Department of Civil Engineering

Date 13/07/2023 & Time 11:00 am

Venu: Office, Head, Department of Civil Engineering

(C- Block 3rd Floor)

CONTENTS

CONSITUTION OF BOARD OF STUDIES

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8.	Dr. Dapinder Deep Singh, Assistant Prof.& Head, Dept. of Civil Engg., SBSSU, Ferozepur	Chairman

Agenda Item No. 2.1

Approval regarding scheme of 3rd to 8th semester along with open electives and Syllabus of 3rd semester of Batch 2022 and onwards.

The scheme of Batch 2022 and onwards from 3rd to 8th semesters along with open electives is as per the skeleton approved by university and the syllabus of 3rd semester. The detail of scheme and syllabus is attached as Annexure-I. Skeleton is attached as Annexure-II.

This item is placed before BOS for approval please.

Agenda Item No. 2.1

Regarding starting six months certificate course on Testing of Building Materials

A new certificate course is being proposed for six months duration in Testing of Building Materials. The duration, no of seats, fee, scheme and detailed syllabus of all subjects are attached as Annexure-III.

This item is placed before BOS for approval please.

Annexure-I

B.Tech. (Civil Engineering)

Scheme and Syllabus

Batch 2022and Onwards

Department of Civil Engineering

Shaheed Bhagat Singh State University, Ferozepur

B.Tech. (Civil Engineering) Scheme and Syllabus Batch 2022 and Onwards

Semester 3rd									Total Credits=24	
Sr. No.	**Category**	**Subject Code**	**Course Title**	**Contact Hours**			**Maximum Marks**		**Total Marks**	**Credits**
				L	**T**	**P**	**Internal**	**External**		
1	Core Subject	BTCE301C	Irrigation Engineering	3	0	0	40	60	100	3
2	Core Subject	BTCE302C	Fluid Mechanics	3	1	0	40	60	100	4
3	Core Subject	BTCE303C	Solid Mechanics	3	1	0	40	60	100	4
4	Core Subject	BTCE304C	Surveying	3	0	0	40	60	100	3
5	Core Subject	BTCE305C	Fluid Mechanics Lab	0	0	2	30	20	50	1
6	Core Subject	BTCE306C	Solid Mechanics Lab	0	0	2	30	20	50	1
7	Core Subject	BTCE307C	Surveying Lab	0	0	4	30	20	50	2
8	Core Subject	BTCE308C	Computer Aided Structural Drawing Lab-I	0	0	2	30	20	50	1
9	Training/ Project	BTCE309C	Workshop Training*	0	0	2	60	40	100	2
10	Diploma Course	BTCE310C	Engineering Geology	3	0	0	40	60	100	3
Total				**15**	**2**	**12**	**380**	**420**	**800**	**24**
*Training will be imparted in the institution at the end of 2nd semester for 4 week duration.										

Shaheed Bhagat Singh State University, Ferozepur

B.Tech. (Civil Engineering) Scheme and Syllabus Batch 2022 and Onwards

Semester 4th									Total Credits=24
Sr. No.	**Category**	**Subject Code**	**Course Title**	**Contact Hours**			**Maximum Marks**		**Total Marks**	**Credits**
				L	**T**	**P**	**Internal**	**External**		
1	Core Subject	BTCE401C	Structural Analysis	3	1	0	40	60	100	4
2	Core Subject	BTCE402C	Transportation Engineering-I	3	0	0	40	60	100	3
3	Core Subject	BTCE403C	Environmental Engineering-I	3	1	0	40	60	100	4
4	Core Subject	BTCE404C	Design of Concrete Structures-I	3	1	0	40	60	100	4
5	Core Subject	BTCE405C	Transportation Engineering Lab	0	0	2	30	20	50	1
6	Core Subject	BTCE406C	Structural Engineering Lab	0	0	2	30	20	50	1
7	Core Subject	BTCE407C	Environmental Engineering Lab	0	0	2	30	20	50	1
8	Open Elective Course	xxxx	Open Elective Subject is chosen from the list of Open Electives offered by other departments of university.	3	0	0	40	60	100	3
9	Diploma Course	BTCE408C	Construction Machinery and Works Management)	3	0	0	40	60	100	3
Total				**18**	**3**	**6**	**330**	**420**	**750**	**24**
Survey camp will be conducted after fourth semester for which viva will be conducted along with end semester examination of fifth semester.										

Shaheed Bhagat Singh State University, Ferozepur

B.Tech. (Civil Engineering) Scheme and Syllabus Batch 2022 and Onwards

Semester 5th									Total Credits=21	
Sr. No.	**Category**	**Subject Code**	**Course Title**	**Contact Hours**			**Maximum Marks**		**Total Marks**	**Credits**
				L	**T**	**P**	**Internal**	**External**		
1	Core Subject	BTCE501C	Design of Concrete Structures -II	3	0	0	40	60	100	3
2	Core Subject	BTCE502C	Transportation Engineering-II	3	0	0	40	60	100	3
3	Core Subject	BTCE503C	Geotechnical Engineering	3	0	0	40	60	100	3
4	Core Subject	BTCE504C	Concrete Technology Lab	0	0	2	30	20	50	1
5	Core Subject	BTCE505C	Geotechnical Engineering Lab	0	0	2	30	20	50	1
6	Core Subject	BTCE506C	Survey Camp	0	0	2	30	20	50	1
7	Departmental Elective (Select any one)	BTCE511C	Environmental Engineering-II	3	0	0	40	60	100	3
		BTCE512C	Repair & Rehabilitation of Structures							
		BTCE513C	Environment Impact Assessment and Life Cycle Assessment							
8	Open Elective Course	xxxx	Open Elective Subject is chosen from the list of Open Electives offered by other departments of university.	3	0	0	40	60	100	3
9	Advanced Diploma Course	BTCE507C	Earthquake Engineering	3	0	0	40	40	100	3
Total				**18**	**0**	**6**	**330**	**400**	**750**	**21**

Shaheed Bhagat Singh State University, Ferozepur

B.Tech. (Civil Engineering) Scheme and Syllabus Batch 2022 and Onwards

Semester 6th									Total Credits=21	
Sr. No.	**Category**	**Subject Code**	**Course Title**	**Contact Hours**			**Maximum Marks**		**Total Marks**	**Credits**
				L	**T**	**P**	**Internal**	**External**		
1	Core Subject	BTCE601C	Foundation Engineering	3	1	0	40	60	100	4
2	Core Subject	BTCE602C	Estimation & Costing	3	1	0	40	60	100	4
3	Core Subject	BTCE603C	Computer Aided Structural Drawing Lab-II	0	0	2	30	20	50	1
4	Departmental Elective (Select any one)	BTCE611C	Ground Improvement Techniques	3	0	0	40	60	100	3
		BTCE612C	Disaster Management							
		BTCE613C	Solid & Hazardous Waste Management							
5	Open Elective Course	xxxx	Open Elective Subject is chosen from the list of Open Electives offered by other departments of university.	3	0	0	40	60	100	3
6	Humanities & Management	xxxx		3	0	0	40	60	100	3
7	Advanced Diploma Course	BTCE604C	Air & Noise Pollution	3	0	0	40	40	100	3
Total				**18**	**2**	**2**	**270**	**360**	**650**	**21**

Semester 7th									**Total Credits=21**	
Sr. No.	**Category**	**Subject Code**	**Course Title**	**Contact Hours**			**Maximum Marks**		**Total Marks**	**Credits**
				L	**T**	**P**	**Internal**	**External**		
1	Core Subject	BTCE701C	Hydrology & Dams	3	1	0	40	60	100	4
2	Core Subject	BTCE702C	Design of Steel Structures	3	1	0	40	60	100	4
3	Departmental Elective (Select any one)	BTCE711C	Rural Water Supply and Onsite Sanitation Systems	3	0	0	40	60	100	3
		BTCE712C	Traffic Engineering							
		BTCE713C	Bridge Engineering							
4	Open Elective Course	xxxx	Open Elective Subject is chosen from the list of Open Electives offered by other departments of university.	3	0	0	40	60	100	3
5	Humanities & Management	xxxx		3	0	0	40	60	100	3
6	Core Subject	BTCE703C	Project	0	0	4	40	40	100	4
Total				**15**	**2**	**4**	**240**	**340**	**600**	**21**

Semester 8th(a)									**Total Credits=14**	
Sr. No.	**Category**	**Subject Code**	**Course Title**	**Contact Hours**			**Maximum Marks**		**Total Marks**	**Credits**
				L	**T**	**P**	**Internal**	**External**		
1	Core Subject	BTCE801C	Smart City	2	0	0	40	60	100	2
2	Departmental Elective (Select any one)	BTCE811C	Maintenance of Building Structures	3	0	0	40	60	100	3
		BTCE812C	Intelligent Transport System							
3	Departmental Elective (Select any one)	BTCE813C	Construction Engineering Materials	3	0	0	40	60	100	3
		BTCE814C	Pre-stressed Concrete							
4	Departmental Elective (Select any one)	BTCE815C	Soil Reinforcing Techniques	3	0	0	40	60	100	3
		BTCE816C	Groundwater Engineering							
5	Open Elective Course	xxxx	Open Elective Subject is chosen from the list of Open Electives offered by other departments of university.	3	0	0	40	60	100	3
Total				**14**	**0**	**0**	**200**	**300**	**500**	**14**

Semester 8th(b)				**Total Credits=14**				
Sr. No.	**Category**	**Subject Code**	**Course Title**	**Evaluation Internal**		**External**	**Total Marks**	**Credits**
				Institutional	**Industrial**			
1	Training (One Semester)	BTCE802C	Software Training#	50	50	100	200	14
			Industrial Training#	100	100	100	300	
Total				**150**	**150**	**200**	**500**	**14**
# Duration of software and industrial training are 2 and 4 months, respectively.								

List of open electives offered by Department of Civil Engineering to other departments

Sr.No.	Subject Code	Course Tile	Contact Hours			Maximum Marks		Total Marks	Credits
			L	T	P	Internal	External		
1	BTCE901C	Rock Mechanics and Engineering Geology	3	0	0	40	60	100	3
2	BTCE902C	Disaster Management	3	0	0	40	60	100	3
3	BTCE903C	Remote Sensing & GIS	3	0	0	40	60	100	3
4	BTCE904C	Construction Engineering & Management	3	0	0	40	60	100	3
5	BTCE905C	Concrete Technology	3	0	0	40	60	100	3
6	BTCE906C	Metro system and Engineering	3	0	0	40	60	100	3
7	BTCE907C	Traffic Management	3	0	0	40	60	100	3
8	BTCE908C	Road Safety	3	0	0	40	60	100	3
9	BTCE909C	Environmental Impact Assessment	3	0	0	40	60	100	3
10	BTCE910C	Air & Noise Pollution	3	0	0	40	60	100	3

Semester 3rd

Sr. No.	Category	Subject Code	Course Title	Contact Hours			Credits
1.	Core Subject	BTCE301C	Irrigation Engineering	L	T	P	3
				3	0	0	
Internal Marks: 40, External Marks: 60, Total Marks: 100							

Course Objectives: The course should enable the students to:

1. Take up the basic concepts of irrigation and construction of various hydraulic structures.
2. Introduce students to basic concepts of water, plants, their interactions, as well as irrigation and drainage systems design, planning and management.
3. The structures involved the elementary hydraulic design of different structures and the concepts of maintenance shall also form part.
4. Develop analytical skills relevant to the areas mentioned above, particularly the design of irrigation and drainage projects.

UNIT-I

Introduction: Importance of irrigation engineering, Purposes of irrigation, Objectives of irrigation,Benefits of irrigation, Advantages of various techniques of irrigation: Furrow irrigation, Border strip irrigation, Basin irrigation, Sprinkler irrigation, Drip irrigation.

Methods of Irrigation: Advantages and disadvantages of irrigation, Water requirements of crops,Factors affecting water requirement, Consumptive use of water, Water depth or delta, Duty of water,Relation between delta, duty and base period, Soil crop relation-ship and soil fertility.

UNIT-II

Canal Irrigation: Classifications of canals, Canal alignment, Inundation canals, Bandhara irrigation, Advantages and disadvantages, Silt theories-Kennedy's theory and Lacey's theory, Drawbacks in Kennedy's andLacey's theories, Comparison of Lacey's and Kennedy's theories, Design of unlined canals based on Kennedy's and Lacey's theories, Suspended and bed loads.

Lined Canals: Types of lining, Selection of type of lining, Economics of lining, Maintenance of lined canals, Silt removal, Strengthening of channel banks, Measurement of discharge in channels, Design of lined canals, Methods of providing drainage behind lining.

UNIT-III

Losses in Canals, Water Logging and Drainage: Losses in canals- evaporation and seepage, Water logging, Causes and ill effects of water logging- anti water logging measures, Drainage of land, Classification of drains – surface and subsurface drains, Design considerations for surface drains, Advantages and maintenance of tile drains.

River Training Works: Objectives, classification of river-training works, Design of guide banks,Groynes or spurs – Their design and classification ISI, Recommendations of approach embankments and afflux embankments, Pitched islands, Natural cut-offs, artificial cut-offs and their design considerations.

UNIT-IV

Tube Well Irrigation: Types of tubewells – strainer type, cavity type and slotted type, Type of strainers, Aquifer, Porosity, Uniformity coefficient, Specific yield and specific retention, Coefficients of permeability, Transmissibility and storage, Yield or discharge of a tube well, Assumptions, Theim's and Dupuit's formulae, Interference of tubewells with canal or adjoining tubewells, Optimum capacity, Causes of failure of tubewells, Duty and delta of a tube well, Rehabilitation of tube well.

Course Outcomes: Upon completion of this course the student shall be able to:

1. Concepts of irrigation and different hydraulic structures.
2. Estimate the quantity of water required by crops.
3. Plan and design irrigation projects.

4. Design channels and other irrigation structures required for irrigation, drainage, soil conservation, flood control and other water-management projects.

Books Recommended :

1. Sharma, S.K. "Principles and practice of Irrigation Engg",
2. Punmia, B.C.and LalPande, B.B. "Irrigation and Water Power Engg",Laxmi Publications (P) Ltd.
3. Singh,B."Fundamentals of Irrigation Engg.",Nem Chand & Bros.
4. Gupta & Gupta,V. "Irrigation Engg. & Hydraulic Structure",Nem Chand and Brothers
5. Garg,S. K."Irrigation Engg. & Hydraulic Structure",Khanna Publishers

Sr. No.	Category	Subject Code	Course Title	Contact Hours			Credits
1.	Core Subject	BTCE302C	Fluid Mechanics	L	T	P	4
				3	1	0	
Internal Marks: 40, External Marks: 60, Total Marks: 100							

Course Objectives: The course should enable the students to:

1. Make the students learn the basic concepts of fluid mechanics and gain knowledge about the methods of solving real life problems involving fluids.
2. Introduce fundamentals of stagnant, flowing fluid and flow through different conduits.

UNIT-I

Basic Concepts and Definitions: Distinction between a fluid and a solid, Density, Specific weight, Specific gravity, Kinematic and dynamic viscosity, Variation of viscosity with temperature, Newton law of viscosity, Surface tension, Capillarity, Bulk modulus of elasticity, Compressibility.

Fluid Statics: Fluid Pressure: Pressure at a point, Pascal's law, Piezometer, U-Tube Manometer, U-Tube Differential Manometer, Micro manometers, Pressure gauges, Hydrostatic pressure and force: horizontal, vertical and inclined surfaces, Buoyancy and stability of floating bodies.

UNIT-II

Fluid Kinematics: Classification of fluid flow: Steady and unsteady flow, Uniform and non-uniform flow, Laminar and turbulent flow, Rotational and irrotational flow, Compressible and incompressible flow, Ideal and real fluid flow; One, Two and Three dimensional flows, Stream line, Path line, Streak line and stream tube, Stream function, Velocity potential function, One, Two and Three -dimensional continuity equations in Cartesian coordinates.

Fluid Dynamics: Surface and body forces, Equations of motion - Euler's equation, Bernoulli's equation – derivation, Energy Principle, Practical applications of Bernoulli's equation : Venturimeter, Orifice meter and pitot tube, Momentum principle, Forces exerted by fluid flow on pipe bend, Dimensional Analysis and Dynamic Similitude - Definitions of Reynolds Number, Froude Number, Mach Number, Weber Number and Euler Number, Buckingham's π-Theorem.

UNIT-III

Laminar Flow and Turbulent Flow: Laminar flow through: circular pipes, parallel plates, Stoke's law, Reynolds experiment, Transition from laminar to turbulent flow, Prandtl's mixing length theory, Universal velocity distribution equation, Resistance to flow of fluid in smooth and rough pipes, Moody's diagram, Flow through Pipes: Loss of head through pipes, Darcy-Wiesbach equation, Minor losses, Total energy equation, Hydraulic gradient line, Pipes in series, Equivalent pipes, Pipes in parallel.

Boundary Layer Analysis: Assumption and concept of boundary layer theory, Boundary-layer thickness, Displacement, Momentum and energy thickness, Laminar and turbulent boundary layers on a flat plate, Laminar sublayer, Smooth and rough boundaries, Local and average friction coefficients, Separation and control.

UNIT-IV

Open Channel Flow: Introduction, Comparison between open channel flow and pipe flow, geometrical parameters of a channel, Uniform Characteristics of uniform flow, Chezy's formula, Manning's formula, Most economical section of channel, Specific energy, Specific energy curve, Critical flow, Discharge curve, Specific force, Specific depth and Critical depth, Channel Transitions, Theory of hydraulic jump, Elements and characteristics of hydraulic jump in a rectangular channel, Length and height of jump, Location of jump: Types, applications and location of hydraulic jump, Energy dissipation and other uses.

Course Outcomes: Upon completion of this course the student shall be able to:

1. Understand the basic terms used in fluid mechanics and its broad principles.
2. Estimate the forces induced on a plane/ submerged bodies.
3. Apply the continuity, momentum and energy principles and design the pipelines used for water supply or sewage under different situation.

4. Calculate drag force exerted by fluid on the body of varying shapes and able to minimize them.
5. Design and addressing problems in open channel (lined/ unlined) of different shapes and size optimally as per site condition.

Books Recommended :

1. Bansal, R.K., "Fluid Mechanics & Hydraulic Machines",Laxmi Publication (P)Ltd.
2. Modi, P.N. and Seth, S.M., "Hydraulic and Fluid Mechanic",Standard Book House.
3. Garde, R.J. and Mirajgaoker, A.G., "Engineering Fluid Mechanics",Vedams (P) Ltd (New Delhi, India).
4. Douglas, J.F., Gasiorek, J.M., Swaffield, J.P. and Pitman, "Fluid Mechanics",Prentice Hall.
5. Subraminayam, S., "Flow in Open Channels", Tata McGraw Hill.
6. Streeter, V.L. and Benjamin, W.E., "Fluid Mechanics", McGraw-Hill.

Sr. No.	Category	Subject Code	Course Title	Contact Hours			Credits
1.	Core Subject	BTCE303C	Solid Mechanics	L	T	P	4
				3	1	0	
Internal Marks: 40, External Marks: 60, Total Marks: 100							

Course Objectives: The course should enable the students to:

1. Introduce to continuum mechanics and material modeling of engineering materials based on first energy principles, deformation and strain, momentum balance, stress and stress states, elasticity and elasticity bounds, plasticity and yield design.
2. Develop the ability of the student to analyze the engineering objects subjected to different types of forces using the basic principles of statics.
3. Involve analytical methods for determining the strength, stiffness (deformation characteristics), and stability of the various members in a structural system.

UNIT-I

Simple Stresses and Strains: Concept of stress and strain, St. Venant‘s principle, stress and strain diagram, Elasticity and plasticity – Types of stresses and strains, Hooke‘s law– stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson‘s ratio and volumetric strain – Elastic modulii and the relationship between them – Bars of varying section – composite bars – Temperature stresses. Strain Energy – Resilience Gradual, Sudden, Impact and shock loadings – simple applications.

Compound Stresses and Strains: Two dimensional system, Stress at a point on a plane, Principal stresses and principal planes, Mohr circle of stress, Ellipse of stress and their applications. Two dimensional stress-strain system, principal strains and principal axis of strain, circle of strain and ellipse of strain, Relationship between elastic constants.

UNIT-II

Shear Force and Bending Moment Diagrams: Shear force diagrams (SFD) and Bending moment diagrams (BMD). SFD and BMD for cantilevers simply supported and fixed beams with or without overhangs. Calculation of maximum SF and BM and the point of contra flexure under concentrated loads, Uniformly distributed loads over the whole span or part of span, Combination of concentrated loads (two or three) and uniformly distributed loads, Uniformly varying loads, Application of moments.

Flexural Stresses-Theory of Simple Bending: Assumptions – Derivation of bending equation: M/I = f/y = E/R - Neutral axis – Determination of bending stresses – Section modulus of rectangular and circular sections (Solid and Hollow), I,T, Angle and Channel sections – Design of simple beam sections.

UNIT-III

Shear Stresses: Derivation of formula –Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections.

Slope and deflection: Relationship between moment, slope and deflection, Double Integration method, Macaulay‘s method, Use of these methods to calculate slope and deflection for determinant beams.

UNIT-IV

Torsion: Derivation of torsion equation and its assumptions, Applications of the equation for hollow and solid circular shafts, torsional rigidity, Combined torsion and bending of circular shafts, principal stresses and maximum shear stresses under combined loading of bending and torsion, Analysis of closely-coiled-helical springs.

Thin Cylinders and Spheres: Derivation of formulae and calculations of hoop stress, Longitudinal stress in a cylinder and sphere subjected to internal pressures.

Course Outcomes: Upon completion of this course the student shall be able to:

1. Describe the concepts and principles, understand the theory of elasticity including strain / displacement and Hooke’s law relationships, and perform calculations, relative to the strength and stability of structures and mechanical components.
2. Define the characteristics and calculate the magnitude of combined stresses in individual members and

complete structures, analyze solid mechanics problems using classical methods and energy methods.

3. Analyze various situations involving structural members subjected to combined stresses by application of Mohr's circle of stress, locate the shear centre of thin wall beams.
4. Calculate the deflection at any point on a beam subjected to a combination of loads, solve for stresses and deflections of beams under unsymmetrical loading, apply various failure criteria for general stress states at points and solve torsion problems in bars and thin walled members.

Books Recommended :

1. Ramamrutham, S. And Narayaan, R., Strength of Materials, Dhanpat Rai Publishers.
2. Bansal, R. K., Strength of Materials: Mechanics of Solids, S. Chand.
3. Timoshenko, S. and Young, D. H., ―Elements of Strength of Materials, DVNC, New York, USA.
4. Kazmi, S. M. A., ―Solid Mechanics‖ TMH, Delhi, India.
5. Hibbeler, R. C. Mechanics of Materials. 6th ed. East Rutherford, NJ: Pearson Prentice Hall.
6. Crandall, S. H., N. C. Dahl, and T. J. Lardner. An Introduction to the Mechanics of Solids. 2nd edition New York, NY: McGraw Hill, 1979
7. Strength of Materials by R. Subramanian, Oxford University Press, New Delhi.

Sr. No.	Category	Subject Code	Course Title	Contact Hours			Credits
1.	Core Subject	BTCE304C	Surveying	L	T	P	3
				3	0	0	
Internal Marks: 40, External Marks: 60, Total Marks: 100							

Course Objectives: The course should enable the students to:

1. Gain the practical knowledge on calculation of an area, volume of an irregular and regular land surface using chains and tapes.
2. Operate different types of instruments in surveying. Perform levelling and contouring of ground surfaces.
3. Apply knowledge of mathematics in surveying field to calculate areas and volumes for different projects.
4. Utilize total station and other modern survey instruments.

UNIT-I

Introduction to Surveying: Principles of surveying, Different types of surveys, Topographical map, Scale of map. Survey stations, Survey lines- ranging, direct & indirect ranging, Bearing and its measurement with prismatic compass, Calculation of angles from bearings, Local Attraction.

Levelling: Principles of levelling- booking and reducing levels, Differential, Reciprocal levelling, Profile levelling and cross sectioning, Auto level.

Contouring: Characteristics, methods and uses

Plane Table surveying: Temporary adjustment of plane table, Methods of plane tabling, Two and three point problem.

UNIT-II

Theodolite survey: Instruments, Measurement of horizontal and vertical angle; Balancing of Traverse, Omitted Measurements.

Tachometry: Definition, determination of tachometer constants and reduced level from tachometric observations.

Triangulation: Baseline- Choices, Extension of base lines, Corrections, Trigonometric levelling.

UNIT-III

Curves: Elements of simple and compound curves, Method of setting out Transition curve, Length of curve, Elements of transition curve.

UNIT-IV

Modern Field Survey Systems: Total Station – Parts of a Total Station – Accessories –Advantages and Applications, Field Procedure for total station survey, Errors in Total Station Survey; Global Positioning Systems- Segments, GPS measurements, errors and biases, Surveying with DGPS, Introduction to Photogrammetry, Remote sensing and GIS.

Course Outcomes: Upon completion of this course the student shall be able to:

1. Understand the concept, various methods and techniques of surveying.
2. Compute angles, distances and levels for given area.
3. Apply the concept of tachometry survey in difficult and hilly terrain.
4. Select appropriate instruments for data collection and survey purpose.
5. Analyze and retrieve the information from remotely sensed data and interpret the data for survey.
6. Understand the concepts related to GIS and GPS and analyze the geographical data.

Books Recommended :

1. Duggal, S.K., Surveying Vol I & II, Tata McGraw Hill
2. Punmia, B.C., Jain, Ashok Kumar and Jain, Arun Kumar, Surveying Vol. I, II & III, Laxmi Publications
3. Agor, R., Surveying, Khanna Publishers

4. Bhavikatti, S.S. Surveying & Levelling Volume I & II
5. Kochher, C. L., Surveying, Dhanpat Rai Publishers Co.

Sr. No.	Category	Subject Code	Course Title	Contact Hours			Credits
1.	Core Subject	BTCE305C	Fluid Mechanics Lab	L	T	P	1
				0	0	2	
Internal Marks: 30, External Marks: 20, Total Marks: 50							

Course Objectives: The practical work should enable the students to:

1. Determine the various parameters related to fluid flow in Pipe and in open channels.
2. Examine the properties of fluids and to conduct experiments involving both in incompressible and compressible flow.
3. Investigating the fundamentals of fluid statics as well as kinematics & Kinetics of fluid flow to enhance the hands-on experience of our students.
4. conduct experiments on open channel flow, centrifugal pumps and groundwater flow.

List of Experiments:

1. To study of pressure measuring devices as peizometer, U-tube manometer, and pressure gauges.
2. To verify Bernoulli's Theorem
3. To determine the Meta centric height of a Floating Body under different condition.
4. To determine the coefficient of discharge of a Venturimeter.
5. To determine the coefficient of discharge of a Orifice Meter.
6. To determine the coefficient of friction of different diameter pipes.
7. To estimate the minor losses as energy loss in pipe bend, sudden contraction or enlargement in pipe.
8. To determine the coefficient of discharge on rectangular and V-notches.
9. To determine the various element of a hydraulic jump.

Course Outcomes: Upon completion of this practical work the student shall be able to:

1. Select appropriate pressure measuring device under different condition of flow.
2. Determine the stability of a floating body.
3. Understand and apply Bernoulli's theorem practically.
4. Find discharge of fluid through pipe, orifices and in open channel.
5. Estimate the major and minor losses in pipe.
6. Estimate the various elements and energy losses in hydraulic jump.

Manuals Recommended :

1. Fluid Mechanics and Machinery, C.S.P.Ojha, R. Berndtsson and P. N. Chadramouli, Oxford University Press, 2010
2. Hydraulics and Fluid Mechanics, P M Modi and S M Seth, Standard Book House
3. Theory and Applications of Fluid Mechanics, K. Subramanya, Tata McGraw Hill
4. Fluid Mechanics with Engineering Applications, R.L. Daugherty, J.B. Franzini and E.J. Finnemore, International Student Edition, Mc Graw Hill.

Sr. No.	Category	Subject Code	Course Title	Contact Hours			Credits
1.	Core Subject	BTCE306C	Solid Mechanics Lab	L	T	P	1
				0	0	2	
Internal Marks: 30, External Marks: 20, Total Marks: 50							

Course Objectives: The practical work should enable the students to:

1. Deal with an experimental determination and evaluation of material behaviour in order to explain the deformation and fracture behaviour of structural materials.
2. Determine the mechanical and structural properties of materials from the laboratory.
3. Test the materials under accurately known forces or loads.
4. Study the material behaviour by careful observations and measurements.

List of Experiments:

1. To determine Impact Strength of Mild Steel.
2. To determine the spring constant / stiffness of the given spring.
3. To determine Brinell and Vicker's Hardness numbers of mild steel.
4. To determine the Rockwell Hardness number of metals.
5. To determine the Fatigue Strength of mild steel.
6. To determine Torsional Strength of mild steel and cast iron.
7. To determine Tensile Strength of mild steel.
8. Determination of shear forces in beams.
9. Determination of bending moments in beams.
10. Measurement of deflections in statically determinate beams.

Course Outcomes: Upon completion of this practical work the student shall be able to:

1. Operate the laboratory equipment, interpret the laboratory data including conversion of measurements into engineering values.
2. Find the deviation of material properties (strength and stiffness) from the engineering values
3. Observe various modes of failure in compression, tension, and shear.
4. Observe various types of material behavior under similar loading conditions.
5. Observe material behavior under repeated loading.

Manuals Recommended :

1. Experimental methods in Structural Mechanics by C.B. Kukreja and V.V. Sastry, Standard Publishers Distributors, Delhi.
2. Laboratory Manual of Testing Materials - William Kendrick Hall
3. Analysis of Structures, Volume – I, by V. N. Vazirani & Ratwani

Sr. No.	Category	Subject Code	Course Title	Contact Hours			Credits
1.	Core Subject	BTCE307C	Surveying Lab	L	T	P	2
				0	0	4	
Internal Marks: 30, External Marks: 20, Total Marks: 50							

Course Objectives: The practical work should enable the students to:

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

List of Experiments:

1. Measurement of distance, ranging a line.
2. Measurement of bearing and angles with compass, adjustment of traverse by graphical method.
3. Different methods of levelling, height of instrument, rise & fall methods.
4. Measurement of horizontal and vertical angle by theodolite.
5. Determination of tachometric constants and determination of reduced levels by tachometric observations.
6. Plane table survey, different methods of plotting, three point problem.
7. Setting out of circular curves in the field using different methods.
8. Plotting of traverse using the Total Station and DGPS.

Course Outcomes: Upon completion of this practical work the student shall be able to:

1. Assess horizontal & vertical angles by Theodolite.
2. Survey the area using different methods of plane tabling and compass survey and to adjust the compass traverse graphically.
3. Compute the reduce levels using various methods of leveling.
4. Predict the location of any point horizontally and vertically using Tachometry.
5. Setting out curves in the field.
6. Use electronic survey instruments.

Manuals Recommended :

1. Duggal, S.K., Surveying Vol I & II, Tata McGraw Hill.
2. Punmia, B.C., Jain, Ashok Kumar and Jain, Arun Kumar, Surveying Vol. I, II & III, Laxmi Publications.
3. Agor, R., Surveying, Khanna Publishers.
4. Bhavikatti, S.S. Surveying & Levelling Volume I & II.

Sr. No.	Category	Subject Code	Course Title	Contact Hours			Credits
1.	Core Subject	BTCE308C	Computer Aided Structural Drawing Lab-I	L	T	P	1
				0	0	2	
Internal Marks: 30, External Marks: 20, Total Marks: 50							

Course Objectives: The practical work should enable the students to:

1. Develop structural designs.
2. Understand design procedures and ways- The student learn to interpret drawings, and to produce designs using Civil Engineering software.

Laboratory Drawing Works:

1. Basic Structural Drawings of concrete & steel elements such as plan, Elevation, side plans of beams, columns, slabs, Connections, Tension Members, Compression Members, steel Beams, Foundations, Roof Trusses, etc.

Course Outcomes: Upon completion of this practical work the student shall be able to:

1. Design and draw working structural drawings of various concrete structures and their members.
2. Understand and interoperate design aids and handbooks.
3. Use of relevant Indian Standard specifications applicable to Reinforced concrete structures

Sr. No.	Category	Subject Code	Course Title	Contact Hours			Credits
				L	T	P	
1.	Diploma Course	BTCE310C	Engineering Geology	3	0	0	3
Internal Marks: 40, External Marks: 60, Total Marks: 100							

Course Objectives: The course should enable the students to:

1. Know the principal objective of the engineering geologist is the protection of life and property against damage caused by various geological conditions.
2. Provide geological and geotechnical recommendations, analysis, and design associated with human development and various types of structures.

UNIT-I

General Geology: Scope of geology in Civil Engineering, The Earth - its structure and environment - Standard geological time scale, Unit & fossils, Physiographic, Stratigraphic and tectonic divisions of India - Geomorphologic (surface) processes - Weathering - types, Weathered products, Fluvial processes, Glacial Deposits, Wind action, and their significance in Civil Engineering.

UNIT-II

Mineralogy and Petrology: Physical properties of minerals – classification - study of important rock forming minerals – Quartz family, Feldspar family, Mica family, Calcite, Iron oxide minerals, Clay minerals and their behaviour and significance in the field of Civil Engineering. Classification of rock - mode of formation - distinction between Igneous, Sedimentary and Metamorphic rocks. Characteristic of rocks. Study of important rocks: Granite, Syenite, Diorite, Gabbro, Pegmatite, Dolerite, Basalt, Sand stone, Limestone, Shale, Quartzite, Marble, Slate.

UNIT-III

Structural Geology and Geophysical Methods: Attitude of beds - out crops, Study of structures such as Folds, Faults, Joints, Unconformities, In-lier and out-lier - their brief classification and their bearing on engineering construction. Principles of geophysical methods, Electrical resistivity method, Seismic method and its applications in civil engineering.

UNIT-IV

Geology and Construction: Role of geology in site investigation, Geotechnical classification of rock, Geological considerations in open excavation, Tunnels and Dam site, Reservoir site, Buildings, Road cuttings, Landslides and land subsidence its causes, Classification and preventive measures, Groundwater- types of aquifers, Properties of geological formations affecting groundwater and its role as a geological hazard.

Course Outcomes: Upon completion of this course the student shall be able to:

1. Provide the students with basic knowledge and understanding in the most central part of engineering geology, rock and soil.
2. Give an overview & an understanding of the engineering properties of rock and soil materials, debris generation and distribution, engineering geological investigations, slope stability, geological factors affecting the stability of a facility on and in the soil, engineering, stability and protection of underground facilities, etc.
3. Develop the ability to perform basic engineering geological assessments and analyses, and to understand the relevance of engineering geology in complex projects in and on solid rock.

Books Recommended :

1. Arora. D.S., “A Text Book of Geology”, Mohindra Capital Publishers, 1988.
2. Engineering and General Geology, Parbin Singh, 8th Edition (2010), S K Kataria& Sons
3. A Text Book of Engineering Geology, N. ChennaKesavulu, 2nd Edition (2009), Macmillan Publishers India. Reddy D.,” Engineering Geology for Civil Engineers”, Oxford & IBH , 1995
4. Blyth, F.G.M., “A Geology for Engineers”, Arnold, Londo, 2003.
5. Bell. F.G, “Fundamentals of Engineering Geology” Butterworth, 1983.

Annexure-III

Certificate Course

on

Testing of Building Materials

Scheme and Syllabus

Batch 2023

Course Details

Certificate Course on Testing of Building Materials		
Sr. No.	**Course Duration**	**6 months**
1	**Required Qualification**	**Students passed in matriculation examination are eligible for the course**
2	**Course Fee**	**15000/-**
3	**Number of Seats**	**30**

Study Scheme

Sr. No.	Category	Subject Code	Course Title	Contact Hours			Maximum Marks		Total Marks
				L	T	P	Internal	External	
1	Certificate Course	CCCE101A	Introduction to Building Materials	4	0	0	40	60	100
2	Certificate Course	CCCE102A	Concrete Testing Lab	0	0	3	60	40	100
3	Certificate Course	CCCE103A	Soil Testing Lab	0	0	3	60	40	100
4	Certificate Course	CCCE104A	Highway Material Testing Lab	0	0	3	60	40	100
Total				**4**	**0**	**9**	**220**	**180**	**400**

Syllabus

Sr. No.	Category	Subject Code	Course Title	Contact Hours		
1.	Certificate Course	CCCE101A	Introduction to Building Materials	L	T	P
				4	0	0
Internal Marks: 40, External Marks: 60, Total Marks: 100						

Course Objectives: The course should enable the students to:
1. Develop knowledge of material science and behaviour of various building materials used in construction.
2. Identify the construction materials required for the assigned work.

UNIT-I

Bricks: General terms, Classification of bricks, Composition of good brick earth, Harmful ingredients in brick earth, Qualities of good bricks, Tests for bricks.

Timber: Definition, Classification of trees, Structure of a tree, Seasoning of timber, Defects in timber, Market forms of timber.

UNIT-II

Cement: Different types of cement, Constituents of cement, Manufacturing of Portland cement, Tests for cement, Uses of different types of cement.

Concrete: Introduction, Constituents of concrete, Batching of materials, Manufacturing process of cement concrete, Workability and factors affecting it, Methods to determine workability, Segregation and bleeding of concrete, Strength of concrete and factors affecting it, Tests for concrete.

UNIT-III

Soil: Definition of soil, Origin of Soils, Formation of Soils, Transportation of Soils, Major Soil Deposits of India, Terminology of different types of soils.

UNIT-IV

Highway: Materials used in Highway Construction, Soil, Stone Aggregates, Bituminous binders, Bituminous paving mixes, Modified Binders Materials, Concrete road materials.

Course Outcomes: Upon completion of this course the student shall be able to:
1. understand the concept of various methods of manufacture of bricks.
2. obtain differentiate the fine aggregates and coarse aggregates under various views.
3. explain various types of cements and their applications in construction. Various field and laboratory tests on cement.
4. understanding the concept of soil properties.
5. understanding the concept of highway materials.

Books Recommended :
1. Shetty, M.S. “Concrete Technology”, S. Chand Publication.
2. Bindra, S.P. and Arora, S.P. “Building Construction”, DhanpatRai Publication.
3. Duggal, S.K. “Building Materials”, New Age International Publishers.
4. Rangwala, ‘Engineering Materials’, Charotar Publication House.
5. Punmia, B.C. “Building construction”, Laxmi Publication.
6. Singh,P. “Civil Engineering Materials”, S K Kataria and Sons

Sr. No.	Category	Subject Code	Course Title	Contact Hours		
1.	Certificate Course	CCCE102A	Concrete Testing Lab	L	T	P
				0	0	3
Internal Marks: 60, External Marks: 40, Total Marks: 100						

Course Objectives: The practical work should enable the students to:

1. understand the relevance of different properties of constituent materials on properties of concrete.
2. understand the behaviour and durability aspects of concrete under different loading and exposure conditions
3. understand various testing methods for concrete and their applicability.

List of Experiments:

1. Tests on cement:
   - i. Fineness
   - ii. Consistency
   - iii. Setting time
   - iv. Soundness
   - v. Specific gravity
   - vi. Strength
2. Tests on aggregates (fine and coarse)
   - i. Specific gravity
   - ii. Bulk Density
   - iii. Fineness Modulus
   - iv. Moisture content
   - v. Water Absorption
   - vi. Bulking of sand
3. Workability tests on concrete`
   - i. Slump test
   - ii. Compaction Factor test
   - iii. Vee-Bee test
4. Strength tests on concrete
   - **i.** Compressive strength (Cube and Cylinder)

Course Outcomes: Upon completion of this practical work the student shall be able to:

1. evaluate properties of building materials, such as cement and aggregates.
2. conduct experiments and check the acceptance criteria (if any).
3. analyze the properties of concrete in fresh and hardened state.

Manuals Recommended :

1. Concrete Lab Manua', M. L. Gambhir, Dhanpat Rai & Sons, New Delhi.
2. Concrete Lab Manual, TTTI Chandigarh.

Sr. No.	Category	Subject Code	Course Title	Contact Hours		
1.	Certificate Course	CCCE103A	Soil Testing Lab	L	T	P
				0	0	3
Internal Marks: 60, External Marks: 40, Total Marks: 100						

Course Objectives: The practical work should enable the students to:

1. understand their fundamental, index and engineering properties.
2. investigate and write the laboratory reports for soil.

List of Experiments:

1. To determine particle size distribution of given soil specimen.
2. To determine moisture content of given soil sample.
3. To determine insitu density of soil sample.
4. To determine liquid limit and plastic limit of given soil sample.
5. To determine specific gravity of given soil sample.
6. To determine the compaction characteristics of given soil sample by Proctor's Test.

Course Outcomes: Upon completion of this practical work the student shall be able to:

1. determine particle size distribution, moisture content, specific gravity and liquid/ plastic limit of soil.

Manuals Recommended :

1. Soil testing engineering, Manual by Shamsher Prakash and P.K. Jain. Nem Chand & Brothers

Sr. No.	Category	Subject Code	Course Title	Contact Hours		
1.	Certificate Course	CCCE104A	Highway Material Testing Lab	L	T	P
				0	0	3
Internal Marks: 60, External Marks: 40, Total Marks: 100						

Course Objectives: The practical work should enable the students to:

1. know about the highway materials.
2. know about the types of bituminous.

List of Experiments:

1. To find grain size analysis on sub grade soil.
2. To find out consistency limit on subgrade soil.
3. To find CBR value of subgrade soil.
4. To determine impact value of road aggregate.
5. To determine the abrasion value of road aggregate.
6. To findout the aggregate crushing value.
7. To determine the shape of road aggregate by flankiness and elongation index.
8. To determine the penetration value of bituminous.

Course Outcomes: Upon completion of this practical work the student shall be able to:

1. characterize the pavement materials as per the Indian Standard guidelines.
2. evaluate the strength of subgrade soil by CBR test.
3. conduct experiments to evaluate aggregate properties.
4. determine properties of bitumen material and mixes

Manuals Recommended :

1. Khanna S.K., and Justo, C.E.G. “Highway Material & Pavement Testing”, NemChand and Brothers, Roorkee.