DAV UNIVERSITY JALANDHAR

Course Scheme For

Civil Engineering B. Tech (Hons.)
(Program ID-12)

3rd TO 8th SEMESTER
Examinations 2013–2014 Session Onwards

Syllabi Applicable For Admissions in 2013

DAV UNIVERSITY, JALANDHAR

Scheme of Courses B.Tech

Civil Engineering (Hons.)

Semester 3

S.No	Paper Code	Course Title	L	T	P	Cr	A	B	C	D	E
1.	MTH252	Engineering Mathematics-III	4	1	0	4	25	25	25	25	100
2.	CIV201	Principles of Surveying	3	1	0	3	25	25	25	25	75
3.	CIV203	Hydraulic Engineering-1	3	1	0	3	25	25	25	25	75
4.	CIV205	Environment Engineering-1	3	0	0	3	25	25	25	25	75
5.	CIV207	Building Material and Construction	3	0	0	3	25	25	25	25	75
6.	CIV209	Strength of Materials	3	1		3	25	25	25	25	75
7.	CIV211	Surveying Laboratory	0	0	3	2	-	-	-	-	50
8.	CIV213	Hydraulic Engineering Laboratory	0	0	2	2	-	-	-	-	50
9.	CIV215	Strength of Materials Laboratory	0	0	2	2	-	-	-	-	50
			19	**4**	**7**	**25**					**625**

A: Continuous Assessment: Based on Objective Type Tests
B: Mid-Term Test-1: Based on Objective Type & Subjective Type Test
C: Mid-Term Test-2: Based on Objective Type & Subjective Type Test
D: End-Term Exam (Final): Based on Objective Type Tests
E: Total Marks

L: Lectures T: Tutorial P: Practical Cr: Credits

DAV UNIVERSITY, JALANDHAR

Scheme of Courses B.Tech

Civil Engineering (Hons.)

Semester 4

S.No	Paper Code	Course Title	L	T	P	Cr	A	B	C	D	E
1.	CIV202	Geomatic Engineering.	3	0	0	3	25	25	25	25	75
2.	CIV204	Theory of Structure-1	3	2	0	3	25	25	25	25	75
3.	CIV206	Design of Concrete Structure-1	3	2	0	3	25	25	25	25	75
4.	CIV208	Hydraulic Engineering-2	3	2	0	3	25	25	25	25	75
5.	CIV210	Engineering Geology	3	0	0	3	25	25	25	25	75
6.	CIV212	Construction Machinery and Works Management	3	0	0	3	25	25	25	25	75
7.	CIV214	Design of Concrete Elements Lab	0	0	2	2	-	-	-	-	50
8.	CIV216	Theory of Structure-1 Lab	0	0	2	2	-	-	-	-	50
9.	CIV218	Seminar	0	0	2	2	-	-	-	-	50
			18	**6**	**6**	**24**					**600**

A: Continuous Assessment: Based on Objective Type Tests
B: Mid-Term Test-1: Based on Objective Type & Subjective Type Test
C: Mid-Term Test-2: Based on Objective Type & Subjective Type Test
D: End-Term Exam (Final): Based on Objective Type Tests
E: Total Marks

L: Lectures T: Tutorial P: Practical Cr: Credits

DAV UNIVERSITY, JALANDHAR

Scheme of Courses B.Tech

Civil Engineering (Hons.)

Semester 5

S.No	Paper Code	Course Title	L	T	P	Cr	A	B	C	D	E
1.	CIV301	Design of Steel Strcuture-1	3	1	0	3	25	25	25	25	75
2.	CIV303	Theory of Structure-2	3	2	0	3	25	25	25	25	75
3.	CIV305	Geo-technical Engineering	3	2	0	3	25	25	25	25	75
4.	CIV307	Transportation Engineering	3	1	0	3	25	25	25	25	75
5.	CIV309	Irrigation Engineering-1	3	0	0	3	25	25	25	25	75
6.	CIV311	Estimation and Costing	3	0	0	3	25	25	25	25	75
7.	CIV313	Geo-Technical Engineering Lab	0	0	2	2	-	-	-	-	50
8.	CIV315	Transportation Engineering Lab	0	0	2	2	-	-	-	-	50
9.	CIV317	Computer Aided Steel Drawing	0	0	2	2	-	-	-	-	50
10.	CIV319	Survey Camp	0	0	0	2	-	-	-	-	50
			18	**6**	**6**	**26**					**650**

A: Continuous Assessment: Based on Objective Type Tests
B: Mid-Term Test-1: Based on Objective Type & Subjective Type Test
C: Mid-Term Test-2: Based on Objective Type & Subjective Type Test
D: End-Term Exam (Final): Based on Objective Type Tests
E: Total Marks

L: Lectures T: Tutorial P: Practical Cr: Credits

***** * 3-4 weeks Survey Camp will be held preferably in some hilly area during summer vacation after 4th semester

DAV UNIVERSITY, JALANDHAR

Scheme of Courses B.Tech
Civil Engineering (Hons.)

Semester 6

S.No	Paper Code	Course Title	L	T	P	Cr	A	B	C	D	E
1.	CIV302	Design of Concrete Structure-2	4	1	0	4	25	25	25	25	100
2.	CIV304	Foundation Engineering	3	1	0	3	25	25	25	25	75
3.	CIV306	Environmental Engineering-2	3	1	0	3	25	25	25	25	75
4.	CIV308	Numerical Method in Civil Engineering.	4	0	0	4	25	25	25	25	100
5.	CIV3XX	DE- I	3	1	0	3	25	25	25	25	75
6.	MGT453	Principles of Marketing	3	0	0	3	25	25	25	25	75
7.	CIV310	Environmental Engineering-2 Lab	0	0	2	2	-	-	-	-	50
8.	CIV312	Computer Aided Concrete Drawing	0	0	2	2	-	-	-	-	50
9.	CIV314	Seminar	0	0	2	2	-	-	-	-	50
			20	**4**	**6**	**26**					**650**

DEPARTMENTAL ELECTIVE (DE)-I

S. No	Paper Code	Course Title
1.	CIV316	Elements of remote sensing, GIS and GPS
2.	CIV318	Architecture and town Planning
3.	CIV320	Theory of Structure-3
4.	CIV322	Traffic Engineering

A: Continuous Assessment: Based on Objective Type Tests
B: Mid-Term Test-1: Based on Objective Type & Subjective Type Test
C: Mid-Term Test-2: Based on Objective Type & Subjective Type Test
D: End-Term Exam (Final): Based on Objective Type Tests
E: Total Marks L: Lectures T: Tutorial P: Practical Cr: Credits

DAV UNIVERSITY, JALANDHAR

Scheme of Courses B.Tech

Civil Engineering (Hons.)

Semester 7

S.No	Paper Code	Course Title	L	T	P	Cr	A	B	C	D	E
1.	CIV401	Composite Materials	3	0	0	3	25	25	25	25	75
2.	CIV403	Design of Steel Structure-2	4	1	0	4	25	25	25	25	100
3.	CIV405	Irrigation Engineering-2	4	1	0	4	25	25	25	25	100
4.	CIV407	Finite Element Method	3	1	0	3	25	25	25	25	75
5.	CIV4xx	DE-II	3	1	0	3	25	25	25	25	75
6.	CIV421	Disaster Management	3	0	0	3	25	25	25	25	75
7.	CIV417	Minor Project	0	0	6	4	-	-	-	-	100
8.	CIV419	Industrial Practical Training*	-	-	-	2	-	-	-	-	50
			20	**4**	**6**	**26**					**650**

DEPARTMENTAL ELECTIVE (DE)-II

S. No	Paper Code	Course Title
1.	CIV409	Dynamics of Structure
2.	CIV411	Ground improvement techniques
3.	CIV413	Hydrology and Dams
4.	CIV415	Bridge Engineering

A: Continuous Assessment: Based on Objective Type Tests
B: Mid-Term Test-1: Based on Objective Type & Subjective Type Test
C: Mid-Term Test-2: Based on Objective Type & Subjective Type Test
D: End-Term Exam (Final): Based on Objective Type Tests
E: Total Marks

L: Lectures T: Tutorial P: Practical Cr: Credits

***** Industrial practical Training for eight weeks will be held during summer vacation after 6th semester.

DAV UNIVERSITY, JALANDHAR

Scheme of Courses B.Tech

Civil Engineering (Hons.)

Semester 8

S.No	Paper Code	Course Title	L	T	P	Cr	A	B	C	D	E
1.	CIV402	Earthquake Engineering	4	0	0	4	25	25	25	25	100
2.	CIV404	Railways, Airports and Harbour Engineering	3	1	0	3	25	25	25	25	75
3.	CIV4xx	DE-III	3	2	0	3	25	25	25	25	75
4.	CIV4xx	DE-IV	3	1	0	3	25	25	25	25	75
5.	CIV426	Building Maintenance and Repair	3	0	0	3	25	25	25	25	75
6.	CIV422	Major Project	0	0	8	8	-	-	-	-	200
7.	CIV424	Seminar	0	0	2	2	-	-	-	-	50
			16	**4**	**10**	**26**					**650**

DEPARTMENTAL ELECTIVE (DE)-III

S.No	Paper Code	Course Title
1.	CIV406	Plastic Analysis of Structure
2.	CIV408	Pavement design
3.	CIV410	Earth and Earth retaining structures
4.	CIV412	Advanced Environmental Engineering

DEPARTMENTAL ELECTIVE (DE)-IV

S.No	Paper Code	Course Title
1.	CIV414	Pre-stressed concrete
2.	CIV416	Traffic Engineering
3.	CIV418	Soil dynamics
4.	CIV420	Flood control and River engineering

A: Continuous Assessment: Based on Objective Type Tests
B: Mid-Term Test-1: Based on Objective Type & Subjective Type Test
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D: End-Term Exam (Final): Based on Objective Type Tests
E: Total Marks

L: Lectures T: Tutorial P: Practical Cr: Credits

DAV UNIVERSITY, JALANDHAR

THIRD SEMESTER

Course Title: ENGINEERING MATHEMATICS-III
Course Code: MTH-252

L	T	P	Credits
4	1	0	4

Course Objective:
The objective of the course is to enable the students to understand the basic concepts related to Laplace transforms, Fourier series, ordinary differential and partial differential equations and their applications.

PART-A

Laplace Transforms
Laplace transforms of various standard functions, Linear property of Laplace transforms, Shifting property and change of scale, inverse Laplace transforms, transform of derivatives and integrals, Laplace transform of unit step function, impulse function, periodic functions, applications to solution of ordinary linear differential equations with constant coefficients, and simultaneous differential equations.

[14]

PART-B

Fourier series
Periodic functions, Euler's formula. Dirichlet's conditions. Fourier series of discontinuous functions. Fourier series of Even and Odd functions, half range expansions, Fourier series of different wave forms, Complex form of Fourier series. Fourier Transformation.

[14]

PART-C

Partial Differential Equations
Formulation of partial differential equations, Linear partial differential equations, homogeneous partial differential equations with constant coefficients. Wave equation and Heat conduction equation in one dimension. Two dimensional Laplace equation and their applications, solution by the method of separation of variables.

[14]

PART-D

Functions of Complex Variable
Limits, continuity and derivative of the function of complex variable, Analytic function, Cauchy-Riemann equations, conjugate functions, and harmonic functions.
Conformal Mapping
Definition, standard transformations, translation, rotation, inversion, bilinear.
Complex Integration
Line integrals in the complex plane, Cauchy's theorem, Cauchy's integral formula and derivatives of analytic function. Taylor's and Laurent's expansions (without proofs), singular points, poles, residue, Integration of function of complex variables using the method of residues.

[14]

REFERENCES:-

1. Kreyzig E.: Advanced Engineering Mathematics, John Wiley and Sons.
2. Ponnusamy S.: Foundations of Complex Analysis, Narosa Publishers.
3. Sneedon I.N.: Elements of Partial Differential Equations, McGraw-Hill.
4. Grewal B.S. Higher Engineering Mathematics, Khanna Publishers.

DAV UNIVERSITY, JALANDHAR

Course Title: PRINCIPLES OF SURVEYING

Paper Code: CIV201

L	T	P	Credits
3	1	0	3

Course Objective: This course offers a good understanding of the various surveying techniques.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of various methods of surveying, basic principle of surveying and various types of instruments used in surveying.

Part-A

Introduction: Definition, classification of surveys, principle, distorted or shrunk scales, precision in surveying. **[4]**

Chain Surveying: Instruments for measuring distances, chains, tapes, ranging – direct indirect, methods of chaining, folding and opening of chain, chaining on sloping ground, errors in chaining, corrections for linear measurements, Obstacle in chaining, reconnaissance, station selection, Triangulation, Base line measurement, limiting length of offsets, field notes. [6**]**

Part-B

Compass Surveying: Instruments used in traversing, bearings, meridians, declination, dip ofmagnetic needle, bearing of lines from included angles, local attraction, closing error and its removal. **[6]**

Plane Table Surveying: Introduction to plane table surveying, principle, instruments, workingoperations, setting up the plane table, centering, leveling, orientation, methods of plane table survey, two and three point problems, Lehmann's Rules, errors. **[6]**

Part-C

Leveling: Definitions of terms used in leveling, different types of levels, parallax, adjustments, bench marks, classification of leveling, booking and reducing the levels, rise and fall method, line of collimation method, errors in leveling, permanent adjustments, corrections to curvature and refraction, setting out grades, longitudinal leveling, and profile leveling. Automatic Levels. **[8]**

Contouring: Definition, representation of reliefs, horizontal equivalent, contour interval, characteristics of contours, methods of contouring, contour gradient, Interpolation of contours, uses of contour maps. **[6]**

Part-D

Theodolite: Types of theodolite, measurement of angles, temporary and permanent adjustments, closed & open traverse, consecutive and independent co-ordinates, advantages and disadvantages of traversing, Latitudes and Departures, closing error, Bowditch & Transit Rules, Gales traverse table, Different cases of omitted measurements. **[8]**

REFERENCE:

1. Punmia B C "Surveying" Vol.1 & 2 Laxmi Publications Pvt. Ltd., New Delhi, 2002.
2. Kanetkar T P and Kulkarni S V "Surveying and leveling" Vol. I & II PVG Prakashan, Pune, 1994.
3. Basak N N "Surveying and leveling" Tata McGraw Hill, New Delhi, 2000.
4. Bhavikatti,S.S. Surveying & Levelling Volume I&II (2009.
5. Duggal, S.K., Surveying Vol I & II, Tata McGraw Hill (2007).
6. Narinder Singh, "Surveying", Tata McGraw Hill.

DAV UNIVERSITY, JALANDHAR

Course Title: **HYDRAULICS ENGINEERING-1**
Paper Code: CIV203

L	T	P	Credits
3	1	0	3

Course Objective: This course offers a good understanding of the various properties of fluid like dynamic and kinematic properties.

Learning Outcomes: After the completion of this course the participants would gain the knowledge about various types of flow, fluid properties like Fluid Kinematics and fluid dynamics.

Part-A

Fluid and their properties : Concept of fluid, difference between solids, liquids and gases; ideal and real fluids; Continuum concept of fluid: density, specific weight and relative density; viscosity and its dependence on temperature; surface tension and capillarity, vapor pressure and cavitation's, compressibility band bulk modulus; Newtonian and non-Newtonian fluids [6]

Fluid Statics: Concept of pressure, Pascal's law and its engineering hydrostatic paradox. 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.

[8]

Part-B

Fluid Kinematics: Classification of fluid flows, velocity and acceleration of fluid particle, local and convective acceleration, normal & tangential acceleration streamline, pathline and streakline, flow rate and discharge mean velocity continuity equation in Cartesian co-ordinates. Rotational flows- Rotational velocity and circulation, stream & velocity potential functions. [12]

Part-C

Fluid Dynamics :- Euler's equation, Bernoulli's equation and steady flow energy equation; representation of energy changes in fluid system, impulse momentum equation, kinetic energy and momentum correction factors, flow along a curved streamline, free and forced vortex motions. [10]

Part-D

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. [4]

Flow Past immersed bodies: Drag and lift deformation Drag and pressure drag. Drag on asphere, cylinder and Airfoil: lift-Magnus Effect and circulation, lift on a circular cylinder.[2]

Flow Measurement: - Manometers, Pitot tubes, venture meter and orifice meters, orifices, mouthpieces, notches **(Rectangular and V-notches)** and weirs **(Sharp crested Weirs)**. [4]

REFERENCE:

1. Dr. R.K. Bansal, "Fluid Mechanics & Hydraulic Machines"
2. P.N.Modi & S.M.Seth, "Hydraulic and Fluid Mechanic".
3. R.J.Garde & A.G.Mirajgaoker, "Engineering Fluid Mechanics".
4. Munson Young okiishi, "Fundamentals of fluid mechanics", by Wiley Publisher.
5. VL & Wylie EB, "Fluid Mechanics: Streetes", Mcgraw Hill book company.
6. Chow, "Fluid Mechanics", IBH publisher.
7. Subramanean, "Open Channel flow", Mcgraw Hill book company.

DAV UNIVERSITY, JALANDHAR

Course Title: ENVIRONMENT ENGINEERING-1

Paper Code: CIV205

L	T	P	Credits
3	0	0	3

Course Objective: This course offers a good understanding of the various water supply techniques used in modern life, various types of distribution systems.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of various water supply systems as well as about the quality tests for water.

Part-A

Public Water Supply: Beneficial uses of water, water demand, per capita demand, variation in demand, causes detection and prevention of wastage of water, population forecasting, and water demand for firefighting, population forecasting and water demand estimation. **[6]**

Water sources and development: Surface and ground water sources; Selection and development of sources; Assessment of potential; Flow measurement in closed pipes, intakes and transmission systems. **[6]**

Part-B

Pumps and pumping stations: Types of pumps and their characteristics and efficiencies; Pump operating curves and selection of pumps; pumping stations. **[4]**

Quality and testing of Water: Impurities in water, sampling of water, physical, chemical and bacteriological water quality parameters, drinking water quality standards and criteria. **[4]**

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 and deflouridation, and water desalination and demineralization, taste and odour removal. **[6]**

Part-C

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. **[6]**

Rural water supply: Principles, selection of source, rain water harvesting, quantitative requirements, low cost treatment techniques. **[6]**

Part-D

Miscellaneous Methods of Water Treatment: Aerial colour, odors & Taster from water, control, removal of iron & manganese from water softening processes, base exchange process, swimming pool water treatment **[8]**

REFERENCES:

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. "Water Supply and Sewerage" by Steel EW and McGhee, Terence J.; McGraw Hill.

DAV UNIVERSITY, JALANDHAR

Course Title: BUILDING MATERIAL AND CONSTRUCTION
Paper Code: CIV207

L	T	P	Credits
3	0	0	3

Course Objective: This course offers a good understanding and study of different materials and material properties in civil engineering.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of various materials used in construction, their properties, uses and type of construction work for which they can be used.

Part-A

Building Stones: General, Uses of stones, natural bed of stones, qualities of a good building stone, deterioration of stones, preservation of stones, artificial stones, common building stones of India and their uses. [4]

Bricks: General, Composition of good brick earth, Harmful ingredients in brick earth, qualities of good bricks, tests for bricks, classification of bricks. [4]

Timber: Definition, classification of trees, structure of a tree, felling of trees, seasoning of timber, storage of timber, market forms of timber. [4]

Part-B

Lime: General, some definitions calcination, Hydraulicity, setting, slacking, sources of lime, classification of limes, uses of lime, tests for limestones. [4]
Cement: Constituents of Cement**,** Manufacture of Portland cement [2]
Concrete : Introduction, Constituents of concrete, Batching of materials, Manufacturing process of cement concrete, workability and factors affecting it, Methods to determine workability, segregation and bleeding of concrete, Strength of concrete and factors affecting it. [4]

Miscellaneous materials: Paints, Distempering, Glass, Plastics [2]

Part-C

Foundation and Walls: Definition, types of foundations, Types of walls and thickness considerations. [4]
Brick and stone masonry: Terms used, Types of bonds & their merits and demerits, rubble and ashlars joints in stone masonry, cement concrete hollow blocks and their advantages and disadvantage. [4]

Damp Proofing: Sources, causes and bad effects of dampness, preventive measures for dampness in buildings. [2]

Part-D

Roofs: Terms used, Classification of roofs and roof trusses, Different roof covering materials**.** [2]
Plastering and pointing: Objects, Methods of plastering, Materials and types, Defects in plastering, special material for plastered surface, Distempering white washing and colour washing**.** [4]
Floors: General, Types of floors used in building & and their suitability, factors for selecting suitable floor for building**.** [2]

REFERENCE:

1. Rangwala – "Building materials"
2. Bindra SP, Arora KR "Building construction"
3. Shetty MS , "Concrete Technology"
4. Punmia BC, "Building construction"
5. Singh, Parbin , "Building materials"
6. Sushil Kumar , "Building Construction"

DAV UNIVERSITY, JALANDHAR

Course Title: STRENGTH OF MATERIALS
Paper Code: CIV209

L	T	P	Credits
3	1	0	3

Course Objective: This course will provide the knowledge of various types' supports, loadings, beams and stresses acting on different kind of structural systems.
Learning Outcomes: After the completion of this course the participants would gain the knowledge various stresses and strains acting on materials, Types of Beams and types of loadings Bending stresses on various types of Beams

Part-A

Simple stresses and strains: Concept of stress and strain: St. Venants principle of stress and strain diagram, Hooke's law, Young's modulus, Poisson ratio, stress at a point, stresses and strains in bars subjected to axial loading, Modulus of elasticity, stress produced in compound bars subject to axial loading, Temperature stress and strain calculations due to applications of axial loads and variation of temperature in single and compound walls. [6]
Compound stresses and strains: Two dimensional system, stress at a point on a plane, principal stresses and principal planes, Mohr's circle of stress, Relationship between elastic constants and strains, ellipse of stress and their applications, Two dimensional stress-strain system, principal strains and principal axis of strain, circle of strain and ellipse of strain. [6]

Part-B

Bending moment and shear force diagrams: Bending moment and shear force diagrams, Shear Force and Bending Moments definitions. BM and SF diagrams for cantilevers, simply supported and fixed beams with or without overhangs and calculation of maximum BM and SF and the point of contra flexure under: Concentrated loads, uniformly distributed loads over the whole span or part of span, combination of concentrated loads (two or three) and uniformly distributed loads, uniformly varying loads, application of moments. [6]
Theory of bending stresses: Assumptions in the simple bending theory, derivation of formula: its application to beams of rectangular, circular and channel sections, composite/fletched beams, bending and shear stresses in composite beams. [6]

Part-C

Torsion: Derivation of torsion equation and its assumptions. Applications of the equation of the hollow and solid circular shafts torsional rigidity, combined torsion and bending of circular shafts principal stress and maximum shear stresses under combined loading of bending and torsion, analysis of close-coiled-helical springs. [6]

Thin cylinders and spheres: Derivation of formulae and calculations of hoop stress longitudinal stress in a cylinder, and sphere subjected to internal pressures increase in Diameter and volume. [4]

Part-D

Columns and struts: Columns under uni-axial load, Buckling of Columns, Slenderness ratio and conditions. Derivations of Euler's formula for elastic buckling load, equivalent length, Rankine Gordon's empirical formula. [4]

Strain energy: Energy of dilation and distortion, resilience stress due to suddenly applied loads, Castigliano's theorem, and Maxwell's theorem of reciprocal deflection. [4]

Theories of Failure: Maximum principal stress theory, maximum shear stress, theory, maximum strain energy theory, maximum shear strain energy theory, graphical representation

and derivation of equation for each and their application to problems relating to two dimensional stress systems only. [2]

REFERENCE:

1. "Strength of Material" by S. Ramamrutham
2. "Mechanics of Materia" : E .Popov
3. "Strength of Material" : Rajput
4. "Strength of Materials" : Sadhu Singh
5. "Strength of materials" by Debabrata Nag and Abhijitchanda, Wiley India publisher

Course Title: Surveying Lab
Paper Code: CIV211

L	T	P	Credits
0	0	3	2

List of experiments:

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

Course Title: Hydraulic Engineering Lab

Paper Code: CIV213

L	T	P	Credits
0	0	2	2

List of experiments:

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 Bernoulii's energy equation.
3. To determine the coefficient of discharge for an obstruction flow meter (venturimeter)
4. To determine the coefficient of discharge for an obstruction flow meter (orifice meter)
5. To determine the discharge coefficient for a Vee notch or rectangular notch.
6. To determine the coefficient of discharge for Broad crested weir**.**
7. To determine the hydraulic coefficients for flow through an orifice.
8. To determine the friction coefficient for pipes of different diameter.
9. To determine the head loss in a pipe line due to sudden expansion / sudden contraction/ bend.
10. To determine the velocity distribution for pipe line flow with a pitot static probe.

REFERENCE:

1. Practical Fluid Mechanics for Engineering Applications (Mechanical Engineering (Marcell Dekker) By John J. Bloomer
2. Fluid Mechanics Practical Manual by S.Sarabjit Singh.

DAV UNIVERSITY, JALANDHAR

Course Title: Strength of Materials Lab
Paper Code: CIV215

L	T	P	Credits
0	0	2	2

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 conditions.
5. Draw load deflection curve for spring in unloading conditions.
6. To determine the hardness of the given material by Rockwell and Brinell hardness testing machine.
7. To determine the fatigue strength of the material.
8. To determine the impact strength by Izod and Charpy test.
9. To determine the load carrying capacity of the leaf spring.
10. To test a mild steel and cast iron specimen in double shear.

DAV UNIVERSITY, JALANDHAR

FOURTH SEMESTER

Course Title: GEOMATIC ENGINEERING
Paper Code: CIV202

L	T	P	Credits
3	0	0	3

Course Objective: Aim of this paper is to familiarize the students with different types of modern techniques in remote sensing.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of various modern remote sensing techniques, Various GIS & GPS systems.

Part-A

Photogrammetry: Introduction of Geometric Engineering, 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. [8]

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. [8]

Part-B

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 – Geo-stationary and sun-synchronous, Earth Resources Satellites, Meteorological satellites, Sensors, Types and their characteristics, Across track and Along track scanning, Applications of Remote Sensing. [10]

Part-C

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. [10]

Part-D

Global Positioning System (GPS): Introduction, Fundamental concepts, GPS system elements and signals, GPS measurements and 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. [10]

REFERENCE:

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 Sensin", 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 and company.
8. Kaplan, E.D., Understanding GPS : "Principles and Application"; Artec House; 2 Edition

DAV UNIVERSITY, JALANDHAR

Course Title: THEORY OF STRUCTURE-1
Paper Code: CIV204

L	T	P	Credits
3	2	0	3

Course Objective: Aim of this paper is to familiarize the students with different types of structures and their analysis methods.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of structural analysis and various types of determinate and indeterminate beams.

Part-A

Introduction: Need of analysis, techniques of structural idealization, basic tools of analysis, reactions in structure, notations and sign conventions, free – body diagrams, static determinacy, stability of structures, principle of superposition, loads on structures. **[6]**

Plane Trusses: Introduction, member arrangement in a truss, stability and determinacy, roof and bridge trusses, analysis of trusses, notations and sign conventions, equations of condition, classification of trusses. **[6]**

Part-B

Deflection of Beams: Introduction, direct integration method, moment – area method, conjugate beam method, Principle of virtual work, unit load method, Betti's law, Maxwell's law, Castigliano's theorem. **[6]**
Rolling Loads Introduction to rolling loads and influence lines, Determination of shear force, bending moment at a section and absolute shear force and bending moment due to single point load, uniformly distributed load, several point loads etc. **[6]**

Part-C

Influence lines: Introduction, moving loads, influence lines, influence lines for reactions, shear force and bending moment, influence lines for beams, girders with floor beams, trusses and arches, absolute maximum B. M. & S. F, Muller Breslau Principle **[6]**

Arches: Introduction, curved beams, arch versus a beam, three hinged arch, moment, shears and normal thrust in three hinged arches **[6]**

Part-D

Cables and Suspension Bridges: Introduction, shape of a loaded cable, cable carrying point loads and UDL, cables with ends at different level, cable subjected to temperature stresses, suspension bridge with two hinged and three hinged stiffening girders, influence lines. **[6]**
Statically determinate space Trusses: Concurrent forces in space, moment of force, constraint of point in space, tension coefficient method, simple space trusses, and method of sections **[6]**

REFERENCES:

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.
6 "Advanced Structural Analysis",Devdas Menon, Alpha Science International Publisher.

DAV UNIVERSITY, JALANDHAR

Course Title: DESIGN OF CONCRETE STRUCTURE-1
Paper Code: CIV206

L	T	P	Credits
3	2	0	3

Course Objective: Aim of this paper is to familiarize the students with Concrete technology and design of various concrete elements like beams, columns etc.
Learning Outcomes: After the completion of this course the participants would gain the knowledge for design of various concrete elements like beams and columns
Note: Use of IS-456 is allowed in the examination.

Part-A

Introduction: Concrete as a Structural material, constituent materials of concrete. Cement, testing of cement: Fineness, consistency, setting times, strength, types of Portland cements, expansive cements, pozzolanas, physical properties of cement. Aggregates, Mechanical properties: Bond, strength, toughness, hardness, physical Properties. Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded aggregate – Maximum aggregate size **[12]**

Part-B

Mix Design: Factors to be considered: water/cement ratio, durability, workability, cement and aggregate content, Design of mix by IS & ACI methods. Physical Properties of Fresh Concrete**:** Workability: factors affecting, methods of determination of workability, Density of fresh concrete. **[8]**

Part-C

Design Elements:

1. Objectives and Methods of Analysis and Design
2. Properties of Concrete and Steel
3. Design Philosophies of Working Stress Method and Limit State Method
4. Limit State of Collapse - Flexure
5. Computation of Parameters of Governing Equations
6. Determination of Neutral Axis Depth and Computation of Moment of Resistance **[14]**

Part-D

Design part

1. Numerical Problems on Singly Reinforced Rectangular Beams
2. Doubly Reinforced Beams – Theory and Problems
3. Flanged Beams – Theory and Numerical Problems
4. Shear, Bond, Anchorage, Development Length and Torsion
5. Reinforced Concrete Slabs: One and Two way Slabs
6. Analysis and design of members subjected to axial loading. **[12]**

REFERENCES:

1. "Concrete Technology", by M.S.Shetty. – S.Chand& Co.;
2. "Concrete Technology", by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi
3. "Concrete Technology", by A.R. Santha Kumar, Oxford university Press, New Delhi
4. "Advanced Design of Structures", N. Krishna Raju
5. "Limit State Design", Ramachandra
6. "Limit State Design", A.K. Jain
7. "Limit State Design of Reinforced Concrete" P.C. Vergese
8. "Reinforced concrete design" Pillai & Mamenon, Tata Mcgraw hills.

DAV UNIVERSITY, JALANDHAR

Course Title: Hydraulics Engineering-2
Paper Code: CIV208

L	T	P	Credits
3	2	0	3

Course Objective: Aim of this paper is to familiarize the students with different types of flows, channels and their properties in fluid flow.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of types of flows and the various channels through which water flows.

Part-A

Laminar Flow: Navier-stokes equations in Cartesian coordinates (no derivation), meaning of terms, Flow through circular section pipe, flow between parallel plates, stokes law. Flow through porous media. Transition from laminar to turbulent, Critical velocity and critical Reynolds Number [6]

Turbulent Flow: Turbulent flows and flow losses in pipes, Darcy equation minor head losses in pipe fittings, hydraulic and energy gradient lines.Definitionofturbulence, scale and intensity, Effects of turbulent flow in pipes. Equation for velocity distribution in smooth and rough pipes (no derivation). Resistance diagram. [6]

Part-B

Boundary Layer Analysis: Assumption and concept of boundary layer theory. Boundary-layer thickness, displacement, momentum & energy thickness, laminar and turbulent boundary layers on a flat plate; laminar sub-layer, smooth and rough boundaries. Local and average friction coefficients. Separation and Control. [8]

Part-C

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. [4]

Energy and Momentum 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. [6]

Part-D

Gradually varied Flow: Different Equation of water surface profile; limitation, properties and classification of water and surface profiles with examples, computation of water surface profile by graphical, numerical and analytical approaches. [6]

Hydraulic Jump and Surges: Theory of Jump, Elements of jump in a rectangular Channel, length and height of jump, location of jump, Energy dissipation and other uses, Positive and negative surges [6]

REFERENCES:

1. "Hydraulics & Fluid Mechanics", by P.N.Modi and S.M.Seth; Standard Publication
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.

DAV UNIVERSITY, JALANDHAR

Course Title: ENGINEERING GEOLOGY
Paper Code: CIV210

L	T	P	Credits
3	0	0	3

Course Objective: Aim of this paper is to familiarize the students with different type's rocks and the origin of these rocks.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of various types of geological rocks their origin and uses in civil engineering.

Part-A

General Geology: Divisions of geology, Importance of Engineering Geology versus geology applied to Civil Engineering practices. Weathering, definition types and effect. Geological works of rivers, wind, glaciers as agents of erosion, transportation and deposition, resulting features and engineering importance. [4]

Rocks and Minerals: Minerals, their identification and physical properties of minerals, igneous, sedimentary and metamorphic rocks, their formation and structures. Classification of rocks for engineering purpose. Rock quality designation (RQD). [4]

Structural Geology: Brief idea about stratification, apparent dip, true dip, strike andun-conformities. [2]

Part-B

Folds: Definition, parts of a fold, classification, causes relation to engineering operations. **[2]**

Faults: Definition, parts of a fault, classification cause relation to engineering purposes. [2]

Joints: Definition, attitude, joint set, joint systems, classification in relation to engineering operations. [2]

Engineering Geology: Geological considerations in the Engineering Projects like tunnelshighways, foundations, dams, and reservoirs. [2]

Earthquake. Definition, terminology, earthquake waves, intensity, recording of earthquake, seismic zones in India, factors to be considered and methods in earthquake proof construction. [4]

Part-C

Earth movements: Landslides and land subsidence, elementary idea about classifications, factors causing landslides and land subsidence, preventive measures like relating walls, slope treatment, chemical stabilization and drainage control. [6]

Engineering Properties of Rocks and Laboratory Measurement: Uniaxial compression tests,tensile tests, permeability test, shear tests, effect of size and shape of specimen and rate of testing. Confining pressure, stress strain curves of typical rocks. Strength of intact and fissured rocks, effect of anisotropy, influence of effect of pore fluid type instauration and temperature. [6]

Part-D

In-situ determination of Engineering Properties of Rock Masses: Necessity of in-situ test, uniaxial load tests in tunnels and open excavation, cable tests, flat jack test, shear test, pressure tunnel test. Simple methods of determining in-situ stresses bore hole over coring technique-bore hole deformation gauges. [6]

Improvement in Properties of Rock Masses: Pressure grouting for dams and tunnels, rock reinforcement, rock bolting. [6]

REFERENCES:

1. Goodman R E "Introduction to Rock Mechanics", John Wiley & Sons, New York, 1989
2. Jaguer J C and Cook N G W "Foundational of Rock Mechanics" 3rd ed., Chapman & Hall London, 1979
3. Lama R D and Vutukuri V S with Saluja S S "Handbook on Mechanical Properties of Rocks" Vols. I to IV, Trans Tech Publications, Rockport, MA.
4. Arora D S "A Text Book of Geology", Mahindra Capital Publishers, Chandigarh, 1988
5. Singh P "Engineering and General Geology" S. K. Kataria and Sons, New Delhi, 1992
6. BP Verma "Rock Mechanics for Engineers", Khanna Publishers.

DAV UNIVERSITY, JALANDHAR

Course Title: CONSTRUCTION MACHINERY AND WORKS MANAGEMENT
Paper Code: CIV212

L	T	P	Credits
3	0	0	3

Course Objective: Aim of this paper is to familiarize the students with different types of machinery elements used in projects and techniques to handle civil engineering projects.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of various types of construction machinery and various methods like PERT and CPM to handle a project.

Part-A

Construction- Unique features of construction, construction project, types and features, phases of a project, agencies involved and their methods of execution. [4]

Construction project planning- Stages of project planning: pre-tender planning, Pre-construction planning, detailed construction planning, role of client and contractor, level of detail. Process of development of plans and schedules, work break-down structure, activity lists, assessment of work content, estimating durations, sequence of activities, activity utility data. [8]

Part-B

Techniques of planning- Bar charts, Networks: basic terminology, types of precedence relationships: finish to start, start to start, finish to finish, start to finish, preparation of CPM networks, activity on link and activity on node representation, analysis of single relationship (finish to start) networks, computation of float values, critical and semi critical paths, calendaring networks. [8]

Resource Scheduling- Bar chart, line of balance technique, resource constraints and conflicts, resource aggregation, allocation, smoothening and levelling. [4]

Part-C

PERT- Assumptions underlying PERT analysis, determining three time estimates, analysis, slack computations, calculation of probability of completion. [4]

Planning and organizing construction site and resources- Site: site layout, developing site organization, record keeping at site, Manpower: planning, organizing, staffing, motivation, Materials: concepts of planning, procurement and inventory control, [4]

Equipment: basic concepts of planning and organizing, Funds: cash flow, sources of funds. Construction costs- Classification of costs, time cost trade-off in construction projects, compression and decompression [4]

Part-D

Monitoring & control-Supervision, record keeping, periodic progress reports, periodical progress meetings. Updating of plans: purpose, frequency and methods of updating. Common causes of time and cost overruns and corrective measures. Quality control: concept of quality, quality of constructed structure, use of manuals and checklists for quality control, role of inspection, basics of statistical quality control. Safety and health on project sites: accidents; their causes and effects, costs of accidents, occupational health problems in construction, organizing for safety and health. [10]

REFERENCE:

1. Barrie D.S. & Paulson B C, "Professional Construction Management", McGraw Hill
2. Chitkara K K, "Construction Project Management", Tata McGraw Hill
3. P K Joy, "Handbook of Construction Management".
4. King & Hudson, "Construction Hazard and Safety Handbook", Butterworth's
5. Antill J M &Woodhead R W, "Critical Path Methods in Construction Practice", Wiley

DAV UNIVERSITY, JALANDHAR

Course Title: DESIGN OF CONCRETE STRUCTURE-1 LAB
Paper Code: CIV214

L	T	P	Credits
0	0	2	2

List of experiments:

1. To Determine the Specific Gravity of cement
2. To Determine the Soundness of cement.
3. To Determine the Standard Consistency, Initial and Final Setting Times of Cement and Compressive Strength of Cement.
4. To Determine the Fineness Modulus, Bulk Density.
5. To determine water Absorption and Specific gravity of Fine and Coarse Aggregates.
6. To Determine the Slump, Compaction Factor and Vee-Bee Time of Concrete.
7. Mix Design of Concrete by IS methods
8. To Determine the Compressive Strength of Concrete by Cube and Cylinder.
9. To carry out the Split Tensile and Flexural strength of Concrete.
10. Compressive strength of Brick and Tile as IS standard

Books/Manuals :-

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

Course Title: THEORY OF STRUCTURE-1 LAB

Paper Code: CIV216

L	T	P	Credits
0	0	2	2

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 behavior of columns and struts with different end conditions.
7. Experiment on three-hinged arch and experiment on two-hinged arch.
8. Deflection of a statically determinate pin jointed truss.
9. Forces in members of redundant frames.
10. Experiment on curved beams and unsymmetrical bending of a cantilever beam.

REFERENCE:

A Laboratory Manual on Structural Mechanics by Dr. Harwinder Songh; New Academic Publishing Comp. Ltd.

Course Title: SEMINAR

Paper Code: CIV218

L	T	P	Credits
0	0	2	2

The seminar is based on research oriented topic. The evaluation is based upon the contents of topic and the presentation.

DAV UNIVERSITY, JALANDHAR

FIFTH SEMESTER

Course Title: DESIGN OF STEEL STRUCTURE-1
Paper Code: CIV301

L	T	P	Credits
3	1	0	3

Course Objective: Aim of this paper is to familiarize the students with design of different steel structural elements like compression members and tension members.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of various types of steel elements like Tension member, compression member and flexural member.

Note: Use of IS-800 is allowed in the examination.

Part-A

Riveted & Welded Joints: Rivets and riveting, stresses in rivets, strength & failure of riveted joints. Riveted joints in framed structures. Types of welds & welded joints, stresses in welds, design of welds, eccentrically loaded welded joints [6]

Tension Members: Types of tension members, net & gross areas, permissible stresses. Design of members subjected to axial loads, combined bending moments & axial loads, lug angles. Tension Splice [6]

Part -B

Compression Members: Failure modes of columns, end conditions & effective length of columns, various empirical formulae. IS code formula, General codal provisions for design of compression members? Built up compression members, lacing and battening of compression members, splicing of compression members. [10]

Part-C

Column Bases and Foundations: Types of column bases, design of slab base, Gusseted base& grillage foundations. [8]

Design of Flexural Members: Failure modes permissible stresses, design of laterally supported and unsupported beams web crippling, web budding etc., compound beams. [8]

Part-D

Design of plate Girders: Components of a plate girder, basic design assumptions, stiffeners in plate girders, design of various components of a welded and riveted plate girder. [8]

Roof Trusses: Types of roof trusses loads on roof trusses, calculation of forces due to combination of different loads. Design of members and joints. [6]

REFERENCES:

1. Chandra R "Design of Steel Structures" Standard Publishing House, 1999.
2. Limit state design of steel structures: S K Duggal, McGraw
3. Raghupathi M "Design of Steel Structures" Tata McGraw-Hill, New Delhi,1998.
4. Arya A S and Ajmani J L "Design of Steel Structures" Nem Chand Bros. Roorkee,2000.
5. Kazimi S M A and Jindal R S "Design of Steel Structures" Prentice Hall of India, New Delhi,1999.
6. Dayaratnam P "Design of Steel Structures" Wheeler Publishers, New Delhi,1999.
7. L.S Negi, "Design of steel structure", Tata McGraw-Hill, New Delhi

DAV UNIVERSITY, JALANDHAR

Course Title: THEORY OF STRUCTURE-2
Paper Code: CIV303

L	T	P	Credits
3	2	0	3

Course Objective: Aim of this paper is to familiarize the students with different methods used in analysis of indeterminate structures.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of various types of methods used to analyse indeterminate structures.

Part-A

Statically Indeterminate Beams and Frames: Introduction, types of supports-reaction components, external redundancy, statically indeterminate beams and frames, degree of redundancy [6]
Fixed and Continuous Beams: Bending moment diagrams for fixed beams with different loadings, effect of sinking of supports, degree of fixity at supports, advantages and disadvantages of fixed beams, continuous beams, various cases of load and geometry of continuous beams. [4]

Part-B

Classical Methods: Methods of consistent deformation; Theorem of three moments. [4]
Slope Deflection Method: Fundamental equations, Applications to continuous beams and portal frames, side sway in portal frames. [4]
Moment Distribution Method: Basic propositions, stiffness of a member, distribution theorem, carry-over theorem, relative stiffness, distribution factors, applications to continuous beams, portal frames with and without side sway, analysis of multi-storeyed frames, method of substitute frame. [4]

Part-C

Rotation Contribution method: Basic concepts, rotation factor, and application to continuous beams, portal frames and multi-storeyed frames, story shear. [4]

Approximate methods of Structural Analysis: Portal method, Cantilever Method, substitute Frame Method. [4]

Strain Energy: General principles, strain energy due to axial loading and bending, law of reciprocal deflections, Castigliano's first theorem, beam deflections using Castigliano's first theorem, minimum strain energy, Castigliano's second theorem, analysis of statically indeterminate beams and portal frames. [4]

Part-D

Redundant Frames: Order of redundancy, frames with one and two redundant members. Stresses due to lack of fit, the trussed beam, portal frames. [6]
Influence lines for indeterminate Structures: Muller Breslau Principle, Influence lines for shear force, bending moment and reactions in continuous beams, balanced cantilevers and rigid Frames. [4]

REFERENCE:

1. Reddy C S "Basic Structural Analysis" Tata McGraw Hill, New Delhi, 2003.
2. Wang C K "Intermediate Structural Analysis" McGraw Hill, 1998.
3. Punmia B C "Theory of Structures" Luxmi Publications, New Delhi, 1996.
4. Sinha N C "Advanced Theory of Structures" DhanpatRai Publications, New Delhi, 2000.
5. Ramamrutham S and Narayan R "Theory of Structures:" DhanpatRai& Sons, New Delhi, 1996.

6. "Advanced Structural Analysis",Devdas Menon, Alpha Science International Publisher.

Course Title: GEO-TECHNICAL ENGINEERING
Paper Code: CIV305

L	T	P	Credits
3	2	0	3

Course Objective: Aim of this paper is to familiarize the students with concept of soil and its index properties.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of various types of foundations used in different civil engineering projects and various methods of soil testing.

Part-A

Basic Concepts: Definition of soil and soil mechanics common soil problem in Civil Engineering field. Principal types of soils. Important properties of very fine soil i. e. adsorbed water, Base Exchange and soil structure. Characteristics of main clay mineral groups. Basic definitions in soil mechanics. Weight volume relationship physical properties of soils. [8]

Index Properties: Determination of Index properties, classification of coarse grained soils and fine grained soils. [4]

Part-B

Permeability and seepage: Concept of effective stress principle. 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 and its determination average permeability of striated soil mass Factors affecting 'K' and brief discussion. [6]

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. Field comp active effort. Field control of compaction by proctor needle. [8]

Part-C

Consolidation: Definition and object of consolidation difference between compaction and consolidation. Concept of various consolidation characteristics i.e. a_v, m_v and C_v primary and secondary consolidation. Terzaghi's method for one-dimensional consolidation. Consolidation test. Determination of C_v from curve fitting methods. Normally consolidated and over consolidated clays importance of consolidation settlement in the design of structures. [10]

Part-D

ShearStrength: Stress analysis of a two - dimensional stress system by Mohr circle. Concept of pole. Coulomb's law of shear strength Coulomb - Mohr strength theory. Relations between principle stresses at failure Shear strength tests. Derivation of skempton's pore pressure parameters. Stress strain and volume change characteristics of sands. [6]

Stability of Slopes: slope failure, base failure and toe failure - Swedish circle method - $\varphi=0$ Analysis and c=0 analysis - friction circle method - Taylor's stability number - stability charts - sliding block analysis [6]

REFERENCE:

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.DasCengage Publisher
5. "Basic and applied Soil Mechanics", by GopalRanjan and A.S.R.Rao New Age International Publishers

DAV UNIVERSITY, JALANDHAR

Course Title: TRANSPORTATION ENGINEERING
Paper Code: CIV307

L	T	P	Credits
3	1	0	3

Course Objective: Aim of this paper is to familiarize the students with highway planning and its maintenance.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of highway geometric design and various materials used in highway construction.

Part-A

Introduction: Importance and role of transportation systems; different modes of transportation, historical development of road construction, Highway Economics. [6]

Highway Planning & Project Preparation: Planning surveys, Highway alignment, Highway Location surveys, soil and material surveys, Highway Projects: drawing and report. [6]

Part-B

Highway Geometric Design: cross-sectional elements, camber, sight distance-definition analysis of stopping sight and passing sight distances, passing zones. Design of horizontal alignment-super elevation. Extra widening on curves, transition curves. Design of vertical alignment, gradients, types of vertical curves & their design [6]

Highway materials and construction: Desirable properties of soil, Road aggregates, bitumen, cement & cement concrete as highway materials. Various types of roads & their construction-earth roads, gravel roads, W.B.M., bituminous, surface treatment, penetration macadam, premix carpet, bituminous concrete, sheet asphalt and quality control during construction. **[6]**

Part-C

Highway Drainage and Maintenance: Importance of drainage and maintenance, Surface Drainage and Subsoil Drainage, Construction in Water-logged areas, Pavement Failures, Pavement Evaluation, Maintenance and Strengthening Measures. [6]

Pavement Design: Design of flexible and rigid Pavements. [6]

Part-D

Elementary Traffic Engineering-Traffic Engineering studies (speed, volume, O & D, parking and accident studies), traffic signs, traffic signals, road markings, road intersection, highway lighting. [8]

REFERENCE:

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.

DAV UNIVERSITY, JALANDHAR

Course Title: IRRIGATION ENGINEERING-1
Paper Code: CIV309

L	T	P	Credits
3	0	0	3

Course Objective: This course offers a good understanding of irrigation methods used and maintenance of different irrigation channels.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of various methods of irrigation and types of losses in various irrigation channels.

Part-A

INTRODUCTION: Importance of Irrigation Engineering, purposes of Irrigation, objectives of Irrigation, Benefits of Irrigation, Advantages of various techniques of irrigation-- Furrow Irrigation, Boarder strip Irrigation, Basin Irrigation, Sprinkler Irrigation , Drip Irrigation.

[6]

METHODS OF IRRIGATION: Advantages and disadvantages of irrigation, water requirements of crops, factors affecting water requirement, consumptive use of water, water depth or delta , Duty of water, Base Period, relation between delta, duty and base period, Soil crop relation-ship and soil fertility. [6]

Part-B

CANAL IRRIGATION: Classifications of canals, canal alignment, Inundation canals, Bandhara irrigation, advantages and disadvantages, Silt theories-Kennedy's theory, Lacey's theory, Drawbacks in Kennedy's & Lacey's theories, comparison of Lacey's and Kennedy's theories, Design of unlined canals based on Kennedy & Lacey's theories. [6]

LINED CANALS: Types of lining, selection of type of lining, Economics of lining, maintenance of lined canals, silt removal, strengthening of channel banks, measurement of discharge in channels, design of lined canals, methods of providing drainage behind lining. [6]

Part-C

LOSSES IN CANALS, WATER LOGGING AND DRAINAGE: Losses in canals- Evaporation and seepage, water logging, causes and ill effects of water logging anti water logging measures. Drainage of land, classification of drains - surface and subsurface drains Design considerations for surface drains, Advantages and maintenance of tile drains.

[6]

INVESTIGATION AND PREPARATION OF IRRIGATION PROJECTS: Classification of project, Project preparation-investigations, Design of works and drawings, concept of multi - purpose projects, Major, Medium and miner projects, planning of an irrigation project, Economics & financing of irrigation works. Documentation of project report. [6]

Part-D

TUBE - WELL IRRIGATION: Types of tube wells - strainer type, cavity type and slotted type. Type of strainers, Aquifer, porosity, uniformity coefficient, specific yield & specific retention, coefficients of permeability, transmissibility and storage. Yield or discharge of a tube well, Assumptions, Theim's & Dupuit's formulae, Limitations of Theim's and Dupuit's formulae. Interference of tube wells with canal or adjoining tube-wells, causes of failure of tube wells, optimum capacity, Duty and delta of a tube well. Rehabilitation of tube well.

[8]

RIVER TRAINING WORKS: Objectives, classification of river-training works, Designof Guide Banks. Groynes or spurs - Their design and classification ISI. Recommendations of Approach embankments and afflux embankments, pitched Islands, Natural cut-offs and Artificial cut-offs and design Considerations. [4]

REFERENCES:

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", S.R.Sahasrabudhe; S. K. Kataria& Sons
5. "Irrigation Engg. & Hydraulic Structure", Varshney, Gupta & Gupta; Nem Chand and Brothers
6. "Irrigation Engg. & Hydraulic Structure", Santosh Kumar Garg; Khanna Publishers

DAV UNIVERSITY, JALANDHAR

Course Title: ESTIMATION & COSTING
Paper Code: CIV311

L	T	P	Credits
3	0	0	3

Course Objective: This course should provide the students with good understanding of various types of quantity and quality analysis of civil engineering projects.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of calculation of materials required for different projects.

Part-A

Estimates: Types, complete set of estimate, working drawings, site plan, layout plan, index plan, plinth area administrative approval and Technical Sanction. [4]

1. Estimate of buildings
2. Estimate of R. C.C. works
3. Estimate of sloped roof and steel structures
4. Estimate of water supply and sanitary works
5. Estimates of roads (a) Earthwork (b) Bridges and culverts c) Pavement
6. Estimate of Irrigation works. [6]

Part-B

Analysis of Rates: For earthwork, concrete works, D. P. C., Brickwork, stone masonry, plastering, pointing, road work, carriage of materials. [6]

Specifications- For different classes of building and Civil engineering works [6]

Part-C

Contracts: Types of contracts, tender, tender notice, tender form, submission and opening of tender, earnest money, security money, measurement book, muster roll, piecework agreement and work order [8]

Part-D

Accounts: Division of accounts, cash, receipts of money, cashbook, temporary advance, imprest and accounting procedure. [4]

Arbitration: Arbitration, arbitrator, and arbitration act, powers of arbitrator, arbitration awards. [4]

REFERENCES:

1. "Estimating and Costing", by B.N. Datta, 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.

DAV UNIVERSITY, JALANDHAR

Course Title: GEO-TECHNICAL ENGINEERING LAB
Paper Code: CIV313

L	T	P	Credits
0	0	2	2

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 pyconometer method.
4. Grain size analysis of sand and determination of uniformity coefficient (Cu) and coefficient of curvature (Cc).
5. Compaction test of soil and Determination of Relative Density of soil.
6. Determination of permeability by Constant Head Method.
7. Determination of permeability by Variable Head method.
8. Unconfined Compression Test for fine grained soil.
9. Direct Shear Test
10. Triaxial Test and Swell Pressure Test

Books Recommended:-

Soil Testing Engineering, Manual By Shamsher Prakash and P.K. Jain. Nem Chand & Brother

DAV UNIVERSITY, JALANDHAR

Course Title: TRANSPORTATION ENGINEERING LAB
Paper Code: CIV315

L	T	P	Credits
0	0	2	2

List of Experiments

1. Aggregate crushing value test and Impact value test.
2. Abrasion test (Dorry's & Los Angeles)
3. Soundness test and Flakiness test.
4. Water absorption & specific gravity test
5. Laboratory C. B. R. test.
6. Penetration test on bitumen and Softening point test for bitumen
7. Ductility test.
8. Specific gravity Test.
9. Viscosity test.
10. Marshall Stability test.

Course Title: COMPUTER AIDED STEEL DRAWING
Paper Code: CIV317

L	T	P	Credits
0	0	2	2

List of Experiments
1) Detailed working drawings for Industrial buildings, Steel Foot Bridge & Trough Type Railway Bridge
2) Structural Drawings of Steel Elements such as Connections, Tension Members, Compression
Members, Beams, Column Base, and Roof Trusses.
Using Auto Cad***

SURVEY CAMP
Code: CIV319

L	T	P	Credits
0	0	0	2

List of Experiments
Survey Camp of 4 weeks duration will be held immediately after IVth semester at a Hilly Terrain. The students are required to prepare the Topographical Map of the area by traditional method. Students should also be exposed to modern Survey Equipment and practices, like Total Station, Automatic Level, GPS etc.

DAV UNIVERSITY, JALANDHAR

SIXTH SEMESTER

Course Title: DESIGN OF CONCRETE STRUCTURE-2
Paper Code: CIV302

L	T	P	Credits
4	1	0	4

Course Objective: This course should provide the students with good understanding of various types of concrete members and their design

Learning Outcomes: After the completion of this course the participants would gain the knowledge of various steps in design procedure of concrete structures like stairs and beams.

Note: Indian Codes (IS 456) of Practice and Design handbooks are permitted in examination.

Part-A

Stairs: Types and Design of Stairs [6]

RCC Footings - Theory and Design: Isolated Footing (Square, Rectangular), Combined Footing (Rectangular, Trapezoidal, Strap), Raft Footing [6]

Part-B

Compression Members: 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 [8]

Part-C

Continuous beams and curved beam Design of semi-circular beams supported on three supports. Design of circular beam supported on symmetrically placed columns. [8]

Part-D

Domes. Introduction to different types of domes and shells. Design of spherical and conical domes. Design of cylindrical shells supported on edge beams [8]

Retaining walls: Cantilever type retaining wall, Counter fort type retaining wall. [8]
Water Tanks: Introduction to water retaining structures. Design of circular and rectangular overhead water tanks. [6]

REFERENCES:

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.
4. Syal I.C "Behaviour, Analysis and Design of Reinforced Concrete structural Elements" S. Chand & company, New Delhi, 2003.
5. James, G. Mac Gregor,"Reinforced Concrete- Mechanics and Design", Prentice Hall, N.J., New York, 1997.

DAV UNIVERSITY, JALANDHAR

Course Title: FOUNDATION ENGINEERING
Paper Code: CIV304

L	T	P	Credits
3	1	0	3

Course Objective: This course should provide the students with soil investigation and different types of foundations used in civil projects.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of design of different types of foundations used in civil engineering projects.

Part-A

Soil Investigation: Object 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 samples, Stationery piston sampler, Rotary sampler, Geophysical exploration by seismic and resistivity methods. Bore Hole log for S.P.T. [8]

Part-B

Earth Pressure: Terms and symbols used for a retaining wall. Movement of wall and the lateral **e**arth pressure. Rankine's and Coulomb's theory for lateral earth pressure. Culmann's graphical construction and Rebhan's graphical construction. [6]

Stress Distribution: Boussinesq's equation for a point load, uniformly loaded circular and rectangular area, pressure distribution diagrams. New marks chart and its construction. Two-to one method of load distribution. Comparison of Bossinesq and Westerguard analysis for a point load. Limitations of elastic formula. [4]

Part-C

Shallow Foundation: Types of shallow foundations, definitions Terzaghis analysis. Type's offailures. Factors affecting bearing capacity. Skemptions equation. B. I. S. recommendations for shape, depth and inclination factors. Plate Load Test and Standard Penetration Test. Contact pressure distribution. Causes of settlement of structures comparison of immediate and consolidation settlement Calculation of settlement by plate load test and Static Cone Penetration Test data. Allowable settlement of various structures according to IS Code. Situation most suitable for provision of rafts. Proportioning of rafts in sand and clays. Various methods of designing raft. Floating foundation. [10]

Part-D

Pile Foundation: 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. Pile Load Test, separation of skin friction and point resistance using cyclic pile load test data. Related Numerical problems. Determination of point resistance and frictional resistance of a single pile by static formula. 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. Settlement of pile groups in clay and sand Negative skin friction. [4]

Caissons and wells: Major area of use of caissons Advantages and disadvantages of open boxand pneumatic caissons. Essential part of a pneumatic caisson. Components of a well. Calculation of allowable bearing pressure. Conditions for stability of a well. Terzaghi's

analysis for Lateral stability of a well, embedded in sand. Forces acting on a well foundation. Computation of scour depth, Tilts & Shifts. [4]

Machine Foundations: Introduction of machine foundation, Types of machine foundation, IS method of design of machine. [4]

REFERENCES:

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

DAV UNIVERSITY, JALANDHAR

Course Title: ENVIRONMENTAL ENGINEERING-2
Paper Code: CIV306

L	T	P	Credits
3	1	0	3

Course Objective: This course should provide the students with good understanding of various types of sewers and drainage types
Learning Outcomes: After the completion of this course the participants would gain the knowledge of characteristics and types of sewage treatment of sewage.

Part-A

Introduction: Terms & definitions, systems of sanitation and their merits and demerits, system of sewerage, choice of sewerage system and suitability to Indian conditions. Design & planning of a sewage system. [6]

Design of Sewers: Quantity of sanitary and storm sewage flow, forms of sewers, conditions of flow in sewers, sewers of equivalent section, self-cleansing and limiting velocity, hydraulic formulas for flow of sewerage in sewers and their design. [6]

Part-B

Construction & Maintenance of Sewers: Sewer appurtenances, Materials for sewers, laying of sewers, joints in sewers, testing of sewers pipes, Maintenance operations and precaution before entering a sewer. Excavating Trenches. [6]
House Drainage: Principles of house drainage, traps, Inspection chamber Indian and European type W. C., Flushing Cisterns soil waste and anti-siphon age pipes, plumbing systems. [6]

Part-C

Characteristics & Testing of Sewage: Composition of sewage, sampling, physical & chemical analysis of sewerage, biological decomposition of sewage, kinetics of organic waste stabilization. Populating equivalent & relative stability. [6]

Treatment of Sewage: Unit processes of waste water treatment, screens, grit chambers, detritus tank, skimming tank, grease traps, sedimentation, chemical treatment, aerobic biological treatment, trickling filter (LRTF & HRTF), activated sludge processes, anaerobic treatment, units-sludge digesters and biogas plants. [6]

Part-D

Low cost waste water treatment units: Oxidations Ponds, Lagoons, ditches, septic tanks and imhoff tanks, theory, design, advantages & disadvantages. [6]

Sewage Disposal: Dilution, self-purification of streams, oxygen deficiency of polluted streams, oxygen sag serve, de-oxygenation and deoxy- genation. Dilution in seawater, disposal by land treatment. Effluent irrigation and sewage farming. Sickness and its preventive measures. [4]

REFERENCES:

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.

DAV UNIVERSITY, JALANDHAR

Course Title: NUMERICAL METHODS IN CIVIL ENGINEERING
Paper Code: CIV308

L	T	P	Credits
4	0	0	4

Course Objective: This course should provide the students with good understanding of various techniques in civil engineering.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of various techniques in structural analysis in civil engineering

Part-A

Equation: Roots of algebraic transcendental equation, Solution of linear simultaneous equations by different methods using Elimination, Iteration, Inversion, Gauss-Jordan and method. Homogeneous and Eigen Value problem, nonlinear equations, Interpolation. [14]

Part-B

Finite Difference Technique: Initial and Boundary value problems of ordinary and partial differential equations, Solution of Various types of plates and other civil engineering related problems [10]
New Marks Methods: Solution of determinate and indeterminate structures using New marks Procedure (Beam) [4]

Part-C

Statistical Methods: Method of correlation and Regression analysis for fitting a polynomial equation by least square [6]
Initial Value problem: Galerkin's method of least square, Initial Value problem by collocation points, Rungekutta Method [8]

Part-D

New Marks Method: Implicit and explicit solution, solution for nonlinear problems and convergence criteria [12]

REFERENCES:

1. Numerical Mathematical Analysis: James B. Scarborough Oxford and IBH Publishing, 1955.
2. Introductory Methods of Numerical Analysis: S.S. Sastry, PHI Learning (2012).
3. Introduction to Computer Programming and Numerical Methods by XundongJia and Shu Liu, Dubuque, Iowa: Kendall/Hunt Publishing Co.
4. Numerical Methods, J.B Dixit , USP (Laxmi publication),

DAV UNIVERSITY, JALANDHAR

DEPARTMENTAL ELECTIVE-I

Course Title: ELEMENTS OF REMOTE SENSING, GIS AND GPS
Paper Code: CIV316

L	T	P	Credits
3	1	0	3

Course Objective: This course should provide the students with good understanding of various techniques and elements in in positioning systems.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of various remote sensing techniques.

Part-A

Basic concepts of GIS- Information systems, spatial and non-spatial information, geographical concepts and terminology, advantages of GIS, basic components of GIS, commercially available GIS hardware and software, organization of data in GIS. [10]

Part-B

GIS data- Field data, statistical data, Maps, aerial photographs, satellite data, points, lines and areas features, vector and raster data, advantages and disadvantages, data entry through keyboard, digitizers and scanners, digital data, pre-processing of data rectification and registration, interpolation techniques. [12]

Part-C

Data management- DBMS, various data models, run-length encoding, quadtrees, and data analysis-data layers, analysis of spatial and non-spatial data, data overlay and modeling, data processing: raster based and vector based, data presentation –hardcopy devices, softcopy devices. [12]

Part-D

Remote sensing and GIS integration- Principles of electromagnetic remote sensing, imaging characteristics of remote sensing systems, extraction of metric and descriptive information from remotely sensed images, integration of remote sensing and GIS. [8]

Applications of GIS- Map revision, land use, agriculture, forestry, archaeology, municipal geology, water resources, soil erosion, land suitability analysis, change detection [6]

REFERENCES:

1. Lo C P, Yeung A K W, Concepts and Techniques of Geographic Information Systems, Prentice Hall. India.
2. Kang-tsung Chang, Introduction to Geographic Information Systems, Tata McGraw Hill

DAV UNIVERSITY, JALANDHAR

Course Title: ARCHITECTURE AND TOWN PLANNING
Paper Code: CIV318

L	T	P	Credits
3	1	0	3

Course Objective: This course should provide the students with good understanding of various techniques in planning of any residential and industrial areas.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of various steps involved in planning of town and its drawings.

Part-A

Elements of Design: Line direction. Shape, size, texture, value and colour, balance, scale and proportion. [6]

Principles of Design: Repetition, gradation, harmony, contrast and unity, creation of 2 D and 3Dcompositions. [4]

The Industrial Revolution: The age of revivals, the emergence of engineer, new materials and techniques and the evolution of balloon frame and steel frame. [4]

Part-B

Origin of Modern Architecture: definition and concept of modern architecture, various pioneersof modern architecture. [4]

Town Planning: Definition and meaning, age of planning, scope and motives of planning, briefhistory of town planning – its origin and growth, historically development of town planning in ancient valley civilizations. Indus Nile Tigris and Euphrates, Greek Roman, Medieval and Renaissance town planning [8]

Part-C

New Concepts: Garden city movement, Linear city and concentric city concepts, Neighborhood and Radburm, La-cite industrille, Radiant city to present day planning. [4]

Planning Principles: Types of town and their functions, types of town planning – Grid Iron,Radial, Spider webs, Irregular and Mixed, their advantages and disadvantages. [6]

Part-D

Planning Practice and Techniques: Zoning – its definition, procedure and districts, height and bulk zoning, F. A. R., Master Plan – Meaning, preparation and realization, the scope of city planning – city rehabilitation and slum clearance. [10]

REFERENCES:

1. Cherry, Gordon,"Urban Planning Problems",Board Hill, London,1974.
2. Sundaram,K.V.,"Urban and Regional Planning in India" Vikas Publishing house(P) Ltd.,New Delhi,2000.
3. Gallion A B.,Eisner S., "The Urban Pattern" Van Nostrandreinhold,New York,1993.
4. Jon Lang,"A concise history of Modern Architecture in India",Permanent Black Publishers,New York,1998.
5. Taurus Parke,"A City with view Florence", I.B.Taurus Publishers, New York, 1994.

DAV UNIVERSITY, JALANDHAR

Course Title: THEORY OF STRUCTURE-3
Paper Code: CIV-320

L	T	P	Credits
3	1	0	3

Course Objective: This course should provide the students with good understanding of matrix methods used to analyse indeterminate structures.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of Flexibility and stiffness methods of structural analysis.

Part-A

Review of Determinants and Matrices: Introduction, summation convention, determinants and their properties, Cramer's rule, matrices and their properties, solution of non-homogeneous equations by matrix methods, differentiation and integration of a matrix. [8]

Part-B

Flexibility method of Analysis: Introduction, method of consistent deformation, application to pinjointed frames, effect of temperature and pre-strain, displacements and forces in members of indeterminate structures, flexibility matrix of a plane member. [12]

Part-C

Stiffness Method of Analysis: Introduction, relation between slope deflection method and stiffnessmethod, choice between flexibility and stiffness method, stiffness method for members with relative displacement of supports, analysis of indeterminate structures, analysis of pin-Jointed frames. [12]

Part-D

Computer Applications: Matrix structural analysis using spreadsheets, MS Excel Matrix Commands, MS Excel procedure for stiffness method of analysis, analysis of single span beams, continuous beams, plane trusses and plane frames. [10]

REFERENCES:

1. Gere W and Weaver J M "Matrix Analysis of Structures" CBS Publishers, New Delhi, 1986.
2. Kanchi M B "Matrix Methods of Structural Analysis" Wiley Eastern Limited, New Delhi, 2002.
3. Ganju T N "Matrix Structural Analysis using Spreadsheets" TMH Publishing Co. Ltd. New Delhi,2002.
4. Vazirani V N and Ratwani M M "Advanced Theory of Structures and Matrix Methods" Khanna Publishers, New Delhi, 1995.
5. Pandit G S and Gupta S P "Structural Analysis A Matrix Approach" Tata McGraw Hill, New Delhi, 1994.

DAV UNIVERSITY, JALANDHAR

Course Title: TRAFFIC ENGINEERING
Paper Code: CIV322

L	T	P	Credits
3	1	0	3

Course Objective: This course should provide the students with good understanding of traffic planning and management.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of public transportation and transportation flow.

Part-A

Traffic Engineering and control-Review of various traffic surveys and traffic Studies; Statistical methods for traffic engineering and their applications - Distributions, sampling theory and Significance testing, Regression and Correlation; Intersection design-Principles, various available alternatives, rotary design, mini roundabout, traffic signals: types of traffic signals, advantages, determination of optimal cycle time and signal setting for an intersection with fixed time signals, co-ordination of signals, types, area traffic control, delay at signalized intersection. Accident and road safety: accident causes, recording system, analysis and preventive measures, accident cost, alternative methodologies for calculation. Traffic management- various measures and their scope, relative merits and demerits. Highway capacity: Passenger's car units, level of service, factor affecting capacity and level of service, influence of mixed traffic. [12]

Part-B

Transportation Planning and management-Introduction to the process of urban transport planning. Travel demand forecasting=Trip generation analysis, trip classification, multiple regression analysis, category analysis. Modal split analysis: introduction, earlier modal split models, and modal split models with behavioural basis. Trip distribution analysis: introduction, methods of trip distribution, uniform and average factor method, Fratar method, Furness method, The Gravity model, Intervening and competing, Linear programming approach to trip distribution. Traffic Assignment: purpose of traffic assignment, traffic flow characteristics, Assignment techniques=All or nothing assignment, Multiple route assignment, Capacity restraint assignment, Diversion curves. Rout building algorithms. Land use transport models: Introduction, selection of Land-use transport models, The Lowry model, Grain – Lowry model, Applications of Lowry model. [12]

Part-C

Theory of traffic flow- Scope, definitions and basic relationship, review of flow density speed studies, hydrodynamic analogies, Application of hydrodynamic analogy, Car following theory and its application to traffic engineering, probabilistic description of traffic flow, an introduction to queuing theory as applied to traffic flow problems for study state conditions, simulation studies. [12]

Part-D

Transport Economics-Economic evaluation of highway schemes, need for economic evaluation, cost and benefits of transportation projects, basic principles of economic evaluation, Net present value method, benefit/cost ratio method, internal rate of return method. Vehicle operating costs, Value of travel time saving, Accident costs. [6]
Public Transportation-Mass transit systems: Bus and rail transit, characteristic capacities.
Introduction to intelligent transportation systems-Introduction to advanced computational techniques for transportation planning. [4]

REFERENCES:

1. L.R. Kadiyali, Traffic engineering and transport planning,Khanna Publishers Delhi
2. G.J. Pingnataro, Principles of Traffic Engineering, McGraw Hill, 1970.
3. Wohl and Martin, Traffic System Analysis for Engineering and Planners, McGraw Hill, 1983.
4. B.G. Hutchinson, Introduction to Urban Transport Systems, Planning, McGraw Hill, 1970.
5. Fair and Williams, Economics of Transportation, Harper & Bros., Publishers, NY, 1959.
6. Winfrey, Robley, Economic Analysis for Highway, International Textbook Co., PA, USA, 1969.
7. Partha Chakraborty and Animesh das, Principles of Transportation Engineering, Prentice Hall, India
8. Subhash Saxena, a Course in Traffic Engineering and Design, Dhanpat Rai& Sons
9. Manual of Economic Evaluation of Highway Projects in India (SP30), Indian Roads Congress

DAV UNIVERSITY, JALANDHAR

Course Title: PRINCIPLES OF MARKETING

Paper Code: MGT453

L	T	P	Credits	Marks
3	0	0	3	75

Course Objective: This course will enable the students to understand the theories and practices behind the marketing mix variables, to appreciate the holistic role of marketing in a firm, and develop knowledge of and skill in the operating techniques of the marketing management

Learning Outcomes: Students will be able to design the marketing mix for the customers as per their needs and will learn to create product package which sells itself.

UNIT-A

Understanding Marketing Management: Defining Marketing for the 21st Century, Developing Marketing Strategies and Plans, Assessing Market Opportunities and Customer Value: Scanning the Marketing Environment, Forecasting Demand, and Conducting Marketing Research, Creating Customer Value and Customer Relationships, Analyzing Consumer Markets, Analyzing Business Markets [12]

UNIT-B

Choosing Value: Identifying Market Segments and Targets, Competitive Dynamics, Crafting the Brand Positioning, Creating Brand Equity [10]

UNIT-C

Designing and Delivering Value: Setting Product Strategy, Designing and Managing Services, Developing Pricing Strategies and Programs, Designing and Managing Integrated Marketing Channels, Managing Retailing, Wholesaling, and Logistics [12]

UNIT-D

Communicating Value and Sustaining Growth: Designing and Managing Integrated Marketing Communications, Managing Mass Communications, Managing Personal Communications, Introducing New Market Offerings, Tapping into Global Markets, Managing a Holistic Marketing Organization for the Long Run [11]

REFERENCE:

1. Kotler, Keller, Koshy & Jha. Marketing Management: A South Asian Perspective,14th Edition, Pearson Education
2. Saxena, R. Marketing Management, Tata McGraw-Hill Education, 4th Edition
3. Baines, P. Marketing: Asian Edition, Oxford University Press, 1st Edition
4. Czinkota Michael R, Marketing Management, Cengage Learning, 2nd Edition
5. Chopra, P.K. and Mehra, B. Marketing Management, Wiley

DAV UNIVERSITY, JALANDHAR

Course Title: ENVIRONMENTAL ENGINEERING-2 LAB
Paper Code: CIV310

L	T	P	Credits
0	0	2	2

1. To measure the pH value of a water/waste water sample.
2. To determine optimum Alum dose for Coagulation.
3. To find MPN for the bacteriological examination of water.
4. To find the turbidity of a given waste water/water sample
5. To find B.O.D, COD and D.O. of a given waste water sample.
6. Determination of Hardness of a given water sample
7. Determination of total solids, dissolved solids, suspended solids 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.
10. To find acidity/alkalinity of a given water sample

Course Title: COMPUTER AIDED CONCRETE DRAWING
Paper Code: CIV312

L	T	P	Credits
0	0	2	2

Computer Aided Structural Drawings/Reinforcement detailing of

1. R.C.C. Footings
2. Beams curved in plan
3. Domes
4. Staircases
5. Retaining Walls
6. Water Tanks

These Drawings should be prepared by using Auto-CAD.

Course Title: SEMINAR

Paper Code: CIV314

L	T	P	Credits
0	0	2	2

The seminar is based on research oriented topic. The evaluation is based upon the contents of topic and the presentation.

DAV UNIVERSITY, JALANDHAR

SEVENTH SEMESTER

Course Title: COMPOSITE MATERIALS
Paper Code: CIV401

L	T	P	Credits
3	0	0	3

Course Objective: This course should provide the students with good understanding of various types of composite materials used in construction like fibres.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of various advanced materials like fibres, fly ash silica in civil engineering.

Part-A

FIBRE REINFORCED CONCRETE: Properties of Constituent Materials, Mix Proportions, Mixing and Casting Procedures, Properties of Freshly mixed FRC, Mechanics and properties of Fibre reinforced concrete, Composite Material approach, Application of fibre reinforced concrete. [10]

Part-B

FLY ASH CONCRETE: Classification of Indian Fly ashes, Properties of Flyash, Reaction mechanism, Proportioning of flyash concretes, Properties of Flyash concrete in fresh and hardened state, Durability of flyash concrete. [8]
POLYMER CONCRETE: Terminology used in polymer concrete, Properties of constituent materials, Polymer impregnated concrete, Polymer modified concrete, Properties and applications of polymer concrete and polymer impregnated concrete. [8]

Part-C

FERRO CEMENT: Constituent materials and their properties, Mechanical properties of ferro cement, Construction techniques and application of ferro cement. [6]

HIGH PERFORMANCE CONCRETE: Materials for high performance concrete, Supplementary cementing materials, Properties and durability of high-performance concrete, Introduction to silica fume concrete, Properties and applications of silica fume concrete. [6]

Part-D

LIGHT WEIGHT CONCRETE: Properties of light weight concretes, Pumice concrete, Aerated cement mortars, No fines concrete, Design and applications of light weight concrete. Recent developments in construction materials for Cladding, Waterproofing, Tiles, paints, Formwork, Decorative interiors etc. [8]

REFERENCES:

1. Concrete Technology-A.M. Neville
2. Concrete Technology-M.L. Gambhir

DAV UNIVERSITY, JALANDHAR

Course Title: DESIGN OF STEEL STRUCTURES-2
Paper Code: CIV403

L	T	P	Credits
4	1	0	4

Course Objective: This course should provide the students with good understanding of design of various types of steel structures.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of design of steel foot bridge, Gantry girder etc.
Note: Use of IS-800 is allowed in the examination.

Part-A

Design of Round Tubular Structures: Introduction, round tubular sections, permissible stresses, tube columns and compression members, tube tension members, tubular roof trusses, Design of tubular beams, Design of tubular purlins. [14]

Part-B

Design of steel foot bridge: Introduction, design of flooring, cross girders, analysis of N-type truss, design of various members of truss, design of joints, design of bearings. [14]

Part-C

Design of complete industrial building with design of:

- Gantry Girder
- Column bracket.
- Mill bent with constant moment of inertia
- Lateral and longitudinal bracing for column bent etc. [14]

Part-D

Design of a single track through type Railway Bridge with lattice girders having parallel chords (for B. G):

- Design of stringer
- Design of cross girders
- Design of connection between stringer and cross girder
- Design of main girders – various members and their joints
- Design of bottom lateral bracing and top lateral bracing
- Design of portal bracing and sway bracing
- Design of bearings – rocker and rollers [14]

REFERENCES:

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 SBhavikatti
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

DAV UNIVERSITY, JALANDHAR

Course Title: IRRIGATION ENGINEERING-2
Paper Code: CIV405

L	T	P	Credits
4	1	0	4

Course Objective: This course should provide the students with good understanding of various types of irrigation projects like weirs and barrages.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of canal regulation and design steps of irrigation projects like weirs and barrages.

Part-A

Head Works: Types of head works, Functions and investigations of a diversion head Work: component parts of a diversion head work and their design considerations, silt control devices. [6]

Theories of Seepage: Seepage force and exit gradient, assumptions and salient features of Bligh's Creep theory, Limitations of Bligh's Creep theory, salient features of Lane's weighted Creep theory and Khosla's theory, Comparison of Bligh's Creep theory and Khosla's theory, Determination of uplift pressures and floor thickness. [6]

Part-B

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. Design of barrage or weir. [6]

Energy Dissipation Devices: Use of hydraulic jump in energy dissipation, Factors affecting design, Types of energy dissipaters and their hydraulic design. [6]

Part-C

Canal Regulators: Off take alignment, cross-regulators–their functions and design, Distributory head regulators, their design, canal escape. [6]

Canal Falls: Necessity and location, types of falls and their description, selection of type of falls, Principles of design, Design of Sarda type, straight glacis and Inglis or baffle wall falls. [4]

Part-D

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. [6]

Canal Out-lets: Essential requirements, classifications, criteria for outlet behaviors, flexibility, proportionality, sensitivity, sensitiveness, etc. Details and design of nonmodular, semi-modular and modular outlets. [6]

REFERENCES:

1. Irrigation Engg. & Hydraulic Structure by Santosh Kumar Garg, Khanna Publishers
2. Design of Irrigation Structures by R.K. Sharma, Oxford IBH Pub
3. Irrigation Engg. and Hydraulics Structures by S.R. Sahasrabudhe, Katson Publishing
4. Irrigation Practice and Design Vol. I to VII by K.B. Khushlani. Oxford IBH Pub
5. Irrigation with Resources and with Power Engineering, P.N. Modi; Standard Book House
6. Irrigation Engg. Vol. I & II by Ivan E. Houk, John Wiley and sons

DAV UNIVERSITY, JALANDHAR

Course Title: FINITE ELEMENT METHOD
Paper Code: CIV407

L	T	P	Credits
3	1	0	3

Course Objective: This course should provide the students with good understanding of solid mechanics using finite element method.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of finite element properties like isoperimetric element.

Part-A

Basic equations of solid mechanics-review of equilibrium conditions, strain –displacement relations, stress – strain relations, principles of virtual work and stationary potential energy and various formulations. [10]

Part-B

Approximate methods Rayleigh, Ritz weighted residual (Galerkin) and finite difference methods.
Finite element method: displacement model-shape functions Lagrange and Serendipity elements. Element properties-isoperimetric elements-numerical integration technique assemblage of elements and solution technique for static analysis. [12]

Part-C

Analysis of framed structures-2D & 3D truss and beam element and applications.Analysis of plan stress/strain and ax symmetric solids-triangular, quadrilateral and isoperimetric elements, incompatible modes. Three dimensional stress analysis isoperimetric 8 and 20 nodded elements. [12]

Part-D

Analysis of plate bending-basic equations of thin plate theory Reissinner-Mindlin theory-plate elements and applications. Analysis of shells-degenerated shell elements. Finite element programming and FEA software. [12]

REFERENCES:

1. Finite Element Analysis – Theory and Programming by Krishnamurthy, C.S.
2. Numerical Method in Finite Element Analysis by Bathe, K.J. & Wilson, E.L.

DAV UNIVERSITY, JALANDHAR

DEPARTMENTAL ELECTIVES-II

Course Title: DYNAMICS OF STRUCTURES
Paper Code: CIV409

L	T	P	Credits
3	1	0	3

Course Objective: This course should provide the students with good understanding of various types of systems like single degree and multiple degree of freedom system.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of design parameters for various systems with different degree of freedom system and behaviour of different system under different kinds of loadings.

Part-A

Overview of structural dynamics: Fundamental objective of structural dynamic analysis - types of prescribed loadings - essential characteristics of a dynamic problem - method of discretization: lumped-mass procedure - generalized displacements - the finite-element concept [4]

Single degree of freedom systems: Components of the basic dynamic system formulation of the equations of motion - direct equilibration using D'Alembert's principle - principle of virtual displacements - *generalized SDOF systems* - rigid body assemblage [6]

Part-B

Free vibration response: Solution of the equation of motion - Undamped free vibrations - damped free vibrations - critical damping - under damped systems - over damped systems - negative damping. [6]

Response to harmonic loading: Undamped system complementary solution - particular solution -general solution - response ratio - damped system - resonant response. [2]

Response to periodic loading: Fourier series expression of the loading - response to the fourier series loading - exponential form of fourier series solution [2]

Part-C

Response to impulsive loads: General nature of impulsive loads - sine-wave impulse – rectangular impulse - triangular impulse - shock load. [4]

Response to general dynamic loading: Duhamel integral for an undamped system – numerical evaluation of the duhamel integral for an undamped system - response of damped systems - response analysis through the frequency domain [6]

Part-D

Multi degree of freedom systems: Formulation of the MDOF equations of motion - selection of the degrees of freedom - orthogonality conditions - normal co-ordinates - uncoupled equations of motion - Undamped & damped - mode superposition procedure. [8]

Continuous parameter systems: Vibration analysis by Rayleigh's method- basis of the method -approximate analysis of a general system - selection of the vibration shape - improved Rayleigh method. [2]

Practical vibration analysis: Preliminary comments - stodola method - fundamental mode analysis – proof of convergence - analysis of second mode - analysis of third and higher modes – analysis of highest mode - Rayleigh's method in discrete co-ordinate systems. [4]

REFERENCES:

1. Clouch R.W. &Penzien J., Dynamics of Structures, McGraw Hill
2. Weaver W., Jr. Timoshenko S.P., Young D.H, Vibration Problem in Engineering, John Wiley
3. Meivovitch L., Elements of Vibration Analysis, McGraw Hill
4. Seto W.W., Mechanical Vibrations, Schaum's Outline Series, McGraw Hill
5. Srinivasan P., Mechanical Vibration Analysis, Tata McGraw Hill
6. A K Chopra; Dymanics of Structures; Prentice-Hall
7. Pankaj Agrawal, Manish Shrikhande, Earthquake Resistant Design of Structures; Prentice Hall of India

DAV UNIVERSITY, JALANDHAR

Course Title: GROUND IMPROVEMENT TECHNIQUES
Paper Code: CIV411

L	T	P	Credits
3	1	0	3

Course Objective: This course should provide the students with good understanding in various methods in ground improvement.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of different materials used in improving soil properties and various methods and techniques in improving soil properties.

Part-A

Introduction to soil improvement without the addition of materials - dynamic compaction equipment used - application to granular soils - 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 introduction to bio technical stabilization [12]

Part-B

Introduction to soil improvement with the addition of materials - 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 - stone columns [12]

Part-C

Soil improvement using reinforcing elements- introduction to reinforced earth – loadtransfer mechanism and strength development - soil types and reinforced earth-anchoredearth nailing reticulated micro piles - soil dowels - soil anchors - reinforced earth retaining walls [10]

Part-D

Geotextiles - Behaviour of soils on reinforcing with geotextiles - effect on strength, bearing capacity, compaction and permeability - design aspects - slopes - clay embankments - retaining walls – pavements [12]

REFERENCES:

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 SlopeStabilization, John Wiley

DAV UNIVERSITY, JALANDHAR

Course Title: HYDROLOGY AND DAMS
Paper Code: CIV413

L	T	P	Credits
3	1	0	4

Course Objective: This course should provide the students with good understanding of utilization of water resources and their management.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of design of different types of Dams and about their peak flow.

Part-A

Introduction, Precipitation: Importance of hydrological data in water resources planning. The 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, and depth area-duration curves. Interception, Evapo-transpiration and Infiltration: Factors affecting interception, evaporation from free water surfaces and from land surfaces, transpiration, Evapo-transpiration. Infiltration Factors affecting infiltration, rate, Infiltration capacity and its determination. [12]

Part-B

Runoff: Factors affecting runoff, run-off hydrograph, unit hydrograph theory, S-curve hydrograph, Snyder's synthetic unit hydrograph [4]

Peak Flows: Estimation of Peak flow-rational formula, use of unit hydrograph, frequency analysis, [4]
Gumbel's method, design flood and its hydrograph. [4]

Part-C

Gravity Dams-Non Overflow Section: Forces acting, Stability factors, stresses on the faces of dam, Design of profile by the method of zoning, elementary profile of a dam. [6]
Gravity Dams-Spillways: Creagers profiles neglecting velocity of approach, profile taking velocity of approach into account, upstream lip and approach ramp, Advantages of gated spillways, Discharge characteristics of spillways. [4]

Part-D

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. [6]
Earth Dams: Components of earth dams and their functions, phreatic line determination by analytical and graphical methods. [4]

REFERENCE:

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

DAV UNIVERSITY, JALANDHAR

Course Title: BRIDGE ENGINEERING
Paper Code: CIV415

L	T	P	Credits
3	1	0	3

Course Objective: This course should provide the students with good understanding in construction design and maintenance of RCC Bridge.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of site investigation, specifications and selection of suitable type of Bridge.

Part-A

Introduction: Definition and components of a bridge, Classification of bridges, Choice of a bridge type. [4]
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. [6]

Part-B

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. [8]

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.

[4]

Part-C

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. [6]

Part-D

Bearings, Joints & Appurtenances: Importance of Bearings, Different types of bearings- Expansion Bearings, Fixed Bearings, Elastomeric Bearings, Expansion joints, Wearing Course, Approach Slab, Footpath, Handrails. [6]
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. [6]

REFERENCE:

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 Education

DAV UNIVERSITY, JALANDHAR

Course Title: DISASTER MANAGEMENT

L	T	P	Credits
3	0	0	3

Paper Code: CIV421

Course Objective: This course should provide the students with good understanding in various disaster managing steps.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of disaster reduction and various direct and indirect damages due to disaster.

Part-A

Introduction - Concepts and definitions: disaster, hazard, vulnerability, risk, capacity, impact, prevention, mitigation). [3]

Disasters- Disasters classification; natural disasters (floods, draught, cyclones, volcanoes, earthquakes, tsunami, landslides, coastal erosion, soil erosion, forest fires etc.); manmade disasters (industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills etc); hazard and vulnerability profile of India, mountain and coastal areas, ecological fragility

[12]

Part-B

Disaster Impacts - Disaster impacts (environmental, physical, social, ecological, economical, political, etc.); health, psycho-social issues; demographic aspects (gender, age, special needs); hazard locations; global and national disaster trends; climate change and urban disasters. [10]

Part-C

Disaster Risk Reduction (DRR)- Disaster management cycle – its phases; prevention, mitigation, preparedness, relief and recovery; structural and nonstructural measures; risk analysis, vulnerability and capacity assessment; early warning systems, Post-disaster environmental response (water, sanitation, food safety, waste management, disease control); Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction, DRR programmes in India and the activities of National Disaster Management Authority. [15]

Part-D

Disaster Management

Disasters, Environment and Development- Factors affecting vulnerability such as impact of developmental projects and environmental modifications (including of dams, land-use changes, urbanization etc.), sustainable and environmental friendly recovery; reconstruction and development methods. [12]

REFERENCE:

1. http://ndma.gov.in/ (Home page of National Disaster Management Authority).
2. 64
3. http://www.ndmindia.nic.in/ (National Disaster management in India, Ministry of Home Affairs).
4. Pradeep Sahni, 2004, Disaster Risk Reduction in South Asia, Prentice Hall.
5. Singh B.K., 2008, Handbook of Disaster Management: techniques & Guidelines, Rajat Publication.
6. Ghosh G.K., 2006, Disaster Management, APH Publishing Corporation.

Course Title: MINOR PROJECT
Paper Code: CIV417

L	T	P	Credits
0	0	4	2

Students are required to work on project in any of the areas related to Civil Engineering. The students will work 6 hrs per week with his / her supervisor(s).

Any one from following specialization:

- Environment Engineering
- Geo-Tech. Engineering,
- Transportation Eng.,
- Hydraulic Structures
- Structural Engineering.

DAV UNIVERSITY, JALANDHAR

EIGHTH SEMESTER

Course Title: EARTHQUAKE ENGINEERING
Paper Code: CIV402

L	T	P	Credits
4	0	0	4

Course Objective: This course should provide the students with good understanding of various types of behaviour of multi-story buildings under oscillations.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of load analysis of buildings and behaviour of building under earthquake conditions.
Note: Use of IS-13920 is allowed in the examination.

Part-A

Undamped free vibrations of single degree of freedom systems: Introduction, definitions, characteristics of a dynamic problem, degrees of freedom, Newton's law of motion, De Alembert's Principal, free body diagram, derivations of differential equation of motion, solution of differential equation of motion, equivalent stiffness of spring combinations, springs in series, springs in parallel. [12]

Part-B

Damped free vibrations of single degree of freedom systems: Introduction, types of damping, free vibrations with viscous damping, over-damped, critically- damped and under-damped systems, logarithmic decrement, structural damping. [10]
Earthquake Resistant Design Philosophy: Introduction, criteria for earthquake resistant design, principles of reliable seismic behaviour, structural forms for earthquake resistance, earthquake forces versus other forces. [4]

Part-C

Lateral Load Analysis: Idealization of structures and selection of analysis, equivalent lateral force concepts, response spectrum analysis, seismic forces as per IS: 1893 – 1984 and IS: 1893 – 2000. [6]

Introduction to provisions of IS 4326.
Introduction to provision of IS 13920. [4]

Part-D

Behaviour and Design of Concrete Structures: Characteristics of concrete and reinforcing steel, influence of bond and anchorage and confinement of concrete, Seismic design and detailing of reinforced concrete and masonry buildings (IS 13920; IS 13 827: IS 13828; IS 4326) and flexural strength and ductility of RC members, shear behaviour of RC members, beam column joints in moment resisting frames. Introduction to provisions of IS 1893-2002 Part-I for buildings. Estimation of lateral forces due to earthquake. [12]

REFERENCES-

1. Paz M "Structural Dynamics – Theory and Computation" CBS Publishers and Distributors, New Delhi, 2003.
2. Chopra A K "Structural Dynamics" John Wiley & Sons, New Delhi, 2002.
3. Dowrick D J "Earthquake Resistant Design for Engineers and Architects" John Wiley & Sons, New York, 2000.
4. Paulay and Priestley "Seismic Design of Reinforced Concrete and Masonry Buildings" John Wiley and sons, New York, 1992.
5. Rao S.S.,"Mechanical Vibrations" Pearson Education Publishers, 2004.

DAV UNIVERSITY, JALANDHAR

Course Title: RAILWAY, AIRPORT AND HARBOUR ENGINEERING
Paper Code: CIV404

L	T	P	Credits
3	1	0	3

Course Objective: This course should provide the students with good understanding of railway and airport engineering.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of various railways, airport and harbor components and their specification

Part-A

Introduction: History of development of Railways, Permanent Way, Requirement of ideal permanent way, cross-sections of single and double tracks in embankment and cutting. [4]

Points and Crossing: Simple types currently in use: points and crossing terminology, layout plans of simple cross over, turnouts, diamond crossing, and geometric design of a simple turn out design of crossings & switches. [6]

Part-B

Stations and yards: Selection of site for station and yards, different types of stations and yardsand their layouts-way side station. [4]

Permanent way Construction and Maintenance: Lying of track, relaying and dismantling, maintenance of track. [4]

Signaling and Interlocking: Objects of signalling, types of signals, Interlocking and devices used in interlocking. [4]

Part-C

Introduction: Airport classification, classification of flying activities. Characteristics & airport size. [4]

Airport Planning: Types of runway patterns, running layout effect of metrological conditions,wind rose, specifications for runway clearances and other airport utilities. [4]

Airport Grading & drainage: General considerations, master plan, grading design, selective grading, and classification of excavation, drainage purpose & data required, drainage structures & materials, drainage system. [6]

Part-D

Pavement Design: Factors affecting pavement design, design method for flexible pavement(CBR, MC-leads, bur misters) design method for rigid pavements (water guard's analysis, I.R.C. methods)Joints in concrete pavements, design of level bars, tie bars, distribution steel, airport pavement overlays. [6]

Docks and Harbors: Definition, location & layout of docks, classification of docks Simple description, frequent dealing with natural and artificial harbor, their classification & requirement, action of wind, water, tides and lateral drift on harbor structures. [6]

REFERENCES

1. Rangawal S C "Railway Engineering" Charotar Publishers, Anand, 2002.
2. Arora S P and Saxena (2001), "Railway Engineering", DhanpatRai Publishers, New Delhi, 2001
3. Khanna, Arora and Jain "Airport Planning & Design" Nem Chand & Bros., Roorkee 2002
4. Horren Jeff, "Airport, Planning & Design"
5. Srinivasan R and Rangwala S C "Harbours" Charotar Publishers, Anand, 1999

DAV UNIVERSITY, JALANDHAR

DEPARTMENTAL ELECTIVES-III

Course Title: PLASTIC ANALYSIS OF STRUCTURES
Paper Code: CIV406

L	T	P	Credits
3	2	0	3

Course Objective: This course should provide the students with good understanding of plastic behaviour of different structures.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of design consideration in plastic behaviour of multi-storeyed structure.

Part-A

Introduction: Ductility of metals: Concept of plastic design, Overloaded factors, Ultimate load as design coition. [8]

Part-B

Analysis of Indeterminate Structures: Hinge formation in indeterminate structures, Redistribution of moments, Assumption made for structure subjected to bending only. [8]

Part-C

Minimum Weight Design: Concept, assumption, Design of frame with prismatic members, Elements of linear programming and its application to minimum weight design problems. [10]
Deflection: Assumption, Calculation of deflection at ultimate loads, Permissible rotations.[4]

Part-D

Secondary Design Considerations: Influence of direct load, shear local bucking, lateral bucking, repeated loading and brittle fracture on moment capacity. Design of eccentrically loaded columns. Problem of incremental Collapse, Shake down analysis. Special considerations for design of structures using light gauge metals. [12]

REFERENCES

1. Neal B G "Plastic Methods of Structural Analysis" Chapman Hall, London
2. ManikaSelvam V K "Limit Analysis of Structures" DhanpatRai Publications, New Delhi, 1997.
3. Arya A S and Ajmani J L "Design of Steel Structures" Nem Chand & Bros, Roorkee.1992.
4. Chandra R "Design of Steel Structures" Vol. I & II Standard Book House, Delhi, 1999.
5. M.P. Nielsen, "Limit Analysis and Concrete Plasticity" CRS Press, London, 1998.

DAV UNIVERSITY, JALANDHAR

Course Title: PAVEMENT DESIGN
Paper Code: CIV408

L	T	P	Credits
3	2	0	3

Course Objective: This course should provide the students with good understanding the types of various pavements used in civil engineering.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of design of flexible as well as rigid pavements.

Note: Use of IRC: 37-2012 and IRC: 58-2011 shall be allowed in the examination.

Part-A

Introduction: Types of pavement structure. Functions of pavement components, Factors affecting pavement design, Design wheel load, and Strength characteristics of pavement materials. Comparison of flexible and rigid pavements. [10]

Part-B

Design of Flexible Pavements: General design considerations, Methods for design of flexible pavements – Group Index Method, Triaxial Test Method, HveemStabilometer Method, McLeod's Method, and Indian Roads Congress Method. [14]

Part-C

Design of Bituminous Mixes: Mix Design Approaches, Marshall Method of Bituminous Mix Design, Superpave [8]
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. [8]

Part-D

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. [10]

REFERENCES:

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.

DAV UNIVERSITY, JALANDHAR

Course Title: EARTH AND EARTH RETAINING STRUCTURES
Paper Code: CIV410

L	T	P	Credits
3	2	0	3

Course Objective: This course should provide the students with good understanding of various earth retaining structures and their design.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of design procedure of earthen dams and their stability criteria.

Part-A

Earthen Dam: Introduction to Earthen dams, types of dams, selection of type of dam based on material availability, foundation conditions and topography [2]
Design details – crest, free board, upstream and downstream slopes, upstream and downstream slope protection – central and inclined cores – types and design of filters [4]
Seepage analysis and control – seepage through dam and foundations – control of seepage in earth dam and foundation [4]

Part-B

Earth pressure theories –Rankine's and Coulomb's earth pressure theories for cohesion less and cohesive backfills – computation of earth pressures for various cases – inclined – with surcharge – submerged and partly submerged – stratified backfills [6]

Rigid retaining structures –active and passive earth pressures against gravity retaining walls–computation of earth pressures by Trial wedge method – a mathematical approach for completely submerged and partly submerged backfills – Perched water table – importance of capability tension in earth pressure. [6]

Part-C

Graphical methods of earth pressure computation – trial wedge method for coulomb's and Rankine's conditions, for regular and irregular ground and wall conditions – Rebhan's construction for active pressure – friction circle method – logarithmic spiral method.
Design of gravity retaining wall – cantilever retaining walls [6]
Construction techniques – methods of construction – quality control Instrumentation – measurement of pore pressures [4]

Part-D

Flexible retaining structure –type and methods of construction–design strength parameters– safety factor for sheet pile walls – computation of earth pressures against cantilever sheet piles in cohesion less and cohesive soils – anchored sheet piles – free earth method – fixed earth method – Rowe's moment reduction method – stability of sheet piling [6]

Diaphragm walls and coffer dams – type of diaphragm walls and their construction techniques in various soil types – earth pressure on braced cuts and coffer dams – design of coffer dams [6]

REFERENCES:

1. Huntington, Earth pressure on retaining walls.
2. Bowles, Foundation Analysis and Design.
3. Jones, Earth Reinforcements & Soil structures.
4. Prakash, Ranjan & Sasan, Analysis & Design of Foundation & Retaining Structures.

DAV UNIVERSITY, JALANDHAR

Course Title: ADVANCE ENVIRONMENTAL ENGINEERING
Paper Code: CIV412

L	T	P	Credits
3	2	0	3

Course Objective: This course should provide the students with good understanding of different types of pollutions and their measures.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of different controlling methods of air, noise and water pollution.

Part-A

INTRODUCTION: Environment, Biosphere, Ecosystems; their interrelationships and pollution. [4]

AIR POLLUTION & CONTROL: Air pollution, Physical & chemical fundamentals, Air pollution standards, Effects of air pollution; climate change, Air pollution meteorology, Atmospheric dispersion of pollutants, Indoor air quality models, Air pollution control of stationary & mobile sources. [6]

Part-B

NOISE POLLUTION & CONTROL: Introduction, Rating Systems, Sources & Criteria, Noise prediction and Control [10]

Part-C

SOLID WASTE MANAGEMENT: Perspectives & properties, collection, transfer & transport, Life cycle assessment, Disposal in a landfill, Waste to energy, Composting, Resource conservation & recovery for sustainability [12]

Part-D

HAZARDOUS WASTE MANAGEMENT: The hazard, risk, definition & classification RCRA &HSWA, CERCLA & SARA, Hazardous waste management, Treatment technologies, Land disposal, Groundwater contamination & remediation [12]

REFERENCES:

1. Davis & Cornwell, Environmental Engineering, McGraw Hill Int Ed
2. Peavy, H.S, Rowe, D.R, Tchobanoglous, G, Environmental Engineering, McGraw Hill
3. E.P. Odum, Fundamentals of Ecology, Oxford and IBH Pub.
4. Vesilind, Worrell and Reinhart, Solid Waste Engineering, Cengage Learning India
5. Rao and Rao, Air Pollution, Tata McGraw Hill Pub

DAV UNIVERSITY, JALANDHAR

DEPARTMENTAL ELECTIVE-IV

Course Title: PRE-STRESSED CONCRETE
Paper Code: CIV414

L	T	P	Credits
3	1	0	3

Course Objective: This course should provide the students with good understanding of manufacturing of precast concrete structures.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of design for different pre-stresses and precast members like beams, slabs.

Note: IS 1343 is permitted in examination.

Part-A

Materials for pre-stressed concrete and pre-stressing systems: High strength concrete and high tensile steel – tensioning devices – pretensioning systems – post tensioning systems.[10]

Part-B

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. [12]

Part-C

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. [12]

Part-D

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. [12]

REFERENCES:

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. R. Rajagopalan, Prestressed Concrete.
5. IS 1343 2012 Code of Practice for Prestressed Concrete

DAV UNIVERSITY, JALANDHAR

Course Title: TRAFFIC ENGINEERING
Paper Code: CIV416

L	T	P	Credits
3	1	0	3

Course Objective: This course should provide the students with good understanding in design of traffic signals and traffic safety.

Learning Outcomes: After the completion of this course the participants would gain the knowledge of vehicle characteristics and intelligent transport system

Part-A

Introduction: Elements of Traffic Engineering, Components of traffic system–road users, vehicles, highways and control devices. [4]

Vehicle Characteristics: IRC standards, Design speed, volume, Highway capacity and levels of service, capacity of urban and rural roads, PCU concept and its limitations. [6]

Part-B

Traffic Stream Characteristics: Traffic stream parameters, characteristics of interrupted and uninterrupted flows. [4]

Traffic Studies: Traffic volume studies, origin destination studies, speed studies, travel time and delay studies, parking studies, accident studies. [6]

Part-C

Traffic Regulation and Control: Signs and markings, Traffic System Management, At-gradient ersections, Channelization, Roundabouts. [8]

Traffic Signals: Pre-timed and traffic actuated. Design of signal setting, phase diagrams, timing diagram, Signal co-ordination. [6]

Part-D

Grade Separated Intersections: Geometric elements for divided and access controlled highways and expressways. [4]

Traffic Safety: Principles and practices, Road safety audit. [2]

Intelligent Transportation System: Applications in Traffic Engineering [4]

REFERENCES:

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.

DAV UNIVERSITY, JALANDHAR

Course Title: SOIL DYNAMICS
Paper Code: CIV418

L	T	P	Credits
3	1	0	3

Course Objective: This course should provide the students with good understanding in dynamic nature of soil and theory of vibrations.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of dynamic earth pressure and dynamic bearing capacity of soil.

Part-A

Introduction, Nature of Dynamic Loads, Theory of Vibrations. [10]

Part-B

Dynamic Earth pressure and dynamic bearing capacity of shallow foundations. [10]

Part-C

Liquefaction of Soils Wave propagation in elastic, homogeneous and isotropic medium Determining dynamic soil parameters. [12]

Part-D

Machine foundations for reciprocating, impact type and Rotary machines. Vibration isolation and screening. [12]

REFERENCES:

1. Barken D D "Dynamics of bases and foundations" McGraw Hill, New York, 1962
2. Saran S "Soil Dynamics and Machine Foundations", Galogotia Publications Pvt. Ltd,New Delhi, 1999
3. Rao N D V K "Vibration Analysis and Foundation Dynamics" Wheeler Publishing Div. of A. H. Wheeler & Co. Ltd. New Delhi, 1998
4. Krammer S "Geotechnical Earthquake Engineering" Pearson Education Pvt. Ltd. New Delhi, 2003.
5. Prakash S "Soil Dynamics" McGraw Hill Book Company, New York, 1981.

DAV UNIVERSITY, JALANDHAR

Course Title: FLOOD CONTROL AND RIVER ENGINEERING
Paper Code: CIV420

L	T	P	Credits
3	1	0	3

Course Objective: This course should provide the students with good understanding in flood control and flood estimation.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of river modelling and river training works.

Part-A

River Engineering, Flood forecasting, Flood Estimation, Estimating Design flood, Empirical formulate, statistical or Probability methods, Unit hydrograph method [10]

Part-B

Flood control and Economics of Flood control River Regime theories, River Modeling, Meandering [12]

Part-C

River Training, Channel improvements; cut offs, River control structures Sediment load [10]

Part-D

Resistance to flow, Social and environmental impacts. [10]

REFERENCES:

1. R.J. Garde, K.G. RangaRaju, 1. Mechanics of Sedement Transportation and Alluvial Stream problems, Wiley Eastern Ltd.
2. V.A. Vanoni , Sedimentation Engg, John Wiley and Sons
3. .A. Raudkivi, Loose Boundary Hydraulics, Pergamon Press, Inc
4. P.N. Modi, Irrigation Water Resources and Water Power Engineering, Standard Book House
5. Manual on rivers, their behaviour and Training, Pub No. 60, CBIP, New Delhi

DAV UNIVERSITY, JALANDHAR

Course Title: BUILDING MAINTENANCE AND REPAIR
Paper Code: CIV426

L	T	P	Credits
3	0	0	3

Course Objective: This course should provide the students with good understanding in performance, rehabilitation in concrete structure.
Learning Outcomes: After the completion of this course the participants would gain the knowledge of various methods of repairing and testing of various structures.

Part-A

Aging of structures
Performance of structures
Need for rehabilitation
Distress in concrete steel structures

[12]

Part-B

Damage assessment and Evaluation models
Damage testing methods – NDT, Core samples – Methods of repairs - Repair and maintenance of buildings

[12]

Part-C

IS standards - Bridge repairs - Seismic strengthening

[10]

Part-D

Rehabilitation methods - grouting – detailing
Imbalance of structural stability
Case studies.

[10]

REFERENCES:

1. RN Raikar, Diagnosis and treatment of Structures in Distress, R and D Centre, Structural Designers and Consultants, New Bombay, India,1994.
2. VK Raina, Concrete Bridge Practice Construction, Maintenance and Rehabilitation, 2nd Edition, Shroff Publishers and Distributors, August, 2010.
3. WH Ransom, Building Failures, Diagnosis and Avoidance, 2nd Edition, E and F.N. Spon Publishers, December 1987.

Course Title: MAJOR PROJECT

Paper Code: CIV422

L	T	P	Credits
0	0	2	2

Students are required to work on project in any of the areas related to Civil Engineering. The students will work 8 hrs per week with his / her supervisor(s).

Any one from following specialization:

- Environment Engineering
- Geo-Tech. Engineering,
- Transportation Eng.,
- Hydraulic Structures
- Structural Engineering.

Course Title: SEMINAR

Paper Code: CIV424

L	T	P	Credits
0	0	2	2

The seminar is based on research oriented topic. The evaluation is based upon the contents of topic and the presentation.