Vision of the Institute

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

Mission of the Institute

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

Vision of Civil Department

To give the nation qualitative Civil Engineers, who can contribute for the construction of a better world with sophisticated infrastructural facilities, eco-friendly houses, modern transportation facilities with a pollution free environment and to protect the precious natural resources of this planet.

Mission of Civil Department

- To shape the students into good entrepreneurs and to promote self-confidence and all-round development of the student personality through special lectures, practical training programs, field visits and technical seminars.
- To train the students to acquire generic knowledge in the areas of Civil Engineering
- To continuously update the physical infrastructure through modernization, thrust area development, R & D and other schemes
- To generate knowledge base through sustained research and developmental efforts.
- To produce engineers with self-confidence and overall personality who can be self-employed and generate employment opportunities to fellow engineers and take active part in nation building, keeping in view the challenges of the future

Program Educational Objectives (PEO's of Civil Department)

1. The main objective of the faculty is to guide them by the principles of sustainable development and global inter connectedness with the CIVIL structures, and make them to understand the impact of CIVIL engineering projects how they effects society and environment in case of failures.
2. To develop their Communication skills (Oral, Written and Visual, Graphic modes) which makes them to participate actively in their Communities and Profession when working as team leaders or members.
3. An intensive training is provided to identify, formulate and solving engineering problems in technical areas appropriate to CIVIL ENGINEERING.
4. To make them competent and engaged engineering professionals applying their technical & managerial skills in Planning, Designing and Construction.

Program Outcomes(PO's) of Civil Department

1. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics,
natural sciences, and engineering sciences.
3.Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. Recognize the need for, and have the preparation and ability to engage in
independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes(PSO's) of Civil Department

1. An ability to learn constructional concepts and to implement them in the field work and to make the structural planning in a smarter way.
2. To encourage young energetic engineers in technical and software skills in the field of Civil Engineering with innovative thoughts along with existing and future trends in constructional field.
3. The capability to integrate knowledge in constructional field work and to improve skills to become an entrepreneur.

III Year - I Semester

III YEAR I SEMESTER							
S.No	**Subject**	**L**	**T**	**P**	**C**	**I**	**E**
1	Design & Drawing of Reinforced Concrete Structures	4	-	2	3	40	60
2	Strength of Materials-II	3	-	-	3	40	60
3	Geo-Technical Engineering	3	-	-	3	40	60
4	Hydraulics and Hydraulic Machinery	3	-	-	3	40	60
5	**Professional Elective I**						
	1.Remote sensing Geographical Information Systems						
	2.Solid Waste Management						
	3.Advanced surveying						
	4.Green Building Technologies	3	-	-	3	40	60
6	**Open Elective I**						
	1.MAT LAB and Simulink For Engineers						
	2.Data Structures						
	3.Principles of Electronic Communication Systems	3	-	-	3	40	60
	4.AI Tools, Techniques and Applications						
7	Geo-Technical Engineering Lab	-	-	3	1.5	40	60
8	Advanced English Communication Skills Lab	-	-	3	1.5	40	60
9	Quantitative Aptitude -II	-	-	2	1	40	60
	Total	**19**	**-**	**10**	**22**	**360**	**540**
						900	

Subject	DESIGN AND DRAWING OF REINFORCED CONCRETE STRUCTURES				
Year / Semester	III B.Tech/I Sem	L	T	P	C
Regulation Year	2021-22	4	0	2	3

Course Learning Objectives: The objective of this course is:

1. Familiarize Students with different types of design philosophies
2. Equip student with concepts of design of flexural members
3. Understand Concepts of shear, bond and torsion
4. Familiarize students with different types of compressions members and Design
5. Understand different types of footings and their design

SYLLABUS:

UNIT –I

Introduction: a) **Working stress method**: Design codes and handbooks, loading standards – Dead, live, wind and earthquake loads, Elastic theory: design constants, modular ratio, neutral axis depth and moment of resistance for balanced, under-reinforced and over-reinforced sections. Design of singly and doubly reinforced beams.

a) **Limit State Design**: Concepts of limit state design – Basic statistical principles – Characteristic loads –Characteristic strength – Partial load and safety factors – representative stress-strain curves for cold worked deformed bars and mild steel bars. Assumptions in limit state design – stress - block parameters – limiting moment of Resistance.

All units i.e., from Unit II to Unit VI are to be taught in Limit State Design.

UNIT –II

Design for Flexure: Limit state analysis and design of singly reinforced sections effective depth- Moment of Resistance- Design of Doubly reinforced and T section - Minimum depth for a given capacity- Limiting Percentage of Steel- Minimum Tension Reinforcement-Maximum Flexural Steel- Design of Flanged Sections (T)- Effective width of flange –Behavior- Analysis and Design.

UNIT – III

Design for Shear, Torsion and Bond: Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions. Design examples in simply supported and continuous beams.

Limit state design for serviceability: Deflection, cracking and code provision.

UNIT – IV

Slabs: Classification of slabs, design of one - way slabs, one-way continuous slab using IS Coefficients (Conventional) –Design of two - way slabs-simply supported and various edge conditions using IS Coefficients.

UNIT – V

Design of Compression members: Effective length of a column, Design of short and long columns – under axial loads, uniaxial bending and biaxial bending -IS Code

provisions.

UNIT –VI

Footings: Different types of footings – Design of Isolated footings – pedestal, square, rectangular and circular footings subjected to axial loads, uni-axial and bi-axial bending moments.

NOTE:

All the designs to be taught in Limit State Method

Following plates should be prepared by the students.

1. Reinforcement detailing of T-beams and continuous beams.
2. Reinforcement detailing of columns and isolated footings.
3. Detailing of one-way, two-way and continuous slabs

INTERNAL EXAMINATION PATTERN:

The total internal marks (40) are distributed in two components as follows:

- Descriptive (subjective type) examination: 20 marks
- Day to Day work 20 marks

FINAL EXAMINATION PATTERN:

The end semester examination is conducted for 60 marks. The pattern will consist of 2 parts (part –A and part-B), where in part-A, 2 questions will be given with each question carrying 24 marks, out of which the student has to answer one question and part-B consists of 6 questions with each question carrying 12 marks each, out of which the students has answer 3 questions.

IS Codes:

1. IS -456-2000 Code of practice for Reinforced Concrete Structures (Permitted to use in examination hall)
2. IS – 875.
3. SP-16.

Text Books:

1. Limit State Design, A. K. Jain.
2. Design of Reinforced concrete Structures, N. Subrahmanyian.
3. Reinforced Concrete Structures, S. Unni krishna Pillai & Devdas Menon, Tata Mc.GrawHill, New Delhi.

References:

1. R C C Design, B.C Punmia, A. K. Jain and A. K Jain. Lakshmi Publications.
2. Reinforced Concrete Structures, N. Krishna Raju & R. N. Pranesh, New Age Publications.

Course Outcomes:

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

1. Work on different types of design philosophies.
2. Carryout analysis and design of flexural members and detailing.
3. Design structures subjected to shear, bond and torsion.
4. Design different type of compression members and footings.

Subject	STRENGTH OF MATERIALS – II				
Year / Semester	III B.Tech /I Sem	L	T	P	C
Regulation Year	2021-22	3	0	0	3

Course Learning Objectives:

1. To give concepts of Principal stresses and strains developed in cross section of the beams on the cross section and stresses on any inclined plane. To impart concepts of failures in the material considering different theories.
2. To give concepts of torsion and governing torsion equation, and there by calculate the power transmitted by shafts and springs and design the cross section when subjected to loading using different theories of failures.
3. To classify columns and calculation of load carrying capacity and to assess stresses due to axial and lateral loads for different edge conditions and to calculate combined effect of direct and bending stresses on different engineering structures.
4. Introduce the concept of unsymmetrical bending in beams location of neutral axis deflection of beams under unsymmetrical bending.
5. Impart concepts for determination of forces in members of plane pin-jointed perfect trusses by different methods.

SYLLABUS:

UNIT- I

Principal Stresses and Strains: Introduction – Stresses on an inclined section of a bar under axial loading – compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear – Mohr's circle of stresses – Principal stresses and strains – Analytical and graphical solutions.

UNIT – II

Torsion of Circular Shafts and Springs: Theory of pure torsion – Derivation of Torsion equations: $T/J = q/r = N\phi/L$ – Assumptions made in the theory of pure torsion – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending and torsion and end thrust – Design of shafts according to theories of failure.

Springs: Introduction – Types of springs – deflection of close and open coiled helical springs under axial pull and axial couple – springs in series and parallel – Carriage or leaf springs.

UNIT – III

Columns And Struts: Introduction – Types of columns – Short, medium and long columns – Axially loaded compression members – Crushing load – Euler's theorem for long columns- assumptions- derivation of Euler's critical load formulae for various end conditions – Equivalent length of a column – slenderness ratio – Euler's critical stress – Limitations of Euler's theory – Rankine – Gordon formula – Long columns subjected to eccentric loading – Secant formula – Empirical formulae – Straight line formula – Prof.

Perry's formula. Laterally loaded struts – subjected to uniformly distributed and concentrated loads –Maximum B.M. and stress due to transverse and lateral loading.

UNIT – IV

Direct and Bending Stresses: Stresses under the combined action of direct loading and B.M. Core of a section – determination of stresses in the case of retaining walls and dams – conditions for stability – stresses due to direct loading and B.M. about both axes.

UNIT – V

Unsymmetrical Bending: Introduction – Centroidal principal axes of section – Moments of inertia referred to any set of rectangular axes – Stresses in beams subjected to unsymmetrical bending – Principal axes – Resolution of bending moment into two rectangular axes through the centroid – Location of neutral axis Deflection of beams under unsymmetrical bending.

UNIT – VI

Analysis of Pin-Jointed Plane Frames: Determination of Forces in members of V plane pin-jointed perfect trusses by (i) method of joints and (ii) method of sections. Analysis of various types of cantilevers and simply supported trusses by method of joints, method of sections.

Text Books:

1. Mechanics of Materials by B.C Punmia, Jain and Jain.
2. Strength of materials by R. K. Bansal, Lakshmi Publications.

References:

1. Mechanics of Materials- by R. C. Hibbler.
2. Strength of materials by R. K Rajput, S. Chand and Co.
3. Strength of Materials by R. Subramanian, Oxford Publications.

Course Outcomes:

Upon successful completion of this course,

1. The student will be able to understand the basic concepts of Principal stresses developed in a member when it is subjected to stresses along different axes and design the sections.
2. The student can assess stresses in different engineering applications like shafts, springs, columns and struts subjected to different loading conditions.
3. The student will be able to assess forces in different types of trusses used in construction.

Subject	GEO-TECHNICAL ENGINEERING				
Year / Semester	III B.Tech /I Sem	L	T	P	C
Regulation Year	2021-22	3	0	0	3

Course Learning Objectives: The objective of this course is:

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

SYLLABUS:

UNIT – I

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

UNIT – II

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

UNIT –III

Permeability: Soil water – capillary rise – One dimensioned flow of water through soils – Darcy's law- permeability – Factors affecting –laboratory determination of coefficient of permeability –Permeability of layered systems. Total, neutral and effective stresses –quick sand condition – 2-D flow and Laplace's equation - Seepage through soils –
Flow nets: Characteristics and Uses.

UNIT – IV

Stress Distribution in Soils: Stresses induced by applied loads - Boussinesq's and Westergaard's theories for point loads and areas of different shapes– Newmark's influence chart – 2:1 stress distribution method.

UNIT – V

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

UNIT – VI

Shear Strength of Soils: Basic mechanism of shear strength - Mohr – Coulomb Failure theories – Stress-Strain behavior of Sands - Critical Void Ratio – Stress-Strain behavior of clays – Shear Strength determination- various drainage conditions.

Text Books:

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

References:

1. Fundamentals of Soil Mechanics, D. W. Taylor, Wiley.
2. An introduction to Geotechnical Engineering, Holtz and Kovacs; Prentice Hall.
3. Fundamentals of Geotechnical Engineering, B M Das, Cengage Learning, New Delhi.

Course Outcomes: Upon the successful completion of this course

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

Subject	[PE-1] REMOTE SENSING & GEOGRAPHICAL INFORMATION SYSTEMS				
Year / Semester	III B.Tech/I Sem	L	T	P	C
Regulation Year	2021-22	3	0	0	3

Course Learning Objectives:

1. To introduce the basic principles of Remote Sensing and GIS techniques.
2. To learn various types of satellite sensors and platforms.
3. To learn concepts of visual and digital image analyses.
4. To understand the principles of spatial analysis.
5. To appreciate application of RS and GIS to Civil engineering.

SYLLABUS:

UNIT – I

Introduction to remote sensing: Basic concepts of remote sensing, electromagnetic radiation, electromagnetic spectrum, interaction with atmosphere, energy interaction with the earth surfaces, Characteristics of remote sensing systems

Sensors and platforms: Introduction, types of sensors, airborne remote sensing, spaceborne remote sensing, image data characteristics, digital image data formats-band interleaved by pixel, band interleaved by line, band sequential, IRS, LANDSAT, SPOT, MODIS, ASTER, RISAT and CARTOSAT

UNIT – II

Image analysis: Introduction, elements of visual interpretations, digital image processing-image preprocessing, image enhancement, image classification, supervised classification, unsupervised classification.

UNIT – III

Geographic Information System: Introduction, key components, application areas of GIS, map projections.

Data entry and preparation: spatial data input, raster data models, vector data models.

UNIT –IV

Spatial data analysis: Introduction, overlay function-vector overlay operations, raster overlay operations, arithmetic operators, comparison and logical operators, conditional expressions, overlay using a decision table, network analysis-optimal path finding, network allocation, network tracing and buffer analysis.

UNIT – V

RS and GIS applications General: Land cover and land use, agriculture, forestry, geology, geomorphology, urban applications.

UNIT – VI

Applications of Hydrology, Water Resources and Disaster Management:

Flood zoning and mapping, groundwater prospects and potential recharge zones, watershed management and disaster management with case studies.

TEXT BOOKS:

1. Remote sensing and GIS, Bhatta B (2008), Oxford University Press.
2. Remote Sensing and Image Interpretation, Lillesand, T.M, R.W. Kiefer and J.W. Chipman (2013), Wiley India Pvt. Ltd., New Delhi.
3. Fundamentals of Geographic Information Systems, Demers, M.N, Wiley India Pvt. Ltd, 2013.

REFERENCES:

1. Fundamentals of Remote Sensing, George Joseph, Universities Press, 2013.
2. Concepts and Techniques of Geographical Information System, Chor Pang Lo and A K W Yeung, Prentice Hall (India), 2006.
3. Remote Sensing and its Applications, Narayan LRA, Universities Press, 2012.
4. Introduction to Geographic Information Systems, Kand Tsung Chang, McGraw Hill Higher Education, 2009.
5. Basics of Remote sensing & GIS, Kumar S, Laxmi Publications, New Delhi, 2005.
6. Principals of Geographical Information Systems, Burrough P A and R.A. McDonnell, Oxford University Press, 1998.
7. Remote Sensing, Schowenger, R. A (2006), Elsevier publishers.

Course Outcomes:

1. The student will be familiar with ground, air and satellite-based sensor platforms.
2. The students will be able to interpret the aerial photographs and satellite imageries.
3. The students will be able to create and input spatial data for GIS application.
4. The students will be able to apply RS and GIS concepts in water resources engineering.
5. The student will be familiar with applications of various satellite data.

Subject	[PE-1] ADVANCED SURVEYING				
Year / Semester	III B.Tech/I Sem	L	T	P	C
Regulation Year	2021-22	3	0	0	3

COURSE OBJECTIVES: The objective of this course is to enable the students to,

1. Understand the basics of Geodetic Surveying and triangulation systems.
2. Understand the hydrographic surveying and prediction of tides.
3. Understand the Photogrammetric Surveying and Astronomical Surveying.
4. Understand the importance and applications of total stations and GPS.

UNIT I

Geodetic Surveying: Definition, importance, triangulation system, order of triangulation, size and shape of triangulation, strength of figure criterion, triangulation fieldwork, base line measurement- tape corrections, problems in baseline measurement, measurement of angles.

UNIT II

Hydrographic Surveying: Tides-lunar tides, solar tides, spring and neap tides, measurement of tides- shore lines, soundings, sounding equipment, locating soundings by cross rope method and range and time intervals-mean sea level-prediction of tides.

UNIT III

Photogrammetric Surveying: Basic principles, photo theodolite, horizontal and vertical angles from terrestrial photographs, elevation of a point by photographic measurement, determination of focal length of the lens, Aerial camera- scale of vertical photograph, scale of tilted photograph, combined effects of tilt and relief, stereoscopic vision, mosaics.

UNIT IV

Astronomical Surveying: Spherical Trigonometry, latitude and longitude, solar system, astronomical teams, coordinate systems-altitude, azimuth system, declination, hour angle system, time and astronomical work-sidereal time, apparent solar time, mean solar time, standard time, standard time, application of astronomy in surveying, corrections to astronomical observations.

UNIT V

Total stations: Importance, measurement of horizontal angles, vertical angles, horizontal distance, slope distance, height of object-remote elevation measurement (REM), remote distance measurement (RDM)-radial and continuous distances for measuring the lengths and sides of the closed circuits, areas and perimeters calculations.

UNIT VI

Global Positioning System: Principles of GPS, components of GPS, types of GPS and accuracy,

applications of GPS, sources of error GPS and limitations.

TEXT BOOKS:

1. 'Surveying and Levelling' by R. Subramanian, Oxford University Press, New Delhi.
2. A text book of Surveying' by C. Venkatramaiah, University Press, New Delhi.
3. 'Surveying Vol. II and Vol. III (Higher Surveying)' by Dr. B. C. Punmia, Ashok K. Jain and Arun K. Jain, Laxmi Publications Pvt. Ltd., New Delhi.
4. 'Advanced Surveying' by Satheesh Gopi, R. Sathikumar and N. Madhu, Pearson, New Delhi.

REFERENCES:

1. 'Remote Sensing and its Applications' by L A R Narayan, Universities Press, New Delhi.
2. 'Geographical Information Science' by Narayan Panigrahi, Universities Press, New Delhi.
3. 'Basics of Remote Sensing and GIS' by Dr. S. Kumar, University Science Press, New Delhi.

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

1. The student should be able to conduct different types of surveys for obtaining better results.
2. The student should be able to utilize the total stations for getting the required information.
3. The student should be capable of using the GPS instrument to obtain appropriate information of the objects and their positions.

Subject	[PE-I] GREEN BUILDING TECHNOLOGIES				
Year / Semester	III B.Tech/I Sem	L	T	P	C
Regulation Year	2021-22	3	0	0	3

COURSE OBJECTIVES:

The objective of this course is to enable the students to,

1. Learn the principles of planning and orientation of buildings.
2. Acquire knowledge on various aspects of green buildings

UNIT I

Green Buildings: Definition of Green Buildings, typical features of green buildings, benefits of Green Buildings- Sustainable site selection and planning of buildings to maximize comfort, day lighting, ventilation, planning for storm water drainage.

UNIT II

Environmentally friendly building materials and technologies: Natural Materials like bamboo, timber, rammed earth, stabilized mud blocks, hollow blocks, lime & lime-pozzolana cements, materials from agro and industrial waste, ferro-cement and ferro-concrete, alternative roofing systems, various paints reducing the heat gain of the building, etc.

UNIT III

Energy and resource conservation: Need for energy conservation, various forms of energy used in buildings, embodied energy of materials, energy used in transportation and construction processes- water conservation systems in buildings-water harvesting in buildings – waste to energy management in residential complexes or gated communities.

UNIT IV

Use of renewable energy resources: Wind and Solar Energy Harvesting, potential of solar energy in India and world, construction and operation of various solar appliances, success case studies of fully solar energy-based buildings in India.

UNIT V

Climate Design: Local climatic conditions – temperature, humidity, wind speed and direction -impact of climate change on built environment - comforts: the desirable conditions – Principles of thermal design - means of thermal –light and lighting-building acoustics-energy efficient lighting, Ventilation and air quality requirement, various techniques for passive cooling, garden roofs, case studies for passive cooling and thermal comfort.

UNIT VI

Green Building Rating Systems: Introduction to Leadership in Energy and Environment Design (LEED), Green Rating systems for Integrated Habitat Assessment - Modular wastewater treatment systems for built environment - Building automation and building management systems.

TEXT BOOKS:

1. 'Alternative building materials and technologies' by K.S. Jagadish, B.V. Venkatarama Reddy and K.S. Nanjunda Rao.
2. 'Non-Conventional Energy Resources' by G. D. Rai, Khanna Publishers.

REFERENCES:

1. Mili Majumdar, "Energy-efficient buildings in India" Tata Energy Research Institute, 2002.
2. TERI "Sustainable Building Design Manual- Volume I & II" Tata Energy Research Institute, 2009.

COURSE OUTCOMES:

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

1. Explain the principles of building planning, its bylaws and provide facilities for rainwater harvesting.
2. Understand the concepts of green buildings.

Subject	[PE-I] SOLID WASTE MANAGEMENT				
Year / Semester	III B.Tech/I Sem	L	T	P	C
Regulation Year	2021-22	3	0	0	3

COURSE OBJECTIVES:

1. To impart the knowledge of the methods of collection and optimization of collection routing of municipal solid waste.
2. To acquire the principles of treatment of municipal solid waste.
3. To know the impact of solid waste on the health of the living beings.
4. To learn the criterion for selection of landfill and its design.
5. To plan the methods of processing such as composting the municipal organic waste.

UNIT I

Introduction to Solid Waste Management: Goals and objectives of solid waste management, Classification of Solid Waste - Factors Influencing generation of solid waste - sampling and characterization – Future changes in waste composition, major legislation, monitoring responsibilities, Terms related to ISWM like WTE, ULB, TLV etc... Measurement of NPK and Calorific value.

UNIT II

Basic Elements in Solid Waste Management: Elements and their inter relationship – principles of solid waste management- onsite handling, storage and processing of solid waste.

Collection of Solid Waste: Type and methods of waste collection systems, analysis of collection system - optimization of collection routes– alternative techniques for collection system.

UNIT III

Transfer, Transport and Transformation of Waste: Need for transfer operation, compaction of solid waste - transport means and methods, transfer station types and design requirements. Unit operations used for separation and transformation: shredding materials separation and recovery, source reduction and waste minimization.

UNIT IV

Processing and Treatment: Processing of solid waste - Waste transformation through combustion and composting. Market yard wastes and warming composting and vermin composting, anaerobic methods for materials recovery and treatment – Energy recovery – biogas generation and cleaning– Incinerators.

UNIT V

Disposal of Solid Waste: Methods of Disposal, Landfills: Site selection, design and operation, drainage and leachate collection systems –designated waste landfill remediation. Case studies.

UNIT VI

Hazardous Waste Management- sources, collection, transport, treatment and disposal methods; Biomedical waste Management; Electronic waste Management; Environmental law related to waste Management; Case studies.

TEXT BOOKS:

1. Integrated Solid Waste Management, George Techobanoglous, McGraw Hill Publication, 1993.

REFERENCES:

1. Solid Waste Engineering, Vesilind, P.A., Worrell, W., Reinhart, D., Cenage learning, New Delhi, 2004.
2. Hazardous Waste Management, Charles A. Wentz, McGraw Hill Publication, 1995.
3. Solid and Hazardous Waste Management PM Cherry, CBS Publishers and Distributors. New Delhi, 2016.
4. Solid Waste Engineering, William A Worrell, P Aarue Vesilind, Cengage Learning, New Delhi 2016.

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

1. Design the collection systems of solid waste of a town.
2. Design treatment of municipal solid waste and landfill.
3. Know the criteria for selection of landfill.
4. Characterize the solid waste and design a composting facility.
5. Know the Method of treatment and disposal of Hazardous wastes.

Subject	HYDRAULICS AND HYDRAULIC MACHINERY				
Year / Semester	III B.Tech /I Sem	L	T	P	C
Regulation Year	2021-22	3	0	0	3

Course Learning Objectives:

1. To study about uniform and non-uniform flows in open channel and also to learn about the characteristics of hydraulic jump.
2. To introduce dimensional analysis for fluid flow problems.
3. To understand the working principles of various types of hydraulic machines and Pumps.

Syllabus:

UNIT – I

UNIFORM FLOW IN OPEN CHANNELS:
Types of channels –Types of flows - Velocity distribution – Energy and momentum correction factors – Chezy's, and Manning's formulae for uniform flow – Most Economical sections, Critical flow: Specific energy-critical depth.

UNIT II

NON-UNIFORM FLOW IN OPEN CHANNELS: Steady Gradually Varied Flow-Dynamic equation, Mild, Critical, Steep, horizontal and adverse slopes-surface profiles direct step method- Rapidly varied flow, hydraulic jump.

UNIT – III

HYDRAULIC SIMILITUDE: Dimensional analysis-Rayleigh's method and Buckingham's pi theorem-study of Hydraulic models – Geometric, kinematic and dynamic similarities-dimensionless numbers – model and prototype relations.

UNIT – IV

BASICS OF TURBO MACHINERY: Hydrodynamic force of jets on stationary and moving flat, jet striking centrally.

UNIT – V

HYDRAULIC TURBINES – I: Layout of a typical Hydropower installation – Heads and efficiencies - classification of turbines. Pelton wheel - Francis turbine – Kaplan turbine - working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube – theory and efficiency. Governing of turbines-surge tanks and selection of turbines.

UNIT – VI

CENTRIFUGAL-PUMPS: Pump installation details-classification-work done-Manometric head-minimum starting speed-losses and efficiencies-specific speed, multistage pumps-pumps in parallel and series - performance of pumps.

RECIPROCATING PUMPS: Introduction, classification, components, working, discharge, indicator diagram, work done and slip.

Text Books:

1. Open Channel flow, K. Subramanya, Tata McGraw Hill Publishers.
2. A text of Fluid mechanics and hydraulic machines, R. K. Bansal, Laxmi Publications New Delhi.
3. Fluid Mechanics, Modi and Seth, Standard book house.

References:

1. Fluid Flow in Pipes and Channels, G.L. Asawa, CBS
2. Fluid Mechanics and Machinery, C.S.P. OJHA, R. BERNDTSSON and P.N.Chandramouli, Oxford Higher Education.
3. Fluid Mechanics and Machinery, Md. Kaleem Khan, Oxford Higher Education.

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

1. Solve uniform and non-uniform open channel flow problems.
2. Apply the principals of dimensional analysis and similitude in hydraulic model testing.
3. Understand the working principles of various hydraulic machineries and pumps.

Subject	DATA STRUCTURES				
Year / Semester	III B.Tech /I Sem	L	T	P	C
Regulation Year	2021-22	3	0	0	3

Course Objectives:

The objective of the course is to

- Introduce the fundamental concept of data structures and abstract data types
- Emphasize the importance of data structures in developing and implementing efficient algorithms
- Describe how arrays, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms.

UNIT I

Data Structures: Definition, Classification of Data Structures, Operations on Data Structures, Abstract Data Type (ADT), Preliminaries of algorithms. Time and Space complexity. Searching - Linear search, Binary search. Sorting- Insertion sort, Selection sort, Exchange (Bubble sort, quick sort), distribution (radix sort), merging (Merge sort) algorithms.

UNIT II

Stacks: Introduction to Stacks, Array Representation of Stacks, Operations on Stacks, Linked list Representation of Stacks, Operations on Linked Stack, Applications-Reversing list, Infix to Postfix Conversion, Evaluating Postfix Expressions.

UNIT III

Queues: Introduction to Queues, Representation of Queues-using Arrays and using Linked list, Implementation of Queues-using Arrays and using Linked list,Application of Queues-Circular Queues, Dequeues.

UNIT IV

Linked List: Introduction, Single linked list, Representation of Linked list in memory, Operations on Single Linked List-Insertion, Deletion, Search and Traversal, Reversing Single Linked list, Applications and Advantages and Disadvantages of Single Linked list, Double Linked List-Insertion, Deletion, Circular Linked list-Insertion, Deletion.

UNIT V

Trees: Basic Terminology in Trees, Binary Trees-Properties, Representation of Binary Trees using Arrays and Linked lists. Binary Search Trees- Basic Concepts, BST Operations: Insertion, Deletion, Tree Traversals, Applications.

UNIT VI

Graphs: Basic Concepts, Representations of Graphs-Adjacency Matrix and using Linked list, Graph Traversals (BFT & DFT), Applications- Minimum Spanning Tree Using Prims & Kruskals Algorithm, Dijkstra's shortest path.

Text Books:

1) Data Structures Using C. 2nd Edition. Reema Thareja, Oxford.
2) Data Structures and algorithm analysis in C, 2nded, Mark Allen Weiss.

Reference Books:

1) Fundamentals of Data Structures in C, 2nd Edition, Horowitz, Sahni, Universities Press.
2) Data Structures: A Pseudo Code Approach, 2/e, Richard F.Gilberg, Behrouz A. Forouzon, Cengage.
3) Data Structures with C, Seymour Lipschutz TMH

Course Outcomes:

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

- Summarize the properties, interfaces, and behaviors of basic abstract data types
- Discuss the computational efficiency of the principal algorithms for sorting & searching
- Use arrays, records, linked structures, stacks, queues, trees, and Graphs in writing programs
- Demonstrate different methods for traversing trees

Subject	GEO-TECHNICAL ENGINEERING LAB				
Year / Semester	**III B.Tech /I Sem**	**L**	**T**	**P**	**C**
Regulation Year	**2021-22**	**0**	**0**	**3**	**1.5**

Course Learning Objectives: The objective of this course is:

1. To impart knowledge of determination of index properties required for classification of soils.
2. To teach how to determine compaction characteristics and consolidation behavior from relevant lab tests.
3. To determine permeability of soils.
4. To teach how to determine shear parameters of soil through different laboratory tests.

LIST OF EXPERIMENTS

1. Specific gravity, G
2. Atterberg's Limits.
3. Field density - Core cutter and Sand replacement methods
4. Grain size analysis by sieving
5. Hydrometer Analysis Test
6. Permeability of soil - Constant and Variable head tests
7. Compaction test
8. Consolidation test (to be demonstrated)
9. Direct Shear test
10. Triaxial Compression test (UU Test)
11. Unconfined Compression test
12. Vane Shear test
13. Differential free swell (DFS)
14. CBR Test

At least **Ten** experiments shall be conducted.

LIST OF EQUIPMENT:

1. Casagrande's liquid limit apparatus.
2. Apparatus for plastic and shrinkage limits
3. Field density apparatus for
    a. Core cutter method
    b. Sand replacement method
4. Set of sieves: 4.75mm, 2mm, 1mm, 0.6mm, 0.42mm, 0.3mm, 0.15mm and 0.075mm.
5. Hydrometer
6. Permeability apparatus for
    a. Constant head test
    b. Variable head test
7. Universal auto compactor for I.S light and heavy compaction tests.
8. Shaking table, funnel for sand raining technique.
9. Apparatus for CBR test
10. 10 tons loading frame with proving rings of 0.5 tons and 5 tons capacity
11. One dimensional consolation test apparatus with all accessories.
12. Triaxial cell with provision for accommodating 38 mm dia specimens.
13. Box shear test apparatus
14. Laboratory vane shear apparatus.
15. Hot air ovens (range of temperature 500 - 1500C

Reference:

1. Determination of Soil Properties, J. E. Bowles.
2. IS Code 2720 – relevant parts.

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

1. Determine index properties of soil and classify them.
2. Determine permeability of soils.
3. Determine Compaction, Consolidation and shear strength.

Subject	ADVANCED ENGLISH COMMUNICATION SKILLS LAB				
Year / Semester	**III B.Tech /I Sem**	**L**	**T**	**P**	**C**
Regulation Year	**2021-22**	**0**	**0**	**3**	**1.5**

COURSE OBJECTIVES:

- To expose students to different contexts through right vocabulary
- To inculcate the habit of reading and understanding any text
- To enable students to acquire the ability of writing for business purposes
- To enable students to acquire interview skills and group discussion dynamics

UNIT – I

Selected High GRE Words, Idioms & Phrases – Discourse Skills – using visuals – Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases, collocations. **(2 sessions)**

UNIT – II

Reading Comprehension – General Vs Local Comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning. **(2 sessions)**

UNIT – III

Writing Skills – Structure of Resume writing —Short Report Writing (Business/Technical)-

(2 sessions)

UNIT – IV

Presentations (Technical)

UNIT – V

Group Discussion – Dynamics of Group Discussion, Intervention, summarizing,

modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation**. (2 sessions)**

UNIT – VI

Interview Skills – Concept and process – pre-interview planning, opening strategies, answering strategies, interview through teleconference & video-conference and mock interviews. **(3 sessions)**

SUGGESTED SOFTWARE:

1. K-Van solutions Software with CD
2. Oxford advanced learner's compass, 7th Edition

SUGGESTED READING:

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
2. Business and Professional Communication: Kelly M.Quintanilla, Shawn T. Wahl. Sage South Asia Edition. Sage Publications, 2011.
3. English Vocabulary in Use Series, Cambridge University Press 2008.
4. Communication Skills by Leena Sen, PHI Learning Pvt. Ltd., New Delhi, 2009.
5. A Course Book of Advanced Communication Skills Lab published by University Press, Hyderabad.

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

CO1: Choose vocabulary contextually.

CO2: Comprehend, analyze and interpret the text in a definite time frame.

CO3: Write resumes cohesively and coherently.

CO4: Construct and elaborate on a given topic.

CO5: Comprehend and practice the dynamics of group discussion.

CO6: Comprehend the concept and process of interview; answering through mock interviews.

Subject	QUANTITATIVE APTITUDE-II				
Year/Semester	III B.Tech / I Sem	L	T	P	C
Regulation Year	2021-22	3	-	-	-

Course Objectives: Enable the students to

1. Know the concepts of partnership and their profit sharing at the end.
2. Understand the concept of sets and relation between sets and Venn diagrams.
3. Apply the concepts of measures of central tendency and dispersion.
4. Know the concepts of Permutations & Combinations and their application in probability.
5. Calculate ages of persons in a family using the given data.
6. Understand the given data and interpret the required values.

Syllabus

UNIT –I: Business & Partnership

Partnership in business- Working and Sleeping Partners -Division of Shares - Partnership Involved Time and Work problems.

UNIT- II: Set Theory &Venn Diagrams

Basic Concepts of Sets-Operations on Sets – Venn Diagrams- Problems.

UNIT –III: Statistics:

Basics of Statistics -Range -Mean- Median-Mode -Standard Deviation-Problems.

UNIT –IV: Permutations & Combinations and Probability

Basic concepts of Permutations & Combinations - Selection with and without repetition- Circular Arrangements.

Concepts of Probability- Various Events of Probability- Related Problems.

UNIT –V: Ages

Ratio Based - Proportion Based - Equation Based – Average Based - Age Problems.

UNIT – VI: Data Interpretation

Line & Bar Graphs- Pie Charts/Graphs-Table –Based Problems.

Text Books:

1. Dr. R.S.Aggarwal ,Quantitative Aptitude for competitive Examinations, Sultan Chand Publications, 2017.

References:

1. Arun Sharma, How to Prepare for Quantitative Aptitude for the CAT, Tata McGraw Hill Publishing Company, 2016.
2. Dinesh Khattar, The Pearson Guide to Quantitative Aptitude for Competitive Examinations, Pearson India, 2016.

Course Outcomes: After completing this course, the students will be able to

1. Calculate the profit or remuneration received at the end using the ratio of investments or workmen ship.
2. Evaluate number of persons/objects belonging to a specified category using the concept of Venn diagram.
3. Measure the range, mean, median and mode of the given data, identify the extent of dispersion and interpret the data.
4. Compute various ways of selection or arrangement of persons /objects and predict the probability of doing so.
5. Deduce the ratios/ equations corresponding to ages of persons of a family and calculate the corresponding ages.
6. Analyze the given chart / table and interpret the results from the given data.