Shri Rawatpura Sarkar University, Raipur, Chhattisgarh
Faculty of Engineering

Shri Rawatpura Sarkar University, Raipur

Examination Scheme & Syllabus

for

B.Tech. In Civil Engineering

Semester-III

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the Session: 2022-23)

Shri Rawatpura Sarkar University, Raipur, Chhattisgarh
Faculty of Engineering

Four Years B.Tech. Programme

Scheme of Teaching and Examination
B.Tech. Third Semester Civil Engineering

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2022-2023)

S.No.	Course Code	Course Title	Hours / Week			Credits	Maximum Marks			Sem End Exam Duration (Hrs)
			L	T	P		Continuous Evaluation	Sem End Exam	Total	
1	BENCE301T	Mathematics-III	3	1	-	4	30	70	100	3
2	BENCE302T	Fluid Mechanics-I	3	1	-	4	30	70	100	3
3	BENCE302P	Fluid Mechanics-I	-	-	2	1	15	35	50	-
4	BENCE303T	Surveying-I	3	1	-	4	30	70	100	3
5	BENCE303P	Surveying – I	-	-	2	1	15	35	50	-
6	BENCE304T	Mechanics of Solids	3	1	-	4	30	70	100	3
7	BENCE305T	Building Materials	1	1	-	2	30	70	100	3
8	BENCE305P	Building Materials	-	-	2	1	15	35	50	-
9	BENCE306T	Engineering Geology	1	1	-	2	30	70	100	3
10	BENCE306P	Engineering Geology	-	-	2	1	15	35	50	-
	Total Contact Hours Per Week: 28					**Total Credit: 24**	**Grand Total Marks**		**800**	

L: Lecture   T: Tutorial   P: Practical

Course Title	Mathematics – III

Course Code	BENCE301T

Course Credits	L	T	P	TC	
	3	1	-	4	

Prerequisites	Engineering Mathematics- I & II

Course Objectives	**This course will enable students to:** • Make student to understand Fourier series. • Understand the Laplace Transform. • Understand the Partial Differential Equation. • Provide an understanding about Complex variables • Understand statistics

Course Contents	**UNIT-I** **Fourier Series** Euler's Formula, Functions having points of discontinuity, Change of interval, Even& Odd functions, Half range series, Harmonic analysis. **UNIT-II** **Laplace Transform** Definition, Transform of elementary functions, Properties of Laplace transform, Transform of derivatives & integrals, Multiplication by Division by t, Evaluation of integrals, Inverse Laplace Transform, Convolution theorem, Unit step function, Unit impulse function, Periodic function, Application to solution of ordinary differential equations. **UNIT-III** **Partial Differential Equation** Formation, Solution by direct integration method, Linear equation of first order, Homogeneous linear equation with constant coefficients, Non-homogeneous linear equations, Method of separation of variables. **UNIT-IV** **Complex Variables** Derivative, Cauchy-Riemann equations, Analytic functions, Harmonic functions, Flow problems, Complex integration, Cauchy theorem, Cauchy integral formula, Taylor & Laurent series, Singularity, n Residue, and Evaluation of real definite integrals.

	UNIT-V **Statistics** Random variables, Discrete & continuous probability distributions, Expectation, Mean & Standard Deviation, Moments & moment generating function, Distributions- Binomial, Poisson and Normal distributions.
Course Outcomes	**After the completion of course:** - Evaluate integrals and solve boundary value problems using Laplace transforms - Solve standard type of first order partial differential equations and higher order partial differential equations with constant coefficients. - Apply the concept of Fourier series to find the sum of certain series. - Hands on these Mathematical topics will make them equipped to prepare for higher studies through competitive examinations.
Text Books	1. Higher Engg. Mathematics by Dr. B.S. Grewal– Khanna Publishers. 2. Advanced Engg. Mathematics by Erwin Kreyszig – John Wiley & Sons. 3. Advanced Engg. Mathematics by R.K. Jain and S.R.K. Iyengar – Narosa Publishing House. 4. Applied Mathematics by P.N.Wartikar & J.N. Wartikar. Vol- II– Pune Vidyarthi Grih Prakashan, Pune 5. Applied Mathematics for Engineers & Physicist by Louis A. Pipes- TMH.
Reference Books	1. Higher Engineering Mathematics, Grewal, B.S., Grewal, J.S., Khanna Publishers, New Delhi, 37th Edn., 5th Reprint 2004, 2003. 2. Engineering Mathematics –III A, Venkataraman, M. K., The National Publishing Company, Chennai, 11th Edn., Reprint 2002, 1998. 3. Engineering Mathematics - III B, Venkataraman, M. K., The National Publishing Company, Chennai, 13th Edn., Reprint 1999, 1998.

B.Tech. In Civil Engineering
Semester-III
2022-23

Course Title	Fluid Mechanics – I				
Course Code	BENCE302T				
Course Credits	L	T	P	TC	
	3	1	-	4	
Prerequisites	Basic Physics				

Course Objectives	**This course will enable students to:** • Understand the properties of fluids and fluid statics • Derive the equation of conservation of mass and its application • Solve kinematic problems such as finding particle paths and stream lines • Use important concepts of continuity equation, Bernoulli's equation and turbulence, and apply the same to problems • Analyze laminar and turbulent flows
Course Contents	**UNIT-I** **Introduction** Fluid and continuum, physical properties of fluids ideal and real fluid, Newtonian and Non- Newtonian Fluid. Fluid Statics-Pressure density height relationship, pressure measurement by Manometers, Pressure on plane and curved surfaces, centre of pressure, buoyancy, stability of immersed and floating bodies, metacentric height **UNIT-II** **Kinematics of Fluid Flow** Steady and unsteady flow, uniform and non uniform flow, laminar and turbulent flow, one, two and three dimensional flow, streamlines, streak lines and path lines, circulation and vorticity, rotational and irrotational flow, velocity potential and stream function, continuity equation. **UNIT-III** **Dynamics of Fluid Flow** Euler's equation of motion along a streamline and its integration, Bernoulli's equation and its applications – Pitot tube, Venturimeter, orifice meter, nozzles, momentum equation and its application to stationary and moving plates/vanes, pipe bends, problems related to combined application of energy and momentum equations.

	UNIT-IV **Flow in Pipes** Reynolds's experiment, experimental determination of critical velocity, transition from laminar to turbulent flow, Laminar flow through circular tubes, flow between parallel plates, minor losses in pipe lines, loss due to sudden contraction, expansion, etc; Hot wire anemometer and LDA. Flow in open Channel Comparison between open channel and pipe flow, definition of uniform and non-uniform flow, uniform flow formulae, Chezy's and Manning's Formula, Hydraulically efficient channel section of rectangular, trapezoidal and circular type. **UNIT-V** **Flow Through Mouthpiece And Orifices** Hydraulic coefficients of orifice, bell method orifice, mouthpieces, Borda's mouthpiece, running free and submerged. Notches and Weirs-Rectangular, triangular and trapezoidal notches and weir, cippoletti and broad crested weir, aeration of nappe, cavitations submerged weir.
Course Outcomes	**After the completion of course:** • Apply the concept of fluid statics in different engineering problem. • Apply the principle of fluid kinematics. • Apply the energy and momentum principle. • Analyse the pipe flow and open channel flow. • Analyse the flow through mouthpiece, orifice, notch and weir.
Text Books	1. Fluid Mechanics and Machines – Dr. A.K. Jain (Khanna Publications) 2. Fluid Mechanics and Machines – Dr. R.K. Bansal (Laxmi Publications) 3. Hydraulics and Fluid Mechanics including Fluid Machines, Modi, P.N., and Seth, S.M., Standard Book House, New Delhi,2000 4. Fluid Mechanics, Hydraulics and Hydraulic Machines, Arora, K.R., Standard Publishers and Distributors, New Delhi, 9th Edition, 2005. 5. Fluid Mechanics, Streeter, V.L. and Whlie, E.B., McGraw Hill, 1983. 6. A text book of Fluid Mechanics in SI units, R.K. Rajput, S. Chand & Company Ltd.
References Books	1. Fluid Mechanics, Nagaratnam, S., Khanna Publishers, 1995. 2. Principles of Fluid Mechanics, Natarajan, M.K. Oxford & IBH Publishing Co, 1994. 3. Hydraulics and Fluid Mechanics, Jagdish Lal, Tata McGraw Hill, 2001. 4. Fluid mechanics, Streeter V.L., Tata McGraw Hill, 1998.

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Course Title	**Fluid Mechanics-I**
Course Code	**BENCE302P**

Course Credits	**L**	**T**	**P**	**TC**	
	-	**-**	**2**	**1**	

Prerequisites	**Basic Physics & Subject Knowledge**

Course Objectives	**This course will enable students to:** • Understand the flow measurement in a pipe flow • Determine the energy loss in pipe flow • Study the characteristics of turbines • Study the characteristics of pumps • Measure the discharge in a open channel flow

Course Contents	**List of Experiments** 1. To determine the met centric height of a ship model. 2. Verification of Bernoulli's equation. 3. Verification of momentum equation. 4. To calibrate a venturimeter and study the variation of the coefficient of discharge with the Reynolds number. 5. To calibrate an orificemeter and study the variation of the coefficient of discharge with the Reynolds number. 6. Experimental determination of critical velocity in pipe. 7. Determination of head loss coefficient due to sudden expansion in pipe. 8. Determination of head loss coefficient due to sudden contraction in pipe. 9. Determination of head loss coefficient in pipe bends. 10. To determine the hydraulic coefficients (C_c, C_d and C_v) of an orifice. 11. To determine the coefficient of discharge of a mouth piece. 12. To calibrate a triangular notch. 13. To calibrate a rectangular notch. 14. To obtain the surface profile and the total distribution of a forced vortex.

Course Outcomes	**After the completion of course:** • Measure discharge in pipes. • Determine the energy loss in conduits.

	• Demonstrate the characteristics curves of pumps.
	• Demonstrate the characteristics curves of turbines.
	• Carry out discharge measurements in open channel.
Text Books	1. Hydraulics Laboratory Manual – S.K. Likhi (New Age International Ltd.)
	2. Fluid Mechanics – Jagdish Lal (Metropolitan Educational, New Delh-2)
	3. Hydraulics and Fluid Mechanics including Fluid Machines, Modi, P.N., and Seth, S.M., Standard Book House, New Delhi,2000
	4. Fluid Mechanics, Hydraulics and Hydraulic Machines, Arora, K.R., Standard Publishers and Distributors, New Delhi, 9th Edition, 2005.
	5. Fluid Mechanics, Streeter, V.L. and Whlie, E.B., McGraw Hill, 1983.
	6. A text book of Fluid Mechanics in SI units, R.K. Rajput, S. Chand & Company Ltd.
Reference Books	1. Fluid Mechanics, Nagaratnam, S., Khanna Publishers, 1995.
	2. Principles of Fluid Mechanics, Natarajan, M.K. Oxford & IBH Publishing Co, 1994.
	3. Hydraulics and Fluid Mechanics, Jagdish Lal, Tata McGraw Hill, 2001.
	4. Fluid mechanics, Streeter V.L., Tata McGraw Hill, 1998.
	5. Fluid Mechanics and Machinery, Rama Durgaiah, D., New Age International Publishers, New Delhi, 1st Edition, Reprint, 2006.

B.Tech. In Civil Engineering
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Course Title	Surveying -I				
Course Code	BENCE303T				
Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**	**-**	**4**	
Prerequisites	Basic Civil Engineering				
Course Objectives	**This course will enable students to:** • Understand the importance of surveying in the field of civil engineering • Study the basics of linear/angular measurement methods like chain surveying, compass surveying • Study the significance of plane table surveying in plan making • Know the basics of levelling and theodolite survey in elevation and angular measurements • Understand tacheometric surveying in distance and height measurements				
Course Contents	**UNIT– I** **Introduction and Principles of Surveying** Classification of Surveying, Brief Introduction to chaining and Ranging, Compass surveying, Prismatic Compass only, Instruments, Bearing of Survey lines, system and Conversions local attraction latitude and departure, Traversing- Traverse adjustment of Closing errors. **UNIT – II** **Theodolite Traversing** Vernier and micrometer theodolite, Temporary and permanent adjustments, Requirements of non-adjustable parts, Measure of horizontal and vertical angles by different methods Principle of traversing by theodolite, Field work and checks, Computation of coordinates, Source of errors, Precision of traversing, Checking and Balancing the traverses, Principles, Advantages and disadvantages, **UNIT – III** **Leveling** Different methods of determining elevations: Spirit, Trigonometric, Barometric and Photogrammetric methods, Spirit leveling-Definitions of terms, Principle, Construction, Temporary and permanent adjustment of levels. Sensitivity of bubble tube, Automatic levels, Leveling staves, Methods of spirit leveling Booking and reduction of field notes, Curvature and refraction,				

Reciprocal leveling Plotting of profiles, Barometric leveling, Trigonometric leveling-simple and reciprocal observations

UNIT – IV

Contouring & Plane Table Survey
Direct and Indirect methods of contouring. Interpolation of contours, Drawing section from contour map, Application and Modern methods of depicting relief on a Map. Minor Instruments- Construction and field use of altimeter, Description and use of Hand level, Abney Level, clinometers, Ceylon Ghat tracer, Box Sextant, Pantograph, Planimeter, Ediograph. Plane table equipment, Different methods of Plane Table Surveying, Resection-Two and Three point problems. Fields work in Plane Table Surveying and contouring.

UNIT – V

Curves
Classification of curves; Elements of Circular, compound, Transition and Vertical curves, Theory and method of setting out Simple, Transition, compound and Vertical curves with field problems.

Course Outcomes	**After the completion of course:** • Carry out preliminary surveying in the field of civil engineering applications such as structural, highway engineering and geotechnical engineering • Do transverse computations, detect and rectify errors. • Determine elevations by applying different techniques. • Do the various methods of traversing with Plane table & Deal with the minor instruments and will be familiar with their functioning. • Set out various curves with the field problems
Text Books	1. Surveying Vol. I, Punmia, B.C., Laxmi Publications (P) Ltd, New Delhi, 13th edition 2004. 2. Surveying Vol. II, Punmia, B.C., Laxmi Publications (P) Ltd, New Delhi, 15th edition 2004. 3. Surveying (Vol. II & III) – Agor, R (Khanna publications, Delhi, 1995) 4. Surveying (Vol. I & II) – S.K. Duggal (Tata McGraw Hill) 5. Surveying (Vol. I & II) – Kanetkar T.P. (Pune Vidyarthi Griha Prakashan, Pune) 6. Surveying (Vol. I & II) – C Venkataramaih (Universities Press Hyderabad)

Reference Books	1. Surveying, Bannister, A., and Raymond, S. ELBS, Sixth Edition, 1992.
	2. Surveying Vol. I and II, Arora, K. R., Standard Book House, New Delhi, 1991.

Course Title	Surveying-I
Course Code	BENCE303P

Course Credits	L	T	P	TC	
	-	-	2	1	

Prerequisites	Basic Civil Engineering

Course Objectives	**This course will enable students to:** • It includes essential measurements to determine the relative position of points or physical and cultural details above, on, or beneath the surface of the earth, and to depict them in a usable form, or to establish the position of points of details. • Will process knowledge about Survey field techniques?

Course Contents	**List of Experiments** 1. To determine the elevation of a point with respect to reference elevation by Fly Leveling 2. To determine sensitivity of bubble tube of a dumpy level. 3. Contouring and its plotting. 4. Measurement of horizontal angle by repetition method. 5. Measurement of horizontal angle by reiteration method. 6. To determine the height of object when base is accessible. 7. To determine the height of tower when base is inaccessible and instrument stations are in same vertical plane. 8. To find out the position of points by the Plane Table Radiation and Intersection method. 9. Determination of location of a point with the help of two point problem. 10. Determination of location of a point with the help of three point problem. 11. Setting out of curve by ordinates or offsets from long chord. 12. Setting out of curve by successive bisection of arcs. 13. Setting out of curve by offsets from chords produced. 14. Setting out of curve by two theodolite method. 15. Setting out of curve by Rankine's method.

Course Outcomes	**After the completion of course:** 1. Use conventional surveying tools such as chain/tape, compass, plane table, level in the field of civil engineering applications such as structural plotting and highway profiling

	2. Apply the procedures involved in field work and to work as a surveying team
	3. Plan a survey appropriately with the skill to understand the surroundings
	4. Take accurate measurements, field booking, plotting and adjustment of errors can be understood
	5. Plot traverses / sides of building and determine the location of points present on field on a piece of a paper
Text Books	1. Surveying Vol. I, Punmia, B.C., Laxmi Publications (P) Ltd, New Delhi, 13th edition 2004.
	2. Surveying Vol. II, Punmia, B.C., Laxmi Publications (P) Ltd, New Delhi, 15th edition 2004.
	3. Surveying (Vol. II & III) – Agor, R (Khanna publications, Delhi, 1995)
	4. Surveying (Vol. I & II) – S.K. Duggal (Tata McGraw Hill)
	5. Surveying (Vol. I & II) – Kanetkar T.P. (Pune Vidyarthi Griha Prakashan, Pune)
	6. Surveying (Vol. I & II) – C Venkataramaih (Universitires Press Hyderabad)
Reference Books	1. Surveying, Bannister, A., and Raymond, S. ELBS, Sixth Edition, 1992.
	2. Surveying Vol. I and II, Arora, K. R., Standard Book House, New Delhi, 1991.

Course Title	Mechanics of Solids				
Course Code	BENCE304				
Course Credits	L	T	P	TC	
	3	1	-	4	
Prerequisites	Engineering Mechanics				
Course Objectives	**This course will enable students to:** • Determine the mechanical behaviour of the body by determining the stresses, strains produced by application of load and to apply the fundamentals of simple stresses and strains. • Determine the Shear force and Bending Moment at a section of the beam for different loading condition. • Facilitate the concept of Bending and its theoretical analysis in a beam, determines bending and shear stress in beams and also to evaluate the crushing strength in columns. • Develop slope and Deflection equations for beams subjected to various types of loads. • Determine the torsion in circular section, Direct and Bending Stresses.				
Course Contents	**UNIT–I** **Stress and Strain** Concept of Simple stress and strain, Types of stresses and strains; stress-strain diagram for Ductile and Brittle materials; Hook's Law; Principle of super-position; stress and strain in composite sections; Temperature stresses in simple sections and composite sections; Elastic constants (E, C, k, μ); Relationship between Elastic constants; Sections subjected to three dimensional stresses; Generalized Hook,s law concept; Principle of complementary shear stresses; Stress at a point concept; stresses on inclined places; Principle stresses and strains; Mohr's circle. **UNIT–II** **Shear Force and Bending Moment** Types of Beams; Concept of shear force and bending moment; shear force and bending moment diagrams (Simply supported, over hanging and cantilever beams); Relationship between shear force and bending moment. **UNIT–III** **Stress in Beams and Columns** Theory of simple bending, assumptions and derivation of flexure formula; bending				

	stresses in beams; Distribution diagrams Concept of combined direct and bending stresses; minimum eccentricity distance in variations types of sections; stability of retaining structures.
	Shear stresses in beams; shear flow and shear stress distribution for various types of sections; Short columns, Eulers formula for long columns; Rankine formulae.
	UNIT–IV
	Deflection of Beams Differential equation of the deflection curve; assumptions; Deflection of simply supported, cantilever and overhanging Beams; Macaulays method.
	UNIT–V
	Torsion Derivation of Torsional formulae; assumptions; Torsion of solid and hollow circular sections; Closely coiled helical spring;
Course Outcomes	**After the completion of course syllabus, students would be able to** - Understand the behaviour of metals under different stress and strain conditions. - Evaluate and draw shear force and bending moment diagram and their relationship. - Formulate the bending and shear stress equations and able to draw bending and shear stress distribution for various type of beams and also calculate stress in short and long columns. - Formulate slope and deflection equation for beams subjected to various loading conditions. - Calculate the shear stress developed in circular section due to the torsion; and also in helical springs.
Text Books	1. Strength of Materials – R.K. Rajput (S. Chand & Co.) 2. Mechanics of Materials – B.C. Punmia (Laxmi Publication)3. Hospitals: Planning, Design and Management – Kunders, opinath &Ashoka Katakam (Tata McGraw Hill) 3. Introductions to Solid Mechanics –Shames & Pitarresi (Prentice Hall of India) 4. Engineering Mechanics of Solid – Popov (Pearson Publication) 5. Strength of Materials – S. Ramamurtham (Dhanpat Rai Publications) 6. Strength of Materials (Part-I) – Timoshenko (CBS Publishers)

Reference Books	1. Solid Mechanics, Kazimi S.M.A Tata McGraw –Hill Book company Ltd., New Delhi, 1998.
	2. Strength of Materials, William Nash, Mcgraw-Hill International, Singapore, Indian edition, New Delhi, Fourth edition, 2004.
	3. Strength of Materials, Second Edition, 2010, Subramanian, Oxford University Press
	4. Strength of Materials, Vol I, Vazirani, V.N. and Ratwani, N.M., Khanna Publishers, 1996.

Course Title	Building Materials				
Course Code	BENCE305T				
Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**	**-**	**4**	
Prerequisites	Basic Civil Engineering				

Course Objectives	**This course will enable students to:** • Introduce students to various materials commonly used in civil engineering construction and their properties. • Develop the conceptual knowledge in building material • Select appropriate material in given field situation • Develop awareness about latest building materials
Course Contents	**UNIT-I** **Cement And Aggregates** Types of Cement, Hydration of cement, tests on properties of cement, Ferro cement. Classification of Aggregates (Coarse and Fine) and their properties, tests on aggregates .Classification of Pozzolanas and applications. **UNIT-II** **Concrete** Properties of concrete in fresh and hardened state, water cement ratio, Modulus of elasticity, factors affecting strength of concrete and durability, mixing, transporting, placing, compacting and curing concrete, variables in proportioning concrete mixes, admixtures in concrete, tests on concrete. **UNIT- III** **Ceramic Materials** Introduction to ceramics, types of ceramic products, properties of ceramics, ceramic building products, manufacturing of ceramic products, Ceiling, Purpose & types of ceiling. Formwork -Different types of formwork, stripping times. **UNIT- IV** **Timber and Plywood** Characteristics of good timber, seasoning and preservation, names of timber producing trees and their relative market value. Types and uses of plywood, veneers and hardboards. Low cost materials for construction – System concepts, cost effective materials, industrial wastes, agricultural wastes, and methods needed for propagation of new technologies from laboratory to field.

	UNIT- V **Paints, Glass** Commercially available varieties of ceramics, glass and their uses, types of tiles, method of manufacturing and tests for suitability. Uses of Plastics and PVC. Composition and use of paints, varnishes and distempers. Composite materials, types and uses.
Course Outcomes	**After the completion of course:** • Describe important properties of building materials used in civil engineering construction • Identify clay based products for use in building constructions based on its properties • Select appropriate rock/stone products for different uses in building construction • Describe timber and wood products and its uses in building construction • Explain different types of advanced building materials and their uses in construction
Text Books	1. Building Materials – S.K. Duggal (New Age Publication) 2. Building Materials – S. C. Rangwala (Charotar Publication) 3. Building Materials – M.L. Gambhir, Neha Jamwal (Mc. Grawhill) 4. Construction Engineering and Management – S. Seetharaman (Umesh Publication) 5. Building Materials – Gurucharan Singh (Standard Publishers, Delhi)
Reference Books	1. Civil Engineering Materials, by Technical Teachers' Training Institute, Chandigarh, Tata-McGraw-Hill Publishing Company Ltd., New Delhi. 2. Materials of construction, by R.C. Smith, McGraw-Hill Company, New York. 3. Engineering Materials, 5th edition, By Surindra Singh,, Konark Publishers Pvt. Ltd., New Delhi. 4. Materials of construction, by D.N. Ghose, Tata-McGraw-Hill Publishing Company Limited. 5. Engineering Materials, By Sushil Kumar, Metropolitan Book Co., Private Ltd., and New Delhi. 6. Engineering Materials [Material Science], by Rangwala 'Charotar Publications' 7. Concrete Technology Theory & Practice, by M.S. Shetty, 'S. Chand & Company Ltd.' 8. Building Construction- Volume-II & III by W.B. Mckay, E.L.B.S. and Longman, London, U.K.

9. Building Materials by S.K. Duggal New Age International Publishers.

10. Building Construction, by B.C. Punmia. Laxmi Publications.

11. Construction Technology, by R. ChudlyVols I & II 2nd Edition Longman, UK.

Course Title	Building Material
Course Code	BENCE305P

Course Credits	L	T	P	TC	
	-	-	2	1	

Prerequisites	Basic Civil Engineering

Course Objectives	**This course will enable students to:** • Facilitate the understanding of the behavior of construction materials • Help for selecting and verifying materials and to evaluate material quality, performance, troubleshooting, research and many other applications.

Course Contents	**List of Experiments**
	
	 1. Field & Lab Test of Bricks.
	
	 2. Determination of Compressive strength of cement.
	
	 3. Determination of Fineness of cement by sieving method.
	
	 4. Test for cement
	      a. Normal consistency of cement.
	      b. Setting time test initial and final.
	
	 5. Determination of Soundness of cement.
	
	 6. Determination of Specific gravity of cement.
	
	 7. To determine Uniaxial Tensile Test of mild steel.
	
	 8. To determine Izod Charpy Value of given mild steel.
	
	 9. To determine the Rockwell Hardness of given Material.
	
	 10. To determine Compressive Strength of Wood: (a) Along the fibre and (b) Across the fibre.
	
	 11. Determination of Specific gravity and water absorption of aggregate.
	
	 12. To study the Cupping Test Machine and determine Ericheser value of mild steel sheet.

Course Outcomes	**After the completion of course:** • Students will have the required knowledge in the area of testing of construction materials and components of construction elements experimentally. • Measure the required physical, chemical and engineering properties of building materials. • Perform the different test for quality assurance of buildings materials

	• Ascertain the current market price for each and every construction material
Text Books	1. Lab Manual Concrete Lab – M.L. Gambhir (Tata McGraw Hill) 2. Concrete Technology – M.S. Shetty (S. Chand & Co.)
Reference Books	1. IS 4031 (Part 1) – 1996 – Indian Standard Method for determination of fineness by dry sieving? 2. IS 2386 (Part 1 to Part 6) – 1963 – Indian Standard methods for test for aggregate for concrete 3. IS 383 – 1970 Indian Standard specification for coarse and fine aggregates from natural sources for concrete.

B.Tech. In Civil Engineering
Semester-III
2022-23

Course Title	Engineering Geology
Course Code	BENCE306T

Course Credits	L	T	P	TC	
	3	1	-	4	

Prerequisites	Chemistry, Environmental Science, Physics

Course Objectives	**This course will enable students to:** 1. Study geological science and apply the same in the field of civil engineering. 2. The course begins with history of earth's formation. It moves on to the different types of soil found on earth and finally describes the various applications of geological science in civil engineering. 3. Also to make the students familiar with remote sensing and geographical information system.
Course Contents	**UNIT- I** **Introduction to Engineering Geology** To understand fundamental concepts of engineering geology, engineering strength, physical & mechanical properties of minerals, rock forming minerals: A case study. **UNIT–II** **Rocks And Its Formations** Types of rocks and origins (structure, texture, agents), ternary diagrams, causes of metamorphism, Folds, Faults, Unconformity & joints: a case study. **UNIT – III** **Earthquakes** Earthquake, its causes, classification, seismic zones of India , seismo tectonics of the Indian plate, earthquake problem and its preventive measures in construction of building , reservoir , dams , underground railway track & tunnels etc : A case study. **UNIT – IV** **Landslides, Land subsidence and Geological Hazards** Landslides, its causes, classification and preventive measures, land subsidence, its causes and preventive measures, major geological hazards & geological considerations in design of constructed facilities and infrastructure, mitigation of landslide hazard: A case study.

	UNIT – V **Geological Investigations In Civil Engineering** Geophysical techniques as aids in engineering geological investigations, geological conditions necessary for construction of bridges, dams, tunnels, building, road cuttings, concept of geological maps, important terminology used for map and making a section from the map: A case study
Course Outcomes	**After the completion of course:** • Understanding of the role of geology in design and construction processes. • Ability to apply geological concepts and approaches to rock engineering projects. • Ability to identify and classify rocks using basic geological classifications and understand the formation and properties of each category. • Ability to use the geological literature to establish the Geo-technical framework needed to properly design and construct heavy civil engineering projects. • Understanding the application of remote sensing and geographical information system in civil engineering projects.
Text Books	1. A Textbook of Geology – Mukherjee P.K. (World Press Publishers) 2. Engineering Geology – D.S. Arora (Mohindra Capital Publisher, Chandigarh) 3. Civil Engineering Geology – Cyril Sankey Fox (C. Lockwood and son, U.K.) 4. Engineering Geology for Civil Engineering Prentice, Varghese, P.C., Hall of India Learning Private Limited, New Delhi, 2012. 5. Engineering Geology, Venkat Reddy. D. Vikas Publishing House Pvt. Lt, 2010. 6. Principles of Engineering Geology, Gokhale KVGK, B.S. Publications, Hyderabad 2011.
Reference Books	1. Geology and Engineering- Leggot, R.F. (Mc-Graw Hill, New York) 2. A Geology for Engineers-Blyth, F.G.M (Arnold, London) 3. Engineering and General Geology – Prabin Singh (Katson Publication House)

Course Title	Engineering Geology
Course Code	BENCE306P

Course Credits	L	T	P	TC	
	-	-	2	1	

Prerequisites	Chemistry, Environmental Science, Physics

Course Objectives	**This course will enable students to:** • Understand the role of geology in the design and construction process of underground openings in rock • Apply geologic concepts and approaches on rock engineering projects. • Identify and classify rock using basic geologic classification systems. • Identify and characterize intact rock/rock mass properties.
Course Contents	**List of Experiments** 1. Identification of granite, pegmatite, syenite megascopic observations. 2. Identification of basalt, gabbro, charnokite, dolerite. 3. Identification of limestone, sand - stone, shale. 4. Identification of conglomerate, breccias, clay. 5. Identification of slate, phyllite, marble. 6. Identification of quartzite, schist, gneiss. 7. A study on simple geological maps 8. To draw a cross section, filling of geological data there in. 9. To make a sketch of faults, with identification of folds, faults and unconformity. 10. A case Study of structural folds, faults and unconformity. 11. A study of Talc, gypsum, calcite, fluorite apatite. 12. A study of feldspar, quartz, topaz, corundum. 13. A study of hornblende, garnet, tourmaline asbestos, olivine,. 14. A study of serpentine, barite, muscovite, biotite, arpiment, realgar, sulpher, amethyst & varieties of uartz, zeolite 15. A study of Hematite, magnetite, pyrite, chalespyrite, pyrolusite, psilomelane, beryl, magnesite, bauxite, zincite, galena etc.
Course Outcomes	**After the completion of course:** 1. Analyses the ground conditions through geophysical surveys 2. Test the geological material and ground to check the suitability of civil

	engineering project construction
	3. Investigate the project site for mega/mini civil engineering projects. Site selection for mega engineering projects like Dams, Tunnels, disposal sites etc.
Text Books	1. Engineering Geology, Venkat Reddy. D. Vikas Publishing House Pvt. Lt, 2010.
	2. Principles of Engineering Geology, Gokhale KVGK, B.S. Publications, Hyderabad 2011.
	3. Geology and Engineering – Leggot, R.F. (Mc-Graw Hill, New York)
	4. Engineering and General Geology – Prabin Singh (Katson Publication House)
Reference Books	1. Geology and Engineering- Leggot, R.F. (Mc-Graw Hill, New York)
	2. A Geology for Engineers-Blyth, F.G.M (Arnold, London)
	3. Engineering and General Geology – Prabin Singh (Katson Publication House)
	4. Text Book of Engineering Geology by N.Chenna Kesavulu, Mac Millan Ltd., New Delhi. 2009