B.TECH. SECOND YEAR

(CIVIL ENGINEERING)
(Batch 2014)
(Session 2015-2016)

SCHEME OF PAPERS

THIRD SEMESTER (Civil Engineering)

Sr.No.	Course No.	Title	L	T	P	Credits
1.	BAS 202	Operations Research	3	1	0	3.5
2.	HSS 201	Management Practices &OrganizationalBehavior	3	1	0	3.5
3.	CVE-201	Survey-1	3	1	0	3.5
4.	CVE 202	Building Materials	3	1	0	3.5
5.	CVE 203	Building Construction	3	1	0	3.5
6.	CVE 204	Fluid Mechanics	3	1	0	3.5
7.	CVE 251	Survey-I Lab *	0	0	2	1.0
8.	CVE 252	Building Materials Lab *	0	0	2	1.0
9.	CVE 254	Fluid Mechanics Lab *	0	0	2	1.0
10		Punjabi	3	0	0	0
			18	6	6	24.0
						Total Contact Hours: 30

*   CVE 251, CVE 252 and CVE 254 are practical papers only.
There will not be any theory examination for these papers.
- In addition to above mentioned subjects, there will be an additional course on Punjabi as a qualifying subject

Department of Civil Engineering

PunjabiUniversity, Patiala.

General Instructions to the Paper Setters

(Common for B.Tech. in Computer Engineering, Electronics and communication Engineering, Mechanical Engineering, Civil Engineering and Integrated BTech/MBA Branches)

Applicable to 2014 Batch

The B. Tech paper structure will be as shown below:

Pattern of Question Paper
TITLE OF SUBJECT (CODE----)
Bachelor of Technology (Branch) Section: ………..
End Semester Exam

TIME ALLOWED: 3 Hour   Roll. No………….
Maximum Marks: 50

Note:- Attempt any Six questions. selecting three questions from each section A and B. Section C is compulsory.

Section-A (From Section A of the syllabus)
Q1. ....
Q2. ....
Q3. ....
Q4. ....   3x5
Q5. ....

Section-B (From Section A of the syllabus)
Q6. ....
Q7. ....
Q8. ....
Q9.………………………………………………..
Q10.…………………………………………….   3x5

Section-C (Common from Whole of the Syllabus)
Q11
a)..
b) ....
c) ....
d) ....
e) ....
f) ....
g) ....
h) ....
i) ....
j)……………………………………………….   10x2=20

Note for the paper setter:

1. Numbers of questions to be set are nine (11) as per the above format.

2. Section A and B contain 10 questions of (5) marks each.

3. Section C is compulsory and contains ten sub-parts of one mark each. The answers for each question should preferably be of 2 to 3 lines.

4. The maximum limit on numerical questions to be set in the paper is 35% while minimum limit is 20% except theoretical, analysis and design papers

5. The paper setter shall provide detailed marking instructions and solution to numerical problems for evaluation purpose in the separate white envelopes provided for solutions.

6. The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.

7. Log tables, charts, graphs, Design data tables etc. should be specified, whenever needed.

8. Use of Scientific calculator should be clearly specified.

9. There are some MBA subjects (*like BAS 202 Operational Research, MBA 5011 Foundation of Financial Accounting, MBA 5012Foundation of Managerial Accounting, MBA 5022 Foundations of Marketing, MBA 5023 Foundations of Law, MBA 5031 Foundations of Macroeconomics, MBA 5032 Foundations of Microeconomics, MBA-5033 Foundations of International Business, MBA 5013 Foundations of Finance*) where syllabus is not divided among four sections namely A, B,C,D then Question paper must be set by without specifying section in it and giving proper weightage to the respective portions.

BAS 202 OPERATIONS RESEARCH

L	T	P	Credits
3	1	0	3.5

Section-A

Definitions, characteristics, necessity, scope and objectives of O.R. Phases of operations Research study, Limitations of O.R.

Linear Programming, assumptions in L.P. formulation of mathematical models for various types of L.P. problems, graphical methods & trial and error methods of solving L.P. problems, Limitations of L.P. methods.

Simplex method, artificial variable technique-the big-M method, degeneracy, unconstrained variables, duality in L.P.

Transportation model, formulation and solution of transportation problems, sensitivity analysis in T.P.

Assignment model, formulation and solution of assignment problems, sequencing problems.

Section-B

Game theory, solution of games with and without saddle point, rules of dominance, arithmetic and algebraic methods for 2x2 games solution of 2xn or m x 2 games.

PERT & CPM Models: Characteristics & uses, Drawing of network, removal of redundancy in network, computing EOR, LOT, Free Slack, Total slack, Crashing, Resource allocations.

Inventory control, necessity for maintaining inventory, inventory cost, inventory models for bought-out items with & without shortages, inventory model for made-in items without shortages, inventory models with price-breaks, Inventory management techniques, solution of problems.

Simulation, advantages and limitations of simulation, Monte carlo method, solution of problems using simulation.

Recommended Books:

1. P.K. Gupta and D.S. Hira, Operations Research, S. Chand and Co. Ltd., Ram Nagar, New Delhi, Ed. 1998.
2. H.A. Taha, Operations Research – an Introduction, Macmillan Publishing Co., New York, Ed. 1994.
3. Ravindran, Operations Research, John Wiley & Sons, N. York
4. A.P. Verma, Operations Research, S.K. Kataria & Sons
5. H.M. Wagner, Principles of Operation Research, PHI, New Delhi

HSS 201 MANAGEMENT PRACTICES & ORGANISATIONAL BEHAVIOUR

	L	T	P	Credits
	3	1	0	3.5

Section A

Introduction to Management: Definition, Importance and functions of Management. Theories of Management; Classical, Neo-classical and Modern. Planning: Nature of planning, planning process, types of plans, Importance and Limitations of Planning. Introduction to MBO (Management by Objectives). Social responsibility of business.

Decision Making: Importance and Process. Organization: Process of Organizing, Organizing Principles, Organization Chart, Authority and Responsibility relationship, Steps in Delegation of Authority. Communication: Process, channels, medium of communication, communication barriers. Controlling: Steps, types of control system, essentials of effective control system.

Section-B

Organizational Behaviors: Concept, features and importance. Personality: determinants and development. Role of Values and Attitudes in individual's behavior. The concept of motivation and its theories. Perception: Concept, Process, Errors in perceptual accuracy, Role of perception in decision making.

Learning: Classical and Operant conditioning theory, Reinforcement-kinds and administration. Concept of group dynamics. Leadership theories and styles. Organizational conflict: Concept, Dimensions, conflict management techniques. Introduction to concept of power and politics in work related organization. Organization culture and effectiveness.

Recommended Books:

1. Aswathappa, K and Reddy G. Sudarsana, Management and Organisation Behaviour, Himalya Publishing House.

2. Pierce John L., Gardner Donald, Gardner Donald, Management and Organisational Behavior: An Integrated Perspective, Ed.1, Cengage Learning India

3. Laurie Mullins, Management and Organisation Behaviour, 7/e, Pearson Education.

4. Stephen, P. Robbins, Seema Sanghi and Timothi A Judge, Organizational Behavior 13/e, Pearson Education.

5. Stephen P. Robbins, Mary Coulter and Neharika Vohra, Management 10/e, Pearson Education.

6. Heinz, Weihrich and Harold Koontz, Essentials of Management, Tata McGraw Hill.

7. Gene Burton and Manab Thakur, Management Today: Principles and Practice, Tata McGraw-Hill.

8. P.C. Tripathy, P.N. Reddy, Principles of Management, Tata McGraw-Hill.

9. Neeru Vashishth, Principles of Management with case studies, Taxmann Publication.

10. L.M. Prasad, Principles & Practice of Management, Sultan Chand & Sons N Delhi

11. James Stoner, R Edward Freeman and Daniel R Gilbert, Management 6/e, Pearson Education.

CVE 201 SURVEY-I

	L	T	P	Credits
	3	1	0	3.5

Section-A

Introduction: Different types of surveys.

Chain Surveying: Principal of chain surveying, description of different equipment, Methods of chaining & booking, selection of base line and stations, obstacles in chaining. Location of inaccessible points by chain, tape & ranging rods.

Prismatic compass survey: Description of Prismatic & surveyors compass methods of traversing, local attraction and its elimination adjustment of closing error by graphical method.

Section-B

Plane Table Survey: Description of different equipment, different methods of plane tabling, Strength of Fix, Two point and three point problems and their solutions.

Leveling: Description of Dumpy and Tilting levels & leveling staves, methods of leveling sensitivity of bubble tube, setting out grade lines permanent adjustment of above mentioned leveling instruments.

Contouring: Setting out contour gradient, different methods of contouring. Simple earth work calculations of areas and volumes.

Minor Instruments: Box sextant, hand level, Abney level, Planimeter, ghat tracer, tangent clinometer etc.

Recommended Books:

1. Kanetkar, T. P., Surveying Vol. I & II, Pune Vidhyarthi Griha Prakashan (1985).
2. P.B. Sahiwney, Surveying
3. Singh, Narinder, Surveying, Tata McGraw Hill (1992).
4. Punmia, B. C., Surveying Vol. I and II, Luxmi Publications (1998).
5. Agor, R., Surveying, Khanna Publishers (1982).
6. Venkataramiah, C., A Text Book of Surveying, Universities Press (1996).

CVE 202 BUILDING MATERIALS

	L	T	P	Credits
	3	1	0	3.5

Section-A

Building Stones: General, Qualities of a good building stone-Deterioration of stones-Preservation of stones, Commonbuilding stone of India & their Uses-Artificial stones. '

Bricks: General, Constituents of bricks, desirable and harmful ingredients in brick earth, qualities of good bricks,testing of bricks, strength, Absorption, weathering of bricks. Varieties of fire bricks, sand lime bricks, building tiles-roofing;flooring and wall tiles.

Lime: Cementing material, Characteristics of good quality lime, classifications & testing of Lime, Hydraulic test, acidtest, setting & slaking of lime, uses of different varieties of lime

Concrete: Constituents of concrete, different types of cements used in concrete, brief introduction to ingredients andmanufacture of cements. Hydration and compounds of hydration. Properties and testing of cement.

Concrete Mixes: Design of concrete mixes by ISI method and ACI method. Design of high strength concrete mixes.Design of concrete mix for flexural strength.

Section-B

Production of Concrete: Introduction, Batching of materials, mixing of concrete materials, transportation and placing ofconcrete, compaction of concrete, curing of concrete.

Properties of fresh and hardened concrete: Introduction, workability, factors effecting workability, methods ofdetermination of workability, strength of concrete, factors effecting strength of concrete, durability and permeability ofconcrete, factors effecting permeability of concrete, creep and shrinkage of concrete.

Timber: Advantages of timber construction, timber trees-exogenous and endogenous trees; soft and hard woods,structure of tree, felling of trees, defects in timber, characteristics of good timber, uses and testing of timber.

Miscellaneous Materials: Paints and varnishes; Distempering; white and color washing; glass and glass products; Asphalt and Bitumen. Commercial forms of iron & steel & their uses, use of plastics in civil Engg.

Recommended Books:
1. Rangawala, S. C., Engineering Materials, Charotar Publishing House (1992).
2. Gambhir, M. L., Concrete Technology, Tata McGraw Hill Publishing Co. Ltd. (2004).
3. Kumar, Sushil, Engineering Materials, Metropolitan Press (1994).
4. Kumar, Sushil, Building Construction, Standard Publishers and Distributors (1990).

CVE 203 BUILDING CONSTRUCTION

	L	T	P	Credits
	3	1	0	3.5

Section-A
Masonry: Stone & Brick: Brick masonry, Bonds and junctions, Walling, Mud wall, Sun-dried bricks, burnt bricks, stones walling, load bearing & non load bearing brick masonry for multistoried constructions, brick panel walling, reinforced masonry. Bonds & junctions
Prefabricated Construction: Prefabricated components, Assembly at site, Low cost housing & hollow blocks.
Damp Proof Course: Points of its requirement in buildings, D.P.C. at Plinth level, in basement and roof tops etc. joints in prefabricated construction. Anti termite treatment

Lintels & Arches: Location and construction details in wood, brick, stone and R.C.C.
Stairs & Stair cases: Suitability of location, stairs in multistoried buildings, Residential and public buildings, Fire escape, Stairs in timber, stone, brick, RCC and Metal Drawings in Plan elevation and sections. Hand rail & railings, description and sketches of lifts escalators.
Section-B
Doors & Windows: Details, location in buildings, sizes & construction for wooden & metal, Battened braced, framed, flush and paneled, sliding, folding telescopic, with louvers, collapsible. Windows in timber & Metal casement, double hung, Dormer, Corner, Fanlight, skylight, clear storey etc. Low cost ideas, Revolving doors, Aluminum door and windows
Roofing and Flooring: Types of Flooring, Flat roofs: Waffle floor, channels, cored units etc., inclined roofs, Form Work and Scaffolding

Foundations: Types and suitability, spread, arch, combined, cantilevered, Raft, Grillage, Piles & wells, Footings in block cotton soil, Basement & Retaining walls
Aspects of Architecture Design: Proportion, orientation etc.
Building Drawings: Building layout, Architectural, structural working drawings, Modular co-ordination and drawing on modules, Building bye-laws.
Exercises:
1. Drawings of all the above components e.g. Brick masonry bonds and junctions, DPC, Lintels and Arches, Stairs, Doors & Windows, Roof & roof coverings
2. A plan of building consisting two stories with three/four rooms:
   - Plan, Elevations & Section (Modular); Site Plan (Bye laws application); Foundation for walls – Construction details; Proposed doors – Construction with details; Roof & floor – details in construction; Stair case details

Recommended Books:
1. Singh, Gurcharan, Building Construction Engineering, Standard Book House (1994).
2. Sharma, S. K., Building Construction, S. Chand and Company (1994).
3. Kumar, Sushil, Building Construction, Standard Publisher and Distributors (1990).
4. Punima, B. C., Building Construction, Laxmi Publishing House (1993).
5. Sharma and Kaul, A Text Book of Building Construction, S. Chand and Company (1985).

CVE 204 FLUID MECHANICS

L	T	P	Credits
3	1	0	3.5

Section-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, vapour pressure and cavitation, compressibility and bulk modulus; Newtonian and non-Newtonian fluids.

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 center of pressure, force on a curved surface due to hydrostatic pressure. Buoyancy and floatation, stability of floating and submerged bodies, Metacentric height and its determination, rotation of liquid in a cylindrical container.

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.

Section-B

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.

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.

Laminar and turbulent Flows: Flow regimes and Reynolds number, critical velocity and critical Reynolds number, laminar flow in circular cross section pipes. Turbulent flows and flow losses in pipes, Darcy equation minor head losses in pipe fittings, hydraulic and energy gradient lines.

Flow Measurement: Manometers, Pitot tubes, venturimenter and orifice meters, orifices, mouth pieces, notches and weirs.

Recommended Books:

1. D.S. Kumar, Fluid Mechanics and Fluid Power Engineering, S.K. Kataria & Sons Publishes, New Delhi.
2. A.K. Jain, Fluid Mechanics, Khanna Publishers, New Delhi.
3. Wylie and Streeter, Fluid Mechanics, McGraw Hill Book Company, New York.
4. Fox and McDonald, Introduction of Fluid Mechanics, John Wiley & Sons (SEA) PTE Ltd., New York.
5. Shams, Mechanics of Fluid, McGraw Hill Book Company, New York.
6. K. Subramanya, Theory and application of Fluid Mechanics, Tata McGraw-Hill Publishing Company, New Delhi.
7. S.C. Gupta, Fluid Mechanics & Hydraulic Machines, Pearson Education Asia, N. Delhi.
8. Douglas JF, Gasiorek JM, Swaffield JP, Fluid Mechanics, Pitman

CVE 251 SURVEY-I LAB

	L	T	P	Credits
	0	0	2	1.0

1   Measurement of distance, ranging a line, plotting of details in chain survey.

2   Measurement of bearing and angles with compass, adjustment of traverse by graphical method.

3   Different methods of leveling, height of instrument, rise & fall methods.

4   Plane table survey, different methods of plotting two point & three point problem.

CVE 252 BUILDING MATERIALS LAB

	L	T	P	Credits
	0	0	2	1.0

Laboratory Work: Tests on: Cement, Fine aggregates, Coarse aggregate, Fresh concrete and Hardened concrete, Tests on bricks, Tests on Steel.

CVE 254 FLUID MECHANICS LAB

L	T	P	Credits
0	**0**	**2**	**1.0**

1. To determine the Reynolds's number and hence the type of flow
2. To determine co-efficient of discharge (c_d) for venturimeter and orifice meter & calibrate Rota meter
3. To determine the co-efficient of discharge (c_d) through different types of notches i.e. Rectangular & V- notch
4. To verify the Bernoulli's theorem
5. To determine the losses due to friction in pipes
6. To determine the coefficient of Pitot tube and plot the velocity profile across the cross section of pipe
7. To determine the Metacentric height & position of the metacenter with angle of heel for the ship model
8. To determine the co-efficient of discharge and co-efficient of velocity for Orifice & Mouthpiece

ਸਿਲੇਬਸ

ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ (ਮੁੱਢਲਾ ਗਿਆਨ)

ਅੰਡਰਗ੍ਰੈਜੁਏਟ ਪੱਧਰ ਤੇ ਪ੍ਰੋਫੈਸ਼ਨਲ ਕੋਰਸਾਂ ਲਈ ਕੁਆਲੀਫਾਇੰਗ ਪੰਜਾਬੀ (ਬੈਚ 2014 ਤੋ ਲਾਗੂ)

For Other State Students of

B. Tech & 5 Yr. Engineering Management Integrated Program Only

ਕੁੱਲ ਅੰਕ: 100 (ਮੌਖਿਕ ਪ੍ਰੀਖਿਆਂ 40 ਅੰਕ ਬਾਹਰੀ ਪ੍ਰੀਖਿਆਂ 60 ਅੰਕ)   ਪਾਸ   ਅੰਕ 35

ਸਮਾਂ : 3ਘੰਟੇ   ਪੀਰੀਅਡ: 3 ਪ੍ਰਤੀ ਹਫ਼ਤਾ

ਭਾਗ ੳ

1) ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ ਤੇ ਲੇਖਣ ਪ੍ਰਬੰਧ

ੳ) ਅੱਖਰ ਸਿੱਖਿਆ: ਤਰਤੀਬ ਵਾਰ ਤੇ ਭੁਲਾਵੇਂ ਅੱਖਰ

ਅ) ਅੱਖਰ ਬਣਤਰ: ਅੱਖਰ ਰੂਪ ਤੇ ਲਿਖਣ ਦੇ ਨਿਯਮ

2) ਗੁਰਮੁਖੀ ਅੱਖਰ ਤੇ ਪੰਜਾਬੀ ਧੁਨੀਆਂ ਦਾ ਪ੍ਰਬੰਧ

ੳ) ਸਵਰ ਤੇ ਵਿਅੰਜਨ: ਵਰਗੀਕਰਨ ਦੇ ਸਿਧਾਂਤ ਤੇ ਉਚਾਰਨ

ਅ) ਲਗਾਂਮਾਤਰਾਂ ਦੀ ਪਛਾਣ ਤੇ ਵਰਤੋ

ਭਾਗ ਅ

1) ਲਿਪੀ ਦੇ ਅੱਖਰਾ ਦੀ ਵਰਤੋ ਦੇ ਨਿਯਮ

ੳ) ਪੂਰੇ ਤੇ ਅੱਧੇ ਅੱਖਰ ਦੀ ਪਛਾਣ ਤੇ ਵਰਤੋ

ਅ) ਸਵਰ ਸੂਚਕ ਅੱਖਰਾ ਦੀ ਪਛਾਣ ਤੇ ਵਰਤੋ

2) ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ ਨਾਲ ਜਾਣ ਪਛਾਣ।

ੳ) ਹਫ਼ਤੇ ਦੇ ਦਿਨ

ਅ) ਮਹੀਨਿਆ ਦੇ ਨਾਮ

ੲ) ਰੰਗਾ ਦੇ ਨਾਮ

ਸ) ਪੰਜਾਬੀ ਰਿਸਤਾਨਾਤਾ ਪ੍ਰਬੰਧ ਸ਼ਬਦਾਵਲੀ

ਭਾਗ ੲ

1)   ਸ਼ਬਦ ਪ੍ਰਬੰਧ: ਸਬਦ ਜੋੜਾ ਦੀ ਵਰਤੋ

ੳ) ਦੇ ਅੱਖਰੀ ਸ਼ਬਦਾ ਦੇ ਸ਼ਬਦ ਜੋੜ

ਅ) ਤਿੰਨ ਅੱਖਰੀ ਸ਼ਬਦਾ ਦੇ ਸ਼ਬਦ ਜੋੜ

2) ਸ਼ਬਦਾਂ ਦੀਆ ਸ਼੍ਰੇਣੀਆਂ ਤੇ ਵਿਆਕਰਨਕ ਵਰਗਾ ਦੀ ਪਛਾਣ

ੳ) ਸ਼ਬਦਾ ਦੀਆ ਸ਼੍ਰੇਣੀਆਂ ਦਾ ਸਿਧਾਂਤ, ਪਛਾਣ ਤੇ ਵਰਤੋ, (ਨਾਵ, ਪੜਨਾਵ, ਵਿਸ਼ੇਸ਼ਣ, ਕਿਰਿਆ ਵਿਸ਼ੇਸ਼ਣ ਆਦਿ)

ਭਾਗ ਸ

1)   ਸ਼ਬਦ ਬਣਤਰਾਂ ਤੇ ਵਿਆਕਰਨਕ ਇਕਾਈਆ ਦਾ ਸਿਧਾਂਤ ਤੇ ਵਰਤੋ

ੳ) ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰਾ ਦਾ ਸਿਧਾਂਤ, ਪਛਾਣ ਤੇ ਵਰਤੋ

(ਅਗੇਤਰ, ਪਿਛੇਤਰ, ਸਮਾਸ, ਦੁਹਰੁਕਤੀ)

ਅ) ਵਿਆਕਰਨਕ ਇਕਾਈਆ ਦਾ ਸਿਧਾਂਤ, ਪਛਾਣ ਤੇ ਵਰਤੋ

(ਵਾਕੰਸ਼, ਉਪਵਾਕ ਤੇ ਵਾਕ)

ਅੰਡਰਗ੍ਰੈਜੂਏਟ ਪੱਧਰ ਤੇ ਪ੍ਰੋਫੈਸ਼ਨਲ ਕੋਰਸਾਂ ਲਈ ਕੁਆਲੀਫਾਇੰਗ ਪੰਜਾਬੀ

2013, 2014 ਅਤੇ 2015 ਪ੍ਰੀਖਿਆਵਾਂ ਲਈ

ਸਿਲੇਬਸ

ਕੁਲ ਸਮਾਂ:100   ਲਿਖਤੀ: 60 ਅੰਕ

ਸਮਾਂ:3 ਘੰਟੇ   ਮੌਖਿਕ   ਪ੍ਰੀਖਿਆ: 40
ਅੰਕ

ਪੀਰੀਅਡ: 3 ਪ੍ਰਤੀ ਹਫ਼ਤਾ   ਪਾਸ   ਅੰਕ: 35

1। ਪੰਜਾਬੀ ਦੀ ਪਾਠ ਪੁਸਤਕ

   (ਮੁੱਖ ਸੰਪਾਦਕ: ਬਲਦੇਵ ਸਿੰਘ ਚੀਮਾ, ਪ੍ਰਕਾਸ਼ਕ ਪਬਲੀਕੇਸ਼ਨ ਬਿਊਰੋ, ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ,
ਪਟਿਆਲਾ)

        ਭਾਗ ਪਹਿਲਾ ਪੰਜਾਬੀ ਸਾਹਿਤ

            (ੳ) ਕਵਿਤਾ

            (ਅ) ਕਹਾਣੀ

            (ੲ) ਨਾਟਕ

        ਭਾਗ ਦੂਜਾ ਪੰਜਾਬ ਸਭਿਆਚਾਰ ਅਤੇ ਲੋਕਧਾਰਾ

        ਭਾਗ ਤੀਜਾ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਗੁਰਮੁਖੀ ਲਿਪੀ

ਅੰਕ ਵੰਡ ਅਤੇ ਪੇਪਰ ਸੈਟਰ ਲਈ ਹਦਾਇਤਾਂ

        ਪੁਸਤਕ ਦੇ ਤਿੰਨ ਭਾਗ ਹਨ। ਪ੍ਰੰਤੂ ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦੇ ਭਾਗਾਂ ਵਿਚ ਹੋਵੇਗਾ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦਾ ਪਹਿਲਾ
ਭਾਗ ਪੁਸਤਕ ਦੇ ਪਹਿਲੇ ਭਾਗ ਉੱਤੇ ਆਧਾਰਿਤ ਹੋਵੇਗਾ। ਇਸ ਭਾਗ ਦੇ ਕੁਲ 36 ਅੰਕ ਹਨ। ਪ੍ਰਸ਼ਨ ਪੱਤਰ ਦਾ
ਦੂਜਾ ਭਾਗ ਪੁਸਤਕ ਦੇ ਦੂਜੇ ਅਤੇ ਤੀਜੇ ਭਾਗ ਉੱਤੇ ਅਧਾਰਿਤ ਹੋਵੇਗਾ। ਇਸ ਭਾਗ ਦੇ ਕੁਲ 24 ਅੰਕ ਹੋਣਗੇ
ਅਤੇ ਇਸ ਵਿਚ ਪੁਸਤਕ ਦੇ ਦੂਜੇ ਅਤੇ ਤੀਜੇ ਭਾਗ ਦੇ 12,12 ਅੰਕ ਹੋਣਗੇ।

(1)   ਪੁਸਤਕ ਦੇ ਪਹਿਲੇ ਭਾਗ ਦੇ ਤਿੰਨ ਉਪਭਾਗ ੳ,ਅ ਅਤੇ ੲ ਹਨ । ਇਨ੍ਹਾਂ ਤਿੰਨਾਂ ਉਪਭਾਗਾਂ ਵਿਚੋਂ ਹੇਠ
ਅਨੁਸਾਰ ਸੁਆਲ ਪੁੱਛੇ ਜਾਣ।

        (ੳ) ਇਸ ਵਿਚ ਕੁਲ 12 ਪ੍ਰਸ਼ਨ ਔਬਜੈਕਟਿਵਟਾਈਪ / ਮਲਟੀਪਲ ਚੋਣ ਵਾਲੇ ਹੋਣਗੇ। ਹਰ ਉਪਭਾਗ
ਵਿੱਚੋਂ 4 ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। ਸਾਰੇ ਪ੍ਰਸ਼ਨ ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ।   ਅੰਕ   3 X 4= 12

        (ਅ) ਹਰ ਉਪਭਾਗ ਵਿੱਚੋਂ 5—5 ਲਘੂ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ ਹਰ ਭਾਗ ਵਿੱਚੋਂ 3 ਪ੍ਰਸ਼ਨ
ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ। ਉੱਤਰ ਪੰਜ ਲਾਈਨਾਂ ਤੋਂ ਵੱਧ ਨਾ ਹੋਵੇ।   ਅੰਕ   9 X
2 = 18

        (ੲ) ਹਰ ਉਪਭਾਗ ਵਿੱਚੋਂ 1 ਪ੍ਰਸ਼ਨ ਪੁੱਛਿਆ ਜਾਵੇਗਾ। ਇਨ੍ਹਾਂ ਵਿੱਚੋਂ ਕੋਈ ਇਕ ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨਾ
ਹੋਵੇਗਾ। ਉੱਤਰ ਇਕ ਸਫੇ ਤੱਕ ਸੀਮਤ ਹੋਵੇ।   ਅੰਕ =
06

(2)   ਪੁਸਤਕ ਦੇ ਦੂਜੇ ਅਤੇ ਤੀਜੇ ਭਾਗ ਵਿੱਚੋਂ ਪ੍ਰਸ਼ਨ ਇਸ ਪ੍ਰਕਾਰ ਪੁੱਛੇ ਜਾਣਗੇ।

        (ੳ) ਹਰ ਭਾਗ ਵਿੱਚੋਂ 4 ਪ੍ਰਸ਼ਨ ਔਬਜੈਕਟਿਵ ਟਾਈਪ / ਮਲਟੀਪਲ ਚੋਣ ਵਾਲੇ ਹੋਣਗੇ। ਸਾਰੇ ਪ੍ਰਸ਼
ਕਰਨੇ ਲਾਜ਼ਮੀ ਹੋਣਗੇ।   ਅੰਕ   4+4 = 8

        (ਅ) ਹਰ ਇਕ ਭਾਗ ਵਿਚ 4 ਸੰਖੇਪ ਪ੍ਰਸ਼ਨ ਪੁੱਛੇ ਜਾਣਗੇ। 8 ਪ੍ਰਸ਼ਨਾਂ ਵਿੱਚੋਂ ਕੁਲ 5 ਪ੍ਰਸ਼ਨ ਹੱਲ ਕਰਨੇ
ਹੋਣਗੇ। ਹਰ ਭਾਗ ਵਿੱਚੋਂ 2 ਪ੍ਰਸ਼ਨ ਲਾਜ਼ਮੀ ਹਨ।   ਅੰਕ   5 X 2 = 10

B.TECH. SECOND YEAR

(CIVIL ENGINEERING)
(Batch 2014)
(Session 2015-2016)

SCHEME OF PAPERS

FOURTH SEMESTER (Civil Engineering)

Sr.No.	Course No.	Title	L	T	P	Credits
1.	BAS 201	Numerical Methods and Applications	3	1	0	3.5
2.	CPE 206	Visual Programming	3	1	0	3.5
3.	CVE 205	Survey-II	3	1	0	3.5
4.	CVE 206	Rock Mechanics & Engineering Geology	3	1	0	3.5
5.	CVE 207	Solid Mechanics	3	1	0	3.5
6.	CVE 208	Hydrology and Ground Water	3	1	0	3.5
7.	BAS 251	Numerical Methods and Applications Lab*	0	0	2	1.0
8.	CPE 256	Visual Programming Lab *	0	0	2	1.0
9.	CVE 257	Solid Mechanics Lab *	0	0	2	1.0
10		Environmental and road safety awareness				
			18	6	6	24.0
						Total Contact Hours: 30

* BAS 251, CPE 256 and CVE 257 are practical papers only.
There will not be any theory examination for these papers.

* In addition to above mentioned subjects, there will be an additional course on Environmental and road safety awareness as a qualifying subject

Department of Civil Engineering

PunjabiUniversity, Patiala.

General Instructions to the Paper Setters

(Common for B.Tech. in Computer Engineering, Electronics and communication Engineering, Mechanical Engineering, Civil Engineering and Integrated BTech/MBA Branches)

Applicable to 2014 Batch

The B. Tech paper structure will be as shown below:

Pattern of Question Paper
TITLE OF SUBJECT (CODE----)
Bachelor of Technology (Branch) Section: ………..
End Semester Exam

TIME ALLOWED: 3 Hour   Roll. No………….
Maximum Marks: 50

Note:- Attempt any Six questions selecting three questions from each section A and B. Section C is compulsory.

Section-A (From Section A of the syllabus)
Q1. ....
Q2. ....
Q3. ....
Q4. ....   3x5
Q5. ....

Section-B (From Section A of the syllabus)
Q6. ....
Q7. ....
Q8. ....
Q9…………………………………………..
Q10…………………………………………   3x5

Section-C (Common from Whole of the Syllabus)
Q11
a)..
b) ....
c) ....
d) ....
e) ....
f) ....
g) ....
h) ....
i) ....
j)…………………………………………   10x2=20

Note for the paper setter:

1. Numbers of questions to be set are nine (11) as per the above format.
2. Section A and B contain 10 questions of (5) marks each.
3. Section C is compulsory and contains ten sub-parts of one mark each. The answers for each question should preferably be of 2 to 3 lines.
4. The maximum limit on numerical questions to be set in the paper is 35% while minimum limit is 20% except theoretical, analysis and design papers
5. The paper setter shall provide detailed marking instructions and solution to numerical problems for evaluation purpose in the separate white envelopes provided for solutions.
6. The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.
7. Log tables, charts, graphs, Design data tables etc. should be specified, whenever needed.
8. Use of Scientific calculator should be clearly specified.
9. There are some MBA subjects (*like BAS 202 Operational Research, MBA 5011 Foundation of Financial Accounting, MBA 5012Foundation of Managerial Accounting, MBA 5022 Foundations of Marketing, MBA 5023 Foundations of Law, MBA 5031 Foundations of Macroeconomics, MBA 5032 Foundations of Microeconomics, MBA-5033 Foundations of International Business, MBA 5013 Foundations of Finance*) where syllabus is not divided among four sections namely A, B,C,D then Question paper must be set by without specifying section in it and giving proper weightage to the respective portions.

BAS 201 NUMERICAL METHODS AND APPLICATIONS

L	T	P	Credits
3	1	0	3.5

Section-A

Solution of Algebraic and Transcendental Equations: Truncation error; Round-Off error; Absolute and Relative errors; Bisection method; Iteration method: Conditions for the convergence of the Iteration method, Acceleration of convergence-Aitken's δ^2 process; Newton-Raphson method: Conditions for the convergence; Comparison of Regula Falsi method and Secant method; Rate of convergence and geometrical representation of each method; Newton-Raphson method for system of non-linear equations.

Solution of system of non-homogeneous linear equations: Matrix inversion method; Gauss Elimination method: Partial and Complete Pivoting.; Gauss Jordan Elimination method; Triangularization method; Factorization method; Jacobi's method and Gauss-Seidal's method. Solution of Tridiagonal system of equations.

Eigen values and Eigen vectors of a matrix: Eigen values of Transpose of matrix, inverse of matrix, Hermitian matrix and Similar matrices; Iterative Methods to find Eigen values and Eigen vectors: Power method and Jacobi method. Diagonalization of a matrix. Curve fitting: Method of Least Squares-fitting a straight line, a second degree parabola and exponential curves.

Section-B

Numerical Differentiation and Integration: Numerical Differentiation using finite differences, Numerical Integration; Newton-Cotes methods, Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule.

Numerical Solution of Differential Equations: Numerical solution of first order ordinary differential equations using Taylor's series method; Picard's method; Euler's method; Improved Euler's method; Modified Euler's method; Runge-Kutta method of Second and Fourth order; Predictor-Corrector methods: Milne's method and Adam's method. Boundary values problems for ordinary differential equation by finite difference method.

RECOMMENDED BOOKS

1. Numerical Methods for Mathematics, Science and Engineering by Mathews, Prentice-Hall of India. Ed. Second.
2. Numerical Methods for Scientist and Engineering Computation by M. K. Jain, S. R. K. Iyengar and R. K. Jain, New Age International Publisher, Ed. Fourth.
3. Introductory Methods of Numerical Analysis by S. S. Sastry

CPE-206   **VISUAL PROGRAMMING USING VB.NET**

L	T	P	Cr
3	1	0	3.5

Section A

Introduction to .NET: NET Framework features & architecture, CLR, Common Type System, MSIL, Assemblies and class libraries.

Introduction to Visual studio: Project basics, types of project in . Net, IDE of VB.NET-Menu bar,Toolbar, Solution Explorer, Toolbox, Properties Window, Form Designer, Output Window, Object Browser. Event driven programming: Methods and Events.

The VB.NET Language: Variables, Declaring variables, Data Type of variables, Scope & lifetime of a variable, Constants. Control flow statements:conditional statement, loop statement. Msgbox & Inputbox.Arrays, types of array, String.

Working with Forms: Loading, showing and hiding forms, controlling One form within another.GUI Programmingwith Windows Form: Textbox, Label, Button, Listbox, Combobox, Checkbox, PictureBox, Radio Button, Panel, Scroll bar, Timer, List View, Tree View, Toolbar, Status Bar. Their Properties, Methods and Events.

Common Dialog Controls: OpenFile Dilog,SaveFileDialog, FontDialog, ColorDialog, Print Dialog.

MDI: SDI vs MDI,Designing menus, Adding Menus.

Section B

Procedures And Classes:Collections, Subroutines, Functions,Passing variable, Number of Argument, Optional Argument, Returning value from function, classes. Object & Classes, Namespaces, Error Handling, Debugging.

Using ADO.Net: Connection, Data Adapter, Data Sets, Data Commands, Advance Data Bound Controls, Introduction to Crystal Reports.

Building a custom window control: Adding new properties, methods and events, testing a control, enhancing existing controls.

Introduction to Database Concepts: Data independence, DBMS Architecture, components of a database system, Advantages and disadvantages of Database system, Schemas, Instances, ER Model.

Introduction to Relational Database Management System:DDL statements: Table Creation and Management: Create Alter, Drop and Rename Table, create view, DML statements: select, insert, update and delete. TCL statement:Commit, Rollback. Integrity Constraints in SQL: Primary key**,** Foreign Key, Not Null, Unique, Check,Basic SQL Query,

Note: This subject is common to all branches. Only basics of Database concepts and SQL are covered.

RECOMMENDED BOOKS:
1. Brian Siler & Jeff Spotts, "Microsoft Visual Basic.Net"
2. Matthew MacDonald, ".NET Insight for VB Developers"
3. "Mastering in VB.Net"
4. "Using Microsoft Visual Basic.NET" by Brian Siler and Jeff Spotts, Pearson Education.
5. Prateek Bhatia, Database Management system, Kalayani Publishers
6. Korth and Silberschatz Abraham, Database Concepts, McGraw Hall, 1991

CVE 205 SURVEY – II

L	T	P	Credits
3	1	0	3.5

Section-A

Theodolite: Different types of Theodolites, temporary & permanent adjustment, traversing with a Theodolite, adjustment of closing error by Bowditch & transit rules.

Curves: Different types of curves, their degree and calculation of ordinates, and angles, their layout obstacles in curves.

Tachometric Survey: Different types of tachometer, calculation of vertical and horizontal distances, substance bar. Tachometric leveling with both angle of depression and elevation, errors due to curvature & refraction.

Section-B

Triangulation: Measurement of baseline, corrections for the baseline, selection of stations.

Trigonometric Levelling: Height & distance of inaccessible objects.

GIS: Introduction, concepts and terminology, Utility of GIS, Essential components of a GIS, Data acquisition through scanners and digitizers, Data storage, Data manipulation and analysis Applications of GIS.

GPS: Introduction, working principle, various application of GPS related to Civil Engg., components of GPS – Point positioning and differential positioning.

Remote Sensing: Introduction, interaction of EMR with Earth Surface Working Principles and Instrumentation.

Recommended Books:
1. C.L. Kochher, Surveying, Danpat Rai & Sons
2. Kanetkar, T. P., Surveying Vol. I & II, Pune Vidhyarthi Griha Prakashan (1985).
3. P.B. Sahiwney, Surveying
4. Singh, Narinder, Surveying, Tata McGraw Hill (1992).
5. Punmia, B. C., Surveying Vol. I and II, Luxmi Publications (1998).
6. Agor, R., Surveying, Khanna Publishers (1982).
7. Venkataramiah, C., A Text Book of Surveying, Universities Press (1996).
8. Kaplan, E.D., Understanding GPS : Principles and applications
9. Campbell, J.B. Taylvor and Francis, "Introduction to Remote Sensing".

CVE 206 ROCK MECHANICS & ENGINEERING GEOLOGY

	L	T	P	Credits
	3	1	0	3.5

Section-A

General Geology: Importance of Engg. Geology applied to Civil Engg. Practices. Weathering, definition, types and effect. Geological works of rivers, wind, glaciers as agents of erosion, transportation and depostion.

Rocks & Minerals: Minerals, their identification igneous, sedimentary & metamorphic rocks. classification of rocks for engineering purposes. Rock quality designation (ROD)

Structural Geology: Brief idea about stratification, apparent dip, true dip, strike and in conformities.

Folds, faults & joints: definition, classification relation to engg. Operations.

Engineering Geology: Geological considerations in the Engg. Projects like tunnels, highways, foundation, dams, reservoirs.

Section-B

Earthquake: Definition, terminology, earthquake waves, intensity, recording of earthquake.

Engineering properties of rocks and laboratory measurement: Uniaxial compression test, tensile tests, permeability test, shear tests, size and shape of specimen rate of testing. Confining pressure, stress strain curves of typical rocks. Strength of intact and fissured rocks, effect of anisotropy, influence of effect of pore fluid type unsaturated and temperature.

In-situ determination of Engg. Properties of Rock masses: Necessity of in-sity tests, uniaxial load tests in tunnels and open excavations, cable tests, flat jack test, shear test, pressure tunnel test. Simple methods of determining in situ stresses bore hole inercoring technique-bore hold deformation gauges.

Improvement in properties of Rock masses: Pressure grouting for dams and tunnels, rock reinforcement rock bolting.

Recommended Books:

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

CVE 207 SOLID MECHANICS

L	T	P	Credits
3	1	0	3.5

Section-A

Simple Stresses and Strains: Introduction, stress-strain curves for elastic materials, different types of stresses and strains, elastic limit, Hookes' Law, Young's modulus of elasticity, Bulk modulus, modulus of rigidity, Lateral strain, Elongation due to self weight bars of tapering sections, bars of varying sections, equivalent area of composite sections, temperature stresses, relation between elastic constants. Volumetric strain.

Complex Stress: Introduction, rectangular block subjected to normal stresses along and across two planes, combination of normal and tangential stresses, pure shear, principal stresses and Principal planes, Mohrs Circle, Principal strains, Computation of Principal stresses from Principal strains.

Bending moment & shear force diagrams: Introduction, Types of beams, supports and loading, sign conventions for bending moments and shear forces, Shear force and Bending moment diagrams for simply supported, cantilever and overhanging beams for different types of loading. Relationship between Bending moment, Shear Force and loading Graphical method of plotting Bending Moment & Shear Force Diagrams.

Bending and Shear Stresses: Introduction, Assumption made in theory of simple bending, derivation of basic equation, determination of stresses in simple sections, built up sections and composite sections. (flitched Beams), Introduction to theory of unsymmetrical bending beams of uniform strength, variation of shear stress across depth of various beam sections.

Section-B

Torsion: Introduction, torsion of shafts and springs, derivation of basic torsion equation, Power transmitted, sections subjected to combined bending and torsion, Principal stresses, equivalent Bending Moment & Torque, Helical spring, analysis of closed Coil helical spring.

Deflection of Beams: Derivation of basic equation of elastic curve, deflection in beams with different end conditions and different loadings by double integration method, Macaulay's method, moment area theorem, conjugate beam method, unit method and strain energy method. Maxwel's reciprocal theorem.

Columns and Struts: Introduction, Euler's buckling loads for columns with different end conditions, limitations of Euler's formula, column carrying eccentric loads, laterally loaded columns, empirical formula.

Strain Energy: Introduction, Strain Energy due to axial Loads, Bending shear and Torsional stress, Impact load, strain energy due to Principal stress & strains, theories of failure.

Recommended Books:

1. E.P. Popov, Engineering Mechanics of Solids, Prentice-Hall of India Pvt. Ltd., New Delhi, 1996.
2. Timoshenko and Gere, Mechanics of Materials, CBS publishers and Distributors, N Delhi
3. Pytel & Kiusalaas, Mechanics of Materials, Cengage Learning, New Delhi
4. Gere, Mechanics of Materials, Cengage Learning, New Delhi
5. D.K. Singh, Mechanics of Solids, Pearson Education Asia, N Delhi
6. Irning H Shames, James M Pitarresi, Solid Mechanics, PHI, N Delhi
7. Sadhu Singh, Strength of Materials, Khanna Publishers, Delhi.
8. S.M.A. Kazimi, Strength of Materials

CVE 208 HYDROLOGY AND GROUND WATER

L	T	P	Credits
3	1	0	3.5

Section-A

Introduction: Hydrologic cycle, Scope and Applications

Precipitation: Types Forms, Measurement by rain gauge and other methods, Design of rain gauges station, Mean precipitation, Presentation of rainfall data, Estimation of messing rainfall data. Test for consistency of record, Analysis of rainfall data, Intensity-depth-area relationship, Duration-Frequency curves, Depth-Area-Duration curves, Frequency analysis of rainfall data. Abstractions from Precipitation: Evaporation, Factors affecting evaporation, Measurement by different methods, Evaporation measurement, infiltration, Factors affecting infiltration Measurement, Infiltration capacity curve, Infiltration indices.

Run Off: Factors affecting run off, Estimation of run-off (various methods), Rainfall-runoff co-relations.

Hydrographs: Components, Base flow separation, Derivation of unit hydrograph and its applications & limitations, Distribution graph, Synthetic and Instantaneous unit hydrograph.

Section-B

Reservoir Planning: Types of reservoir, Storage zones, Selection of reservoir site, Mass curve analysis for reservoir capacity, Reservoir yield and its determination for a given reservoir capacity, Reservoir sedimentation and its control, Reservoir evaporation and Methods for its reduction

Floods: Estimation of peak flood, Methods of flood control, Flood control economics and Flood routing,

Ground Water:Role of Ground Water in hydrological cycle, Distribution of Ground Water, Types of aquifers, Aquifers parameters.

Well Hydraulics: Darcy's law, Types of aquifers, Steady flow towards fully penetrating well, Equation of motion and its applications to ground water flow problems, Determination of aquifer constant in various types of aquifers, Types of tube wells, Methods of construction, Well development.

Recommended Books:

1. Subramanya, K., Engineering Hydrology, Tata McGraw-Hill Publication (2008).
2. Raghunath, H. M., Hydrology, New Age International Publishers(2007).
3. Garg, S. K., Irrigation Engineering and Hydraulic Structures, Standard Book House(2007)
4. Chow, V. T., Applied Hydrology, McGraw Hill Company(2003).
5. Ojha, Bhunia & Berndtsson, Engineering Hydrology, Oxford Publication(2008).

BAS 251 NUMERICAL METHODS AND APPLICATIONS LAB

L	T	P	Credits
0	**0**	**2**	**1.0**

1. WAP to implement Regular Falsi Method

2. WAP to implement Secant Method

3. WAP to implement Newton – Raphson Method

4. WAP to implement Gauss – Elimination Method

5. WAP to implement Gauss – Seidal Method

6. WAP to implement Trapezoidal Rule

7. WAP to implement Simpson Rule

8. WAP to implement Eular's Method

9. WAP to implement Runge – Kutta Method

10. WAP to implement Predictor Corrector Method

11. WAP to implement Power Method

CPE – 256 VISUAL PROGRAMMING USING VB.NET LAB

	L	T	P	Cr
	0	0	2	1.0

1. Write windows applications to demonstrate control structures of VB.NET.

2. Write window applications to demonstrate various controls of VB.NET.

3. Write a Windows application that functions like a Mathematical Calculator.

4. Write a windows application that functions like a Stopwatch.

5. Write a Windows application demonstrating the use of string functions.

6. Write a Windows application demonstrating the use of Arrays.

7. Write a windows application that functions like a Notepad (using Menu Editor, Common Dialog Control, Textbox's properties).

8. Write a windows application demonstrating the use of ADO

9. Write a Windows application for building a user control.

10. Write a windows application demonstrating various MDI features supported in VB.NET.

11. Creation of tables, virtual tables and views in SQL.

12. Viewing the contents of data dictionary.

13. Insert, update, delete of rows tables in SQL.

14. Manipulation (Insert, Update, Delete) on Tables.

15. Adding constraints like: primary key, not Null, Foreign key.

CVE 257 SOLID MECHANICS LAB

	L	T	P	Credits
	0	0	2	1.0

1. To determine Rockwell hardness number of the specimen of steel / soft metal

2. To determine Brinell hardness number of the specimen of steel / soft metal

3. To determine Vicker's hardness number of the specimen of steel / soft metal

4. To determine the modulus of rigidity of a bar on torsion testing machine (destructive test)

5. To determine the impact strength of a specimen on Izod / Charpy impact testing machine

6. To determine the Young's modulus of the material of a beam simply supported at the ends and carrying a concentrated load at the center

7. To determine the Young's modulus of the a strip on tensile testing machine

8. To study the behaviour of the material on universal testing machine

Environmental and Road Safety Awareness

Time Allowed : 3 hours   Total Marks : 100
Total lectures : 50
Pass marks   : 35

Instructions

a) The paper has been introduced from the session 2013-14.

b) The paper will be taught in the Second year/fourth Semester of all the U.G. Courses (B.A., B.Com., B.Sc., Law, Engineering, Commerce, Agriculture etc.) except LL.B. three year course and will be a qualifying paper only. The marks of this paper will not be counted towards final score of the under graduate degree.

c) This will cover only preliminary and basics of the subject and the paper will be set accordingly.

d) The written paper will have two parts. Each part of the paper will be of 50 marks and will contain ten questions. The candidates will attempt five questions out of each part. The answer to each question should not exceed 500 words. Each question will carry ten marks.

Section – I

Unit 1 : The multidisciplinary nature of environmental studies. Definition, scope and importance

- Concept of Biosphere – Lithosphere, Hydrosphere, Atmosphere.
- Need for public awareness   (6 lectures)

Unit – 2 Natural Resources – Renewable and non-renewable resources.
- Natural resources and associated problems.
  a) Forest resources : use and over exploitation, deforestation and its impact.
  b) Water resources ; use and overutilization of surface and ground water and its impact.
  c) Mineral resources : use and effects on environment on over exploitation.
  d) Food resources : Effects modern agriculture, fertilizer-pesticide problem, water logging and salinity.
  e) Energy resources : Growing energy needs, renewable and non-renewable energy sources, use of alternate energy resources.
  f) Role of an individual in conservation of natural resources for sustainable development.   (7 lectures)

Unit 3 : Ecosystems

- Ecosystem and its components : Definition, structure and function; producer, consumer and decomposer.

- Types of Ecosystem (Introductiononly)
- Food Chains, food web and ecological pyramids   (6 lectures)

Unit – 4 : Biodiversity and conservation

- Introduction – Definition : genetic, species and ecosystem diversity, value of biodiversity.
- Hot spots of biodiversity
- Threats to biodiversity : habitat loss, poocting of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India.
- Conservation of Biodiversity.   (6 lectures)

Section – II

Units 5 : Environmental Pollution

- Definition, causes, effects and control measures of
    a) Air pollution
    b) Water pollution
    c) Soil pollution
    d) Marine pollution
    e) Noise pollution
    f) Thermal pollution
    g) Nuclear hazard
- Role of an individual in preventionof pollution.
- Solid waste management : vermicomposting.
- Disaster management : Floods, earthquake, cyclone and landslides   (7 lectures)

Unit 6 : Social Issues and the Environment

- Urban problems related to energy.
- Water conservation rain water harvesting, water shed management.
- Resettlement and rehabilitation of people : its problems and concerns.
- Climate changes, global warming, acid rain, ozone layer depletion.
- Consumerism and waste products.
- Population explosion – Family welfare programme   (6 lectures)

Unit 7 : Introduction to Environmental Protection Laws in India

- Environmental Protection Act.
- Air (Preventionand control of pollution) Act.
- Water (Prevention and Control of pollution) Act.
- Wild life Protection Act.
- Forest Conservation Act.
- Issues involved in the enforcement of environmental legislation.   (6 lectures)

Unit 8 : Road safety Awareness

- Concept and significance of Road safety.

- Traffic signs.

- Traffic rules.

- Traffic Offences and penalties.

- How to obtain license.

- Role of first aid in Road Safety.   (6 lectures)

B.TECH. THIRD YEAR

(CIVIL ENGINEERING)
(Batch 2014)
(Session 2016-2017)

SCHEME OF PAPERS

FIFTH SEMESTER (Civil Engineering)

Sr.No.	Course No.	Title	L	T	P	Credits
1.	CVE-301	Transportation Engg.-I	3	1	0	3.5
2.	CVE-302	Structure Analysis - I	3	1	0	3.5
3.	CVE-303	Concrete Structure Design - I	3	1	0	3.5
4.	CVE-304	Estimation and Costing	3	1	0	3.5
5.	CVE-305	Irrigation Engg. - I	3	1	0	3.5
6.	CVE-306	Steel Structure Design - I	3	1	0	3.5
7.	CVE-351	Transportation Engg.-I (LAB)[*]	0	0	2	1.0
8.	CVE-352	Structure Analysis (LAB)[*]	0	0	2	1.0
9.	CVE-353	Concrete Lab (LAB)[*]	0	0	2	1.0
10	STE - 351	Survey camp	0	0	0	6.0
			18	**6**	**6**	**30.0**
					Total Contact Hours: 30	

❖ CVE 351, CVE 352 and CVE 353 are practical papers only.
   There will not be any theory examination for these papers.
❖ STE - 351 is survey camp. Duration of the survey camp will be a four to six week and will be held at the end of 4th semester

Department of Civil Engineering

PunjabiUniversity, Patiala.

General Instructions to the Paper Setters
(Common for B.Tech. in Computer Engineering, Electronics and communication Engineering, Mechanical Engineering, Civil Engineering and Integrated BTech/MBA Branches)

Applicable to 2014 Batch

The B. Tech paper structure will be as shown below:

Pattern of Question Paper
TITLE OF SUBJECT (CODE----)
Bachelor of Technology (Branch) Section: ………..
End Semester Exam

TIME ALLOWED: 3 Hour   Roll. No………….
Maximum Marks: 50

Note:- Attempt any Six questions selecting three questions from each section A and B. Section C is compulsory.

Section-A (From Section A of the syllabus)
Q1. ....
Q2. ....
Q3. ....
Q4. ....   3x5
Q5. ....
Section-B (From Section A of the syllabus)
Q6. ....
Q7. ....
Q8. ....
Q9………………………………………..
Q10…………………………………………   3x5

Section-C (Common from Whole of the Syllabus)
Q11
a)..
b) ....
c) ....
d) ....
e) ....
f) ....
g) ....
h) ....
i) ....
j)…………………………………………   10x2=20

Note for the paper setter:

10. Numbers of questions to be set are nine (11) as per the above format.

11. Section A and B contain 10 questions of (5) marks each.

12. Section C is compulsory and contains ten sub-parts of one mark each. The answers for each question should preferably be of 2 to 3 lines.

13. The maximum limit on numerical questions to be set in the paper is 35% while minimum limit is 20% except theoretical, analysis and design papers

14. The paper setter shall provide detailed marking instructions and solution to numerical problems for evaluation purpose in the separate white envelopes provided for solutions.

15. The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.

16. Log tables, charts, graphs, Design data tables etc. should be specified, whenever needed.

17. Use of Scientific calculator should be clearly specified.

18. There are some MBA subjects (*like BAS 202 Operational Research, MBA 5011 Foundation of Financial Accounting, MBA 5012Foundation of Managerial Accounting, MBA 5022 Foundations of Marketing, MBA 5023 Foundations of Law, MBA 5031 Foundations of Macroeconomics, MBA 5032 Foundations of Microeconomics, MBA-5033 Foundations of International Business, MBA 5013 Foundations of Finance*) where syllabus is not divided among four sections namely A, B,C,D then Question paper must be set by without specifying section in it and giving proper weightage to the respective portions.

CVE301TRANSPORTATION ENGINEERING-I

	L	T	P	Credits
	3	1	0	3.5

Section-A

Introduction: Transportation and its important. Different modes of transportation. Brief review of history of road development in India and abroad: Roman, Tresagne, Telford and Macadam constructions. Road patterns. Classification of roads, Objectives of highway planning, Planning surveys. Saturation system of planning.

Highway Plans, Highway Alignment and Surveys: Main features of 20 years road development plans in India. Requirements of an ideal highway alignment. Factors affecting alignment. Surveys for highway alignment.

Cross Section Elements and Sight Distant Considerations: Cross section elements: friction, carriageway, formation width, land width, camber, IRC recommended values. Types of terrain Design speed. Sight distant, stopping sight distant, overtaking sight distant, overtaking zones, intermediate sight distant, sight distanT at intersections, head light sight distant, set back distant. Critical locations for sight distant.

Design of Horizontal and Vertical Alignment: Effects of centrifugal force. Design of superelevation. Providing superelevation in the field. Radius of circular curves. Extra-widening. Type and length of transition curves. Gradient, types, values. Summit curves and valley curves, their design criterion. Grade compensation on curves.

Section-B

Traffic Characteristics And Traffic Surveys: Road user and vehicular characteristics. Traffic studies such as volume, speed and O & D study. Parking and accident studies. Fundamental diagram of traffic flow. Level of service. PCU. Capacity for non-urban roads. Causes and preventive measures for road accidents. Traffic Control Devise: Traffic control devise: signs, signals, markings and islands. Types of signs. Types of signals. Design of an isolated fixed time signal by IRC method. Intersections at grade and grade separated intersections. Design of a rotary. Types of grade separated intersections.

Highway Materials:Soil And Aggregates: Index properties of soil, soil classification, CBR test, plate bearing test. Desirable properties of aggregates. Various tests, testing procedures and IRC/IS specification for suitability of aggregates. Proportioning of aggregates for road construction by trial and error and Routhfuch method.

Bituminous Materials and Bituminous Mixes: Types of bituminous materials: bitumen, tar, cutback and emulsions. Various tests, testing procedures and IRS/IS specifications for suitability of bituminous materials in road construction. Marshall method of mix design. Basic concept of use of polymers and rubber modified bitumen in bituminous mixes.

Recommended Books:

6. S.K.Khanna & C.E.G.Justo, Highway Engg , Nem Chand & Bros,Roorkee

7. G.V.Rao Principles of Transportation and Highway Engg. by,Tata McGraw Hill Pub., N.Delhi.

8. L.R.Kadiyali ,Traffic Engg. And Transport Planning ,Khanna Pub.Delhi.

9. Matson, T.M.,Smith,W.S. and Hurd,P.W , Traffic Engg. by.McGraw Hill Book Co., New York.

10. L.R.Kadyali and N.B.Lal, Principles and PractiCEs of Highway Engineering, Khanna Publishers.

CVE 302 STRUCTURE ANALYSIS - I

	L	T	P	Crédits
	3	1	0	3.5

Section-A

INTRODUCTION: Classification of structure, support conditions, Equations of static equilibrium, Free body Diagram, Degree of static and kinematic indeterminacy, Determinate and indeterminate structure. Maxwell reciprocal theorem, Betti law of reciprocal deflection, Castiglione theorem

ANALYSIS OF DETERMINATE TRUSSES
Introduction: Determination of forces in member of trusses by method of joints, method of sections. Deflection of pin joint plane frame by unit load method.

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.

INFLUENCVE LINES
Construction of Influence lines for reaction, shear forces and bending moment for simply supported, overhauling and compound beams, influence lines for girders with floor beams, Influence lines for forces in members of frames. Influence lines for deflection.

Section-B

ARCHES
Introduction, Analysis of three hinged parabolic, circular and semicircular arch at same level and different level support. Influence lines for horizontal thrust, shear force and bending moment for three hinged arches. Nominal thrust and radial shear.

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.

Analysis of Gravity dams, chimneys and Retaining Walls Introduction, limit of eccentricity for no tension in the section, core of the section, middle third rule, wind pressure on chimneys

SPACVE FRAMES: Introduction, simple space truss, types of supports, equilibrium and stability conditions, and analysis of determinate and indeterminate space frames using tension coefficient method.

Recommended Books:

1   C.S. Reddy, Basic structural analysis, Tata McGraw Hill
2   C. K. Wang. Intermediate structural analysis, Tata McGraw Hill
3   B.C. Punima, Theory of structures, Lakshmi Pub. Delhi
4   Theory of structures – S. Ramamrutham, Dhanpat Rai Publication.

CVE 303 CONCRETE STRUCTURE DESIGN - I

	L	T	P	Crédits
	3	1	0	3.5

Section-A

Introduction: reinforced concrete, definition, properties of materials, grades of concrete and reinforcing steel, stress-strain curves, permissible stresses, concrete structural systems-slabs, beams, columns and foundations, design philosophies working stress design, ultimate strength and limit state design method.

Introduction To Working Stress Design Method: Assumptions, derivation of design constants, problems on computation of moment of resistance.

Limit State Design Method: Introduction, Limit States, Characteristic values, characteristic strength, characteristic loads, design values for materials and loads, factored loads.

Limit State Of Collapse (Flexure). Type of failures, assumptions for analysis. Analysis of beams: Moment of Resistance of singly, doubly and flanged beams.

Limit State Of Collapse (Shear, bond and torsion) Introduction - Design for shear, design of rectangular beam section for torsion, development length.

Section-B

Limit State Of Serviceability. Deflection, effective span to effective depth ratio, modification factors. Crack formation and its control.

Design of Rectangular and Flanged beams (singly reinforced and doubly reinforced sections). Analysis and design of one and two way slabs, Design of continuous beam

Design of axially and eccentrically loaded Short columns. (Uniaxial and Biaxial)
Design of Stair case. (single flight and doglegged stair)

Recommended Books:

1. Jain, A. K., Limit State Design of Reinforced Concrete, Nem Chand Brothers.
2. Ram Chandra, Limit State Design, Standard Book House.
3. Shushil Kumar, Treasure of RCC, Standard Book House.
4. S. Ramamurutham, Design of Reinforced Concrete Structure, Dhanpat Rai Publishing Comp.

References Books:

1. Pillai & Menon, Reinforced Concrete Design, Tata McGraw Hill Publishers
2. Varghese, P. C., Limit State Design of Reinforced Concrete, Prentice Hall of India.
3. Sinha, S. N. and Roy, Fundamentals of Reinforced Concrete, S Chand Publishers.

CVE 304 ESTIMATION AND COSTING

	L	**T**	**P**	**Credits**
	3	**1**	**0**	**3.5**

Section A

Estimate: Principles of estimation, units, items of work, different kinds of estimates, different methods of estimation, estimation of materials in single room building, two roomed building with different sections of walls, foundation, floors and roofs, R.B. and R.VC.C. works, Plastering, White-washing, Distempering and painting, doors and windows, lump sum items, Estimates of canals, roads etc.

Specification of Works:Necessity of specifications, types of specifications, general specifications, specification for bricks, Cement, sand, water, lime, reinforcement; Detailed specifications for Earthwork, Cement, concrete, brick work, floorings, D.P.C., R.C.C., Cement plastering, white and colour washing, distempering, painting.

Section B

Rate Analysis: Purpose, importance and requirements of rate analysis, units of measurement, preparation of rate analysis, procedure of rate analysis for items:- Earthwork, concrete works, R.C.C. works, reinforced brick work, plastering, painting, finishing(white-washing, distempering).

Public Works Account: Introduction, function of P.W. department, contract, guidelines, types of contracts, their advantages and disadvantages, Tender and acceptance of tender, Earnest money, security money, retention money, measurement book, cash book, preparation, examination and payment of bills, first and final bills, administrative sanction, technical sanction.

Recommended Books:

1.   P.L.Bhasin ,Estimating and Costing for Building & Civil Engg.Works , S.Chand & Co., N.Delhi.
2.   B.N.Dutta ,Estimating & Costing in Civil Engg..: Theory & PractiCVE , S.Dutta & Co., Lucknow.
3.   George H.Cooper ,Building Construction Estimating by, McGraw Hill Book Co., New York.

CVE 305 Irrigation Engineering - I

L	T	P	Crédits
3	1	0	3.5

Section-A

Methoes Of Irrigation: Advantages and disadvantages of irrigation, water requirements of crops, factors affecting water requirement, consumptive use of water, water depth or delta and crop relation, Duty of water, relation between delta, duty and base period, Soil crop relation-ship and soil fertility, sprinkler irrigation advantages & limitations. Planning and of sprinkler irrigation, drip irrigation advantages & limitations, suitability.

Canal Irrigation: Classifications of canals, canal alignment, Inundation canals. Advantages and disadvantages of bandhara irrigation. Silt theories-Kennedy's theory, Lacey's theory. Drawbacks in Kennedy's & Lacey's theories, comparison of Lacey's and Kennedy's theories, suspended and bed loads. Design of unlined canals based on Kennedy & Lacey's theories.

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

Section-B

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.

Tube -Well Irrigation: Types of tube -wells - strainer type, cavity type and slotted type. Type of strainer, aquifer, porosity, uniformity coefficient, specific yield & specific retention, coefficients of permeability, transmissibility and storage. Yield or discharge of a tube well, Assumptions, Theim & Duputi's formulae. Rehabilitation of tubewell.

River Training Works: Objectives, classification of river-training works, Design of Guide Banks. Groynes or spurs - their design and classification. Approach embankments and afflux embankments

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.

Recommended Books:

1. S.K. Garg, Irrigation Engineering and Hydraulic Structures, Khanna Publishers, New Delhi.
2. Bharat Singh, Fundamentals of Irrigation Engineering, Nem Chand, Roorke.

CVE 306STEEL STRUCTURAL DESIGN - I

	L	T	P	Crédits
	3	1	0	3.5

Section-A

Introduction: Loads, structural steels and their specifications, structural elements, steel vs. concrete and timber, design specifications as per IS: 800, structural layout, strength and stiffness considerations, efficiency of cross-section, safety and serviceability considerations.

Riveted/Bolted Connection: Riveting and bolting, their types, failure of riveted joint, efficiency of a joint, design of riveted joint, concentric riveted joints, advantages and disadvantages of bolted connections, stresses in bolts

Welded Connection: Types of welded joints, design of welded joint subjected to axial loads.

Compression Members: Axially loaded columns, effective length, slenderness ratio, allowable stresses, general specifications, design of axially loaded members, laced and battened columns and their design, built up compression members, eccentrically loaded columns and their design, column splice and its design.

Tension Members: Types of tension members, net area, net effective area for angles, tees, design of tension members, tension splice, and lug angles.

Section-B

Flexural Members (Beams): Design criteria, permissible stresses, laterally supported beams and their design laterally unsupported beams and their design, web buckling, web crippling.

Column Bases: Introduction, slab base, gusseted base, column base subjected to moment, grillage foundation.

Design of Steel Roof Truss: design of members for the given loads, design of riveted and welded connections, detailed working drawings.

Plate Girders: Introduction, weight and economic depth, design of flanges, design of web, curtailment of flange plates, intermediate and bearing stiffeners, design of welded plate girders, web and flange splice.

Book Recommended

1   Vazirani & Ratwani , Design of Steel Structures Vol.-III.Khanna Publishers
2   Arya & Azmani, Design of Steel Structures, Nem chand & Bros., Roorkee
3   Ram Chandra, Design of Steel Structures Vol.-I, Standard Book House

References Book

1. N. Subramanian, Design of Steel Structures, , Oxford University Press
2. S.K.Duggal,Steel Structures, Tata Mc Graw Hill

CVE 351 TRANSPORTATION ENGINEERING-I LAB

L	T	P	Credits
0	0	2	1.0

LIST OF EXPERIMENTS

1. Aggregate Impact Test.

2. Los-Angeles Abrasion Test on Aggregates.

3. Crushing Strength Test on Aggregates.

4. Penetration Test on Bitumen.

5. Ductility Test on Bitumen.

6. Viscosity Test on Bituminous Material

7. Softening Point Test on Bitumen.

8. Flash and Fire Point Test on Bitumen.

9. Specific gravity of bitumen

10. Proportioning of aggregate

CVE 352 STRUCTURE ANALYSIS LAB

L	**T**	**P**	**Credits**
0	**0**	**2**	**1.0**

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.
5   Study of behavior of columns and struts with different end conditions.
6   Experiment on three-hinged arch.
7   Experiment on two-hinged arch.
8   Deflection of a statically determinate pin jointed truss.
9   Experiment on curved beams.
10   Unsymmetrical bending of a cantilever beam.

References Manual:

1. Sastry, V.V. and Kukereja, C.B., Experimental Methods in Structural Mechanics, Dhanpat Rai & Sons.

CVE 353 CONCRETE LAB

L	T	P	Credits
0	0	2	1.0

1. To Determine the Compressive Strength of Cement.
2. Design of a concrete mix in accordance with BIS and ACI guidelines.
3. To Determine the Slump, Compaction Factor and Vee-Bee Time of Concrete.
4. Determination of flexural strength of concrete.
5. Determination of split tensile strength of concrete.
6. Determine the modulus of elasticity.
7. Effect of partial replacement of Cement by fly ash on properties of concrete.
8. To determine the Compressive Strength of hardened Concrete by Non-Destructive Test.
   (Rebound hammer and Ultrasonic pulse velocity)

Books/Manuals :

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

STE 351 SURVEY CAMP

L	T	P	Credits
0	0	0	6.0

Duration of the survey camp will be a four to six week and will be held at the end of 4[th]semester.

B.TECH. THIRD YEAR
(CIVIL ENGINEERING)

(Batch 2014)
(Session 2016-2017)

SCHEME OF PAPERS

SIXTH SEMESTER (Civil Engineering)

Sr.No.	Course No.1.	Title	L	T	P	Credits
1	CVE-307	Transportation Engg.-II	3	1	0	3.5
2.	CVE-308	Geo technology - I	3	1	0	3.5
3.	CVE-309	Concrete Structure Design - II	3	1	0	3.5
4.	CVE-310	Structure Analysis - II	3	1	0	3.5
5.		**Elective - I**	3	1	0	3.5
6.		**Elective - II**	3	1	0	3.5
7.	CVE-357	Transportation Engg.-II (LAB)	0	0	2	1.0
8.	CVE-358	Geo technology - I (LAB)	0	0	2	1.0
9.	CVE-359	Concrete Structure Drawing (CAD LAB)	0	0	2	1.0
			18	6	6	24.0
Total Contact Hours: 30						

❖   CVE 357, CVE 358 and CVE 359 are practical papers only.
There will not be any theory examination for these papers.

The students are required to study any one subject each from Elective - I and Elective - II

S.No.	Course No.	Elective I	L	T	P	Credits
1	CVE 311	Waste Water Treatment	3	1	0	3.5
2	CVE 312	Hydro Electric Power Development	3	1	0	3.5
3	CVE 313	River Mechanics and Flood Control	3	1	0	3.5
4	CVE 314	Design of hydraulic Structure	3	1	0	3.5
5	CVE 315	Concrete Technology	3	1	0	3.5

S.No.	Course No.	Elective II	L	T	P	Credits
1	CVE 316	Irrigation Engg. - II	3	1	0	3.5
2	CVE 317	Introduction to FEM	3	1	0	3.5
3	CVE 318	Construction Technology	3	1	0	3.5
4	CVE 319	Rock Mechanics	3	1	0	3.5
5	CVE 320	Transport Planning	3	1	0	3.5

Department of Civil Engineering
Punjabi University, Patiala.
General Instructions to the Paper Setters
(Common for B.Tech. in Computer Engineering, Electronics and communication Engineering, Mechanical Engineering, Civil Engineering and Integrated BTech/MBA Branches)

Applicable to 2014 Batch

The B. Tech paper structure will be as shown below:

Pattern of Question Paper
TITLE OF SUBJECT (CODE----)
Bachelor of Technology (Branch) Section: ………..
End Semester Exam

TIME ALLOWED: 3 Hour   Roll. No………….
Maximum Marks: 50

Note:- Attempt any Six questions selecting three questions from each section A and B. Section C is compulsory.

Section-A (From Section A of the syllabus)
Q1. ....
Q2. ....
Q3. ....
Q4. ....   3x5
Q5. ....
Section-B (From Section A of the syllabus)
Q6. ....
Q7. ....
Q8. ....
Q9………………………………………………..
Q10…………………………………………………   3x5

Section-C (Common from Whole of the Syllabus)
Q11
a)...
b) ....
c) ....
d) ....
e) ....
f) ....
g) ....
h) ....
i) ....
j)…………………………………………………   10x2=20

Note for the paper setter:
1. Numbers of questions to be set are nine (11) as per the above format.
2. Section A and B contain 10 questions of (5) marks each.
3. Section C is compulsory and contains ten sub-parts of one mark each. The answers for each question should preferably be of 2 to 3 lines.
4. The maximum limit on numerical questions to be set in the paper is 35% while minimum limit is 20% except theoretical, analysis and design papers
5. The paper setter shall provide detailed marking instructions and solution to numerical problems for evaluation purpose in the separate white envelopes provided for solutions.
6. The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.
7. Log tables, charts, graphs, Design data tables etc. should be specified, whenever needed.
8. Use of Scientific calculator should be clearly specified.
9. There are some MBA subjects (*like BAS 202 Operational Research, MBA 5011 Foundation of Financial Accounting, MBA 5012Foundation of Managerial Accounting, MBA 5022 Foundations of Marketing, MBA 5023 Foundations of Law, MBA 5031 Foundations of Macroeconomics, MBA 5032 Foundations of Microeconomics, MBA-5033 Foundations of International Business, MBA 5013 Foundations of Finance*) where syllabus is not divided among four sections namely A, B,C,D then Question paper must be set by without specifying section in it and giving proper weightage to the respective portions.

CVE 307 TRANSPORTATION ENGINEERING-II

	L	T	P	Credits
	3	1	0	3.5

Section A

Design of Flexible Pavements:Types of pavements. Flexible and rigid pavements. Components of a pavement and their functions. Factors affecting design of pavements. Design of thickness of a flexible pavement by Group Index method, CBR method (including latest IRC guidelines), Triaxial method and Burmister's method.

Design Of Rigid Pavements:Westergaard's theory, critical locations of loading, load and temperature stresses. Critical combination of stresses. IRC guidelines for determination of thickness of a rigid pavement. Joints: requirements, types, patterns. Spacing of expansion and contraction joints. Functions of dowel and tie bars.

Highway Construction : Non-Bituminous Pavements:Compacting equipments. Construction steps of Earth roads, Gravel roads, WBM roads, WMM, Construction of Cement concrete pavements. Construction of joints in Cement concrete pavements. Basic concepts of the following:use of geo-synthetics, reinforcedCement concrete pavements, Modified bitumen.

Construction of Bituminous Pavements: Various types of bituminous constructions. Prime coat, tack coat, seal coat and surface dressing. Construction of Surface dressing, BUSG, BM and BC. Mastic asphalt.

Section B

Highway Maintenance: Flexible and Cement concrete pavement failures. Maintenance operations. Maintenance of WBM, bituminous surfaces and Cement concrete pavements. Pavement evaluation. Benkleman beam. Introduction to various types of overlays.

Highway Drainage and Hill Roads:Surface drainage: types, brief design. Types of sub-surface drainage. Special characteristics of hill roads: geometrics, hair pin bends, construction of hill roads, drainage of hill roads, maintenance problems of hill roads

Highway Economics and Finance: Need of economic evaluation. Highway user benefits and costs. Methods of economic evaluation: benefit cost ratio method, net present value method, internal rate of return method, comparison. Highway finance.

Tunnels: Purpose, advantages and disadvantages of tunnels, favorable conditions for tunnel construction, classification of tunnels, cross sections of tunnels. Driving tunnel in rocks: sequence of construction operations, full face method, heading and bench method, drift method. Driving tunnels in soft ground: sequence of construction operations, needle beam method, shield tunneling, compressed air tunneling.

Recommended Books

1.   S.K.Khanna & C.E.G. Justo, Highway Engg., Nem Chand Bros., Roorkee.
2.   L.R.Kadiyali, Principles and PractiCVE of Highway Engg., Khanna Publishers, Delhi.
3.   Yoder,E.J & Witczak,M.W ,Principles of Pavement Design, John Wiley and Sons, USA.
4.   S.C.Saxena Tunnel Engineering, Dhanpat Rai Publications, N.Delhi.
5.   S.P.Bindra A text book of Tunnel, Bridges and Railway Engg., Dhanpat Rai Delhi.

	L	**T**	**P**	**Credits**
	3	**1**	**0**	**3.5**

Section A

Soil Formation and Composition: Introduction, soil and rock, Soil Mechanics and Foundation Engineering, origin of soils, weathering, soil formation, major soil deposits of India, particle size, particle shape, interparticle forces, soil structure, principal clay minerals.

Basic Soil Properties: Introduction, three phase system, weight-volume relationships, soil grain properties, soil aggregate properties, grain size analysis, sieve analysis, sedimentation analysis, grain size distribution curves, consistency of soils, consistency limits and their determination, activity of clays, relative density of sands.

Classification of soils: Purpose of classification, classification on the basis of grain size, classification on the basis of plasticity, plasticity chart, Indian Standard Classification System.

Permeability of Soils: Introduction, Darcy's law and its validity, discharge velocity and seepage velocity, factors affecting permeability, laboratory determination of coefficient of permeability, determination of field permeability, permeability of stratified deposits.

Effective Stress Concept: Principle of effective stress, effective stress under hydrostatic conditions, capillary rise in soils, effective stress in the zone of capillary rise, effective stress under steady state hydro-dynamic conditions, seepage force, quick condition, critical hydraulic gradient, two dimensional flow, Laplace's equation, properties and utilities of flownet, graphical method of construction of flownets, piping, protective filter.

Compaction: Introduction, role of moisture and compactive effect in compaction, laboratory determination of optimum moisture content, moisture density relationship, compaction in field, compaction of cohesionless soils, moderately cohesive soils and clays, field control of compaction.

Section B

Vertical Stress below Applied Loads: Introduction, Boussinesq's equation, vertical stress distribution diagrams, vertical stress beneath loaded areas, Newmark's influence chart, approximate stress distribution methods for loaded areas, Westergaard's analysis, contact pressure.

Compressibility and Consolidation: Introduction, components of total settlement, consolidation process, one-dimensional consolidation test, typical void ratio-pressure relationships for sands and clays, normally consolidated and over consolidated clays, Casagrande's graphical method of estimating pre-consolidation pressure, Terzaghi's theory of one-dimensional primary consolidation, determination of coefficients of consolidation, consolidation settlement, Construction period settlement, secondary consolidation.

Shear Strength: Introduction, Mohr stress circle, Mohr-Coulomb failure-criterion, relationship between principal stresses at failure, shear tests, direct shear test, unconfined compression test, triaxial compression tests, drainage conditions and strength parameters, Vane shear test, shear strength characteristics of sands, normally consolidated clays, over-consolidated clays and partially saturated soils, sensitivity and thixotropy.

Earth Pressure: Introduction, earth pressure at rest, Rankine's active & passive states of plastic equilibrium, Rankine's earth pressure theory, Coulomb's earth pressure theory, Culmann's graphical construction, Rebhann's construction.

Recommended Books
1.   Gopal Ranjan & A.S.R. Rao ,Basic and Applied Soil mechanics, New Age Publisher, New Delhi
2.   V.N.S. Murthy , A text book on Soil Mechanics and Foundation Engineering, U.B.S. Publisher, New Delhi
3.   Parshotham Raj, Geotechnical Engg. , Tata McGraw Hill, New Delhi.
4.   K.R. Arora, Soil Mechanics & Foundation Engineering, Standard Publishers, New Delhi.

CVE 309 CONCRETE STRUCTURE DESIGN - II

	L	T	P	Crédits
	3	1	0	3.5

Section-A

Flats Slabs: Advantages and disadvantages of flat Slabs, Action of Flat Slab, Preliminary design of flat slabs, Basic action of two-way slab, Determination of minimum thickness of slab, Direct Design Method of flat slabs.

Beams curved in plan:Reinforced Concrete Design Circular beam loaded uniformly and supported on symmetrically placed columns,

Isolated footing: Design of Square, rectangular, circular sloped footing
Combined Footings: Different types, design of rectangular, trapezoidal, strap and raft footings, Pile Foundations.

Section-B

Retaining Walls: Types, behaviour, stability requirements, design of cantilever and counterfort type retaining walls.

Domes: Analysis and design of spherical and conical domes

Water Tanks: Introduction, general design requirements on no crack basis, circular and rectangular tanks resting on ground.
Overhead tanks, intze type tanks and their design including staging and foundation.

Recommended Books:

5. Jain, A. K., Limit State Design of Reinforced Concrete, Nem Chand Brothers.
6. Ram Chandra, Limit State Design, Standard Book House.
7. Shushil Kumar, Treasure of RCC, Standard Book House.
8. S. Ramamurutham, Design of Reinforced Concrete Structure, Dhanpat Rai Publishing Comp.

ReferenCVE Books:

4. Pillai & Menon, Reinforced Concrete Design, Tata McGraw Hill Publishers.
5. Varghese, P. C., Limit State Design of Reinforced Concrete, Prentice Hall of India.
6. Sinha, S. N. and Roy, Fundamentals of Reinforced Concrete, S Chand Publishers.

CVE 310 STRUCTURE ANALYSIS - II

	L	T	P	Crédits
	3	1	0	3.5

SECTION: A

ANALYSIS OF STATICALLY INDETERMINATE STRUCTURES: Degree of static and kinematic indeterminacies, analysis of indeterminate beams, rigid frames and trusses by method of consistent deformation method of least work, induced reactions on statically indeterminate beams, rigid frames and trusses due to yielding of supports.

FIXED AND CONTINUOUS BEAMS: Analysis of fixed beams, continuous beams and propped cantilevers, fixed end moments due to different types of loadings, sinking and rotation of supports, bending moment and shear force diagrams for fixed beams and propped cantilevers, slope and deflection of fixed beams, analysis of continuous beams by the Three moment equation (Clapeyron's theorem) due to different types of loadings, effect of sinking of supports.

SLOPE-DEFLECTION METHOD: Introduction, slope-deflection equations, analysis of statically indeterminate beams and rigid frames (sway and non-sway type) due to applied loads and uneven support settlements.

MOMENT-DISTRIBUTION METHOD: Introduction, absolute and relative stiffness of members, stiffness and carry-over factors, distribution factors, analysis of statically indeterminate beams and rigid frames (sway and non-sway type) due to applied loads and uneven support settlements, symmetrical beams and frames with symmetrical, skew-symmetrical and general loading.

SECTION: B

ROTATION CONTRIBUTION METHOD: Introduction, basic concept, analysis of statically indeterminate beams and rigid frames (non-sway type) due to applied loadings and yielding of supports, symmetrical beams and frames, general case-storey columns unequal in height and bases fixed or hinged.

ANALYSIS OF TWO HINGED ARCHES:
Parabolic and circular Arches, Bending Moment Diagram for various loadings, Temperature effects, Axial thrust and Radial Shear force diagrams.

INFLUENCVE LINES FOR STATICALLY INDETERMINATE STRUCTURES: Muller-Breslau principle for statically determinate and indeterminate beams, trusses and rigid frames.

Recommended Books:

1. Dayaratnam, P., Advanced Structural Analysis, Tata McGraw Hill Publishers
2. Punmia, B. C. and Jain, A. K., Theory of Structures, Luxmi Publications.
3. S. Ramamrutham. Theory of structure, Dhanpat Rai Publication
4. C.S. Reddy, Basic Structural Analysis, Tata McGraw Hill Publication.
5. R.L. Jindal ,Indeterminate Structures, S. Chand & Co., New Delhi.

CVE 311 WASTE WATER TREATMENT

	L	T	P	Crédits
	3	1	0	3.5

Section-A

Sewerage system**:** Generation and Estimation of Community Sewage; Flow variations; Storm Water flow; Flow measurement in open channels; Alternate systems for sewage collection and conveyance; Drains and sewers; Sewer appurtenances; Construction and Maintenance of sewers; Sewage pumping and pumping stations; Design ; Operation and maintenance of sewerage systems..

Characterizationof sewage: Parameters for characterization; Sampling, testing and analysis of sewage; Relative stability and population equivalent; BOD and BOD kinetics.

Treatment of sewage:Basic principles of sewage treatment; Introduction to unit operations and processes - primary treatment units such as screening, grit chamber, Floatation units; Sedimentation tanks, secondary treatment units such as different types of aerobic suspended and attached growth systems, and tertiary treatment for polishing, nutrient removal and disinfection;Sludge Handling and disposal – thickening, stabilization, dewatering, drying and disposal.

Section-B

Sewage treatment units design: Designof grit chamber, primary and secondary clarifiers, ASP, TF, stabilization ponds.

Treated effluent disposal**:** Disposal into surface water bodies; Reuse for irrigation and aquaculturing; Land disposal; Disposal through injection into groundwater; effluent standards

Low cost sanitation systems– Imhoff tanks, septic tank - soakage pit/soil absorption systems; stabilization ponds; macrophyte ponds; oxidation ponds; and constructed wetland systems.

Plumbing:Sewer connections for houses and buildings; Traps, sanitary fittings & fixtures.

Recommended Book
1.   S.K. Garg, Environmental Engineering Vol. II, Khanna Publishers New-Delhi
2.   Peavy. Rowe and Tchobanglous Environmental Engineering, McGraw Hill.

ReferenCVEs Books
1. P.N. Modi Sewage Treatment and disposal & Waste Water Engineering, Standard Book House New-Delhi.
2. McGhee Water Supply and Sewerage, , McGraw Hill.

<div align="center">**CVE – 312 HYDRO ELECTRIC POWER DEVELOPMENT**</div>

L	T	P	Credits
3	1	0	3.5

<div align="center">**Section A**</div>

Introduction:Sources of power, estimation of water power, necessity and importance of harnessing small hydro power, flow duration and power duration curves, load curve, load factors, capacity factors, utilization factors, firm and secondary power.

Types of Hydro Power Plants: Elements of Hydro power, classification of hydro-power plants, run-of-river plants, storage plants diversion canal development, pumped storage plants, tidal power plants, base load and peak load plants in a power grid.

Intakes: Intake structures, functions and their types, components of intakes-forebay, trash racks, gates and valves, force required to operate gates.

Conveyance System: Penstocks, design criterion, economical diameter anchor blocks, cradles and footings, water hammer, instantaneous closure of power canal, surge tank, surges in canals.

<div align="center">**Section B**</div>

Turbines: Types of turbines, specific speed and classification of turbines, synchronous speed, scroll casing, flumes and draft tubes, dimensions of scroll casing and draft tubes, setting of turbines

Power House: General layout and arrangements of hydro-power units, number and size of units, sub-structure, spacing of units, super-structure, underground power stations, tidal power.

Recommended Books:

1	Dandekar, M.M., Sharma,K.N.,Water Power Engineering Vikas Publishing House, New Delh
2	Brown J.G Hydro-Electric Engineering Practice Vol.I ,II & III Blackie & Son publications
3	Borrows, H.K.Water Power Engineering Mc Graw hills

CVE- 313 RIVER MECHANICS & FLOOD CONTROL

	L	T	P	Credits
	3	1	0	3.5

Section A

Introduction: Indian rivers, flood, flood problems, river morphology, behaviour of river flow, role of sediments in rivers, changes in regimes, river gauging, causes of flood and losses, alleviation of flooding. Hydrologic Statistics: Probabilistic treatment of hydrologic data, frequency & probability functions, statistical parameters, fitting a probability distribution, probability distribution fort hydraulic variables.

Flood Mitigation by River Protection: Basis of river engineering, flow types, resistance flow , energy slope, backwater effect, three dimensional flow, circular and helicoidal flow, river improvement works, river survey, protection by embankment, discharge capacity, design of dyke, stability analysis of dykes, bank protection, bank recession, types of bank protection works, channel improvement, cutoffs diversion, bypass channel, cutoff channel, floored ways, flood plain zeroing, spreading grounds.

Section B

Flood Mitigation by Reservoirs: Design factors, storage capacity determinations, sequent peak algorithm method, live storage, ripple mass curve flood routing, flood storage, dead storage, reservoir classification, reservoir sedimentation, distribution of sediments in reservoirs, measurement of sediment yields, sediment load measurement, Mood's method, life of reservoir, reservoir operation based on annual storage and regulation, single and multi purpose reservoirs, gate operation schedule, maximum and minimum flow operation, multi purpose reservoir operation, reservoir economics-cost benefit ratios, optimisation of benefits.

Flood Forecasting & Warning: Basic data, communication network, forecasting techniques and proCVEdures, forecast of rainfall, runoff from rainfall, forecasting stages, peak travel time, forecast reporting flood warning, Engineering methods for flood fighting

Engineering Economics of Flood Control: Estimation of flood damages, estimation of benefits of flood control, cost benefit analysis of flood control project.

Recommended Books:

1   S.N.Ghosh Flood Control & Drainage Engg. Taylor & Francis
2   S.K.Garg Hydrology & Flood Control Engg. New Age International,
3.   K.C.Patra Hydrology & Water ResourCVEs Engg.CRC Press

CVE-314 DESIGNS OF HYDRAULIC STRUCTURES

	L	T	P	Credits
	3	1	0	3.5

Section A

Gravity Dams: Dam parameters, Criteria for selection of dam sites, Joints & keys, Cooling arrangement, Water stops at joints, Closing gaps, forces acting on dams, Types of loads, Elementary profile of a gravity dam, Step by step method, Stability analysis methods, Safety criteria, Gravity analysis, Internal stress calculations, Graphical determination of shear stress, Effect of foundation elasticity on stresses, Galleries, Behaviour of concrete gravity dam subjected to earthquakes, Thermal stresses.

Arch Dams: Development of arch dam, Valleys suited for arch dams, Arch dams layout, Types of arch dams, Appurtenant works, Thin cylinder theory and most economical Central angle, Design of arch dam, Suitability at abutments, Effects of foundation elasticity on the behaviours of arch dam.

Buttress Dams: Types of buttress dam, Selection of type of buttress dam, Most economical profile having no tension, Design principles, Butterss design by Unit column theory, Basic shape of buttress, Design of multiple arch dam, Provision of spillways and outlet works.

Section B

Spillways and Energy Dissipaters: Factors affecting design, Components of spillways, Types of spillways, Design principles. Hydraulic design ogee spillway, Side channel spillway, Chute spillway, Syphon spillway, Shaft-spillway, Energy dissipation below spillways, Bucket type energy dissipaters, Design of various types of stilling basins.

Weirs and Barrages: Design of weirs & barrages on permeable foundation, Khosla theory of independent variable, Upstream and downstream protection , Flownets, design of sloping Glacis weir, calculation for hydraulic jump and uplift pressure.

Recommended Books:

1. Creager, Justin & Hinds Engineering for Dams, Wiley Eastern Pvt. Ltd. Delhi.
2. R. S. Varshney Concrete dams, Oxford & IBH Pub. Co. Delhi.
3. K. B. Khushalani Dams Part-1 gravity Dams, Oxford & IBH, Delhi.

CVE-315 CONCRETE TECHNOLOGY

L	T	P	Credits
3	1	03.5	

Section A

Concrete as Structural Material: Introduction, preparation of concrete, grades of concrete, advantages of concrete, concept of quality control.

Concrete Making Materials: Cement, tests on Cement (physical tests), types of Portland Cement, various types of Cement-ordinary Portland Cement, rapid hardening Cement, low heat Cement, sulphate resistant Cement, portland-pozzolona Cement, high strength Portland Cement, high alumina Cement, waterproof Cement, white Portland Cement, hydrophobic Cement, coloured Portland Cement.

Aggregates, classification of aggregates based on petrography, size, shape & textures, deleterious substances in aggregates, bulking of fine aggregate, sieve analysis, grading of aggregates as per IS-383-1970. Fineness Modulus, Maximum size of aggregate. Quality of mixing water, curing water.

Properties of Concrete: Introduction, workability, factors influencing workability, measurement of workability, requirements of workability, properties of hardened concrete, stress and strain characteristics of concrete, Young's modulus of concrete, creep and shrinkage of concrete, permeability of concrete, durability of concrete sulphate attack, fire-resistance, thermal properties of concrete, construction joints, expansion and contraction joints.

Production of Concrete:Introduction, batching of materials, mixing of concrete materials, transportation of concrete, compaction of concrete, ready mixed concrete, vibrators, Internal vibrators, external vibrators, concrete curing and formwork removal.

Section B

Non-Destructive Testing of Concrete: Significance of Non-Destructive Testing, Rebound Hammer, Ultrasonic pulse velocity techniques, Penetration techniques, pullout tests, vibration methods, Radioactive techniques. Cover meter, core-tests.

Deterioration of Concrete & its Prevention: Causes of concrete deterioration, deterioration by water, surface weir, frost action, deterioration by chemical reactions, sulphate attack, alkali-aggregate reaction, corrosion of embedded steel in concrete. Prevention of deterioration of concrete.

Repair Technology for Concrete Structures: Symptoms and diagnosis of distress, evaluation of cracks, repair of cracks, common types of repairs, distress in fire damaged structures, underwater repairs.

Special Concrete: Light weight concrete, definition and its properties, applications, high strength concrete, definitions, its properties and applications, mass concrete, waste material based concrete, shortcrete, fiber reinforced concrete: Materials. Fibers-types and properties, ferrocement, polymer concrete composites, heavy-weight concrete for radiation shielding.

Prestressed Concrete:Introduction, Basic concepts, classification and types of prestressing, prestressing systems, properties of materials, pretensioned and post-tensioned concrete elements.

Recommended Books:

1. Gambhir,M.L.,'Concrete Technology', TMH Pub.N.Delhi
2. Shetty, M.S.'Concrete Techhnology', S.Chand & Co.N.Delhi.
3. Nevellie, A M, 'Concrete Technology', Pearson Education

CVE 316 IRRIGATION ENGINEERING - II

	L	T	P	Crédits
	3	1	0	3.5

Section-A

Theories of Seepage: Seepage force and exit gradient, salient features of Bligh's Creep theory, Lane's weighted Creep theory and Khosla's theory, Determination of uplift. Pressures and floor thickness.

Design of Weirs: Weirs versus barrage, design considerations with respect to surface flow, hydraulic jump and seepage flow. Design of barrage or weir energy

Dissipation Devices: Use of hydraulic jump in energy dissipation, Factors affecting design, Types of energy dissipators and their hydraulic design.

Diversion Head Works: Functions and investigations: component parts of a diversion head work and their design considerations, silt control devices.

Section-B

Distributory Regulators: Offtake alignment, cross-regulators – their functions and design, Distributory head regulators, their design, canal escape.

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.

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.

Canal Out-lets: Essential requirements, classifications, criteria for outlet behaviours, flexibility,proportionality, sensitivity, sensitiveness, etc. Details and design of non-modular, semi-modularand modular outlets.

BOOK SUGGESTED

1. B.C. Punmia & Pande B.B. Lal. Irrigation and Water Power Engg.
2. S.R. Sahasrabudhe. Irrigation Engg. and Hydraulics Structures Katson Pub. House
3. Dr. Bharat Singh Fundamentals of Irrigation Engg Nem Chand and Bros

CVE-317 INTRODUCTION TO FINITE ELEMENT METHOD

	L	T	P	Credits
	3	1	0	3.5

Section A

Introduction: Field conditions, boundary conditions, functional approximation, finite differences method, development of finite element method.

Element Properties: Displacement models, relation between the nodal degrees of freedom and generalized coordinates, convergence requirements, natural co-ordinate systems, shape functions, element strains and stresses, development of element stiffness, matrix and equivalent nodal loads, static condensation.

Isoparametric Elements: Isoparametric, super-parametric and sub-parametric elements, computation of stiffness matrix of isoparametric elements, convergence criteria for isoparametric elements, numerical integration technique using Gauss Quadrature.

One Dimensional Element: Truss element, analysis of plane truss problem, Hermitian beam element, beam on elastic foundation, solution of beam problem.

Section B

Plane Stress and Plane Strain Analysis: Triangular elements, rectangular elements, isoparametric elements, patch test, axisymmetric solid element.

Plane Bending Analysis: Displacement functions, plate bending elements, reduced integration, stress smoothing technique.

Conduction Heat Transfer: Formulation of finite element method for heat conduction, various weighted residual techniques, one dimensional heat conduction, two dimensional conduction heat transfer.

Direct Stiffness Method of Analysis and Solution Technique: Assemblage of elements, direct stiffness method, boundary conditions and reactions, Gauss elimination and matrix decomposition.

Recommended Books:

1. Krishnamurthy, C.S.,'Finite Element Analysis-Theory and Programming', TMH Pub.N.Delhi.
2. Cook, R.D.,Malkus,D.S. and Plesha,M.E.,Concept and Applications of Finite Element Analysis', John Wiley & Sons, New York.
3. Desai, C.S. and Abel,J.F.,'Introduction to the Finite Element Method', Affiliated East-West Press Pvt.Ltd.N.Delhi.
4. Manicka Selvam,V.K.,'Finite Element Primer', Dhanpat Rai Pub.,N.Delhi.

CVE-318 CONSTRUCTIONAL TECHNOLOGY

L	T	P	Credits
3	1	0	3.5

Section A

Setting out of works; Important Survey Methods; Concrete Technology; Structural Steel Fabrication and Erection Methods & Procedures, Temporary Structures – Staging & Storage Works; Conventional Formwork Systems; Plant layout & Material Handling; Prefab Construction.

Basic Methods in Foundation Engg., Building Finishes; Different types of flooring & best practices, External and Internal wall finishes, coatings and claddings, False Ceilings, finishes in Entrance lobbies.

Section B

Construction Equipment sub systems, Ground Drive, Wire Ropes, Belts, Tires, Electrical motors, Bearings Static Plants – Compressors, Generators, Water pumps, Crushers. Brief details of Excavation and Earth moving and other equipments, Properties, maintenance and schedules.

Importance, scope, objective and function of materials management. Integrated approach to materials management. Classification of construction materials, Estimating of materials requirement, planning, Procurement.

Recommended Books:

1. Mehta P.K and Monterio P.M Concrete Microstructure, Properties and Materials, 3rd edn. McGraw Hill New York 2006
2. Rangwals S.C Rangwala K.S & Rangwala KK, Construction of Structure & Management of works, 3rd edn. Charotar Publishing House, Anand, 2000.
3. Ahuja K.K., Material Management, 1st ed., CBS Publishers and Distributors reprint, 1999.
4. Gopalkrishnan p., Handbook of Materials Managements, PrentiCVE Hall Of India, New Delhi 1998.
5. Varma, Mahesh., Construction Equipment and its Planning and application, Metropolitan Book Company (p) Ltd., 1994 (Reprint-Solution)

CVE- 319 ROCK MECHANICS

	L	T	P	Credits
	3	1	0	3.5

Section A

Introduction: Importance of rock mechanics, composition of rocks, geological and lithological classification of rocks, classification of rocks for engineering purposes, R.Q.D. method of classification of rocks. Theories of Brittle failure.

Laboratory Testing of Rocks: Various methods of obtaining rock cores, methods of sample preparation, methods of removing end friction of the rock samples. Compression testing machine, uniaxial compression strength of rock samples, methods of finding tensile strength-direct and indirect methods, Brazilian test, shear box test, triaxial shear test, punch shear test.

In-situ Testing of Rocks: Field direct shear test on rock blocks, field triaxial strength, use of flat jacks, chamber test, plate load test, cable jacking test.

Stress Evaluation in Field: Stress-relief technique(over coring), use of strain gauges, bore hole, deformation Cell, photo-elastic stress meter, stress measurement with flat jack. Hydraulics Fracturing Techniques.

Section B

Stabilization of Rocks: Rock bolting, principle of rock bolting, various types of rock bolts, application of rock bolting. Field testing of rock bolts and cable anchors.

Elastic and Dynamic Properties of Rocks: Stress-strain behaviour dynamic properties, resonance method and ultra-sonic pulse method.

Pressure on Roof of Tunnels: Trap door experiment, Terzaghi's theory, Bieraumer, kommerel, Protodyakanov theory.

Stress Around the Tunnels: Basic design and Principles of tunnels in rocks, design of pressure tunnels in rocks.

Recommended Books:
1   Jaeger and CookFundamentals of Rock Mechanics Wiley Publisher
2   Stagg & Zienkiewiez Rock Mechanics.Springer publisher
3   Obert & DuvellRock Mechanics & Design of Structures in Rocks Wiley Publisher

CVE-320 TRANSPORT PLANNING

L	T	P	Credits
3	1	0	3.5

Section A

Transport Planning Process: Status of transportation in India. Objectives and scope of transport planning. Urban, regional and national transport planning. Transport planning process, various stages. Land use and traffic.

Transportation Survey:Definition of study area. Zoning. Types of surveys. O-D surveys. Inventories of existing transport facilities, land use and economic activities.

Trip Generation: Trip purpose. Factors affecting trip generation. Trip generation estimation by multiple linear regression analysis, brief review of category analysis, advantages and limitations of these methods.

Trip Distribution: Methods of trip distribution. Basic concepts of uniform factor method, average factor method and opportunity model. Trip distribution by gravity model.

Section B

Traffic Assignment: Principles of assignment. Assignment techniques. All or nothing assignment. Brief review of multipath assignment, capacity restraint assignment and diversion curves.

Modal Split: General considerations for modal split. Factors affecting modal split. Brief introduction to various methods of modal split.

Evaluation: Need for evaluation. Several plans to be formulated. Testing. Considerations in evaluation. Economic evaluation, basic principles, brief introduction to various methods of economic evaluation, comparison.

Mass Rapid Transit Systems: Problems of Urban Transport. Introduction to MRTS. Requirements of MRTS. Types of MRTS. MRTS in India

Recommended Books:

1. L.R.Kadiyali ,Traffic Engg. And Transport Planning , Khanna Publishers, Delhi.
2. S.K.Khanna & C.E.G. Justo ,Highway Engg , Nem Chand Bros., Roorkee.
3. Bruton, M.J, Introduction to Transport Planning, Hutchinson Technical Education, London.

CVE – 357 TRANSPORTATION ENGINEERING-II LAB

L	T	P	Credits
0	0	2	1.0

- Flakiness and Elongation Index of aggregates.

- Specific gravity and water absorption test on aggregates.

- Marshall's stability test.

- Stripping test on aggregates.

- Determination of bitumen content.

- CBR lab test on soil.

- Soundness Test

- Demonstration of roughness measurement (by fifth wheel bump integrator)

- Demonstration of Benkelman Beam deflection test

CVE – 358 GEOTECHNOLOGY-I LAB

L	**T**	**P**	**Credits**
0	**0**	**2**	**1.0**

List of Experiments:

1. Visual Soil Classification

2. Determination of water content

3. Determination of field density by Core cutter method

4. Determination of field density by Sand replacement method

5. Grain size Analysis by Mechanical Method

6. Grain size Analysis by Hydrometer Method

7. Determination of Specific Gravity by Psychomotor

8. Determination of Atterberg's limit.

9. Determination of Permeability by constant head permeameter

10. Determination of permeability by variable head permeameter

11. Proctor's Compaction Test

12. Unconfined Compression Test

13. Direct Shear Test

CVE 359 CONCRETE STRUCTURE DRAWING (CAD)

L	T	P	Crédits
0	0	2	1

Detailed Working Drawings (Computer Aided):

1   Isolated Footing: Rectangular, Circular and Square footing.

2   Combined Footing : Rectangular, Trapezoidal, Strap and Raft Footing

3   Spherical and Conical Domes

4   Cantilever and Counterfort Retaining Walls

5   Intz Tank.

B.TECH. FORTH YEAR
(CIVIL ENGINEERING)
(Batch 2014)
(Session 2017-2018)

SCHEME OF PAPERS

SEVENTH SEMESTER (Civil Engineering)

Sr.No.	Course No.	Title	L	T	P	Credits
1.	CVE-401	Geo technology - II	3	1	0	3.5
2.	CVE-402	Water Supply Engineering	3	1	0	3.5
3.	CVE-403	Steel Structure Design - II	3	1	0	3.5
4.	CVE-404	Structure Analysis - III	3	1	0	3.5
5.		**Elective III**	3	1	0	3.5
6.		**Elective IV**	3	1	0	3.5
7.	CVE-451	Geo technology - II (LAB)	0	0	2	1.0
8.	CVE-452	Environment Engg. (LAB)	0	0	2	1.0
9.	CVE-453	Steel Structure Drawing (CAD LAB)	0	0	2	1.0
			18	6	6	24.0
					Total Contact Hours: 30	

❖ CVE 451, CVE 452 and CVE 453 are practical papers only.
   There will not be any theory examination for these papers.

The students are required to study any one subject each from Elective - III and Elective – IV

S.No.	Course No.	Elective III	L	T	P	Credits
1	CVE 405	Railway and Airport	3	1	0	3.5
2	CVE 406	AdvanCVE Traffic Engineering	3	1	0	3.5
3	CVE 407	Element of Remote Sensing and GIS	3	1	0	3.5
4	CVE 408	Environmental Impact Assessment	3	1	0	3.5
5	CVE 409	Air Quality Management	3	1	0	3.5

S.No.	Course No.	Elective IV	L	T	P	Credits
1	CVE 410	Earthquake Engg.	3	1	0	3.5
2	CVE 411	Environmental Laws and Treaties	3	1	0	3.5
3	CVE 412	Bridge Engineering	3	1	0	3.5
4	CVE 413	Site Organization and Management	3	1	0	3.5
5	CVE 414	Ground Improvement	3	1	0	3.5

Department of Civil Engineering

PunjabiUniversity, Patiala.

General Instructions to the Paper Setters

(Common for B.Tech. in Computer Engineering, Electronics and communication Engineering, Mechanical Engineering, Civil Engineering and Integrated BTech/MBA Branches)

Applicable to 2014 Batch

The B. Tech paper structure will be as shown below:

Pattern of Question Paper
TITLE OF SUBJECT (CODE----)
Bachelor of Technology (Branch) Section: ………..
End Semester Exam

TIME ALLOWED: 3 Hour   Roll. No………….
Maximum Marks: 50

Note:- Attempt any Six questions selecting three questions from each section A and B. Section C is compulsory.

Section-A (From Section A of the syllabus)
Q1. ....
Q2. ....
Q3. ....
Q4. ....   3x5
Q5. ....

Section-B (From Section A of the syllabus)
Q6. ....
Q7. ....
Q8. ....
Q9………………………………………………..
Q10………………………………………………….   3x5

Section-C (Common from Whole of the Syllabus)
Q11
a)...
b) ....
c) ....
d) ....
e) ....
f) ....
g) ....
h) ....
i) ....
j)………………………………………………….   10x2=20

Note for the paper setter:

1. Numbers of questions to be set are nine (11) as per the above format.
2. Section A and B contain 10 questions of (5) marks each.
3. Section C is compulsory and contains ten sub-parts of one mark each. The answers for each question should preferably be of 2 to 3 lines.
4. The maximum limit on numerical questions to be set in the paper is 35% while minimum limit is 20% except theoretical, analysis and design papers
5. The paper setter shall provide detailed marking instructions and solution to numerical problems for evaluation purpose in the separate white envelopes provided for solutions.
6. The paper setters should seal the internal & external envelope properly with signatures & cello tape at proper place.
7. Log tables, charts, graphs, Design data tables etc. should be specified, whenever needed.
8. Use of Scientific calculator should be clearly specified.
9. There are some MBA subjects (*like BAS 202 Operational Research, MBA 5011 Foundation of Financial Accounting, MBA 5012Foundation of Managerial Accounting, MBA 5022 Foundations of Marketing, MBA 5023 Foundations of Law, MBA 5031 Foundations of Macroeconomics, MBA 5032 Foundations of Microeconomics, MBA-5033 Foundations of International Business, MBA 5013 Foundations of Finance*) where syllabus is not divided among four sections namely A, B,C,D then Question paper must be set by without specifying section in it and giving proper weightage to the respective portions.

CVE 401 GEOTECHNOLOGY II

	L	T	P	Credits
	0	0	2	1.0

Section A

Introduction to soil exploration: scope, soil exploration for different structures, spacing, significant depth, boring and sampling techniques, types of samples, penetration test (SCP and SPT), sample disturbances and Geophysical methods.

Earth Pressure: Earth Pressures at rest condition, states of plastic equilibrium, Rankine and Coulomb's theories for active and passive conditions, Influence of surcharge, water table, wall friction, Rehbann's and Culmann's graphical methods, open cuts, Retaining Walls.

Stability of Slopes: Infinite slope, types of failure, total and effective stress analysis, Taylor's stability numbers, concept of factors of safety, method of slices, Swedish's circle method, friction circle method, effect of sudden draw down and submergence.

Design of Shallow Foundation: Bearing Capacity, Definitions, depth of foundation, Terzaghi's general bearing capacity equation, IS code equation, factors affecting bearing capacity. Settlements for clays and sands, permissible settlements, bearing capacity by penetration tests, plate load test. Types of Shallow Foundations, Design Criteria, Stability, Shear, and Settlement Failures, Influence of eccentric and inclined loads.

Section C

Pile Foundations: Types, function, selection of piles, pile driving formulae, equipment, point, bearing and friction piles. Load carrying capacity of single pile, group action, spacing of piles, Negative skin friction, Piles subjected to lateral loads, settlement of pile groups, under reamed piles.

Caissons and Wells: Introduction, components, shapes, stability of well foundation, Terzaghi's method of analysis, sinking of well, tilts and shifts.

Foundation in Difficult Grounds: Ground Improvement techniques, drainage and dewatering, Foundation in Swelling Soils, use of Soil reinforcement.

Machine Foundation: Definition, types, problem of machine foundation, spring mass analogy, coefficient of elastic uniform compression, free and damped vibration, block foundation test, Cyclic plate load test, mathematical models, design criteria.

Recommended Books
1.   Gopal Ranjan Rao, ASR Rao, Basic and Applied Soil Mechanics, by, New Age Int. (P) Ltd. Pub., New Delhi,
2.   VNS Murthy, A Text Book of Soil Mechanics Foundation Engg., U.B.S, New Delhi.
3.   Peck,Foundation Engineering, Wiley Eastern India Limited, New Delhi.
4.   K.R. Arora, Soil Mechanics & Foundation Engineering, Standard Publishers, New Delhi.

CVE 402 WATER SUPPLY ENGINEERING

	L	T	P	Crédits
	3	1	0	3.5

Section: 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.

SOURCVES OF WATER SUPPLY: Surface and underground sources, relation and development of source in r/o quality and quantity of water, Development of wells, Storage reservoir-balancing and service storage, capacity determination by mass curve method. Intake and transmission system distribution systems: network design.

QUALITIY AND EXAMINATION OF WATER: Necessity for examination of water impurities in water, sampling of water, physical, chemical and bacteriological quality for domestic water supply. Drinking water quality standards and criteria.

WATER SUPPLY AND DRAINAGE OF BUILDINGS: System of water supply houses connections, matering, internal distribution, and sanitary fittings pipe joints, Different types of pipes and pipes materials.

Section: B

WATER TREATMENT: Unit operations in water treatment screening, sedimentation, and its theory sedimentation aided with coagulation, flocculation, sand filtration-slow, rapid, gravity and pressure filters, Disinfecting, Necessary: requirements of disinfectant, methods, of disinfecting different practices of chlorinating.

MISCVELLANEOUS METHODS OF WATER TREATMENT: Aeration, taste and odour control iron and manganese removal water softening processes Base exchange process, Swimming pool water Treatment

Recommended Books:

1   B.C. Punmia, Ashok Jain, Arun Jain. Water Supply Engineering, Lakshmi Pub. Delhi
2   PEAVY, ROWE. Environmental Engineering and Technology, McGraw Hill.

CVE 403 STEEL STRUCTURE DESIGN - II

	L	**T**	**P**	**Crédits**
	3	1	0	3.5

Section – A

Design of riveted and welded joints, subjected to moment in the plane of joint and perpendicular to the plane of joint, framed connections.

Design of steel foot bridge with parallel booms, carrying wooden decking using welded joints.

Section – B

Complete design of industrial buildings
  i.   Gantry girder
  ii. Column bracket
  iii. Mill bent with constant moment of inertia
  iv. Lateral and Longitudinal bracing for column bent
  v.

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

  i.   Stringer
  ii. Cross girder
  iii. Main girders with welded joints
  iv. Portal sway bracings
  v.   Bearing rocker and rollers

Recommended Books:

1   Vazirani & Ratwani Design of Steel Structures Vol.-III Khanna Publisher
2   Arya & Azmani Design of Steel Structures Nemchand Bros, Roorke
3   S.K.Duggal Steel Structures Tata Mc graw Hill Publication Ltd.
4   Ram Chandra Design of Steel Structures Vol.-II Standard Book House Delhi

CVE 404 STRUCTURE ANALYSIS - III

L	T	P	Crédits
3	1	0	3.5

SECTION – A

BASIC CONCVEPTS OF STRUCTURAL ANALYSIS: Static and kinematic indeterminacies of beams, rigid-jointed plane and space frames, pin-jointed plane and space frames and hybrid structures, actions and displacements, action and displacement equations, generalized system of coordinates, unit-load method, conjugate-beam method, slope-deflection equations. Moment area method, area multiplication method

FLEXIBILITY MATRIX (PHYSICAL APPROACH): Basic definitions and types of matrices, matrix operations, matrix inversion, solution of linear simultaneous equations, development of flexibility matrices for statically determinate and in determinate beams, rigid-jointed plane frames and pin-jointed plane frames using physical approach.

STIFFNESS MATRIX (PHYSICAL APPROACH): Development of stiffness matrices for statically determinate and indeterminate beams, rigid-jointed plane frames and pin-jointed plane frames using physical approach, reduced stiffness matrix, total stiffness matrix, translational or lateral stiffness matrix.

SECTION – B

FLEXIBILITY AND STIFFNESS METHOD OF ANALYSIS: Analysis of continuous beams, rigid-jointed plane frames and pin-jointed plane frames using the physical approaches, effect of support settlements, comparison of flexibility and stiffness methods of analysis.

APPROXIMATE METHODS OF STRUCTURAL ANALYSIS: Vertical and lateral load analysis of multistory frames, portal and cantilever methods and their comparison.

FINITE ELEMENT METHOD (FEM): Basic concept, discretisation, procedure, elementary applications of principles and formulation of problems, steps of FEM (No Numerical Problems)

BOOKS RECOMMENDED:

1   GS Pandit and SP Gupta Structural analysis-A matrix approach Tata McGraw Hills
2   William weaver. Matrix analysis of framed structures .Springer publication
3   C.S. Reddy. Basic structural analysis. Tata McGraw Hills
4   C.S. Krishnamurthy .Finite element analysis – Tata McGraw Hills
5   S. Ramamrutham. Theory of structure – Laxmi Publications

CVE 405 RAILWAYS AND AIRPORT ENGINEERING

	L	T	P	Credits
	3	1	0	3.5

Section A

Rail transportation and its importance in India. Permanent way: requirements and components. Gauges in India and abroad. Selection of gauge. Coning of wheels. Adzing of sleepers. Rails: functions, composition of rail steel, types of rail sections, requirements of an ideal rail section, length of rails. Defects in rails. Creep of rails. Long welded rails and continuously welded rails.

Sleepers: functions, requirements of an ideal sleeper. Types of sleepers: wooden, cast iron, steel and concrete sleepers, advantages, disadvantages and suitability of each type. Sleeper density. Fastenings for various types of sleepers: fish plates, spikes, bolts, bearing plates, keys, chairs, jaws, tie bars. Elastic fastenings. Ballast: functions, requirements, types of ballast and their suitability.

Necessity. Turnout: various components, working principle. Switch: components, types. Crossing: components and types. Design elements of a turnout, design of a simple turnout. Layout plan of track junctions: crossovers, diamond crossing, single-double slips, throw switch, turn table, triangle.

Signals: objects, types and classification. Semaphore signal: components, working principle. Requirements / principles of a good interlocking system. Brief introduction to devices used in interlocking. Methods of control of train movements: absolute block system, automatic block system, Centralized train control and automatic train control systems.

Section B

Gradients, grade compensation. Super elevation, cant deficiency, negative super elevation. Maximum permissible speed on curves. Tractive resistances, types. Hauling capacity of a locomotive.

Stations: functions and classification. Junction, non-junction and terminal stations. Yards: functions, types. Marshalling yard: functions, types. Maintenance of railway track: necessity, types of maintenance. Brief introduction to mechanized maintenance, M.S.P and D.T.M.

Air transportation, its importance and characteristics, status in India. Layout plan of an airport and its basic elements: terminal area, apron, taxiway, runway, hanger. Aircraft characteristics, their effect on elements of an airport. Site selection of an airport. Classification of airports.

Runway orientation, Wind Rose diagram. Basic runway length. Corrections to basic runway length. Runway patterns. Difference between highway and runway pavement. Types of runway pavements. Design factors for runway pavement. Brief introduction to design of thickness of a runway pavement.

Recommended Books:
1. S.C.Saxena and S.P.Arora ,A text book of Railway Engineering, Dhanpat Rai Publicatios, N.Delhi.
2. J.S.Mundray, Railway Track Engg., Tata McGraw-Hill Publishing Co. Ltd. N.Delhi.
3. S.K.Khanna, M.G.Arora, Airport Planning and Design, Nem Chand Bros., Roorkee.
4. Robort Hornjeff , The Planning and Design of Airports, McGraw Hill Book Co.
5. Virender Kumar & Satish Chandra , Air Transportation Planning and Design, Galgotia Publications,N.Delhi

CVE – 406 ADVANCVED TRAFFIC ENGINEERING

	L	T	P	Credits
	3	1	0	3.5

Section A

Introduction and Traffic Characteristics: Objectives and scope of Traffic Engg. Organizational set up of traffic engineering department in India. Importance of traffic characteristics. Road user characteristics. Vehicular characteristics. Max dimensions and weights of vehicles allowed in India. Effects of traffic characteristics on various design elements of the road.

Traffic Surveys: Methods of conducting the study and presentation of the data for traffic volume study, speed study and origin and destination study. Speed and delay study. Parking surveys. On street parking, off street parking. Accident surveys. Causes of road accidents and preventive measures. Use of photographic techniques in traffic surveys.

Highway Capacity: Importance. Space and time headway. Fundamental diagram of traffic flow. Relationship between speed, volume and density. Level of service. PCU. Design service volume. Capacity of non-urban roads. IRC recommendations. Brief review of capacity of urban roads.

Traffic Control: Types of traffic control devices. Traffic signs, general principles of traffic signing, types of traffic signs. Road markings, types, general principles of pavement markings. Design of rotary. Grade separated intersections. Miscellaneous traffic control aids and street furniture.

Section B

Signal Design: Types of signals. Linked or coordinated signal systems. Design of signal timings by trial cycle method, approximate method, Webstor's method and IRC method

Traffic Regulation And Management: Need and scope of traffic regulations. Regulation of speed, vehicles and drivers. General traffic regulations. Motor vehicle act. Scope of traffic management. Traffic management measures: restrictions on turning movements, one way streets, tidal flow operations, exclusive bus lanes, traffic restraint, road pricing.

Traffic And Environment: Detrimental effects of traffic. Vehicular air pollution. Situation in India. Vehicular emission norms in India and abroad. Alternate fuels. Factors affecting fuel consumption. Arboriculture.

Computer Application, Traffic Simulation: Computer application in traffic engg., transport planning and public transport. Traffic simulation, advantages. Steps in simulation. Scanning techniques. Introduction to Intelligent vehicle highway system. Various types of IVHS.

Recommended Books:
1. L.R.Kadiyali Traffic Engg. And Transport Planning, Khanna Publishers, Delhi.
2. S.K.Khanna & C.E.G. Justo Highway Engg, Nem Chand Bros., Roorkee.
3. Drew, D.R., Traffic Flow Theory McGraw- Hill Book Co., New York.

CVE-407 ELEMENTS OF REMOTE SENSING & GIS

L	T	P	Credits
3	1	0	3.5

Section A

Basic concepts of remote sensing; Airborne and space borne sensors; Data acquisition; Digital image Processing; Restoration; Enhancement; Segmentation feature extraction; Clustering edge detection;

Geographic Information System; Introduction to Microwave remote sensing and Global Positioning System;

Section B

Applications to Water resources; Land use and erosion; Forestry; Environment and ecology;

Use of relevant software for Remote sensing and GIS applications.

Recommended Books:

1. Gopi S , GPS and Surveying using GPS, Tata McGraw Hill
2. Chang ,Introduction to GIS, Tata Mc Graw Hill

CVE-408 ENVIRONMENTAL IMPACT ASSESSMENT

	L	T	P	Credits
	3	1	0	3.5

Section A

Environment and Human Activity: Resources, pollution, reuse and environmental management.

Management of Aquatic Environment: Water quality controls. Drainage basin activities and water pollution. The impact of human activity on aquatic resources. The control measures, regional planning.

Air Quality Management: Atmosphere, effect of human activity on air quality, waste disposal alternative. Optimization, planning of waste disposal.

Section B

Waste Management: Waste disposal methods, Impact of waste disposal of human activity.
Land Use Management: Impact of land use on human life. Control of hazards in land use, management of land use.

Environmental Assessment: National environmental policy, implication of environment assessment in design proCVEss. Preparation of assessment, quantification. General requirements of environmental standards. Techniques of setting standards.

Case studies of EIA of river valley projects and thermal power projects.

Recommended Books:

1. Canter , Environmental Impact Assessment McGraw-Hill
2. J.Glasson , Environmental Impact Assessment Taylor & Francis Publisher.

CVE-409 AIR QUALITY MANAGEMENT

	L	T	P	Credits
	3	1	0	3.5

Section A

Air pollutants, Sources, classification, Combustion Processes and pollutant emission,

Effects on Health, vegetation, materials and atmosphere, Reactions of pollutants in the atmosphere and their effects-Smoke, smog and ozone layer disturbance etc.

Section B

Atmospheric diffusion of pollutants and their analysis, Transport, transformation and deposition of air contaminants on a global scale, Air sampling and pollution measurement methods, principles and instruments, Ambient air quality and emission standards, control principles,

Removal of gaseous pollutants by adsorption, absorption, reaction and other methods. Particulate emission control, settling chambers, cyclone separation, Wet collectors, fabric filters, electrostatic precipitators and other removal methods.

Recommended Books:
1. M N Rao , Air quality management Springer publication
2. Debashree Mukherjee ,Somnath Hazra, Air pollution and health Tata Mc Graw Hill Publications
3. Arthur C Stren, Air pollution: air quality management Elsevier Publications

CVE 410 EARTHQUAKE ENGINEERING

L	T	P	Crédits
3	1	0	3.5

Section-A

Introduction to Earthquakes, Causes of earthquakes, basic Terminology, Magnitude, Intensity, Peak ground motion parameters. Past earthquakes and Lessons learnt.

Introduction to theory of Vibrations, Sources of Vibrations, Types of Vibrations, Degree of Freedom, spring   action and damping, Equation of motion of S.D.O.F. systems, Undamped, Damped system subjected to transient forces, general solution, green's function.

Lateral Force analysis, Floor Diaphragm action, Moment resisting frames, shear walls.

Section-B

Concepts of seismic design, Lateral Strength, stiffness, ductility and structural configuration. Provision of IS 1893 for buildings.

Seismic Design of Masonry Structures, Provision of BIS 4326, BIS: 4326, BIS: 13828, BIS: 13827 Seismic Design and Detailing of R.C.C. buildings, Provision of IS 13920.

BOOK SUGGESTED

1   R.W. Clough and Joseph Penzien Dynamics of Structures. McGraw-Hill
2   Mario & Paz Structural Dynamics Van Nostrand Reinhold publisher
3   David J. Dowrick Earthquake Resistant Design John Wiley & Sons
4   Jai Krishna, Elements of Earthquake Engg Sarita Prakashan

CVE 411ENVIRONMENTAL LAWS AND TREATIES

	L	T	P	Credits
	3	1	0	3.5

Acts: Water act, Water Chess act, Air act, Environment Protection act and their amendments, Wildlife act and Forest acts.

Rules and Regulations: Review of water rules, air rules and environment rules with special reference to- Standards of emission or discharge of environmental pollutants.

Treaties: Earth Summit, Agenda-21, Kyoto Protocol, Biodiversity treaty, Monteral Protocol, Ramsar Convention of Watershed management

Recommended Books

1.   R.E.   Munn,   Environmental   Impact   Assessment,   John   Wiley,   New   York,   USA
2. Pollution   Control   Law   Series;   PCL/2/2001,   Central   Pollution   Control   Board,   New   Delhi.
3.   Eds, Jain and Clark, Environmental Technology Assessment and Policy, John Wiley, New York, USA

CVE 412BRIDGE ENGINEERING

	L	T	P	Credits
	3	1	0	3.5

Section A

Introduction: Definition, components of a bridge, classifications, importance of bridges.

Investigation of Bridges: Need for investigations, selection of bridge site, preliminary data to be collected, design discharge and its determination, linear waterway, economical span, vertical clearance above HFL, scour depth, choice of bridge type

Standard Specifications: Road bridges, I.R.C. loadings, code provisions on width of carriageway, clearances, loads considered etc.

Slab type Bridges: Design of R.C.C. Orthogonal and Skew Culverts

Section B

Reinforced Concrete Bridges: T-Beam Bridge, Courbon's theory for load distribution. Balanced cantilever bridges, Pre-stressed concrete bridges (General discussions)

Sub Structure: Types of piers and abutments, design forces, design of piers and abutments.

Bearing and Joints: Various types of expansion bearing and fixed bearings, elastomeric bearings, joints and their types, design of bearings

Construction, inspection and maintenance of bridges

Recommended Books

1. D. Johnson Victor, Elements of Bridge Engineering,, Oxford and IBH Publishers, New Delhi.
2. Vazirani & Ratwani , Design of Concrete Bridges, Khanna Publishers, New Delhi
3. V.K. Raina, Analysis, Design and Construction of Bridges, Tata McGraw Hill

CVE 413SITE ORGANIZATION AND MANAGEMENT

	L	T	P	Credits
	3	1	0	3.5

Section A

Preparation:Site Clearance, Layout, infra-structural facilities, organizing utilities, site grading Security, safety, legal frame-work, acquisition of land, liaison with local authorities.

Organization:Various levels, job description, role of consultants, contractor and client and their responsibilities, training, Job layout, placement of material equipment on site. Documentation, inspection.

Section B

Mobilization: Machinery, stores equipment, contractor, work-shop, Quarries, vendors

Supervision: Procedure for quality assurance, Controlling and reporting system, Labour laws, legislation

Recommended Books
1. R. Sengupta and H. Guha Construction Management and Planning, Tata McGraw Hill
2. P.K.Joy Hand Book for Construction Management, , Mac Milan India Ltd.
3. R. Peurofy Construction Planning, Equipment and Method; McGraw Hill

CVE 414GROUND IMPROVEMENT

	L	T	P	Credits
	3	1	0	3.5

Section A

Introduction to different methods of ground improvement and its importance Mechanical method of ground improvement, Ruthfuch method; methods based on PI. Ground Freezing, methods, Hydrogeology of frozen soils, strength and behaviour of frozen soils. Ground heating, effect on soil properties, methods.

Drainage Techniques, filter drains, sand drains, sandwicks & band drains, lime columns. Electro-osmosis and Electrochemical stabilization. Compaction & consolidation techniques viz. pre-compression, compaction piles, vibro-compaction (Vibro-floation, Terra-probe, vibro-replacement, concrete columns & vibro-displacement) Dynamic compaction, explosive compaction.

Section B

Soil Reinforcement, load transfer mechanism, strength development, anchored earth. In-situ reinforcement techniques viz soil nailing, reticuled micropiles, soil dowels and anchors. Grouts, properties, penetration, clay, Cement clay, Cement, clay-chemical, chemical and Bituminous grouts, grouting methods viz penetration, claquage, compaction & jet.

Reinforced earth; Introduction, Mechanism of reinforced types of reinforcement strength characteristics. Design of reinforced earth retaining walls, abutments, earth slopes. Exclusion techniques viz. sheet piles, contiguous bored piles, secant piles, slurry trenches. Diaphragm walls. Design of stone columns.

Recommended Books

1. P. Purushotham Raj Ground Improvement Techniques, Tata McGraw Hill, New Delhi.
2. .G. Bell, E & FN Engineering Treatment of Soils F Spon Publishers, UK.
3. M.R. Hausmann Engineering Principles of Ground Modification, McGraw Hill Publishers, New York.
4. **W.F. Van Impe., A.A. Balkema** Ground Improvement Techniques & their Evolution Publishers, Nehterlands.

CVE 451 GEOTECHNOLOGY-II LAB

	L	T	P	Credits
	0	0	2	1.0

1.   Determination of Relative density of coarse grained soils in dry and saturated conditions.

2.   Determination of shear strength at different densities by Direct shear test.

3.   Determination of MDD and OMC at different compactive effort by compaction test.

4.   Determination of Unconfined compressive strength at different compactive effort.

5.   Determination of compressibility characteristics of fine grained soils by Consolidation test.

6.   Determination of bearing capacity by Standard Penetration test.

7.   Determination of shear strength of dry sands by Tri-axial shear test.

8.   Determination of shear strength of saturated sands by Tri-axial test.

9.   Determination of bearing capacity by Plate load test.

10. Determination of bearing capacity by Cone Penetration test.

CVE 452 ENVIRONMENT ENGINEERING (LAB)

	L	T	P	Credits
	0	**0**	**2**	**1.0**

1   To measure the PH value of a sample

2   To find the turbidity of a given sample

3   To find B.O.D. of a given sample

4   To measure D.O. of a given sample

5   Determination of Hardness of a given sample

6   Determination of total solids, dissolved solids, suspended solids of a given sample

7   To determine the concentration of sulphates in water/wastewater sample.

8   To find chlorides in a given sample

9   To find acidity/alkalinity of a given sample

10.   To determine the COD of a wastewater sample.

CVE 453 STEEL STRUCTURE DRAWING (CAD)

L	T	P	Crédits
0	0	2	1

Following drawings are to be prepared by students:

1:      Riveted and welded eccentric loading joints

2**:**   Industrial Buildings:
        Gantry girder and column bracket'
        Lateral & Longitudinal bracing for column bent

3:      Railway Bridge

        Stringer
        Cross Girder
        Main girder with welded joints
        Portal sway bracings
        Bearing rockers and rollers

B.TECH. FORTH YEAR

(CIVIL ENGINEERING)
(Batch 2014)
(Session 2017-2018)

SCHEME OF PAPERS

EIGHTSEMESTER (Civil Engineering)

S.No.	Course No.	Title	L	T	P	Credits
1.	PRJ 451	Industrial training	0	0	0	24

PRJ 451, to be carried out in Industry / Research Institution. The duration training would be six month.

Breakup of Marks:

Industrial Visit by Faculty Coordinator (150 Marks)
(Within 10—12 weeks of commencement of Training)

Presentation	: 60 Marks
Viva Voce	: 60 Marks
Report (Hard Copy)	: 30 Marks

Evaluation by Faculty Coordinator is consolation with Industrial Coordinator during industrial visit.

Evaluation by a Team of Faculty Members in the Institute (250 Marks)
(Within One Week of completion of Training)

Presentation	: 100 Marks
Viva Voce	: 100 Marks
Report (Hard Copy)	: 50 Marks

The Final Presentation and viva – voce will be conducted jointly by the faculty coordinator, external examiner and nominee of the Head to be appointed by the Head of the Department.

The Letter grade will be awarded to the students according to marks obtained by him/her out of total 400 marks.