Start Guide from Beginner to Expert - Excel, Microsoft Office" 2016.

CSE102 Computer Science & Information Technology-II 0-2-1

Examination scheme: Laboratory Continuous Assessment (50 Marks)

Course Objectives

1. To build the foundations for advanced programming languages.
2. To learn the fundamentals of networking and mobile computing.
3. To understand data analysis tools.

Course Outcomes

After completion of this course students will be able to:

1. Design programming constructs using advanced programming languages.
2. Design and develop basic web and mobile applications.
3. Use data analysis tools.

Introduction to Java Programming: Introduction, History, Features, Java Virtual Machine (JVM).

Classes and Methods: Defining classes, methods, object creation, method overloading, garbage collection.

Inheritance: Super class, constructor call sequence, method overriding.

Introduction to Python Programming: Installation, Variables, String functions, Lists, Functions, Conditional statements.

Introduction to Android Programming: Overview of Android OS, Overview of Wireless Application Protocol (WAP), Introduction to open handset alliance, Introduction to android platform differences, Introduction to Android SDK.

Introduction to Networking and Data Analytics: Introduction to Internet, World Wide Web & Search Engines.

HTML: Introduction to HTML, Creating an HTML document, HTML tags and references.

Data Analytics: Concepts of Data Analysis, Introduction to basic R Programming, Data analytics using R.

Laboratory work

List of Experiments

1. Write a Java Program to display "Hello World".
2. Write a Java Program to implement polymorphism.
3. Write a Java Program to implement inheritance.
4. Write a python program to swap two numbers.
5. Write a python program to display the number of occurrences of a substring in a given string.

6. Installation of Android SDK for Eclipse and Write a program to display a message “Hello World" using android.
7. Design a webpage for Employee information (personal information, photo, qualification, experience, etc) using images, tables and hyperlinks.
8. Design share predictor using R programming.

Assessment:

Laboratory Continuous Assessment (50 Marks)
Component of Laboratory Continuous Assessment can be known from evaluation rubric for CSIT.

Reference Books:

1. Schildt Herbert, "The Complete Reference Java", Nineth Edition, Tata McGraw Hill 2014.
2. Lutz Mark, Ascher David, "Learning Python", Fifth Edition, O'Reilly Publication 2013.
3. Steven Holzner, "HTML 5 Black Book", Second edition, Dreamtech Press 2016.

Marko Gargenta, "Learning Android", Second edition, O'Reilly Publication 2011.