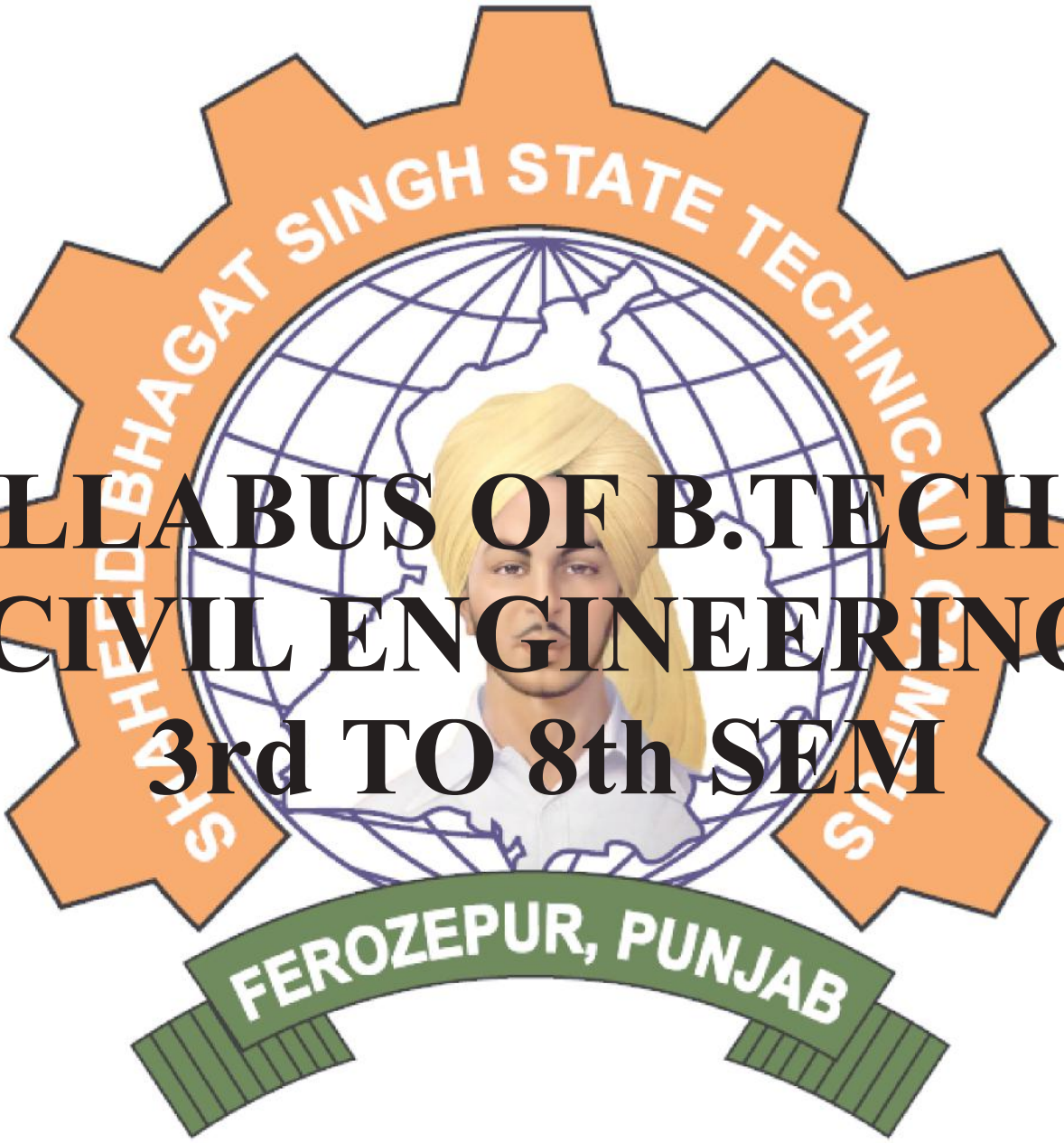


SYLLABUS OF B.TECH IN CIVIL ENGINEERING 3rd TO 8th SEM

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Third Semester

Sr. No.	Course Code	Course Name	Shedule of Teaching				Evaluation Scheme			Credits
			CBCS*	L	T	P	Internal Assessment	External Assessment	Total Marks	
1.	BTCE301A	Strength of Materials	C	3	2	-	40	60	100	4
2.	BTCE302A	Fluid Mechanics	C	3	1	-	40	60	100	4
3.	BTCE303A	Survey	C	3	-	-	40	60	100	3
4.	BTCE304A	Building Materials	C	3	-	-	40	60	100	3
5.	BTCE31YA	Professional Elective-I	E	3	-	-	40	60	100	3
6.	BTCE305A	Fluid Mechanics Lab	C	-	-	2	30	20	50	1
7.	BTCE306A	Strength of Materials Lab	C	-	-	2	30	20	50	1
8.	BTCE307A	Survey Lab	C	-	-	3	30	20	50	1
9.	BTCE308A	Training-I	T	-	-	-	60	40	100	2
10.	BTHU301A	Professional Skills-I	C	-	-	2	30	20	50	1
		Total		15	3	9	380	420	800	-
		Total Contact Hours		27			Total Credits			23

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Fourth Semester

Sr. No.	Course Code	Course Name	Shedule of Teaching				Evaluation Scheme			Credits
			CBCS*	L	T	P	Internal Assessment	External Assessment	Total Marks	
1.	BTCE401A	Structural Analysis-I	C	3	2	-	40	60	100	4
2.	BTCE402A	Construction machinery and works management	C	3	-	-	40	60	100	3
3.	BTCE403A	Irrigation Engineering	C	3	1	-	40	60	100	4
4.	BTCE404A	Building Construction	C	3	-	-	40	60	100	3
5.	BTCE41YA	Professional Elective-II	E	3	1	-	40	60	100	4
6.	BTCE405A	Structural Analysis Lab	C	-	-	2	30	20	50	1
7.	BTHU401A	Professional Skills-II	C	-	-	2	30	20	50	1
		Total		15	4	4	260	340	600	-
		Total Contact Hours		23			Total Credits			20

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Fifth Semester

Sr. No.	Course Code	Course Name	Shedule of Teaching				Evaluation Scheme			Credits
			CBCS*	L	T	P	Internal Assessment	External Assessment	Total Marks	
1.	BTCE501A	Structural Analysis-II	C	3	1	-	40	60	100	4
2.	BTCE502A	Design of concrete Structures-I	C	3	1	-	40	60	100	4
3.	BTCE503A	Design of Steel Structures-I	C	3	1	-	40	60	100	4
4.	BTCE504A	Transportation Engineering-I	C	3	-	-	40	60	100	3
5.	BTCE 9YYA	Open Elective-I	OE	3	-	-	40	60	100	3
6.	BTCE505A	Concrete Technology Lab	C	-	-	2	30	20	50	1
7.	BTCE506A	Transportation Engineering Lab	C	-	-	2	30	20	50	1
8.	BTCE507A	Training-II	T	-	-	-	60	40	100	3
9.	BTHU501A	Professional Skills-III	C	-	-	2	30	20	50	1
		Total		15	3	6	350	400	750	-
Total Contact Hours			24				Total Credits			24

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Sixth Semester

Sr. No.	Course Code	Course Name	Shedule of Teaching				Evaluation Scheme			Credits
			CBCS*	L	T	P	Internal Assessment	External Assessment	Total Marks	
1.	BTCE601A	Geotechnical Engineering	C	3	1	-	40	60	100	4
2.	BTCE602A	Design of Concrete Structures-II	C	3	1	-	40	60	100	4
3.	BTCE603A	Design of Steel Structures-II	C	3	1	-	40	60	100	4
4.	BTCE604A	Transportation Engineering-II	C	3	-	-	40	60	100	3
5.	BTCE9YYA	Open Elective-II	OE	3	-	-	40	60	100	3
6.	BTCE605A	Computer Aided Design Lab	C	-	-	3	30	20	50	1
7.	BTCE606A	Geotechnical Engineering Lab	C	-	-	2	30	20	50	1
8.	BTHU601A	Professional Skills-IV	C	-	-	2	30	20	50	1
Total				15	3	7	290	360	650	-
Total Contact Hours				25			Total Credits			21

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Seventh Semester

Sr. No.	Course Code	Course Name	Shedule of Teaching				Evaluation Scheme			Credits
			CBCS*	L	T	P	Internal Assessment	External Assessment	Total Marks	
1.	BTCE701A	Foundation Engineering	C	3	1	-	40	60	100	4
2.	BTCE702A	Environmental Engineering-I	C	3	1	-	40	60	100	4
3.	BTCE703A	Estimating & Costing	C	3	1	-	40	60	100	4
4.	BTCE71YA	Professional Elective-III	E	3	-	-	40	60	100	3
5.	BTCE705A	Software Lab	C	-	-	2	30	20	50	1
6.	BTCE706A	Environmental Engineering Lab	C	-	-	2	30	20	50	1
7.	BTCE707A	Training-III	T	-	-	-	120	80	200	4
8.	BTCE708A	Project-I	P	-	-	4	40	60	100	4
		Total		12	3	8	380	420	800	-
		Total Contact Hours		23			Total Credits			25

Seventh Semester

Sr. No.	Course Code	Course Name	Shedule of Teaching				Evaluation Scheme			Credits
			CBCS*	L	T	P	Internal Assessment	External Assessment	Total Marks	
1.	BTCE801A	Hydrology and Dams	C	3	1	-	40	60	100	4
2.	BTCE802A	Environmental Engineering-II	C	3	1	-	40	60	100	4
3.	BTCE81YA	Professional Elective-IV	C	3	-	-	40	60	100	3
4.	BTCE804A	Project	P	-	-	6	120	80	200	6
		Total		9	2	6	240	260	500	-
		Total Contact Hours		17			Total Credits			17

*CBCS: Choice Based Credit System
C-Core;E-Elective; OE-Open Elective; T-Training; P-Project

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Professional Elective-I (BTCE31YA)

1. BTCE 311A; Rock Mechanics & Engineering Geology
2. BTCE 312A ; Principles and Economics of Management
3. BTCE313A ; Town Planning

Professional Elective-II (BTCE41YA)

1. BTCE 411A; Geomatics Engineering
2. BTCE 412A; Disaster Management
3. BTCE 413A; Building Maintenance

Professional Elective-III (BTCE71YA)

1. BTCE 711A; Bridge Engineering
2. BTCE 712A; Environmental Impact Assessment
3. BTCE 713A; Ground Improvement Techniques

Professional Elective-IV (BTCE81YA)

1. BTCE811A; Elements of Earthquake Engineering
2. BTCE812A; Pre -stressed Concrete
3. BTCE813A; Pavement Design

Training-I: Workshop Training of 4 weeks duration after 2nd semester Carpentry, Electrical, Plumbing, Masonry, CAD.
Training-II: Survey Camp of 04 weeks duration after 4th Semester.
Training-III: In house/Industrial 8 week training during summer vacations after 6th semester.

OPEN ELECTIVES (BTCE9YY)-Offered by Department of Civil Engineering to be Studied by other discipline students except Civil Engineering students	
BTCE901A	Disaster Management
BTCE902A	Project Management Techniques
BTCE903A	Traffic & Transportation Engineering
BTCE904A	Environment Pollution Control

THIRD SEMESTER

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Strength of Material

Subject Code: BTCE301A

	L	T	P
Internal Marks: 40			
External Marks: 60	3	2	0
Total Marks: 100			

1. **Concept of Equilibrium:** Load, reaction, General equilibrium equations, Equilibrium of a point in space, Equilibrium of a member, Concept of free body diagrams, Displacements, Concept of displacement-constraints/ supports, Statical-determinacy of a problem.
2. **Simple Stress and Strains:** Introduction, Concept of stress and strain, Stress-strain curves for ductile, brittle materials, Generalized Hooke's law, Stress-strain diagram of ductile and brittle material, statically determinate and indeterminate problems, compound and composite bars, thermal stresses. Elastic constants, relations between various elastic constants and its use, Lateral strain, volumetric strain, poisons ratio, Stress and strains in thin cylinders, spherical shells, thin vessels subjected to internal pressures.
3. **Complex stress and strains:** Introduction, Normal stress, tangential stress, Rectangular block subjected to normal stress along and across two planes, combination of normal and tangential stress, Concept of principal stress and its computation, Mohr circle, Principal strains, Computation of principal stresses from the principal strains.
4. **Shear force and Bending moment diagrams:** Introduction to the concept of reaction diagrams-shear force and bending moment, Role of sign conventions, Types of load, beams, supports, Shear force and bending moment diagrams: simply supported, overhang and cantilever beams subjected to any combination of point loads, uniformly distributed and varying load, and moment, Relationship between load, shear force and bending moment, Different methods for plotting a bending moment and shear force diagrams.
5. **Bending and Shear Stresses:** Introduction, Assumptions and derivation of flexural formula for straight beams, Centroid of simple and built up section, second moment of area, Bending stress calculation for beams of simple and built up section, composite sections (flitched sections), Shear stress, Variation of bending and shear stress along the depth of section.
6. **Columns and Struts:** Stability of Columns, Buckling load of an axially loaded columns with various end conditions, Euler's and Rankine's formula, Columns under eccentric load, lateral load.

7. **Torsion of Circular shafts:** Torsion, basic assumptions, derivation of torsion equation, Power transmitted by shafts, analysis and design of solid and Hollow shafts based on strength and stiffness, Sections under combined bending and torsion, equivalent bending and torsion.
8. **Failure theories:** Maximum principal stress theory, Maximum shear stress theory, Distortion Energy theory, Strain Energy theory, Constant Analysis of Thin Cylinder.

Books Recommended:

1. Strength of Material by S. Ramamrutham
2. Mechanics of Material : E.Popov
3. Strength of Materials : Sadhu Singh
4. Strength of Material : Dr. R.K. Bansal

CO1 To provide students with exposure to the systematic methods for solving engineering problems in solid mechanics.
CO2 Apply the linear laws of elasticity as related to different stress and strain conditions.
CO3 To learn the concept of shear force and bending moment diagram for different structure component under various loading conditions.
CO4 Determine the effect of combined axial and bending stress.
CO5 Understand the behavior of columns and struts under axial loading.
CO6 To learn about torsion, bending characteristics of shafts and various failure stress theories.

Chapter CO	1	2	3	4	5	6	7	8
CO1	M	M						
CO2			M					
CO3				M				
CO4					M			
CO5						M		
CO6							M	M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Fluid Mechanics

Subject Code: BTCE302A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**1**	**0**
Total Marks: 100			

1. **Fluid and their properties:** Ideal and real fluids, Continuum concept of fluid: density, specific weight and relative density, viscosity and its dependence on temperature, surface tension and capillarity, vapour pressure and cavitation, compressibility band bulk modulus, Newtonian and non-Newtonian fluids.
2. **Fluid Statics:** Concept of pressure, Pascal's law, Action of fluid pressure on plane (horizontal, vertical and inclined) submerged surface, resultant force and centre of pressure, force on a curved surface due to hydrostatic pressure, Buoyancy and flotation, stability of floating and submerged bodies, Meta centric height and its determination.
3. **Fluid Kinematics:** Classification of fluid flows, velocity and acceleration of fluid particle, local and convective acceleration, normal & tangential acceleration streamline, path line and streak line, flow rate and discharge mean velocity continuity equation in Cartesian co-ordinates, stream & velocity potential functions.
4. **Fluid Dynamics:** Euler's equation, Bernoulli's equation and steady flow energy equation, kinetic energy and momentum correction factors, flow along a curved streamline, free and forced vortex motions.
5. **Dimensional Analysis and Similitude:** Fundamental and derived units and dimensions, dimensional homogeneity, Rayleigh's and Buckingham's Pi method for dimensional analysis, dimension less number and their significance, geometric, kinematic and dynamic similarity, model studies, Flow Measurement in Manometers, Pitot tubes, Venturimeter and orifice meters, orifices, mouthpieces, notches **(Rectangular and V-notches)** and weirs **(Sharp crested Weirs)**.
6. **Laminar& Turbulent Flow:** Flow through circular section pipe, flow between parallel plates, stokes law, Transition from laminar to turbulent, Critical velocity and critical Reynolds Number Turbulent flows and flow losses in pipes, Darcy equation minor head losses in pipe fittings, hydraulic and energy gradient lines, Effects of turbulent flow in pipes.

7. **Uniform flow in open Channels:** Flow classifications, basic resistance equation for open channel flow, Chezy, Manning, Bazin and Kutter formulae, Variation of roughness coefficient, conveyance and normal depth, Velocity Distribution, Most efficient flow sections, rectangular, trapezoidal and circular.

8. **Energy principles and critical flow:** Energy and specific energy in an open channel, critical depth for rectangular and trapezoidal channels, Alternate depths, applications of specific energy to transitions and Broads crested weirs, Momentum and specific force in open channel flow, sequent depths.

Books Recommended:

1. Hydraulics & Fluid Mechanics by P.N.Modi and S.M.Seth; StandardPublication
2. Flow in Open Channels by S.Subraminayam; Tata MacGraw Hill
3. Introduction to Fluid Mechanics by Robert N.Fox& Alan T.Macnold
4. Fluid Mechanics : Dr. R.K. Bansal; Laxmi Publications
5. Fluid Mechanics : Dr.JagdishLal; Metropolitan Book Co. (p) Ltd

CO1 Able to describe appropriate physical properties of fluids and determine pressures and forces on submerged bodies.

CO2 Able to understand the concepts of fluid dynamics and kinematic.

CO3 Ability to present data or governing equations in non-dimensional form, design experiments, and perform model studies.

CO4 To study about laminar and turbulent flow, energy gradient and effects of head losses in pipes.

CO5 To classify the flow in open channel and various momentum principles in open channels.

Co6 To learn the applications of specific energy to transitions and Broads crested weirs, Momentum and specific force in open channel flow.

Chapter CO	1	2	3	4	5	6	7	8
CO 1	M	M						
CO 2			M	M				
CO 3					M			
CO 4						M		
CO 5							M	
CO 6								M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Survey

Subject Code:BTCE303A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**1**	**0**
Total Marks: 100			

1. **Introduction:** Definition, principles of surveying, different types of surveys, topographical map, scale of map, selection of stations and base line, corrections for base line.
2. **Chain and Compass Surveying:** Measurement of distances with chain and tape, direct &indirect ranging, offsets, bearing and its measurement with prismatic and surveyor's compass, calculation of angles from bearings.
3. **Plane Table Surveying:** Setting up the plane table and methods of plane tabling.
4. **Levelling & Contouring**: Setting up of a dumpy/auto level, booking and reducing the levels by rise &fall method and height of instrument method, correction due to curvature and refraction, characteristics of contours, methods of contouring, uses of contour maps.
5. **Theodolite Traversing:** Temporary and permanent adjustments, measurement of horizontal and vertical angles, adjustment of closing error by Bowditch & Transit rules.
6. **Tachometry:** Definition, determination of tachometer constants and reduced level from tachometric observations.
7. **Curves:** Elements of a simple curve, different methods of setting out of simple circular curve.

Books Recommended:

1. Duggal, S.K., Surveying Vol I & II, Tata McGraw Hill (2006)
2. Punmia, B.C., Jain, Ashok Kumar and Jain, Arun Kumar, Surveying Vol. I and II, Laxmi Publications (2005).
3. Agor, R., Surveying, Khanna Publishers (1982)
4. Bhavikatti,S.S. Survey Volume I&II (2009)
5. Surveying by Dr. Narinder Singh

CO1 Ability to use survey instruments in carrying out survey, collect data, write reports and able to perform required calculations to achieve the objective for different types of surveying for different Engineering projects.

Co2 Able to understand the different methods and techniques of surveying like levelling, compass survey, contouring and curve settings etc. and their applications in surveying.

CO3 Able to do field work and office work simultaneously with the help of plane table surveying

CO4 Apply the concept of Theodolite and Tachometry for surveying in different areas to obtain the topographical map of area.

CO5 To learn the different methods of setting out of curves.

Chapter CO	1	2	3	4	5	6	7
CO 1	M	M					
CO 2		M		M			
CO 3			M				
CO 4					M	M	
CO 5							M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Building Materials

Subject Code: BTCE304A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**0**	**0**
Total Marks: 100			

1. **Building Stones:** General, Qualities of a good building stone-Deterioration of stones-Preservation of stones, Common building stone of India &their Uses-Artificial stones.
2. **Bricks:** General, Constituents of bricks, desirable and harmful ingredients in brick earth, qualities of good bricks, testing of bricks, strength, Absorption, weathering of bricks, Varieties of fire bricks, sand lime bricks, building tiles- roofing, flooring and wall tiles.
3. **Lime:** Cementing material, Characteristics of good quality lime, classifications & testing of Lime, Hydraulic test, acid test, setting & slaking of lime, uses of different varieties of lime.
4. **Concrete:** Constituents of concrete, different types of cements used in concrete, brief introduction to ingredients and manufacture of cements, Hydration and compounds of hydration, Properties and testing of cement.
5. **Concrete Mixes:** Design of concrete mixes by ISI method and ACI method, Design of high strength concrete mixes, Design of concrete mix for flexural strength.
6. **Production of Concrete:** Introduction, Batching of materials, mixing of concrete materials, transportation and placing of concrete, compaction of concrete, curing of concrete.
7. **Properties of fresh and hardened concrete:** Introduction, workability, factors effecting workability, methods of determination of workability, strength of concrete, factors effecting strength of concrete, durability and permeability of concrete, factors effecting permeability of concrete, creep and shrinkage of concrete.
8. **Timber:** Advantages of timber construction, timber trees- exogenous and endogenous trees, soft and hard woods, structure of tree, felling of trees, defects in timber, characteristics of good timber, uses and testing of timber.
9. **Miscellaneous Materials:** Paints and varnishes, Distempering, white and color washing, glass and glass products, Asphalt and Bitumen.

Books Recommended:

1. Rangwala – Building Materials
2. Shetty MS, Concrete Technology
3. Punmia BC, Building Construction
4. Singh Parbin, Building Materials
5. M L Gambhir- Concrete Technology

CO1 Impart the knowledge about the characteristics, sources and defects in various materials used for construction purposes.

CO2 Able to design and test the materials either in the laboratory or in the field before their actual use at the site.

CO3 Learn to design concrete mixes by different methods.

CO4 Learn about different types of timbers being used in construction industry along with their uses characteristics ,defects and testing.

Co5 Able to know Paints and varnishes; Distempering; white and color washing; glass and glass products; Asphalt and Bitumen and their uses.

Chapter CO	1	2	3	4	5	6	7	8	9
CO1	M	M		M			M		
CO2		M	M						
CO3				M	M	M			
CO4							M		
CO5								M	M

Fluid Mechanics Lab

Subject Code:BTCE305A

	L	T	P
Internal Marks: 30			
External Marks: 20	**0**	**0**	**2**
Total Marks: 50			

1. To determine the meta-centric height of a floating vessel under loaded and unloaded conditions.
2. To study the flow through a variable area duct and verify Bernoulli's energy equation.
3. To determine the coefficient of discharge for an obstruction flow meter (venturimeter /orifice meter)
4. To determine the discharge coefficient for a Vee notch or rectangular notch.
5. To determine the coefficient of discharge for Broad crested weir.
6. To determine the hydraulic coefficients for flow through an orifice.
7. To determine the friction coefficient for pipes of different diameter.
8. To determine the head loss in a pipe line due to sudden expansion / sudden contraction/ bend.
9. To determine the velocity distribution for pipe line flow with a pitot static probe.

Books Recommended:

1. Practical Fluid Mechanics for Engineering Applications (Mechanical Engineering (Marcell Dekker) : John J.Bloomer
2. Fluid Mechanics Practical Manual: S.Sarabjit Singh.
3. Fluid Mechanics Manual: Baljit Kapoor

CO1 Know the behavior of water current in rivers, canal and drains.
Co2 Use important practical results in common fluid flows.
CO3 Determine metacentre of a floating vessel.
CO4 Calibrate various flow measuring devices in pipe and open channel flow .
Co5 Determine various losses and velocity in pipe flow in field.

Chapter CO	1	2	3	4	5	6	7	8	9
CO1				M	M	M			
CO2	M	M							
CO3	M						M		
CO4								M	M
CO5									M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Strength of Material Lab

Subject Code:BTCE306A

	L	T	P
Internal Marks: 30			
External Marks: 20	**0**	**0**	**2**
Total Marks: 50			

List of experiments:

1. Draw Stress Strain curve for Ductile and Brittle material in tension.
2. Draw Stress Strain curve for Ductile and Brittle material in compression.
3. Draw shear stress, shear strain curve for ductile and brittle material in torsion strength testing
4. Draw load deflection curve for spring in loading and unloading conditions.
5. To determine the hardness of the given material by Rockwell and Brinell hardness testing machine.
6. To determine the fatigue strength of the material.
7. To determine the impact strength by Izod and Charpy test.
8. To determine the load carrying capacity of the leaf spring.
9. To test a mild steel and cast iron specimen in double shear.

Recommended Books:

1. Strength of Material Manual : M.L. Gahmbir
2. Strength of Material Manual: C.B.Kukreja

CO1 Know stress-strain curves of different materials used in the field under different loading conditions.

CO2 Differentiate between properties of materials affect strength under various conditions.

CO3 Able to calculate simple tensile and shear stress using the appropriate guidelines and formats.

CO4 Analyze the bending stress on different types of sections.

CO5 Understand deflection of different sections at different loading conditions.

Chapter CO	1	2	3	4	5	6	7	8	9
CO1			M	M					
CO2	M	M							
CO3					M				
CO4						M	M		
CO5								M	M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Survey Lab

Subject Code BTCE307A

	L	T	P
Internal Marks: 30			
External Marks: 20	**0**	**0**	**3**
Total Marks: 50			

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, two point & three point problem.
7. Setting out a transition curve. Setting out of circular curves in the field using different methods.

Books Recommended:

1 Agor, R., Surveying, Khanna Publishers (1982)
2 Bhavikatti S.S., Survey Volume I&II (2009)
3. Narinder Singh: Surveying:

CO1 Prepare the survey sheet according to the method used.
CO2 Application of theoretical considerations in field and other engineering projects.
CO3 Survey the area using different methods of plane tabling and compass survey and to adjust the compass traverse graphically.
CO4 Record the reduced levels using various methods of levelling and measurement of horizontal & vertical angles by Theodolite.
CO5 Determine the location of any point horizontally and vertically using Tachometry.

Chapter CO	1	2	3	4	5	6	7
CO 1		M					M
CO 2	M	M					
CO 3		M				M	
CO 4			M	M			
CO 5					M	M	

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Workshop Training

Subject Code:BTCE308A
Internal Marks: 40
External Marks: 60
Total Marks: 100

This will be held after 2nd Semester during Summer in the Institute Workshop for four weeks daily for 4 hrs. The students will be trained in the area of Carpentry, Electrical, Plumbing, Masonary and CAD work.

CO1 Useful during the field working in the industry & Civil Engineering works.

CO2 Understand modern manufacturing operations, including their capabilities, limitations and how to design economically.

CO3 Gain insight into how designers influence manufacturing schedule and cost, and cost of different components.

CO4 Learn how to analyze products and be able to improve their manufacturability and make the cost effectively.

CO5 Able to acquire skills in basic engineering practice and identify the hand tools and instruments

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Rock Mechanics & Engineering Geology

Subject Code: BTCE311A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**0**	**0**
Total Marks: 100			

1. **General Geology:** Importance of Engg. Geology applied to Civil Engg. Practices, Weathering, Definition- types and effect, Geological works of rivers, wind, glaciers as agents of erosion, transportation and deposition.
2. **Rocks & Minerals:** Minerals, their identification, igneous, sedimentary & metamorphic rocks. Classification of rocks for engineering purposes, Rock quality designation (RQD).
3. **Structural Geology:** Brief idea about stratification, apparent dip, true dip, strike and in Conformities, Folds, faults & joints: definition, classification relation to engineering operations.
4. **Engineering Geology:** Geological considerations in the Engg. Projects like tunnels, highways, foundation, dams, reservoirs. Earthquake: Definition, terminology, earthquake waves, intensity, recording of earthquake.
5. **Engineering properties of rocks and laboratory measurement:** Uniaxial compression test, tensile tests, permeability test, shear tests, size and shape of specimen rate of testing. Confining pressure, stress strain curves of typical rocks. Strength of intact and fissured rocks, effect of anisotropy, effect of saturation and temperature.
6. **In-situ determination of Engineering Properties of Rock masses:** Necessity of in-situ tests, uniaxialload tests in tunnels and open excavations, cable tests, flat jack test, shear test, pressure tunnel test, Simple methods of determining in situ stresses, bore hole test.
7. **Improvement in properties of Rock masses** : Pressure grouting for dams and tunnels, Rock reinforcement, rock bolting.

Books Recommended:

1. Introduction to Rock Mechanics : Richard E. Goodman.
2. Engg. Behaviour of rocks :Farmar, I.W.
3. Rock Mechanics and Engg. : Jaager C.
4. Fundamentals of Rock Mechanics : Jaager and Cook
5. Engineering Geology : D.S.Arora
6. Engineering Geology : Parbin Singh
7. Rock Mechanics for Engineering : B.P. Verma

CO1 Appreciate importance of seismic activity considerations in a terrain.

CO2 Learn geology and its types, various structural features like folds, faults, joints, weathering etc., minerals, rocks, and rock formations in relation to civil engineering projects.

CO3 Understand various techniques to determine engineering properties of rocks etc. and distinguish the different types of rocks and minerals.

Co4 Understand various techniques to analyze and to make possible solutions for various Geological Engineering problems.

Chapter CO	1	2	3	4	5	6	7
CO 1	M						
CO 2		M	M				
CO 3				M	M		
CO 4				M		M	M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Principles and Economics of Management

Subject Code: BTCE312A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**0**	**0**
Total Marks: 100			

1. **Economics:** Definition, nature and scope.
2. **Economy:** Types, problems and functions.
3. **Basic Terms & Concepts:** Good, Utility, value, capital & margin Human wants, consumption and standard of living Consumers' Behaviour Consumers' surplus Demand & law of demand, determinants of demand & elasticity of demand.
4. **Scale of Production:** Law of returns Costs & Costs Curves, Supply & Supply curves Market – Definition and types, equilibrium of firms& industry
5. **Pricing:** Commodity pricing under perfect competition, monopoly, monopolistic competition and oligopoly Theories of Distribution, Rent, Interest and Profits
6. **Functions of Management, Management-** Science or Art Universality of Management, Scientific Management, Principles of Management by Henry Fayol Authority, Responsibility, Accountability and Power Delegation of Authority
7. **Motivation-** Concept and theories.

Books Recommended:

1. Economics : Sloman
2. Managerial Economics : P.L. Mehta
3. Modern Micro Economics : Koutsoyannisa
4. Principles & practices of Management : L.M. Prasad
5. Essentials of Management : Koontz &Weihrich

CO1 To impart knowledge, with respect to concepts, principles and practical applications of Economics, which govern the functioning of a firm/organization under different market conditions.

CO2 To help the students to understand the fundamental concepts and principles of management; the basic roles, skills, functions of management, various organizational structures and basic knowledge of marketing.

Chapter CO	1	2	3	4	5	6	7
CO 1	M	M	M	M	M		
CO 2						M	M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

TOWN PLANNING

Subject Code: BTCE-313A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**0**	**0**
Total Marks: 100			

1. Introduction, Role, Importance and Scope of Town Planning
2. Planning Principals of Human Settlement in Nile Valley, Greek and Roman Periods.
3. Regional Plan-Objectives, Role, Importance and Methodology
4. Planning Concepts-Garden City, Linear City, Industrial City and Sustainable City and Neighbourhood
5. Existing Towns and Cities in India-Problems, Remedies etc.
6. Urbanization –Causes, Pattern and Effect in India.
7. Study of New Towns in India –Chandigarh, New Delhi & Gandhi Nagar

Books Recommended:

1. UDPFI Guidelines –Ministry of Urban Development
2. Rangwala S C, "Town Planning"
3. GallionArthur B, "The Urban Pattern:City Planning and Design".
4. Gupta S.P. "The Chandigarh: An Overview"

CO1 Able to explain the tools of town planning
CO2 Able to explain different components of town and their effect in town planning
CO3 Able to describe the facts relating to the Industrial areas of a town
CO4 Able to describe the aspects involved in a Development Plan
CO5 Able to apply land use regulation for planning issues

Chapter CO	1	2	3	4	5	6	7
CO 1	M						
CO 2		M	M				
CO 3				M	M		
CO 4					M	M	
CO 5							M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

PROFESSIONAL SKILLS

Subject Code: BTHU-301A

L	T	P
0	0	2

Personality Development: General overview of Personality. Understanding Self Concept andSelf esteem, Building Self Esteem, Self Confidence, Assertiveness (activity Based training) Understanding assessment of Personality.

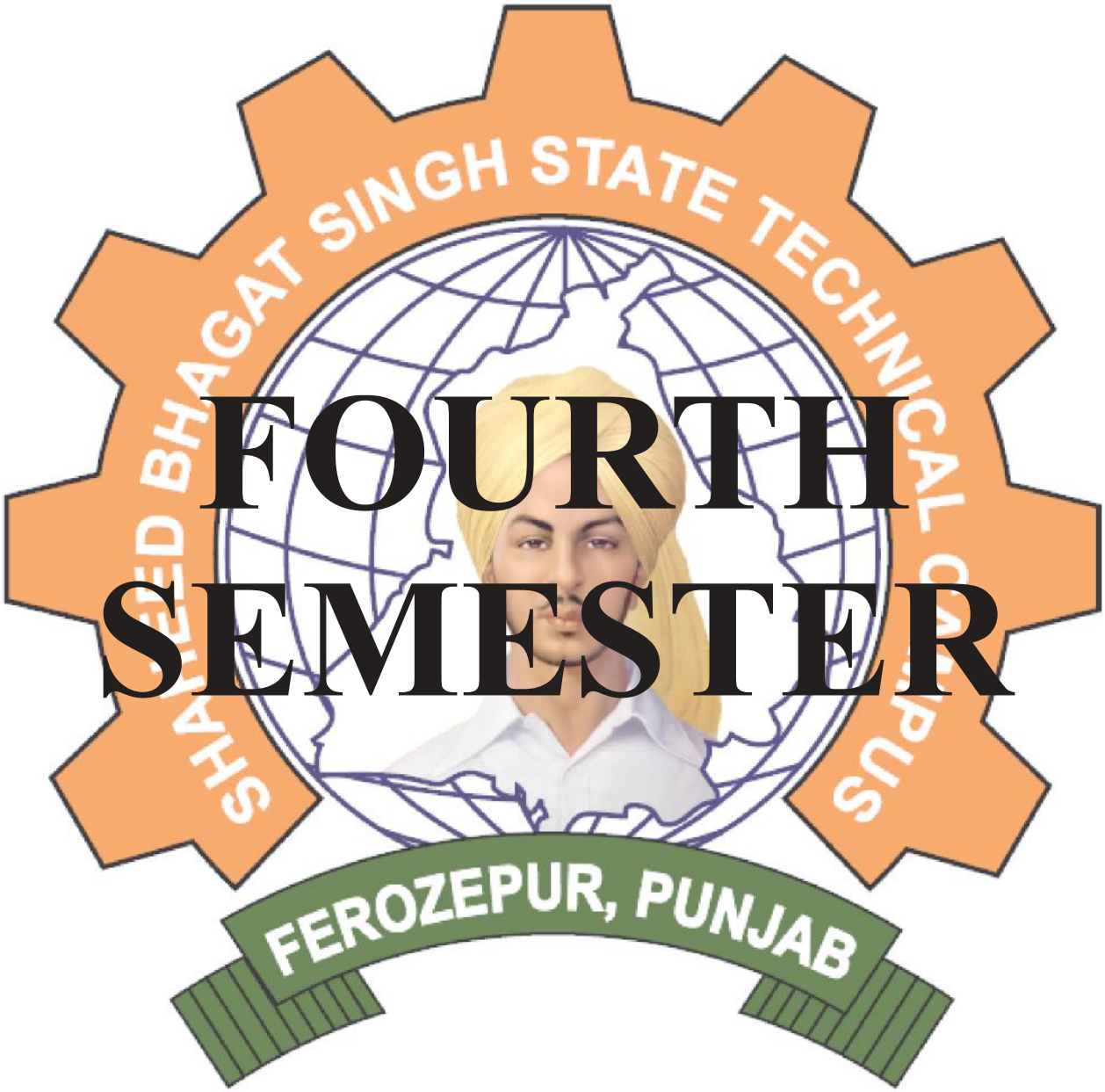
Mental Abilities: Understanding Intelligence, emotional intelligence, successful intelligence, development of emotional intelligence.

Social Etiquettes and Personal Grooming: Importance of social image, Do's and Dont's in dressing up, Developing an Understanding of Social Etiquettes.

Communication Skills: Features of an effective Communication. Verbal and Non- verbal Communication, Understanding role of body language in effective communication.

Recommended Books:

1. Personality Development by Harold Wallace and L. Ann Masters, Cengage Learning.
2. Psychology by Baron, Prentice Hall India.
3. Educational Psychology by Anita Woolfolk, Pearson
4. Organisational behaviour by Stephen Robbins, Pearson Education.
5. Communication in organisations by Dalmer Fisher, Jaico Publishing House, New Delhi.



FOURTH SEMESTER

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

STRUCTURAL ANALYSIS- I

Subject Code: BTCE401A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**2**	**0**
Total Marks: 100			

1. **Displacements**: Concept; Governing differential equation for deflection of straight beams; Following methods for determination of structural displacements: Geometric Methods: Double integration; Macaulay's method; Moment area method; Conjugate beam method. Energy Methods: Strain energy in members, Betti's and Maxwell's Laws of reciprocal deflections, Concept of Virtual work and its applications, Castigliano's theorems, unit load method, deflections of trusses and 2D-frames.
2. **Determinate Structures:** Concept of determinacy; Analysis of determinate structural elements truss, arch, beam, frame, cables; Internal forces in determinate structures; Reaction diagram-- Bending moment, shear force, radial shear, normal thrust diagrams for the determinant structures. Analysis of plane trusses, compound and complex trusses using method of joints, method of joints, tension coefficients. Analysis of three-hinged arch of various shapes under different loading conditions. Analysis of simple portal frame, cables under different loading conditions. Analysis of cables under point load and UDL with ends at same or different levels.
3. **Moving Loads and Influence Line Diagrams:** Concept of influence line diagram, rolling loads; Bending moment and shear force diagrams due to single and multiple concentrated rolling loads, uniformly distributed moving loads; Equivalent UDL; Muller Breslau principle; Influence lines for beams, girders with floor beams and frames; calculation of the maximum and absolute maximum shear force and bending moment; Concept of envelopes; Influence line for displacements; Influence line for bar force in trusses.
4. **Analysis of Cables and Suspension Bridges:** General cable theorem, shape, elastic stretch of cable, maximum tension in cable and back-stays, pressure on supporting towers, suspension bridges, three hinged stiffening girders.
5. **Analysis of Dams, Chimneys and Retaining Walls:** Introduction, loadings for the dames, chimneys, and retaining walls; limit of eccentricity for no-tension criteria; Concept of core; Middle-third rule; maximum/minimum base pressures.

Books Recommended:

1. Basic structural Analysis C.S. Reddy; Tata McGraw-Hill Education
2. Analysis of Structures Vol- I and Vol.-II Vazirani&Ratwani; Khanna Publishers
3. Intermediate structural Analysis C.K.Wang; McGraw-Hill
4. Advanced Structural Analysis, A.K. Jain, Nem Chand & Bros., Roorkee.
5. Theory of Structures, Vol. I, S.P. Gupta &G.S.Pandit, Tata McGraw Hill, New Delhi

CO1 To interpret the various methods of structural displacements.
CO2 To analyse the determinate structure and its reaction diagram
CO3 Draw the influence line diagram for rolling loads.
CO4 To compute the pressure on supporting tower, suspension bridge etc.
CO5 Calculation of loads for no tension criteria on domes chimneys and retaining walls

Chapter CO	1	2	3	4	5
CO 1	M	M			
CO 2		M			
CO 3			M		
CO 4				M	
CO 5					M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

CONSTRUCTION MACHINERY & WORKS MANAGEMENT

Subject Code:BTCE402A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**0**	**0**
Total Marks: 100			

1. **Introduction:** Need for project planning & management, time, activity & event, Bar chart, Milestone chart, uses & draw backs.
2. **PERT:** Construction of PERT network, time estimates, network analysis, forward pass &backward pass, slack, critical path, data reduction, suitability of PERT for research project, numerical problems.
3. **CPM:** Definitions, network construction, critical path, fundamental rules, determination of project schedule, activity time estimates, float types, their significance in project control, numerical problems.
4. **Cost Analysis And Contract:** Type of costs, cost time relationships, cost slopes, conducting a crash programme, determining the minimum total cost of project, numerical problems. updating a project, when to update, time grid diagram, resource scheduling. planning of different components of civil engineering projects such as a house, workshop, dam, tunnel.
5. **Construction Equipment and Machinery:** Tractors, bull dozers, rippers, scrappers, power shovels, dragline, hoes. Line diagram of each, sizes, output, uses, factors affecting selection of each equipment, economic life of equipment, maintenance and repair cost.
6. **Hoisting & Transporting Equipments**: Hosts, Winches, Cranes, Belt conveyors, Ropeways, trucks & Wagons.
7. **Plants For Grading:** Batching, mixing, types of mixers, concrete pumps, bitumen plants.

Books Recommended:

1. Construction Planning and Equipment - R.L.Peurifoy - Tata McGraw Hill, New Delhi
2. PERT and CPM - L.S.Srinath, East West Press
3. Management Guide to PERT & CPM - Wiest& levy; Prentice Hall
4. Construction Equipment & Planning and Application. - Mahesh VermaArtec Publication.
5. Construction Planning and Management by U. K. Shrivastava; Galgotia Publications Pvt.Ltd.
6. PERT and CPM - B.C. Punmia and K.K. Khandelwal

CO1 To describe the requirement of planning and management
CO2 To recognize the critical path and pert suitability for research projects
Co3 To determine projects schedule and estimate the activity time of CPM.
CO4 To discuss resource scheduling and planning of civil engineering Projects
Co5 To illustrate various construction equipments and machinery, their utility

Chapter CO	1	2	3	4	5	6	7
CO 1	M						
CO 2		M	M				
CO 3			M				
CO 4				M			
CO 5					M	M	M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

IRRIGATION ENGINEERING

Subject Code:BTCE403A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**1**	**0**
Total Marks: 100			

1. **Introduction:** Objectives of Irrigation, Methods Of Irrigation and Advantages of various techniques of irrigation-water requirements of crops, water depth or delta , Duty of water, Base Period, relation between delta, duty and base period, Soil crop relation-ship and soil fertility.
2. **Canal Irrigation:** Classifications of canals, canal alignment, Inundation canals, Bandhara irrigation, advantages and disadvantages, Silt theories-Kennedy's theory, Lacey's theory, Design of unlined canals based on Kennedy & Lacey's theories, types of canal lining, selection of type of lining, maintenance of lined canals, silt removal, strengthening of channel banks, design of lined canals.
3. **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, Theories of Seepage, Seepage force and exit gradient, Bligh's & Creep theory, Khosla's theory, Determination of uplift pressures and floor thickness.
4. **River Training Works:** Objectives, classification of river-training works, Design of Guide Banks, Groynes or spurs - their design and classification, Recommendations of Approach embankments and afflux embankments, pitched Islands, Types of head works, component parts of a diversion head work and their design considerations, silt control devices, Types of energy dissipators and their hydraulic design.
5. **Design of Weirs:** Weirs versus barrage, types of weirs, main components of weir, causes of failure of weir and design considerations with respect to surface flow, hydraulic jump and seepage flow. Designof barrage or weir.
6. **Canal Regulators, Falls and Outlets:** Offtake alignment, cross-regulators – their functions and design, Distributory head regulators, their design, canal escape, types of falls and their description, selection of type of falls, Principles of design of falls, Design of Sarda type, straight glacis and Inglis or baffle wall falls, Essential requirements of Canal Outlets and their classifications, Details and design of non-modular, semi-modular and modular outlets.

7. **Cross-Drainage works:** Definitions, choice of type, Hydraulic design consideration, Aqueducts their types and design, siphon aqueducts - their types and design considerations, super passages, canal siphons and level crossing.

Books Recommended:

1. Principles & practice of Irrigation Engg. S.K.Sharma; S. Chand, Limited.
2. Irrigation & Water Power Engg. B.C. Punmia, PandeB.B.Lal; Laxmi Publications (p) Ltd
3. Fundamentals of Irrigation Engg. Dr. Bharat Singh; Nem Chand & Bros
4. Irrigation Engg. & Hydraulic Structure by Santosh Kumar Garg, Khanna Publishers
5. Design of Irrigation Structures by R.K. Sharma, Oxford IBH Pub
6. Irrigation Engg. and Hydraulics Structures by S.R. Sahasrabudhe, . Katson Publishing
7. Irrigation Practice and Design Vol. I to VII by K.B. Khushlani. Oxford IBH Pub

CO1 To understand various techniques and parameters of irrigation

CO2 To analyse the design of lined canal and its problems.

CO3 Able to calculate losses in canals ,water logging Seepage force and uplift pressure using different theories of seepage

CO4 To analyse the design and classification of river training works according to ISI recommendations

CO5 Learn about the weirs and energy dissipating devices, Design Different cross drainage works at canals, location and necessity of canal falls

Chapter CO	1	2	3	4	5	6	7
CO 1	M	M					
CO 2			M				
CO 3			M				
CO 4				M			
CO 5					M	M	M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

BUILDING CONSTRUCTION

Subject Code:BTCE404A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**0**	**0**
Total Marks: 100			

1. **Brick & Stone Masonry:** Terms used; types of bonds; their merits and demerits; Rubble and ashlar joints in stone masonry, introduction to cement concrete hollow blocks, advantages and disadvantages of concrete block masonry over brick masonry. Walls and Foundation: Load bearing and non-load bearing walls, estimation of load on walls and footings, Thickness considerations, partition and cavity walls design of masonry walls, pillars and footings.
2. **Damp Proofing:** Sources, Causes of dampness in buildings, bad effects of dampness, methods of damp proofing.
3. **Arches and Lintels:** Introduction to terms used in Arches; different types of arches; brick and stone arches, types and functions of lintels.
4. **Roofs:** Introduction, terms used, types of roof trusses and roof coverings, details of rain proofing, rain water pipes.
5. **Doors and Windows:** Introduction, terms used, location of doors and windows, types of doors and windows, methods of fixing doors and window frames in walls. Ventilators.
6. **Plastering, Pointing and Painting:** Introduction, objects and types, special materials for plastered surfaces, distempering, white washing and colour washing of plastered surfaces.
7. **Floors:** Introduction, various types of floors commonly used and their suitability for different buildings, constructional details of concrete and Terrazzo floorings, marble flooring, anti- termite treatment.
8. **Miscellaneous Topics:**
   (a) Site selection; and orientation of building.
   (b) Principles of acoustical design of Building.
   (c) Fire proof construction methods.
   (d) Construction and expansion joints.
   (e) Building bylaws

Books Recommended:

1. Building Construction: S.K. Sharma
2. Building Construction:Sushil Kumar
3. Building Construction: B.C. Punmia

CO1 Able to learn about different types of masonry bonds used in construction techniques.

CO2 To know about ill effect of dampness in construction and its remedial measures

CO3 Able to learn about arches, lintels, roof trusses and roof covering

Co4 To know about the various door and windows fitting techniques

CO5 To learn about different types of flooring ,Plastering, Pointing and Painting

Chapter CO	1	2	3	4	5	6	7	8
CO 1	M	M						
CO 2		M						
CO 3			M	M				
CO 4					M			M
CO 5						M	M	

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Structural Analysis Lab

Subject Code: BTCE405A

	L	T	P
Internal Marks: 30			
External Marks: 20	**0**	**0**	**2**
Total Marks: 50			

List of Experiments

1. Deflection of a simply supported beam and verification of Clark-Maxwell's theorem.
2. To determine the Flexural Rigidity of a given beam.
3. To verify the Moment- area theorem for slope and deflection of a given beam.
4. Deflection of a fixed beam and influence line for reactions.
5. Deflection studies for a continuous beam and influence line for reactions.
6. Study of behaviour of columns and struts with different end conditions.
7. Experiment on three-hinged arch.
8. Experiment on two-hinged arch.
9. Deflection of a statically determinate pin jointed truss.
10. Forces in members of redundant frames.
11. Experiment on curved beams.
12. Unsymmetrical bending of a cantilever beam.

References:

A Laboratory Manual on Structural Mechanics by Harvinder Singh; New Academic Publishing Comp. Ltd.

CO1 Knowledge of the experimental study in structural analysis helps to check the stability of various structures in the field.

CO2 Able to design and conduct experiments, as well as being able to analyze and interpret data.

CO3 Able to design a system, component, or process to meet desired needs.

CO4 Able to function in multi-disciplinary teams.

CO5 Able to identify, formulate, and solve engineering problems.

Chapter CO	1	2	3	4	5	6	7	8	9	10	11	12
CO 1	M	M	M									
CO 2			M	M	M							
CO 3							M	M	M			
CO 4						M						M
CO 5	M									M	M	M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

GEOMATICS ENGINEERING

Subject Code: BTCE 411A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**1**	**0**
Total Marks: 100			

1. **Photogrammetry:** Introduction, Basic Principles, Photo-Theodolite, Elevation of a Point by Photographic Measurement, Aerial Camera, Vertical Photograph, Tilted Photograph, Scale, Crab and Drift, Flight Planning for Aerial Photography, Ground Control for Photogrammetry, Photomaps and Mosaics, Stereoscopic Vision, Stereoscopic parallax, Stereoscopic Plotting Instruments, Applications.
2. **Electromagnetic Distance Measurement (EDM):** Electromagnetic Waves, Carrier Waves, Black body radiation, Laws of radiation Modulation, Types of EDM Instruments, Electro-optical, Infrared, and Microwave EDM Instruments, Effect of Atmospheric Conditions, The Geodimeter, The Tellurometer, Wild Distomats, Electronic Total Station.
3. **Remote Sensing:** Introduction, Basic Principles, Electromagnetic (EM) Energy Spectrum, EM Radiations and the Atmosphere, Interaction of EM radiations with Earth's Surface, Types of remote sensing systems, Remote Sensing Observation Platforms, Satellites and their characteristics – Geostationary and sun-synchronous, Earth Resources Satellites, Meteorological satellites, Sensors, Types and their characteristics, Across track and Along track scanning, Applications of Remote Sensing.
4. **Global Positioning System (GPS):** Introduction, Fundamental concepts, GPS system elements and signals, GPS measurement sand accuracy of GPS, Satellite Movement, GPS Satellites, Co-ordinate systems - Geoids, Ellipsoid and Datum, Spheroid, Customised Local Reference Ellipsoids, National Reference Systems, Worldwide Reference Ellipsoid, WGS 84, Differential-GPS, Classification of GPS receivers, GPS Applications.
5. **Geographical Information System (GIS):** Definition, GIS Objectives, Hardware and software requirements for GIS, Components of GIS, Coordinate System and Projections in GIS, Data structure and formats, Spatial data models – Raster and Vector, Data inputting in GIS, Data base design - editing and topology, creation in GIS, Linkage between spatial and non spatial data, Spatial data analysis - significance and type, Attribute Query, Spatial Query, Vector based spatial data analysis, Raster based spatial data analysis, Errors in GIS, Integration of RS and GIS data, Digital Elevation Model, Network Analysis in GIS, GIS Software Packages.

Books Recommended:

1. Arora, K.R., 2007: Surveying Vol-III, Standard Book House.
2. Campbell, J.B.2002: Introduction to Remote Sensing. Taylor Publications.
3. Chang.T.K. 2002: Geographic Information Systems, Tata McGrawHill.
4. Heywood.I, Cornelius S, CrverSteve. 2003: An Introduction to Geographical Information Systems, Pearson Education.
5. Joseph George, 2003: Fundamentals of Remote Sensing. Universities Press.
6. Punmia, B.C., Jain A.K., 2005: Higher Surveying, Luxmi Publications
7. Sabbins, F.F., 1985: Remote Sensing Principles and Interpretation. W.H.Freeman

CO1 To understand the basic principles of aerial photogrammetry and its instrumental knowledge.

CO2 Illustration of different types of satellites and their characterstics

CO3 To analysis the data based on GIS Systems and GIS errors

CO4 Classification of Coordinate SYSTEM BASED ON GPS and its applications

Chapter / CO	1	2	3	4	5
CO 1	M				
CO 2		M			
CO 3			M		
CO 4				M	M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

DISASTER MANAGEMENT

Subject Code:BTCE 412A

	L	T	P
Internal marks: 40			
External marks: 60	**3**	**1**	**0**
Total marks: 100			

1. **Introduction to Disaster Management:** Define and describe disaster, hazard, emergency, vulnerability, risk and disaster management; Identify and describe the types of natural and non-natural disasters. Important phases of Disaster Management Cycle.
2. **Disaster Mitigation and Preparedness:** Natural Hazards: causes, distribution pattern, consequences and mitigation measures for earth quake, tsunami, cyclone, flood, landslide drought etc. Man-made hazards: causes, consequences mitigation measures for various industrial hazards/disasters, Preparedness for natural disasters in urban areas.
3. **Hazard and Risk Assessment:** Assessment of capacity, vulnerability and risk, vulnerability and risk mapping, stages in disaster recovery and associated problems.
4. **Emergency Management Systems (EMS):** Emergency medical and essential public health services, response and recovery operations, reconstruction and rehabilitation.
5. **Capacity Building:** Gender sensitive disaster management approach and inculcate new skills and sharpen existing skills of government officials, voluntary activists, development of professional and elected representative for effective disaster management, role of media in effective disaster management, overview of disaster management in India, role of agencies like NDMA, SDMA and other International agencies, organizational structure, role of insurance sector, DM act and NDMA guidelines.
6. **Application of Geo informatics and Advanced Techniques:** Use of Remote Sensing Systems (RSS) and GIS in disaster Management, role of knowledge based expert systems in hazard scenario, using risks-time charts to plan for the future, early warning systems.
7. **Integration of public policy:** Planning and design of infrastructure for disaster management, Community based approach in disaster management, methods for effective dissemination of information, ecological and sustainable development models for disaster management.
8. **Case Studies:** Lessons and experiences from various important disasters with specific reference to Civil Engineering.

Books Recommended:

1. Natural Hazards in the Urban Habitat by Iyengar, C.B.R.I., Tata McGraw Hill.Pub
2. Natural Disaster management, Jon Ingleton (Ed), Published by Tudor Rose, Leicester
3. Disaster Management, R.B. Singh (Ed), Rawat Publications ESCAP: Asian and the Pacific Report on Natural Hazards and Natural Disaster Reduction.
4. Disaster Management –Future Challenges & Opportunities by Jagbir Singh. I.K. International Publishing House.

CO1 To be familiar with disasters, their types, causes disaster management

CO2 To learn the importance of capacity building, vulnerability, Risk mapping, stages in disaster recovery and associated problems

CO3 To gain knowledge about Emergency medical and essential public health services, response and recovery operations, reconstruction and rehabilitation, role of different agencies during disasters

CO4 To learn the use of modern techniques like Remote Sensing Systems (RSS) and GIS in disaster Management, role of knowledge based expert systems in hazard scenario, using risks-time charts to plan for the future, early warning systems.

CO5 To learn about Planning and design of infrastructure for disaster management, Community based approach in disaster management, Lessons and experiences from various important disasters. Civil Engineering.

Chapter CO	1	2	3	4	5	6	7	8
CO 1	M	M						
CO 2			M		M			
CO 3				M				
CO 4						M		
CO 5							M	M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

BUILDING MAINTENANCE

Subject Code:BTCE 413A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**1**	**0**
Total Marks: 100			

1. **Principles of Maintenance** : Importance of Maintenance, Deterioration and durability, Factors affecting decision to carryout maintenance, Maintenance and GNP Agencies causing deterioration, effect of deterioration agencies on materials.
2. **Design and economic consideration in Maintenance** : Factors to reduce maintenance at design stage, Consideration of maintenance aspects in preparing tender document and specifications, Sources of error in design which enhances maintenance, Importance of working drawings and schedules Provision of access for maintenance and its importance at design stage. Economic consideration in Maintenance: Physical life, Functional life, Economic life of different types of buildings, Discounting technique for assessment of economic life.
3. **Maintenance Management** : Definition, Organization structure, work force for Maintenance, Communication needs, Building inspections, Maintenance budget and estimates, Property inspections and reports, Specification for maintenance jobs, Health and safety in maintenance, Quality in Maintenance, maintenance Manual and their importance.
4. **Materials for Maintenance :** Compatibility of repair materials, Durability and maintenance, Types of materials, their specification and application, Criteria for selection of material, Use of Commercial available materials in maintenance.
5. **Investigation and diagnosis for Repair of structures :** Basic Approach to investigations, Physical inspection, Material Tests, Non destructive testing for diagnosis, Estimation of actual, loads and environmental effects, Study of design and construction practices used in original construction, Retrospective analysis, Confirmation and repair steps.
6. **Building Defects and Remedial Measures :**Nature, types of problems, their causes, remedial measures and special treatment for building elements.

- Foundation,
- Basements
- D.P.C.
- Walls
- Wall finishes
- Chimney, stacks and shafts
- Columns and beams
- Roof and roof terraces
- Floor and floor finishes
- Joinery work - Decorative/decorative finishes
- Services - Materials – Dampness

CO1 Able to explain the meaning of terms commonly used in the building maintenance.

CO2 Able to explain design and economic consideration in maintenance.

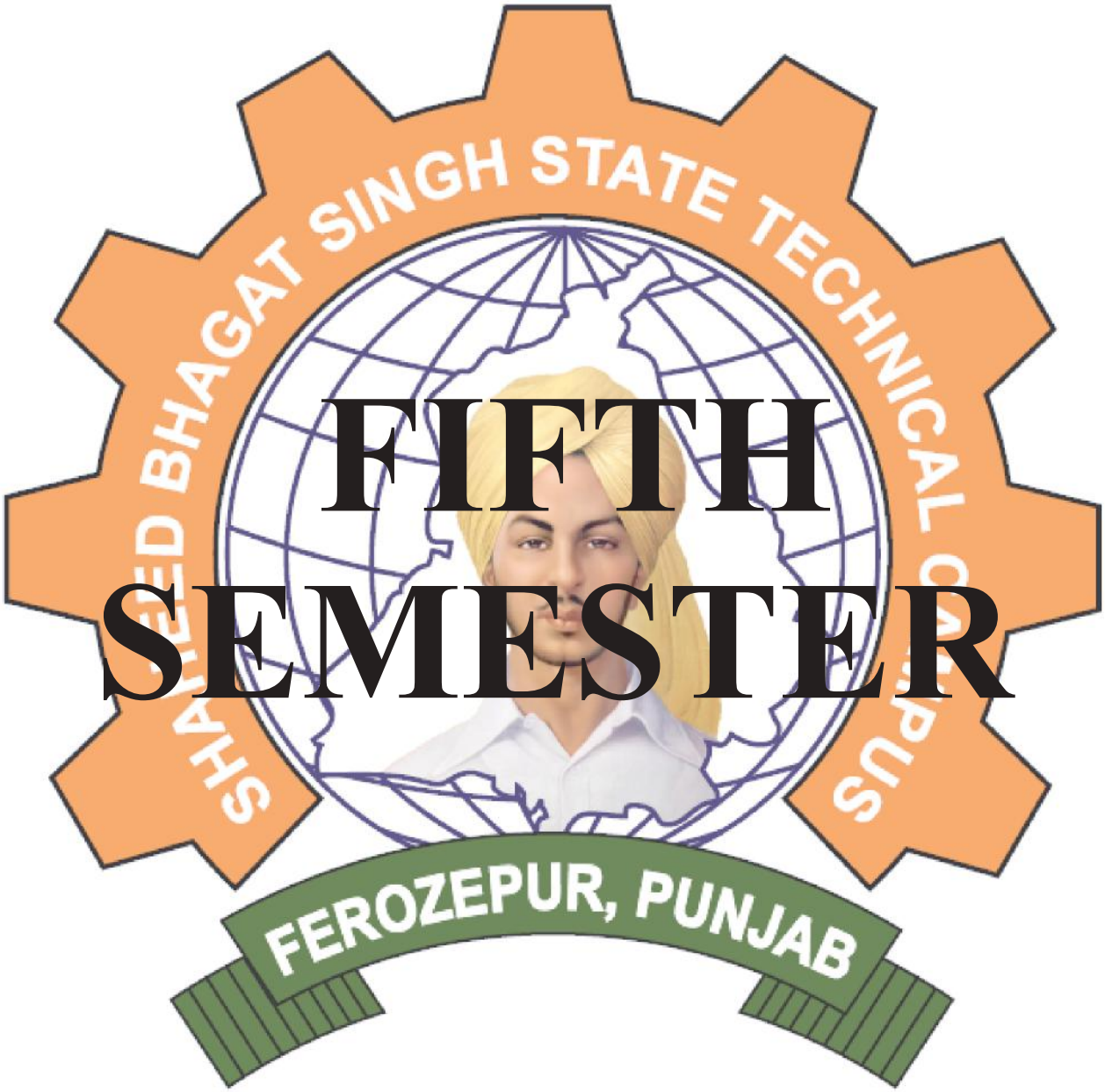
CO3 Able to make decisions about the management and maintenance of building systems.

CO4 Able to use material commonly used in the building maintenance

CO5 To learn various tests and design considerations regarding diagnosis and repair of structure.

CO6 Able to learn various defects in buildings and their remedial measures

Chapter CO	1	2	3	4	5	6
CO 1	M					
CO 2		M				
CO 3			M			
CO 4				M		
CO 5					M	
CO 6						M



FIFTH SEMESTER

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Structural Analysis-II

(Pre-requisite: Structural Analysis-I)

Subject Code:BTCE 501A

	L	T	P
Internal Marks: 40			
External Marks: 60	3	1	0
Total Marks: 100			

1. **Indeterminate Structures:** Concept of indeterminate /redundant structures; Static and kinematic indeterminacies; stability of structures; internal forces; Conditions of stress-strain relationships, equilibrium and compatibility of displacements; Solution of simultaneous algebraic equations.
2. **Indeterminate Structural Systems**: Pin-jointed and rigid-jointed structural systems; Deformation of redundant structures-sway and non-sway frames, elastic curve; Static equilibrium and deformation compatibility checks; Effects of support settlement and lack of fit; Fixed-end moments – member loading, sinking of supports, temperature.
3. **Analysis of redundant beams, frames, trusses, arches using following methods:** Slope deflection method; Moment distribution method; Rotation contribution method (Kani's Method), Theorem of three moments, Portal method; Cantilever method.
4. **Influence Line Diagrams:** Concept and application in the analysis of statically indeterminate structures; Influence line for bar forces in the statically indeterminate trusses, beams and frames.

BOOKS & CODES RECOMMENDED:

1. Basic structural analysis - C.S. Reddy Tata McGraw-Hill
2. Intermediate structural analysis - C. K. Wang. McGraw Hill
3. Indeterminate structural analysis - J. Sterling Kinney Addison-Wesley Educational Publishers
4. Theory of structures - B.C. Punima, Laxmi Publications
5. Structural Analysis, Devdas Menon, Narosa Publishers.

Course Outcomes

CO1 Able to identify determinate, indeterminate stable and unstable structures.

CO2 Able to analyse various concepts of multi-storey buildings under different type of loading conditions.

CO3 Understand about slope deflection method and rotation contribution method for various civil engineering structures.

Co4 Ability to obtain the influence line diagram for statically indeterminate structures and trusses.

Chapter CO	1	2	3	4
CO 1	M	M		
CO 2		M	M	
CO 3			M	
CO 4				M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Design of Concrete Structures-I

Subject Code: BTCE-502A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**1**	**0**
Total Marks: 100			

Note: (i) BIS 456 & SP16 are permitted in Examination.
(ii) Limit State Method of design should be used.

CONCRETE TECHNOLOGY

1. **Concrete:** Workability – Factors affecting workability – Measurement of workability by different tests – Setting times of concrete – Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete – Quality of mixing water, Abram's Law , Factors affecting strength; Target strength, Modulus of elasticity, Modulus of rupture, Types of Concrete.
2. **Basic Concepts of Reinforced Cement Concrete:** Objectives and Methods of Analysis and Design, Properties of Concrete and Steel, Design Philosophies of Working Stress Method and Limit State Method & Ultimate Method of Calculation of Loads according to BIS 875, Limit State of Collapse – Flexure.
3. **Design of Elements using Limit State Method :**Computation of Parameters of Governing Equations, Determination of Neutral Axis Depth and Computation of Moment of Resistance, Numerical Problems on Singly Reinforced Rectangular Beams, Doubly Reinforced Beams – Theory and Problems, Flanged Beams – Theory and Numerical Problems, Shear, Bond, Anchorage, Development Length and Torsion ,Reinforced Concrete Slabs: One, Two way Slab and Flat slab.
4. **Design of Compression Members using Limit State Method:** Definitions, Classifications, Guidelines and Assumptions, Design of Short Axially Loaded Compression Members, Design of Short Compression Members under Axial Load with Uniaxial and biaxial Bending, Preparation of Design Charts, Design of Slender Columns.

BOOKS:

1. Properties of Concrete by A.M.Neville – Prentice Hall
2. Concrete Technology by M.S.Shetty. – S.Chand& Co.;
3. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi
4. Concrete Technology by A.R. Santha Kumar, Oxford university Press, New Delhi

5. Advanced Design of Structures N. Krishna Raju
6. Advanced RCC Design Pillai &Mennon ; Tata MacGraw Hill
7. Limit State Design Ramachandra
8. Limit State Design A.K. Jain
9. Limit State Design of Reinforced Concrete P.C. Vergese

Course Outcomes

CO1. Able toUnderstand about composition and characteristics of concrete. And study of various properties of aggregates.

CO2. Design the proportion of concrete as per BIS method

CO3. Understand the design philosophies of Working Stress Method (WSM) and Limit State Method (LSM)

CO4. Able to solve problems in context to singly, doubly and flanged Beam, columns and slabs.

Chapter / CO	1	2	3	4
CO 1	M			
CO 2		M		
CO 3			M	M
CO 4			M	M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Design of Steel Structures – I

Subject Code:BTCE 503A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**1**	**0**
Total Marks: 100			

Note: BIS 800-2007 & SP6 are permitted in Examination.

1. **Introduction**: Properties of structural steel, I.S. rolled sections, I.S. specifications.
2. **Connections**: Riveted, bolted and welded connections for axial and eccentric loads.
3. **Tension members**: Design of members subjected to axial tension.
4. **Compression members**: Design of axially loaded members, built-up columns, laced and battened columns including the design of lacing and battens.
5. **Flexural members**: Design of laterally restrained and un-restrained rolled and built-up sections, encased beams.
6. **Column bases**: Design of slab base, gusseted base and grillage foundation.

BOOKS & CODES RECOMMENDED:

1) Limit state design of steel structures: S K Duggal, Mc Graw Hill
2) Design of steel structures: N Subramanian Oxford Higher Education
3) Design of steel structures (Vol. 1): Ram Chandra Standard Book House - Rajsons
4) Design of steel structures (by limit state method as per IS: 800-2007): S SBhavikatti I.K International Publishing House
5) IS 800: 2007 (General construction in steel-Code of practice)*
6) SP: 6(1) (Handbook for structural engineers-Structural steel sections)* * permitted in Examination

Course Outcomes

CO1. Able to design bolted and welded connections for tension and compression members and beams.

CO2. Understand the behavior and properties of structural steel members to resist bending, shear, tension and compression and apply the relevant codes of practice.

CO3. Able to analyses the behavior of structural steel members and undertake design at both service ability and ultimate limit states.

CO4. Knowledge to design the various steel structures.

Chapter CO	1	2	3	4	5	6
CO 1	M	M				
CO 2			M	M		
CO 3					M	
CO 4						M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Transportation Engineering – I

Subject Code:BTCE-504A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**0**	**0**
Total Marks: 100			

1. **Highway Development, Planning & Alignment:** Principles of Highway Planning, Classification of Roads, Planning Surveys, Requirements of highway alignment, Alignment of Hill Roads, Engineering Surveys.
2. **Highway Geometric Design:** Cross Section Elements, Carriageway, Camber, Sight Distances, Horizontal Curves, Extra-widening, Super-elevation, Vertical Curves.
3. **Highway Construction:** Properties of Sub-grade and Component of Pavement. Earthen/Gravel Road, Water Bound Macadam, Wet Mix Macadam, Bituminous Pavements, Cement Concrete Pavements, Premix Carpet, Dense Bituminous Macadam, Bituminous Macadam& Bituminous Concrete. Importance of drainage and maintenance, Surface Drainage and Subsoil Drainage, Construction in Water-logged areas, Pavement Failures, Pavement Evaluation, Maintenance and Strengthening Measures.
4. **Traffic Engineering:** Road User Characteristics, Driver Characteristics, Vehicular Characteristics, Traffic Volume Studies, Speed Studies, O-D Survey, Parking Study, Traffic Signs, Markings, Islands, Signals, Cause and Type of Accidents, Use of Intelligent Transport Systems.

Books Recommended:

1. Khanna S.K., and Justo, C.E.G. "Highway Engineering", Nem Chand and Brothers, Roorkee, 1998.
2. Kadiyali, L.R. "Principles and Practice of Highway Engineering", Khanna Publishers, New Delhi, 1997
3. Flaherty, C.A.O. "Highway Engineering", Volume 2, Edward Arnold, London, 1986.
4. Sharma, S.K. "Principles, Practice & Design of Highway Engineering", S. Chand & Company Ltd., New Delhi, 1985.
5. Mannering, "Principles of Highway Engineering & Traffic Analysis", Wiley Publishers, New Delhi.

Course Outcomes

CO1. Understand the properties of various pavement materials and their applications.

CO2. Able design the flexible and rigid pavements.

CO3. Acquire the understanding of properties of Sub-grade and Pavement Component Materials.

Co4. Able to compute road vehicle characteristics and estimate braking and stopping distances based on vehicle and human factors.

Chapter CO	1	2	3	4
CO 1	M	M		
CO 2			M	
CO 3			M	
CO 4				M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Concrete Technology Lab

Subject Code: BTCE-505A

	L	T	P
Internal Marks: 30			
External Marks: 20	**0**	**0**	**2**
Total Marks: 50			

List of experiments:

1. Testing of Brick as per BIS.
2. To Determine the fineness modulus, Specific Gravity, Soundness, Standard Consistency, Setting Time and Compressive Strength of Cement.
3. To Determine the Bulk Density, Water Absorption and Specific gravity of Fine and Coarse Aggregates.
4. To Determine the Slump, Compaction Factor and Vee-Bee Time of Concrete.
5. Mix Design of Concrete as perBIS.
6. To Determine the Compressive Strength of Concrete by Cube and Cylinder.
7. To determine the strength of hardened concrete by using Rebound Hammer Method &Ultrasonic Pulse Velocity Test
8. To carry out the Split Tensile and Flexural strength of Concrete.

Books/Manuals :-

1. Concrete Manual By Dr. M.L. Gambhir, Dhanpat Rai & Sons Delhi.
2. Concrete Lab Manual by TTTIChandigarh
3. Concrete Technology, Theory and Practice by M.S.Shetty, S.Chand& Company.

Course Outcomes

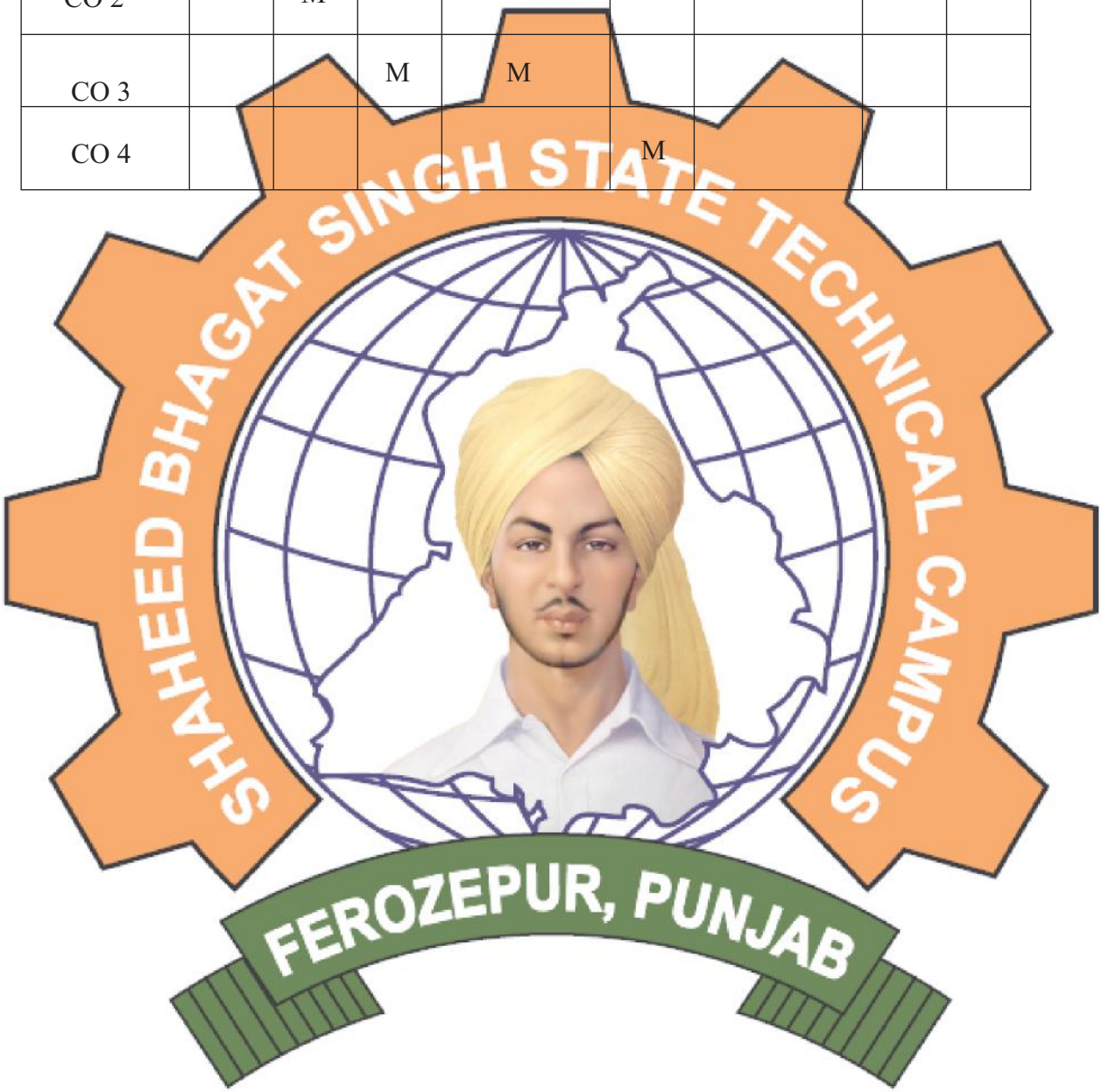
CO1. Able to know the different properties of bricks andconcrete as per BIS.

CO2. Acquire knowledge about specific gravity, soundness, standard consistency, initial, final setting time and compressive strength of Cement.

CO3. Able to determine the fineness modulus, bulk density, water absorption and specific gravity of fine and coarse aggregates.

CO4. Able to mix design of concrete by BIS methods.

Chapter CO	1	2	3	4	5	6	7	8
CO 1	M					M	M	M
CO 2		M						
CO 3			M	M				
CO 4					M			



Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Transportation Engineering Lab

Subject Code:BTCE-506A

	L	T	P
Internal Marks: 30			
External Marks: 20	**0**	**0**	**2**
Total Marks: 50			

List of experiments:

1. To determine the California Bearing Ratio value of soil.
2. To determine the Aggregate Crushing Value of coarse aggregates and to access suitability of aggregates for use in different types of road pavement.
3. To determine Los Angeles Abrasion Value and to find out the suitability of aggregates for use in road construction.
4. To determine the Impact value of road aggregates and to access suitability of aggregates for use in different types of road pavement.
5. To determine the shape and size of aggregates by Flakiness and Elongation Index.
6. To determine the Penetration value of bitumen.
7. To determine the Ductility of bitumen.
8. To determine the Softening Point of tar or bitumen.
9. To determine Flash& Fire Point of given bitumen sample.
10. To determine the bitumen content of given sample.
11. Job Mix Formula for Wet Mix Macadam.

Books/Manuals Recommended :

1. Khanna S.K., and Justo, C.E.G. "Highway Material & Pavement Testing", Nem Chand and Brothers, Roor

Course Outcomes

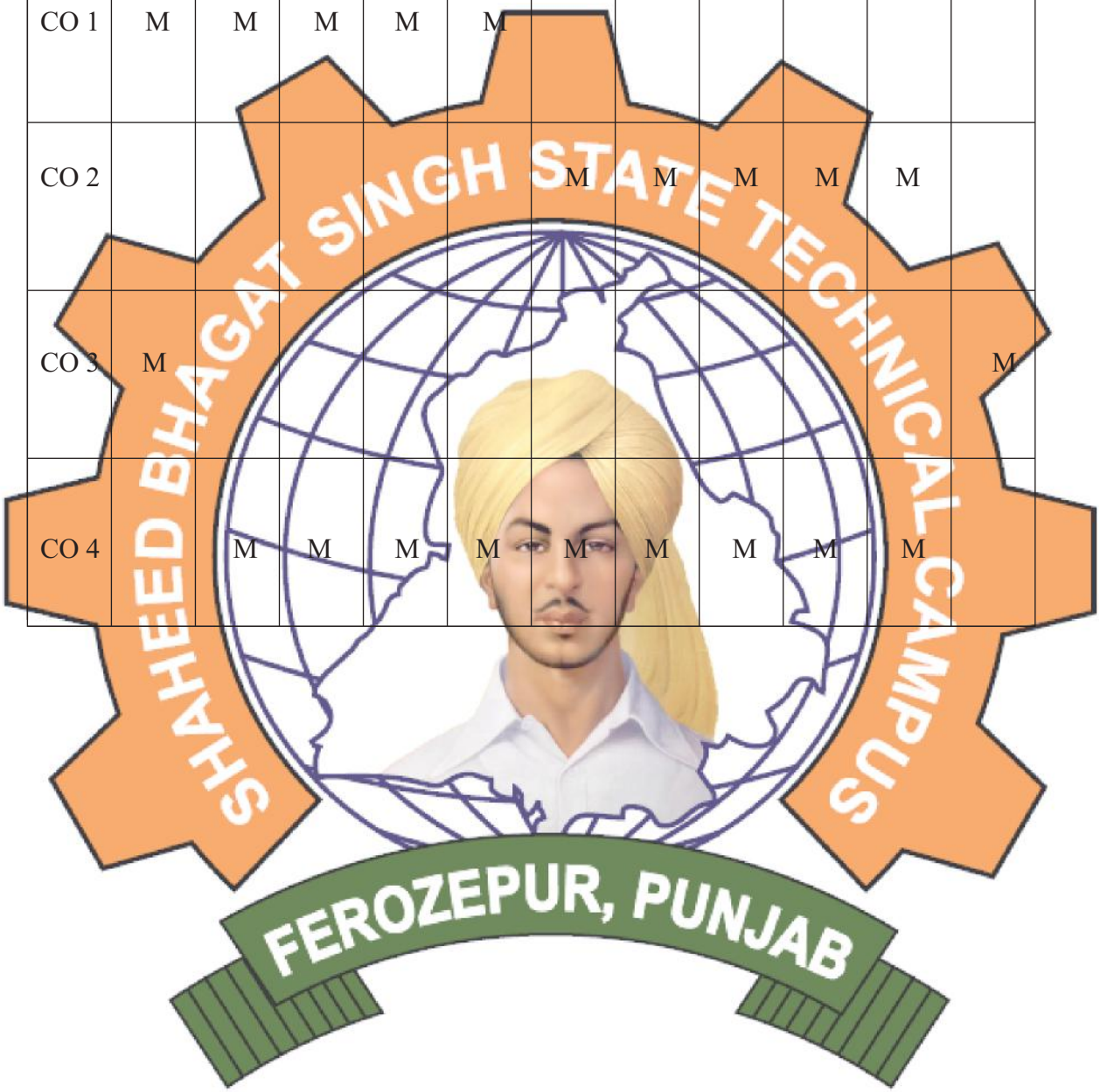
CO1 Understand the properties of aggregate used for construction of highways and to prepare formal report.

CO2 Able to determine the properties of bitumen used for construction technique for highways.

CO3 Able to collect and analyze the data for use in planning and designing of highway.

CO4 Able to maintain the highway.

Chapter CO	1	2	3	4	5	6	7	8	9	10	11
CO 1	M	M	M	M	M						
CO 2						M	M	M	M	M	
CO 3	M										M
CO 4		M	M	M	M	M	M	M	M	M	



Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Training -II (Survey Camp)

Subject Code: BTCE-507A
Internal Marks: 60
External Marks: 40
Total Marks: 100
Survey Camp contents are as under (4 weeks duration):

Part-I

Survey Camp will be held immediately after 4th semester preferably at hill station. The students are required to prepare the Topographical Map of the area by traditional method.

Part-II

Students should also be exposed to modern Survey Equipment and practices, like Total Station, DGPS etc.

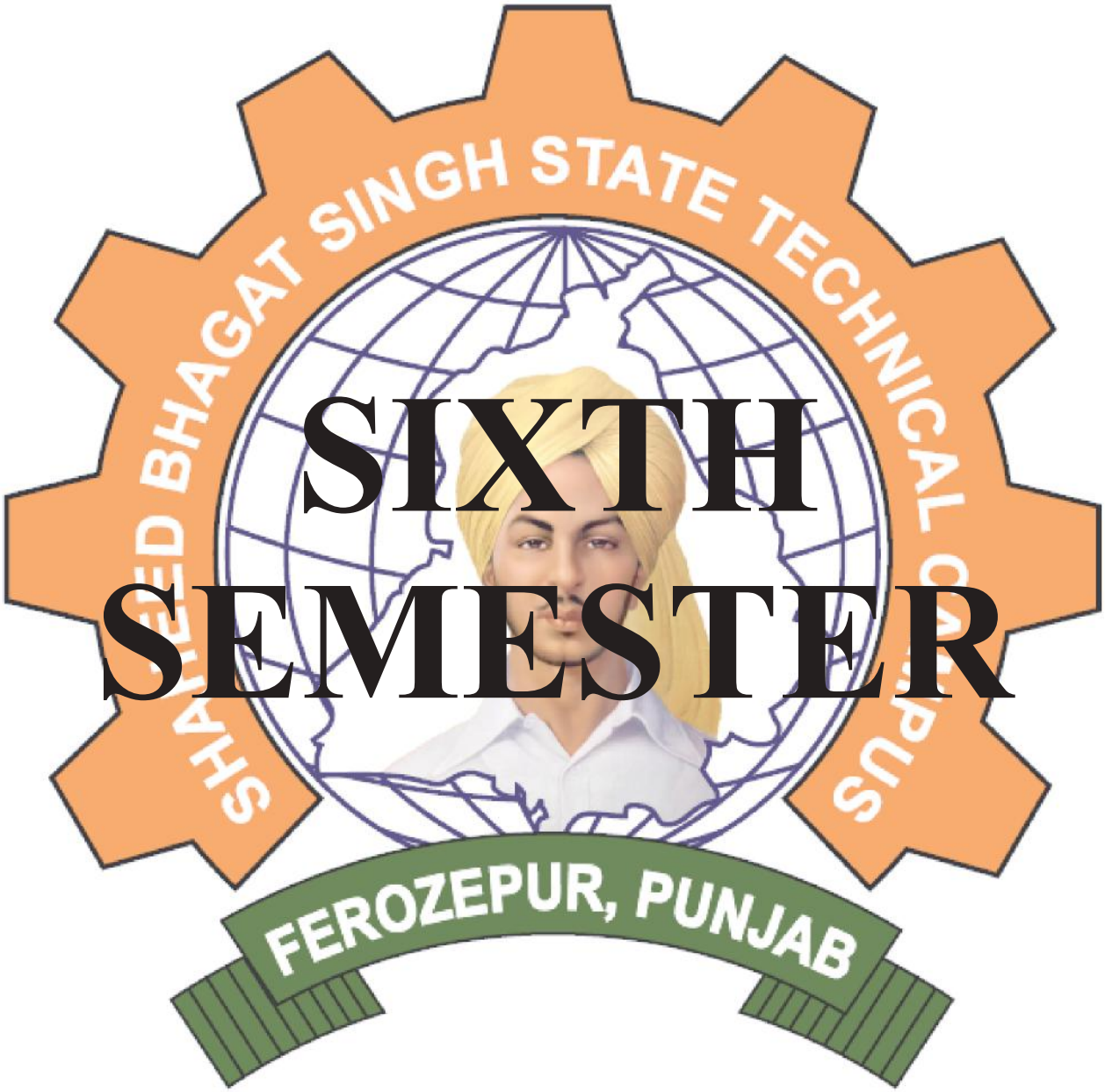
Course Outcomes

CO1 Understand field activity which provide real application of theoretical principles of surveying.

CO2 Able to do simultaneously field work and office work.

CO3 Able to prepare Topographical map of the given area using different devices/ modern equipment's.

Chapter CO	1	2
CO 1	M	
CO 2	M	M
CO 3		M



SIXTH SEMESTER

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

GEOTECHNICAL ENGINEERING

Subject Code: BTCE- 601A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**1**	**0**
Total Marks: 100			

1. **Basic Concepts**: Definition of soil and soil mechanics. Principal types of soils and important properties. Weight volume relationship and determination of specific gravity from pycnometer test. Field density from sand replacement method and other methods. Grain size analysis. Stokes's law and Hydrometer analysis. Consistency and sensitivity of Clay, Atterbeg Limits, Flow Index and Toughness Index. Underlying Classification of coarse and fine grained soils as per Indian Standard.
2. **Compaction**: Definition and object of compaction and concept of O.M.C. and zero Air Void Line. Modified proctor Test. Factors affecting compaction Effect of compaction on soil properties and their discussion. Field compaction methods- their comparison of performance and relative suitability.
3. **Consolidation**: Definition and object of consolidation, Difference between compaction and consolidation. Concept of various consolidation characteristics i.e. av, mv and cv, primary and secondary consolidation. Terzaghi's Differential equation and its derivation. Boundary conditions for Terzaghi's solution for one dimensional consolidation concept of cv, tv & U. Consolidation test determination of cv from curve fitting methods, consolidation pressure determination. Normally consolidated and over consolidated clays. Causes of over-consolidation.
4. **Permeability and Seepage**: Concept of effective stress principal, seepage pressure, critical hydraulic gradient and quick sand condition. Capillary phenomenon in soil. Darcy's Law and its validity, seepage velocity, co-efficient of permeability (k) and its determination. Average permeability of startified soil mass, factors affecting 'k' and brief discussion.
5. **Shear Strength**: Stress analysis of a two dimensional stress system by Mohr circle. Concept of pole. Coulomb's law of shear strength coulomb - Mohr strength theory. Relation between principal stesses at failure. Vane shear test, triaxial and unconfined shear strength tests. Triaxial shear tests based on drainage conditions typical strength envelopes for clay obtained from these tests.

6. **Earth Pressure:** Introduction, Rankine's and Coulomb's earth pressure. Calculation of earth pressure in different conditions.

Books:-

1. Soil Mech. & Foundation Engg, by K.R.Arora Standard *Publishers* Distributors
2. Geotechnical Engineering, by P. Purshotama Raj *Tata Mcgraw Hill*
3. Soil Mech. & Foundation Engg., by V.N.S.Murthy CBS *Publishers* & Distributors.
4. Principle of Geotechnical Engineering by B.M.Das Cengage Publisher
5. Basic and applied Soil Mechanics by Gopal Ranjan and A.S.R.Rao New Age International Publishers
6. Geotechnical Engineering by Gulati and Datta, Tata McGraw Hill
7. Problems in Soil mechanics and Foundation Engineering by B.P.Verma, Khanna Publish

Course Outcomes

CO1. To identify different types of soils and their index and engineering properties.

CO2. To understand the concept and effect of compaction and consolidation under different loading conditions on soil properties.

CO3. To describe Darcy's law for the flow of water through saturated soils; determine the coefficient of permeability and equivalent hydraulic conductivity in stratified soil.

Co4. Able to describe different shear strength tests and also to understand the concept of earth pressure in different conditions.

Chapter CO	1	2	3	4	5	6
CO1	M					
CO2		M	M			
CO3				M		
Co4					M	M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

DESIGN OF CONCRETE STRUCTURES-II

Subject Code: BTCE-602A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**1**	**0**
Total Marks: 100			

Note: IS 456, IS 3370 & SP 16 are permitted in the examination

1. **Stairs** : Introduction, Terminology, Types of stairs(Straight, Dog-Legged, Open Well).
2. **Foundations** – Types, Components of foundations. Design of isolated footing (Square & Rectangular). Combined footing (Rectangular, Trapezodial and Strap footing). Raft footing.
3. **Continuous beams:** Introduction and its design.
4. **Domes:** Types, Design of spherical and conical dome.
5. **Retaining walls**: Cantilever type retaining wall, Counter fort type retaining wall.
6. **Water retaining structures**. Design of circular, rectangular and overhead service reservoir. Reservoir resting on ground.

Books:

1. Reinforced Concrete Design; Pillai & Menon; Tata McGraw-Hill Education"
2. Limit state Design of Reinforced Concrete; Varghese P C; Prentice-Hall of India Pvt. Ltd"
3. Reinforced Cement Concrete, Mallick and Rangasamy; Oxford-IBH.

BIS Codes of practice and Design Handbooks:

1. *IS 456-2000*- Indian Standard. Plain and Reinforced concrete -Code of practice
2. *IS 3370- Code of practice for concrete structures for storage of liquids
3. *Design Aid SP 16
4. Explanatory hand book SP24.
5. Detailing of Reinforcement SP 34

Note: The codes marked with * are permitted in examination.

Course Outcomes

CO1. Able to design different types of Stairs.

CO2. Able to design different type of foundations.

Co3. Able to design different types of Reinforced Concrete members (Continuous beams and Domes).

CO4. Able to design different types of retaining walls(Cantilever and Counter fort).

CO5. How to design various types of water retaining structures according to IS code.

Chapter CO	1	2	3	4	5	6
CO 1	M					
CO 2		M				
CO 3			M	M		
CO 4					M	
CO 5						M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

DESIGN OF STEEL STRUCTURES – II

Subject Code: BTCE 603A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**1**	**0**
Total Marks: 100			

Note: IS 800:2007 & SP6(1) are permitted in examination.

1. Elements of a plate girder, design of a plate girder, curtailment of flanges, various type of stiffeners.
2. Design of steel foot bridge with parallel booms and carrying wooden decking, using welded joints.
3. **Complete design of an industrial shed including:**
   i) Gantry girder
   ii) Column bracket
   iii) Lateral and longitudinal bracing for column
4. **Roof truss:** Design loads, combination of loads, design of members (including purlins) and joints, detailed working drawings.
5. **Railway Bridge:** Design of single track Railway Bridge with lattice girders having parallel chords (for B.G.)- Stringer, Cross girder, Main girders with welded joints, Portal sway bracings, Rocker and rollers bearing.
6. **Plastic:** Introduction, Design of plastic beams.

BOOKS & CODES RECOMMENDED:

1) Limit state design of steel structures: **S K Duggal**
2) Design of steel structures: **N Subramanian**
3) Design of steel structures (Vol. 2): **Ram Chandra**
4) Design of steel structures: **L S Negi**
5) Design of steel structures (by limit state method as per IS: 800-2007): **S S Bhavikatti**
6) IS 800: 2007 (General construction in steel-Code of practice)*
7) SP: 6(1) (Handbook for structural engineers-Structural steel sections)*

*permitted in Examination

Course Outcomes

CO1 Able to design various steel structures in the field of civil engineering works.
CO2. Ability to analyse, footbridge and industrial sheds.
CO3. Able to analyse Roof Truss including design of its members.
CO4. Able to design various parts of railway bridge.
CO5. Able to design different types of plastic beams.

Chapter CO	1	2	3	4	5	6
CO 1	M					
CO 2		M	M			
CO 3				M		
CO 4					M	
CO 5						M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

TRANSPORTATION ENGINEERING – II

Subject Code: BTCE-604A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**1**	**0**
Total Marks: 100			

1. **Introduction to Railway Engineering:** History of Railways, Development of Indian Railway, Organization of Indian Railway, Important Statistics of Indian Railways. Railway Gauge, Gauges on World Railways, Choice of Gauge, Uniformity of Gauge, Loading Gauge, Construction Gauge.
2. **Railway Track:** Requirements of a Good Track, Components of Railway Track: Rails, Sleepers, Ballast, Sub-grade and Formation, Track Fixtures & Fastenings, Coning of Wheels, Tilting of Rails, Adzing of Sleepers, Rail Joints, Creep of Rails.
3. **Geometric Design of Railway Track:** Track Specifications on Indian Railways, Cross-Section of Single/Double Track, Alignment, Gradients, Horizontal Curve, Cant, Equilibrium Cant, Cant Deficiency, Cant Excess, Transition Curves.
4. **Points and Crossings**: Necessity, Functions, Layout and Working of a Turnout, Various types of Track Junctions and their layouts, Level-crossing.
5. **Railway Stations & Yards:** Site Selection, Classification & Layout of Stations, Marshalling Yard, Locomotive Yard, Equipment at Railway Stations & Yards.
6. **Signalling and Interlocking:** Objectives, Classification of Signals, Types of Signals in Stations and Yards, Automatic Signalling, Principal of Interlocking. Modernization of Railway Tracks: High Speed Tracks, Improvement in existing track for high speed, Ballast less Track, MAGLEV, TACV.
7. **Airport Planning:** Aircraft Characteristics, Factors for Site Selection, Airport Classification, General Layout of an Airport, Approach Zones and Turning Zones.
8. **Runway Orientation and Design:** Head Wind, Cross Wind, Wind Rose Diagram, Basic Runway Length, Corrections, Geometric Design Elements, Runway Configuration.
9. **Taxiway and Aircraft Parking:** Aircraft Parking System. Main Taxiway, Exit Taxiway, Separation Clearance, Holding Aprons.
10. **Visual Aids:** Marking and Lighting of Runway and Taxiway, Landing Direction Indicator, and Wind Direction Indicator, IFR/VFR.

Books Recommended:

1. Chandra S., and Aggarwal, "Railway Engineering", M.M. Oxford University Press, New Delhi, 2007.
2. Saxena, S.C., and Arora, S.P., "A Text Book of Railway Engineering", Dhanpat Rai and Sons, Delhi, 1997.
3. J. S. Mundrey, "Railway Track Engineering", McGraw Hill Publishing Co., 2009
4. Khanna, S.K., Arora, M.G., and Jain, S.S., "Airport Planning and Design", Nem Chand & Bros. Roorkee, 1999.
5. Horenjeff, R. and McKelvey, F., "Planning and Design of Airports", McGraw Hill Company, New York, 1994.
6. Norman J. Ashford, Saleh Mumayiz, Paul H. Wright, "Airport Engineering: Planning, Designand Development of 21st Century", Wiley Publishers, 2011

Course Outcomes

CO1. Able to understand the basic terminology and geometric properties along with the geometric design of railway track.

CO2. Able to understand point and crossing of railway track along with detail understanding of railway stations and yards.

CO3. Able to understand functioning of signalling and interlocking along with modernization of railway tracks.

CO4. Able to understand the Airport planning, Runway Orientation and Design.

CO5. Able to understand Taxiway, Aircraft Parking and visual aids of Air port.

Chapter CO	1	2	3	4	5	6	7	8	9	10
CO 1	M	M	M							
CO 2				M	M					
CO 3						M				
CO 4							M	M		
CO 5									M	M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

COMPUTER AIDED DESIGN LAB

Subject Code: BTCE-605A

	L	T	P
Internal Marks: 30			
External Marks: 20	**0**	**0**	**3**
Total Marks: 50			

List of experiments:

1. Structural Drawings of Reinforced Concrete Elements such as Beams, Slabs.
2. Structural Drawings of Steel Elements such as Connections, Tension Members, Compression Members, Beams, Column Base, and Roof Trusses

Course Outcomes

CO1 Application of software's in design and drawings of Civil Engineering structures.

CO2 Able to proficiency, including the ability to use industry-standard computer software to generate drawings.

CO3 Able to apply computer-aided design techniques to use computer-aided visualization techniques to prepare.

Chapter CO	1	2
CO 1	M	
CO 2	M	M
CO 3	M	M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

GEOTECHNICAL ENGINEERING LAB

Subject Code: BTCE-606A

	L	T	P
Internal Marks: 30			
External Marks: 20	**0**	**0**	**2**
Total Marks: 50			

List of experiments:

1. Determination of in-situ density by core cutter method and Sand replacement method.
2. Determination of Liquid Limit & Plastic Limit.
3. Determination of specific gravity of soil solids by Pycono-meter method.
4. Grain size analysis of sand and determination of uniformity coefficient (Cu) and coefficient of curvature (Cc).
5. Determination of coefficient of permeability by Constant Head and Variable Head methods
6. Determination of optimum moisture content and maximum dry unit weight by standard Proctor's test and Modified Proctor's Test.
7. Unconfined Compression Test for fine grained soil.
8. Determination of cohesion intercept and angle of shearing resistance by direct shear test.
9. Determination of cohesion intercept and angle of shearing resistance by tri-axial test.
10. Determination of co-efficient of consolidation.
11. Demonstration of Standard Penetration Test (SPT).

Books Recommended:- Soil Testing Engineering, Manual By Shamsher Prakash and P.K. Jain. Nem Chand & Brothers

Course Outcomes

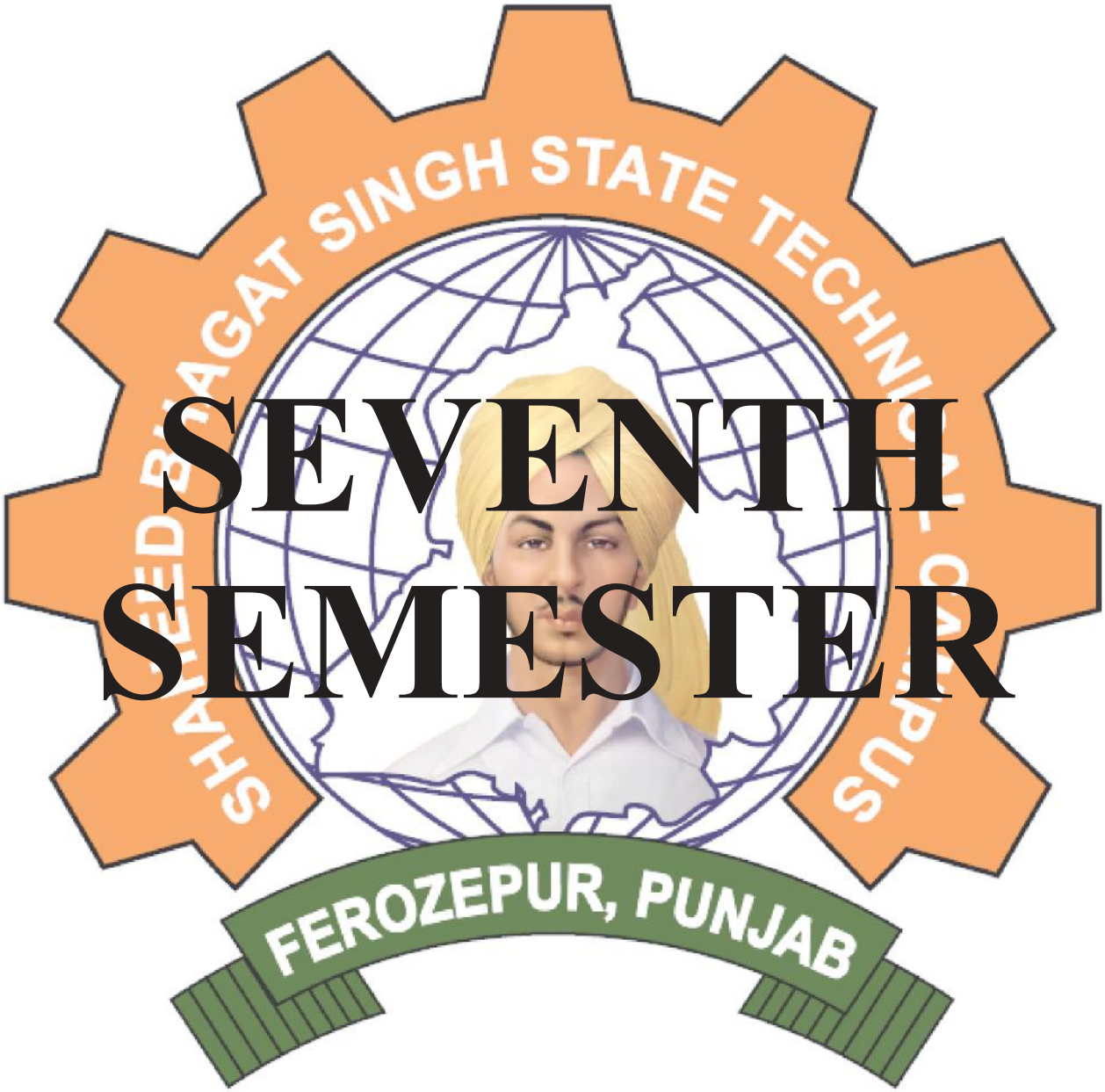
CO1 Able to perform laboratory compaction and in –situ density test for fill quality control.

CO2 Understand the specific field investigation including collection of soil samples for testing and observation of soil behaviour.

CO3 Able to identify and classify soil based on standard geotechnical engineering practice.

CO4 Able to determine different soil properties by lab tests as well as by field tests.

Chapter	1	2	3	4	5	6	7	8	9	10	11
CO											
CO 1	M					M	M				
CO 2		M	M		M						
CO 3				M							
CO 4								M	M	M	M



SEVENTH SEMESTER

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

FOUNDATION ENGINEERING

Subject Code: BTCE701A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**1**	**0**
Total Marks: 100			

1. **Soil Investigation**: Objectives of soil investigation for new and existing structures, depth of exploration for different structures, spacing of bore Holes, methods of soil exploration and relative merits and demerits, types of soil sample, design features of sampler affecting sample disturbance, essential features and application of the following types of samples-open drive sampler, stationery piston sampler, rotary sampler, geophysical methods and new methods.
2. **Earth Pressure:** Terms and symbols used for a retaining wall, Movement of all and the lateral earth pressure, Earth pressure at rest, Rankine states of plastic equilibrium, , Rankine's theory both for active and passive earth pressure for Cohesionless backfill with surcharge and fully submerged case, Cohesive backfill condition, Coulomb's method for cohesion less backfill, Merits and demerits of Rankine and Coulomb's theories, Rehman's & Culmann's graphical methods.
3. **Shallow Foundation**: **a)** Type of shallow foundations, Depth and factors affecting it, Definition of ultimate bearing capacity, safe bearing capacity and allowable bearing capacity, Rankine's analysis and Terzaghi's analysis, Types of failures, Factors affecting bearing capacity, Skemptons equation, B.I.S. recommendations for shape, depth and inclination factors, Plate Load test and Standard Penetration Test.

   b) Bosussinesq equation for a point load, uniformly loaded circular and rectangular area, pressure distribution diagrams, Westergaard analysis, comparison of Bosussiness and Westergaard analysis, Newmarks chart and its construction, causes of settlement of structures, types of settlements, calculation of settlement by Plate Load Test and Static Cone Penetration Test data, codal recommendations for allowable settlement of various structures and design of raft foundation.
4. **Pile Foundations**: Necessity and uses of piles, Classification of piles, Merits and demerits of different types based on composition, Types of pile driving hammers & their comparison, Effect of pile driving on adjacent ground, Use of Engineering News

Formula and Hiley's Formula for determination of allowable load, Limitations of pile driving formulae, Cyclic Pile Load Test, Separation of skin friction and point resistance using cyclic pile load test, Determination of point resistance and frictional resistance of a single pile by Static formulas, Piles in Clay, Safe load on a Friction and point Bearing pile. Pile in sand, Spacing of piles in a group, Factors affecting capacity of a pile group, Efficiency of pile group, Bearing capacity of a pile group in clay by block failure and individual action approach. Calculation of settlement of friction pile group in clay, Settlement of pile groups in sand and negative skin friction.

5. **Caissons and Wells**: Major areas of use of caissons, advantages and disadvantages of open box and pneumatic caissons, Essential part of a pneumatic caisson, Components of a well foundation, Calculation of allowable bearing pressure, Conditions for stability of a well, Forces acting on a well foundation and computation of scour depth.

Books Recommended:

1. Soil Mech. & Foundation Engg, by K.R.Arora, Standard Publishers Distributors
2. Geotechnical Engineering, by P. Purshotama Raj
3. Soil Mech. & Foundation Engg., by V.N.S.Murthy
4. Principle of Foundation Engineering by B.M.Das, CL Engineering
5. Basic and applied Soil Mechanics by GopalRanjan and A.S.R.Rao, New Age International
6. Soil Mech. & Foundations by Muni Budhu Wiley, John Wiley & Sons
7. Geotechnical Engineering by Gulhati and Datta, Tata McGraw - Hill Education
8. Foundation Engineering by Varghese P.C, PHI Learning.
9. Problems in Soil mechanics and Foundation Engineering by B.P.Verma, Khanna Publication.
10. Foundation Analysis and Design by Bowles J.E, Tata McGraw - Hill Education.

Course Outcomes

CO1 Able to get knowledge about different methods of soil exploration, essential features and applications of the different types of samples.

CO2 Able to know about different theories of Earth Pressure.

CO3 Able to know about different types of shallow foundations, bearing capacity and methods of its determination, Causes of settlement of structures.

CO4 Understand the concept, theory and need of Pile foundations, concept of load carrying capacity of individual as well as group piles.

CO5 Able to get knowledge about different types of Caissons, Well foundations.

CO Mapping

Chapter CO	1	2	3	4	5
CO 1	M				
CO 2		M	M		
CO 3			M	M	
CO 4					M
CO 5					M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

Environmental Engineering-I

Subject Code:BTCE702A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**1**	**0**
Total Marks: 100			

1. **Introduction:** Beneficial uses of water, water demand, per capita demand, variations in demand, water demand for fire fighting, population forecasting and water demand estimation.
2. **Water sources and development:** Surface and groundwater sources, selection and development of sources, assessment of potential, flow measurement in closed pipes, intakes and transmission systems.
3. **Pumps and pumping stations:** Types of pumps and their characteristics and efficiencies, pump operating curves, selection of pumps and pumping stations.
4. **Quality and Examination of Water:** Impurities in water, sampling of water, physical, chemical and bacteriological water quality parameters, drinking water quality standards and criteria.
5. **Water treatment:** Water treatment schemes, basic principles of water treatment, design of plain sedimentation, coagulation and flocculation, filtration – slow, rapid and pressure, disinfection units, fundamentals of water softening, fluoridation, deflouridation, water desalination, demineralization, taste and odour removal.
6. **Transportation of Water:** Pipes for transporting water and their design, water distribution systems and appurtenances, water supply network design and design of balancing and service reservoirs, operation and maintenance of water supply systems.
7. **Rural water supply:** Principles, selection of source, rain water harvesting, quantitative requirements, low cost treatment techniques.

Books Recommended:

1. Water Supply Engineering- Environmental Engg. (Vol. – I) by B.C. Punmia, Ashok Jain, Arun Jain, Laxmi Publications, New Delhi.
2. Environmental Engg. - A design Approach by Arcadio P. Sincero and Gregoria P. Sincero, Prentice Hall of India, New Delhi.
3. "Environmental Engg." By Howard S. Peavy, Donald R. Rowe & George Tchobanoglous, McGraw Hill, International Edition

4. Water Supply Engineering- Environmental Engg. (Vol. – I) by S.K. Garg, Khanna Publishers, Delhi.
5. Elemnets of Environmental Engineering by Dr. K.N. Duggal publisher S. Chand
6. Water Supply Engineering by Subash Verma, Varinder Kanwar, Siby John publisher Vikas publishing House (P) Ltd.

Course Outcomes

CO1 Able to identify different types of water demands and select suitable source of water.

CO2 Able to predict future population and estimate future water demands

CO3 Able to Demonstrate a firm understanding of various water quality parameters.

CO4 Able to design different water treatment units to meet the drinking water quality standards and criteria.

CO5 Able to plan and design the water transportation, pumping stations and low cost water treatment techniques in the rural areas.

Chapter CO	1	2	3	4	5	6	7
CO 1	M						
CO 2		M					
CO 3			M				
CO 4				M	M		
CO 5						M	M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

ESTIMATING AND COSTING

Subject Code:BTCE703A

	L	T	P
Internal Marks: 40			
External Marks: 60	3	1	0
Total Marks: 100			

1. **Estimates**: Method of building estimates, types, site plan index plan, layout plan, plinth area, floor area, Technical sanction, administrative approval, estimate of buildings, roads, earthwork, R.C.C. works, sloped roof, roof truss, masonry platform, complete set of estimate.
2. **Schedule of Rates, analysis of rates:** For earthwork, concrete work, D.P.C., stone masonry, plastering, pointing, roadwork.
3. **Specifications:** For different classes of building and Civil engineering works.
4. **Rules of measurements:** For different types of Civil engineering works.
5. **Types of contracts:** Tenders, tender form, submission and opening of tenders, measurement book, muster roll, piecework agreement and work order.
6. **Accounts:** Division of accounts, cash, receipt of money, cash book, temporary advance, imprest, accounting procedure.
7. **Arbitration**: Acts and legal decision making process.

Books Recommended:

1. Estimating and Costing by B.N. Dutta, UBSPD, New Delhi
2. Estimating and Costing by G.S. Birdie, Dhanpat Rai Publication New Delhi .
3. Estimating and Costing by V.N. Chakravorty, Calcutta
4. Civil Engg. Contracts & Estimates by B.S. Patil, Orient-Longman Ltd., New Delhi.

Course Outcomes

CO 1 Able to prepare estimate of building and road works along with technical sanction.

CO 2 Perform rate analysis as required in preparing specifications, detailed estimate and tender documents etc.

CO 3 Develop an understanding of various laws applicable to buildings and construction industry.

CO 4 Able to write Measurement Book, Cash book and muster roll.

CO 5 Able to calculating the quantities and billing of various work with Acts of decision making process.

Chapter CO	1	2	3	4	5	6	7
CO 1	M						
CO 2		M	M				
CO 3			M	M			
CO 4					M	M	
CO 5						M	M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

SOFTWARE LAB

Subject Code: BTCE705A

	L	T	P
Internal Marks : 30			
External Marks : 20	**0**	**0**	**2**
Total Marks : 50			

1. Any one software that enhances professional capability in civil engineering practice a partial indicative list is mentioned below:

i) Plaxis
ii) Arc GIS
iii) Prima Vera
iv) Staad Pro
v) Any other relevant software

Course Outcomes

CO1: To have proper knowledge of any one civil related software.

CO Mapping

Chapter CO	1
CO 1	M

Chapter CO	1	2	3	4	5	6	7	8	9	10	11	12
CO 1	M	M	M	M	M	M	M	M	M	M	M	M
CO 2		M	M	M	M	M						M
CO 3					M		M		M	M	M	M
CO 4	M	M		M			M	M	M		M	M

ENVIRONMENTAL ENGINEERING LAB

Subject Code: BTCE706A

	L	T	P
Internal Marks : 30			
External Marks : 20	**0**	**0**	**2**
Total Marks : 50			

1. Determination of total solids, dissolved solids, suspended solids of a given water sample.
2. To measure the pH value of a water/waste water sample.
3. To find the turbidity of a given water/waste water sample
4. To determine optimum Alum dose for Coagulation.
5. To find MPN for the bacteriological examination of water.
6. To measure D.O. of a given sample of water.
7. To determine the Hardness of a given water sample.
8. To determine the concentration of sulphates in water/wastewater sample.
9. To find chlorides in a given sample of water/waste water sample.
10. To find acidity/alkalinity of a given water sample.
11. To determine the BOD & COD of a wastewater sample.
12. To determine the concentration of nitrate in water/wastewater sample.

Books Recommended:

1. Chemistry for Enviromental Engg. and Science by Sawyer & McCarty, TMH, New Delhi
2. Standard Methods for the examination of water & wastewater, APHA, AWWA, WE
3. Manual of environmental Engg. By NK Khullar and Jaspal Singh

Course Outcomes

CO1 Able to conduct experiments as per standard methods of sampling and analysis.
CO2 Able to demonstrate the expertise to characterize water and wastewater samples.
CO3 Able to understand the importance of laboratory analysis as a controlling factor in the treatment of water and wastewater.
CO4 Able to record the experimental observations and interpret the analysis results.

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

TRAINING-III

Subject Code:BTCE707A
Internal Marks: 120
External Marks: 80
Total Marks: 200

Training-III: In house/Industrial 8 week training during summer vacations after 6th semester.

Course Outcomes

CO1 To get exposure of construction sites.

CO2 To get technical knowledge about planning, execution and scheduling of various civil engineering projects.

CO3 To enhance the professional capability of the students as an individual and as a team.

Chapter CO	1
CO 1	M
CO 2	M
CO 3	M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

PROJECT - I

Subject Code: BTCE708A

	L	T	P
Internal Marks : 40			
External Marks : 60	**0**	**0**	**4**
Total Marks : 100			

The students will apply their practical knowledge in various labs related to civil engineering.

CO1 To apply their technical skill in various fields of civil engineering.

CO Mapping

Chapter	1
CO	
CO 1	M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

PROFESSIONAL ELECTIVE-III
BRIDGE ENGINEERING

Subject Code: BTCE711A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**0**	**0**
Total Marks : 100			

1. **Introduction:** Definition and components of a bridge, Classification of bridges, Choice of a bridge type.
2. **Investigation for Bridges**: Need for investigation, Selection of bridge site, Determination of design discharge for River Bridge, Linear waterway, Economical span, Vertical clearance, Scour depth, Afflux, Traffic projection.
3. **Standard Specifications for Road Bridges**: IRC Bridge Codes, Width of carriageway, Clearances, Dead load, I.R.C. standard live loads, Impact effect, Wind load, Longitudinal forces, Centrifugal forces, Horizontal forces due to water current, Buoyancy effect, Earth pressure, Deformation stresses, Erection stresses, Temperature effects, and Seismic force.
4. **Reinforced Concrete Bridges**: Types of RCC bridges; Culverts - Box Culvert, Pipe Culvert, Solid slab bridge, T-beam girder bridges, Hollow girder bridges, Balanced cantilever bridges, Continuous girder bridges, Rigid frame bridges, Arch bridges, Pre-stressed concrete bridges.
5. **Steel Bridges**: Types of Steel bridges; Beam bridges, Plate girder bridges, Box girder bridges, Truss bridges, Arch bridges, Cantilever bridges, Cable stayed bridges, Suspension bridges.
6. **Sub-structure and Foundation**: Piers and abutments, materials for piers and abutments, Types of foundations; Shallow, Pile, and Well foundations. Relative merits of piles and well foundations, Pneumatic Caissons, Box Caissons.
7. **Bearings, Joints & Appurtenances**: Importance of Bearings, Different types of bearings Expansion Bearings, Fixed Bearings, Elastomeric Bearings, Expansion joints, Wearing Course, Approach Slab, Footpath, Handrails.
8. **Construction and Maintenance of Bridges**: Methods of construction of concrete and steel bridges. Formwork and false work for concrete bridges, Causes of Bridge failures, Inspection and maintenance.

Books Recommended:

1. Johnson, Victor, "Essentials of Bridge Engineering", Oxford University Press.
2. Khadilkar, C. H., "A Text book of Bridge Construction", Allied Publishers.
3. Rangwala, S. C., "Bridge Engineering", Charotar Publishing House Pvt. Ltd.

4. Raina, V. K., "Concrete Bridges Handbook", Shroff Publishers and Distributors.
5. Ponnuswamy, S. "Bridge Engineering", McGraw Hill Publishers.

Course Outcomes

CO1 Able to understand basic of bridges.
CO2 Able to gain the knowledge of road, reinforced concrete and steel bridges.
CO3 Able to know different types of substructures and foundations in bridges.
CO4 Able to know different types of bearings and joints in bridges.
CO5 Able to know various methods of construction and maintenance of bridges.

Chapter CO	1	2	3	4	5	6	7	8
CO 1	M	M						
CO 2			M	M	M			
CO 3						M		
CO 4							M	
CO 5								M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

ENVIRONMENT IMPACT ASSESSMENT

Subject Code: BTCE 712A

	L	T	P
Internal Marks : 40			
External Marks : 60	**3**	**0**	**0**
Total Marks : 100			

1. **Concepts of environmental impact analysis:** Key features of the National Environmental Policy Act and its implementation, screening in the EIA process, role of the USEPA, environmental protection and EIA at the national level, utility and scope of the EIA process.
2. **Planning and management of environmental impact studies:** Factors for consideration in assessing the impacts of water related projects, power projects, waste water treatment facilities etc. Concepts and terms in the impact assessment process, socioeconomic impact analysis.
3. **Simple methods for impact identification:** Matrices, net works and checklists. Description of the environmental setting. Environmental indices and indicators for describing the affected environment.
4. **Prediction and assessment:** Prediction and assessment of the impact on surface water, soil, groundwater, air, water quality, vegetation & wild life and biological environments. Case studies and examples. Prediction and assessment of visual impacts and impacts on the socioeconomic setting, decision methods for evaluation of alternatives, public participation in decision-making. Preparing the EIA document. Environmental monitoring.

Books Recommended:

1. Larry W Canter, Environmental Impact Assessment, McGraw Hill, Inc., 1996
2. Betty Bowers Marriot, Environmental Impact Assessment A Practical Guide, McGraw Hill, Inc., 997.
3. C.J. Barrow, Environmental & Social Impact Assessment – An Introduction, Edward Arnold, 2002.
4. Evan. K. Paleologos and Ian Lerche, Environmental Risk Analysis, McGraw Hill Inc., 2001
5. Peter Morris (ed.) and Riki Therivel (ed.), Methods of Environmental Impact Assessment, Routledge, 2001.

Course Outcomes

CO1 Able to understand the concepts of environmental impact analysis and legislations involving EIA.

CO2 Able to identify the factors for assessing the impacts of field projects.

CO3 Able to use the methodologies to set up environmental indices and quantify the impacts.

CO4 Able to assess the environmental, socio-economic and health impacts of different projects.

CO5 Able to design an environmental proposal and evaluate the available alternatives.

CO MAPPING

Chapter	1	2	3	4
CO				
CO 1	M			
CO 2		M		
CO 3			M	
CO 4			M	
CO 5			M	M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

GROUND IMPROVEMENT TECHNIQUES

Subject Code: BTCE713A

	L	T	P
Internal Marks : 40			
External Marks : 60	**3**	**0**	**0**
Total Marks : 100			

1. **Soil improvement with by mechanical methods**: Dynamic compaction equipment used, application to granular soil, cohesive soils, depth of improvement, environmental considerations, induced settlements, compaction using vibratory probes, vibro techniques vibro equipment, the vibro compaction and replacement process, control of verification of vibro techniques, vibro systems and liquefaction. Soil improvement by thermal treatment, preloading techniques, surface compaction.
2. **Soil improvement by additives** : Lime stabilization, lime column method, stabilization of soft clay or silt with lime, bearing capacity of lime treated soils, settlement of lime treated soils, improvement in slope stability, control methods, chemical grouting, commonly used chemicals, grouting systems, grouting operations, applications, compaction grouting, introduction, application and limitations, plant for preparing grouting materials, jet grouting, jet grouting process, geometry and properties of treated soils, applications, slab jacking, gravel, sand and stone columns.
3. **Soil improvement using reinforcing elements**: Introduction to reinforced earth - load transfer mechanism and strength development, soil types and reinforced earth. Anchored earth nailing reticulated micro piles, soil dowels, soil anchors. Reinforced earth retaining walls.
4. **Geotextiles**: Behaviour of soils on reinforcing with geotextiles, effect on strength, bearing capacity, compaction, permeability, design aspects, slopes, clay embankments, retaining walls and pavements.

Books Recommended:

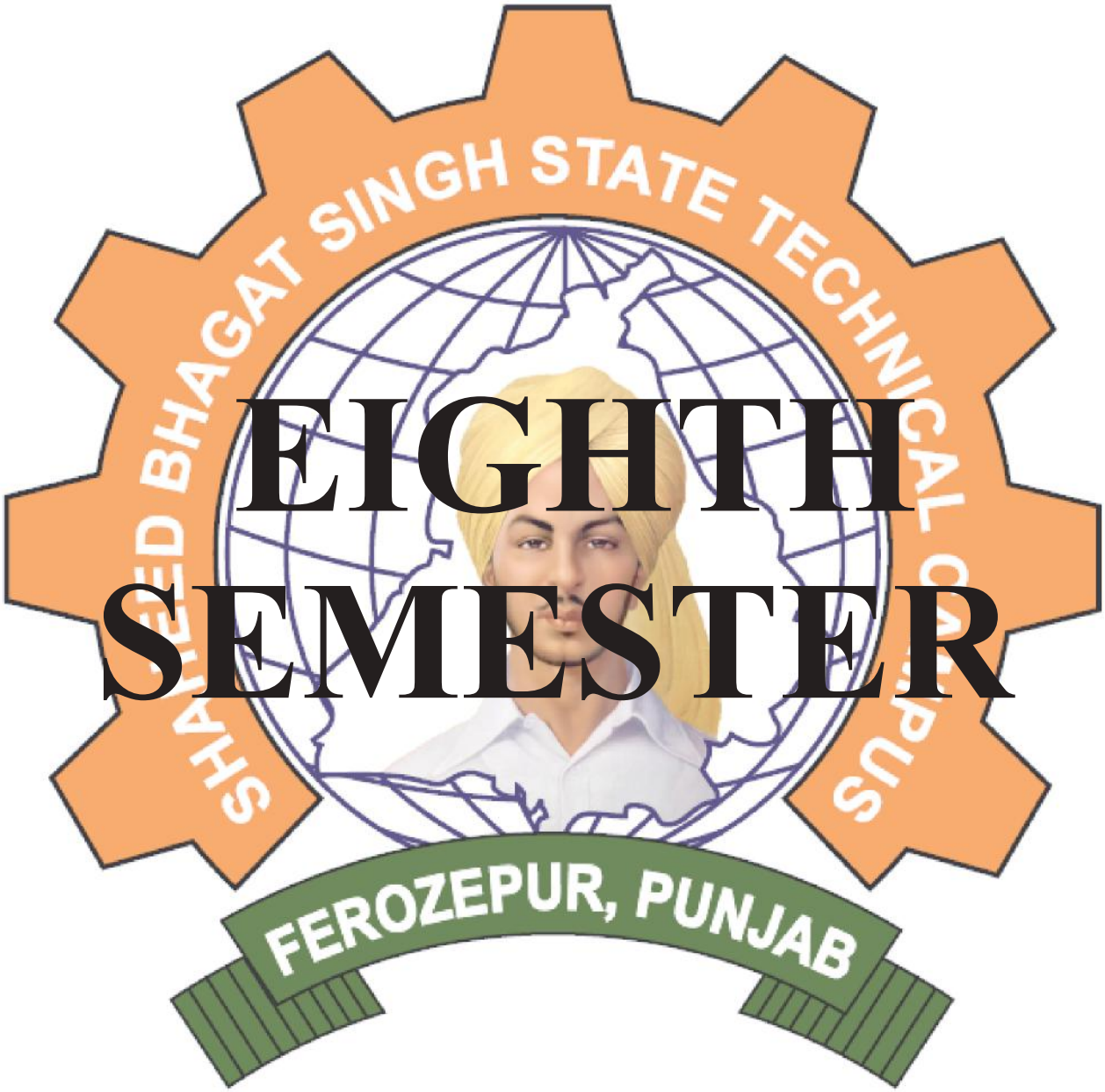
1. Moseley, Text Book on Ground Improvement, Blackie Academic Professional, Chapman & Hall
2. Boweven R., Text Book on Grouting in Engineering Practice, Applied Science Publishers Ltd
3. Jewell R.A., Text Book on Soil Reinforcement with Geotextiles, CIRIA Special Publication, Thomas Telford
4. Van Impe W.E., Text Book On Soil Improvement Technique & Their Evolution, Balkema Publishers 5. Donald .H. Gray & Robbin B. Sotir, Text Book On Bio Technical & Soil Engineering Slope Stabilization, John Wiley
6. Rao G.V. & Rao G.V.S., Text Book On Engineering With Geotextiles, Tata McGraw Hill

7. Korener, Construction & Geotechnical Methods In Foundation Engineering, McGraw Hill
8. Shukla, S.K. and Yin, J.H. Fundamental of Geosynthetic Engineering, Taylor & Francis
9. Swamisaran, Reinforced Soil and its Engineering Application, New Age Publication
10. Gulati, S.K. and Datta, M., Geotechnical Engineering, Tata McGraw Hill.

Course Outcomes

CO1 Able to apply the various mechanical methods of soil improvement.
CO2 Able to know the various methods of soil improvement with additives.
CO3 Able to know the various methods of soil improvement using reinforcing elements.
CO4 To have proper knowledge of geotextiles and their usage in different structures.

Chapter / CO	1	2	3	4
CO 1	M			
CO 2		M		
CO 3			M	
CO 4				M



EIGHTH SEMESTER

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

HYDROLOGY AND DAMS

Subject Code: BTCE801A

	L	T	P
Internal Marks : 40			
External Marks : 60	**3**	**1**	**0**
Total Marks : 100			

1. **Introduction:** Precipitation, importance of hydrological data in water resources planning, Hydrologic cycle, Mechanics of precipitation, types and causes, measurement by rain gauges, Gauge net-works, hyetograph, averaging depth of precipitation over the basin, mass-rainfall curves, intensity duration frequency curves, depth area-duration curves.
2. **Interception and Infiltration:** a) Interception: Factors affecting interception, evaporation from free water surfaces and from land surfaces, transpiration, Evapo-transpiration.
   b) Infiltration: Factors affecting infiltration, rate, Infiltration capacity and its determination.
3. **Runoff:** Factors affecting runoff, run-off hydrograph, unit hydrograph theory, S-curve hydrograph, Synder's synthetic unit hydrograph.
4. **Peak Flows:** Estimation of Peak flow-rational formula, uses of unit hydrograph, frequency analysis, Gumbel's method, design flood and its hydrograph.
5. **Gravity Dams:** Forces, Stability factors, stresses on the faces of dam, design of profile by the method of zoning, elementary profile of a dam, Spillways: Advantages of gated spillways, Discharge characteristics of spillways.
6. **Arch and Buttress Dams:** Classification of arch dam- constant radius, constant angle and variable radius , cylinder theory, expression relating central angle and cross-sectional area of arch, types of buttress dams, advantages of buttress dams.
7. **Earth Dams:** Components of earth dams and their functions, phreatic line determination by analytical and graphical methods.

Books Recommended:

1. Engineering Hydrology - J.Nemec, Prentice Hall
2. Engineering Hydrology by Stanley Buttler, John. Wiley
3. Ground Water Hydrology by TODD, John. Wiley
4. Engineering for Dams Vol. II & III by Creager Justin & Hinds. John. Wiley
5. Hydrology by. S.K.Garg, Khanna Pub
6. Hydrology Principles, Analysis and Design by. Raghunath, H M, New Age Int. Pub.

Course Outcomes

CO1 Able to get knowledge of hydrological cycle, precipitation, its types, methods of measurement.

CO2 Able to know about various water losses resulting due to Interception, Infiltration, transpiration, Evapo-transpiration, run-off.

Co3 Understand the concept of Peak Flow, its estimation by different methods, unit hydrograph theory.

CO4 Understand the concept and theories of Gravity dams, Arch dams, Buttress Dams, Earth Dams.

CO Mapping

Chapter CO	1	2	3	4	5	6	7
CO 1	M						
CO 2		M	M				
CO 3			M	M			
CO 4					M	M	M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

ENVIRONMENTAL ENGINEERING-II

Subject Code: BTCE802A

	L	T	P
Internal Marks : 40			
External Marks : 60	**3**	**1**	**0**
Total Marks : 100			

1. **Introduction:** Terms & definitions, systems of sanitation and their merits and demerits, system of sewerage, choice of sewerage system and suitability to Indian conditions.
2. **Sewerage System:** Generation and estimation of community sewage, flow variations, storm water flow, types of sewers, design of sewers and storm water sewers, construction & maintenance of sewers, sewer appurtenances, sewage pumping and pumping stations.
3. **House Drainage:** Principles of house drainage, traps, sanitary fittings, systems of plumbing, drainage lay out for residences.
4. **Characteristics of Sewage:** Composition of domestic and industrial sewage, sampling, physical, chemical and microbiological analysis of sewage, biological decomposition of sewage, BOD and BOD kinetics, effluent disposal limits.
5. **Treatment of Sewage:** Introduction to unit operations and processes, primary treatment, screening, grit chamber, floatation units, sedimentation tanks, secondary treatment units, activated sludge process, sequencing batch reactors, trickling filters, anaerobic systems, anaerobic filters, upflow anaerobic sludge blanket (introduction), anaerobic lagoons, sludge handling and disposal, thickening, stabilization, dewatering, drying and disposal.
6. **Low Cost Sanitation Systems:** Imhoff tank, septic tank, soakage pit/soil absorption systems, stabilization ponds, macrophyte ponds, oxidation ponds and constructed wetland systems.
7. **Wastewater Treatment Plants and Advanced Wastewater Treatment:** Treatment plants, site selection, plant design, hydraulic profiles, operation and maintenance aspects, advanced wastewater treatment for nutrient removal, disinfection and polishing.

Books Recommended:

1. Waste Water Engg. (Environmental Engg.-II) by B.C.Punmia, Ashok Jain, Laxmi Publications, New Delhi.
2. Environmental Engg. - A design Approach by Arcadio P. Sincero and Gregoria P. Sincero, Prentice Hall of India, New Delhi.

3. "Waste Water Engineering - Treatment and Reuse" by Metcalf & Eddy, TMH, New Delhi.
4. "Environmental Engg." By Howard S. Peavy, Donald R. Rowe & George Tchobanoglous, McGraw Hill, International Edition
5. Environmental Engineering (Vol. II) by S.K. Garg, Khanna Publishers, Delhi

Course Outcomes

CO1 Able to demonstrate a firm understanding of various sewerage systems and their suitability.

CO2 Able to design sewer and drainage systems layout for communities.

CO3 Able to evaluate the waste water characteristics to determine the degree of treatment required.

CO4 Able to explain the physical, chemical and biological techniques of wastewater treatment.

CO5 Able to compare the applicability of treatment technologies under different conditions and the need of advanced treatment.

Chapter CO	1	2	3	4	5	6	7
CO 1	M						
CO 2		M					
CO 3			M				
CO 4				M		M	
CO 5					M		M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

PROJECT II

Subject Code: BTCE804A

	L	T	P
Internal Marks : 120			
External Marks : 80	**0**	**0**	**6**
Total Marks : 200			

The students will apply their practical knowledge in different projects related to civil engineering.

CO1: Able to perform in different projects related to civil engineering.

Chapter	1
CO	
CO 1	M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

PROFESSIONAL ELECTIVE-IV
ELEMENTS OF EARTHQUAKE ENGINEERING

Subject Code: BTCE811A

	L	T	P
Internal Marks : 40			
External Marks : 60	**3**	**0**	**0**
Total Marks : 100			

Note: No Indian Codes of Practice and Design handbooks are permitted, so paper setter is expected to provide required data from relevant IS codes, for any numerical or design part.

1. **Introduction of Earthquakes:** Causes of Earthquakes, Basic Terminology, Magnitude, Intensity, Peak ground motion parameters and lessons learnt from past erarthquakes.
2. **Theory of Vibrations:** Sources of Vibrations, Types of Vibrations, Degree of Freedom, Spring action and damping, Equation of motion of S.D.O.F. systems, Undamped, Damped system subjected to transient forces, general solution, green's function.
3. **Elements of seismic design:** Concepts of seismic design, lateral Strength, stiffness, ductility and structural configuration, lateral force analysis, estimation of lateral forces due to earthquake, floor diaphragm action, moment resisting frames, shear walls.
4. **Codal provisions for earthquake resistant design:** Introduction to provisions of IS 1893 Part-I for buildings., introduction to provisions of IS 4326, introduction to provision of IS 13920.

Books Recommended:

1. Earthquake Resistant Design of Structures, Pankaj Agrawal, Manish Shrikhande, PHI Learning.
2. Dynamics of Structures: Theory and Applications to Earthquake Engineering, AK Chopra, Prentice Hall
3. Dynamics of Structures, R.W. Clough and Joseph Penzien, McGraw-Hill Education
4. Earthquake Resistant Design by David J. Dowrick, Wiley India Pvt Ltd
5. Elements of Earthquake Engg by Jai Krishna, A.R. Chandrasekaran, Brijesh Chandra, South Asian Publishers.
6. IS 1893 Indian Standard Criteria for Earthquake Resistant Design of Structures.
7. IS 4326 Indian Standard for Earthquake Resistant Design and Construction of Buildings.
8. IS 13920 Ductile detailing of Reinforced Concrete Structures subjected to Seismic Forces.

Course Outcomes

CO1 Able to understand characteristics of earthquake and behaviour of building from past eartquakes.

Co2 Able to understand theory of vibrations and damped system subjected to transient forces with lateral force analysis.

CO3 Able to understand the concept of seismic response analysis of a structure design and detail to enhance ductility.

CO4 Able to understand behaviour of lateral forces acting on symmetric as well as asymmetric buildings as per Indian standard.

Chapter CO	1	2	3	4
CO 1	M			
CO 2		M		
CO 3			M	
CO 4				M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

PRESTRESSED CONCRETE

Subject Code: BTCE812A

	L	T	P
Internal Marks : 40			
External Marks : 60	**3**	**0**	**0**
Total Marks : 100			

Note: IS 1343 is permitted in examination.

1. **Materials for prestressed concrete and prestressing systems** : High strength concrete and high tensile steel – tensioning devices – pretensioning systems – post tensioning systems.
2. **Analysis of prestress and bending stresses** : Analysis of prestress – resultant stresses at a sector – pressure line or thrust line and internal resisting couple – concept of load balancing – losses of prestress – deflection of beams.
3. **Strength of prestressed concrete sections in flexure, shear and torsion:** Types of flexural failure – strain compatibility method – IS:1343 code procedure – design for limit state of shear and torsion.
4. **Design of prestressed concrete beams and slabs**: Transfer of prestress in pre tensioned and post tensioned members – design of anchorage zone reinforcement – design of simple beams – cable profiles – design of slabs.

Books

1. N. Krishna Raju, Prestressed concrete, Tata McGraw Hill
2. T.Y. Lin, Ned H. Burns, Design of Prestressed Concrete Structures, John Wiley & Sons.
3. P. Dayaratnam, Prestressed Concrete, Oxford & IBH
4. IS 1343 2012 Code of Practice for Prestressed Concrete

Course Outcomes

CO1 Able to know about various materials and devices used in prestressing.
CO2 Able to analyse the pretress and bending stresses.
CO3 Able to find the strength in concrete section.
CO4 Able to design of prestressed concrete beams and slabs.

CO Mapping

Chapter CO	1	2	3	4
CO 1	M			
CO 2		M		
CO 3			M	
CO 4				M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

PAVEMENT DESIGN

Subject Code: BTCE813A

	L	T	P
Internal Marks : 40			
External Marks : 60	**3**	**0**	**0**
Total Marks : 100			

Note: Use of IRC:37and IRC:58 shall be allowed in the examination.

1. **Introduction**: Types of pavement structure. Functions of pavement components, Factors affecting pavement design, Design wheel load, Strength characteristics of pavement materials. Comparison of flexible and rigid pavements.
2. **Design of Flexible Pavements**: General design considerations, Methods for design of flexible pavements – Group Index Method, Triaxial Test Method, Hveem Stabilometer Method, McLeod's Method, Indian Roads Congress Method.
3. **Design of Rigid Pavements**: General design considerations, Westergard's Analysis, Methods for design of rigid pavements - PCA method, AASHTO Method, Indian Roads Congress Method, Types and design of Joints in cement concrete pavements.
4. **Design of Bituminous Mixes**: Mix Design Approaches, Marshall Method of Bituminous Mix Design, Superpave.
5. **Modern Design Concepts**: Reinforced Concrete Pavement, Airport Pavement Design, Bituminous Pavement with Cemented Base, Interlocking Concrete Block Pavement, Full Depth Bituminous Pavement, Ultrathin White Topping, Perpetual Pavement, Pavement Overlays.

Books Recommended:

1. Yoder, E. J., and M. W. Witczak, "Principals of Pavement Design", Wiley Publication.
2. Khanna, S. K., and C. E. G. Justo, "Highway Engineering", Nem Chand & Bros., Roorkee.
3. Sharma, S. K., "Principles, Practice and Design of Highway Engineering", S. Chand & Co.
4. Chakraborty,P. and A.Das, "Principles of Transportation Engineering", Prentice Hall India.
5. Yang H. Huang, "Pavement Analysis and Design", Prentice Hall.

Course Outcomes

CO1 To develop skills in conducting analysis of pavements by calculating the response due to vehicular loading.

Co2 To perform design of rigid and flexible pavements based on traffic by different methods as per IRC.

CO3 Able to understand the behaviour bituminous mixes under varying loading conditions.

CO4 Able to understand and develop modern design concept of pavement.

Chapter CO	1	2	3	4	5
CO 1	M				
CO 2		M	M		
CO 3				M	
CO 4					M

OPEN ELECTIVE OFFERED TO OTHER DEPARTMENTS

Department of Civil Engineering

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

DISASTER MANAGEMENT

Subject Code:BTCE-901A

	L	T	P
Internal marks: 40			
External marks: 60	**3**	**0**	**0**
Total marks: 100			

1. **Introduction to Disaster Management:** Define disaster, hazard, emergency, vulnerability, risk and disaster management; Identify and description of the types of natural and non-natural disasters. Important phases of Disaster Management Cycle.
2. **Disaster Mitigation and Preparedness:** Natural Hazards: causes, distribution pattern, consequences and mitigation measures for earth quake, tsunami, cyclone, flood, landslide drought etc. Man-made hazards: causes, consequences mitigation measures for various industrial hazards/disasters, Preparedness for natural disasters in urban areas.
3. **Hazard and Risk Assessment:** Assessment of capacity, vulnerability and risk, vulnerability and risk mapping, stages in disaster recovery and associated problems.
4. **Emergency Management Systems (EMS):** Emergency medical and essential public health services, response and recovery operations, reconstruction and rehabilitation.
5. **Capacity Building:** Gender sensitive disaster management approach and inculcate new skills and sharpen existing skills of government officials, voluntary activists, development of professional and elected representative for effective disaster management, role of media in effective disaster management, overview of disaster management in India, role of agencies like NDMA, SDMA and other International agencies, organizational structure, role of insurance sector, DM act and NDMA guidelines.

Books Recommended:

1. Natural Hazards in the Urban Habitat by Iyengar, C.B.R.I., Tata McGraw Hill.Pub
2. Natural Disaster management, Jon Ingleton (Ed), Published by Tudor Rose, Leicester
3. Disaster Management, R.B. Singh (Ed), Rawat Publications ESCAP: Asian and the Pacific Report on Natural Hazards and Natural Disaster Reduction.
4. Disaster Management –Future Challenges & Opportunities by Jagbir Singh, I.K. International Publishing House.

Course Outcomes

CO1 Understanding of disasters, their types, causes disaster management

CO2 Able to learn the importance of capacity building, vulnerability, Risk mapping, stages in disaster recovery and associated problems

CO3 Knowledge about Emergency medical and essential public health services.

Co4 Understanding about response and recovery operations, reconstruction and rehabilitation, role of different agencies during disasters

Chapter CO	1	2	3	4	5
CO 1	M	M			
CO 2			M		
CO 3				M	
CO 4					M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

PROJECT MANAGEMENT TECHNIQUES

Subject Code: BTCE-902A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**0**	**0**
Total Marks: 100			

1. **INTRODUCTION:** Need for project planning & management, time, activity & event, bar chart, Milestone chart, uses & draw backs.
2. **PERT :** Construction of PERT network, time estimates, network analysis, forward pass & backward pass, slack, critical path, data reduction, suitability of PERT for research project, numerical problems.
3. **CPM :** Definitions, network construction, critical path, fundamental rules, determination of project schedule, activity time estimates, float types, their significance in project control, numerical problems.
4. **COST ANALYSIS AND CONTRACT :** Type of costs, cost time relationships, cost slopes, conducting a crash programme, determining the minimum total cost of project, numerical problems. updating a project, when to update, time grid diagram, resource scheduling. planning of different components of civil engineering projects such as a house, workshop, dam, tunnel.
5. **PLANNING:** Nature of Planning, Planning Process, Application of Planning Process in a Hypothetical Situation, Types of Planning, Types of Plans, Management by Objective (MBO).
6. **ORGANIZING:** Concept of Organization, Departmentation, Forms of Organization Structure Analysis of Organization Structure – Case Studies, Hypothetical Formation of an Organization.
7. **CONTROLLING:** Nature and Process of Controlling, Requirements for Effective Controlling.

Books/references:

1 "Principles and Practices of Management", Rao V.S.P. and Narayana P.S., Pubs: Konark Publishers.

2 "Principles & Practice of Management", Prasad L.M., 8th Edition, Pubs: Sultan Chand & Sons.

3 "Essentials of Management: International and Leadership Perspective", Weihrich H. and Koontz H., 9th Edition, Pubs: McGraw Hill.

4 "The New Era of Management", Daft R.L., 11th Edition, Pubs: Cengage Learning.

5 "Management: Text and Cases", Rao V.S.P. and Krishna V.H., Pubs: Excel Books.

6 "Fundamentals of Management: Essential Concepts and Applications", Robbins S.P, DeCenzo D.A., Bhattacharya S. and Agarwal M.N., 6th Edition, Pubs: Pearson India.

7. Construction Planning and Equipment - R.L.Peurifoy - Tata McGraw Hill, New Delhi

8. PERT and CPM - L.S.Srinath, East West Press

9. Management Guide to PERT & CPM - Wiest & levy; Prentice Hall

10. Construction Equipment & Planning and Application. - Mahesh VermaArtec Publication.

11. Construction Planning and Management by U. K. Shrivastava; Galgotia Publications Ltd.

Course Outcomes

CO1 Able to describe the requirement of planning and management.

CO2 Able to recognize the critical path and pert suitability for research projects.

CO3 Able to determine cost time relationships of different projects.

CO4 Able to planning, organizing and controlling of various engineering Projects

Chapter CO	1	2	3	4	5	6	7
CO 1	M						
CO 2		M	M				
CO 3				M			
CO 4					M	M	M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

TRAFFIC & TRANSPORTATION ENGINEERING

Subject Code: BTCE-903A

	L	T	P
Internal Marks: 40			
External Marks: 60	3	0	0
Total Marks: 100			

1. **Introduction:** Elements of Traffic Engineering, Components of traffic system – road users, vehicles, highways and control devices.
2. **Traffic Stream Characteristics**: Traffic stream parameters, characteristics of interrupted and uninterrupted flows.
3. **Traffic Studies**: Traffic volume studies, origin destination studies, speed studies, travel time and delay studies, parking studies, accident studies.
4. **Traffic Regulation and Control:** Signs and markings, Traffic System Management, At-grade intersections, Channelisation, Roundabouts.
5. **Traffic Signals:** Pre-timed and traffic actuated. Design of signal setting, phase diagrams, timing diagram, Signal co-ordination.

Books Recommended:

1. William, R.M. and Roger, P.R., "Traffic Engineering", Prentice Hall.
2. Hobbs, F.D., "Traffic Planning and Engineering", Pergamon Press.
3. Khisty, C.J. and Kent, B.L., "Transportation Engineering – An Introduction", Prentice Hall of India Pvt. Ltd.
4. Kadiyali, L.R., "Traffic Engineering & Transport Planning", Khanna Publishers, New Delhi.
5. Mannering, "Principles of Highway Engineering & Traffic Analysis", Wiley Publishers, New Delhi.

Course Outcomes

CO1. Know about the elements, components of traffic systems and vehicle characteristics.

CO2. Understanding about traffic stream characteristics.

CO3. Acquire knowledge about various traffic signals and traffic regulation and their control.

CO4. Able to understand various traffic safety practices.

Chapter CO	1	2	3	4	5
CO 1	M				
CO 2		M	M		
CO 3				M	
CO 4					M

Shaheed Bhagat Singh State Technical Campus, Moga Road, Ferozepur-152004 (Punjab)
Study Scheme for 4 year B.Tech (Civil Engineering)

ENVIRONMENT POLLUTION CONTROL

Subject Code: BTCE-904A

	L	T	P
Internal Marks: 40			
External Marks: 60	**3**	**0**	**0**
Total Marks: 100			

1. **Introduction:** List of Environment Pollutants, Soil Pollutants, Fossil Fuels Sources of Environmental Pollution, Air, Water and Land/Soil Pollution, Solid waste Pollution, Disposal of Solid Waste, Types of Solid Waste, Marine Pollution, Sources of Marine Pollution, Thermal Pollution of Water, Nuclear/ Radioactive Pollution, Solid waste Management, Types of Solid Waste.
2. **Air Pollution:** Terminology related to air pollution, Classification of pollutants based on biodegradability and Stationary and Mobile Sources of Air Pollution and its causes.
3. **Water Pollution:** Terminology related to water pollution, Causes & Types of water pollution, Terminology related to waste water treatment.
4. **Noise Pollution:** Terminology related to noise pollution, Sources of noise pollution, Type of Noise Sources.
5. **Atmosphere and its Constituents:** Region/Structure of atmosphere and Salient features of different layers of atmosphere**.**
6. **Effect of Environmental Pollution and its preservations:** Effects of various primary air pollutants on Plants, Trees, Vegetation and Living beings, Major Gaseous pollutants, Effect of minor gaseous pollutant on plants, Effect of secondary air pollutants on plants, trees Vegetation and Living beings**.** Preservations of environment from various kind of pollutions.

Books Recommended:

1. O.P. Gupta "Elements of Environmental Pollution Control"Khanna Book Publishing
2. R.D. Gupta "Environmental Pollution Hazard and Control"
3. V.K. Ahluwalia "Environmental Pollution and Health"Jain Publishers

Course Outcomes

CO1 Able to understand different types of environmental pollution.
CO2 Able to know about the types and source of pollutants.
CO3 Understand the causes and the effects of various kind of pollution.
CO4 Able to understand salient features of our atmosphere.
CO5 Able to know how to preserve our environmental system.

Chapter CO	1	2	3	4	5	6
CO 1	M					
CO 2		M	M	M		
CO 3						M
CO 4					M	
CO 5						M