

Break up of BE Course Structure

Branch: Civil Engineering.

Year: Third.

Semester: Fifth

SL. NO.	COURSE NO.	SUBJECT	PERIOD			EVALUATION SCHEME					
			L	T	P	Sessional Examination			ESE	Subject Total	Credit
						TA	CT	Total			
Theory											
1.	HU 501	Economics & Principles of Management.	3	1		30	20	50	100	150	4
2.	CE 512	Design of Structures-I.	3	1		30	20	50	100	150	4
3.	CE 513	Environmental Engineering-I.	3	1		30	20	50	100	150	4
4.	CE 514	Transportation Engineering-I.	3	1		30	20	50	100	150	4
5.	CE 515	Geotechnical Engineering.	3	1		30	20	50	100	150	4
6.	CE 516	Concrete Technology.	3	1		30	20	50	100	150	4
7.	CE 517	General Proficiency.							50	50	2
Practical/Drawing/Design/Mini Project											
8.	CE 513 L	Environmental Engineering-I.			3	30	20	50		50	2
9.	CE 514 L	Transportation Engineering-I.			3	30	20	50		50	2
10.	CE 515 L	Geotechnical Engineering.			3	30	20	50		50	2
11.	CE 516 L	Concrete Technology.			3	30	20	50		50	2
Total			18	6	12						

Total marks: 1150

Total Periods: 36

Total Credits: 34

TA: Teachers assessment.

CT: Class Test.

ESE: End Semester Examination.

**FIFTH SEMISTER
ECONOMICS AND PRINCIPLES OF MANAGEMENT
SUB CODE: HU 501**

Part A: Economics

Theory: 50 Sessional: 25

1. Economics: Meaning, nature and scope.
2. Consumer behavior and demand analysis: Alternate theories on consumer behavior; Derivation of the demand function. Demand and revenue analysis. Demand forecasting.
3. Producer behavior: Production function. Production analysis and input demand. Cost Analysis. Estimation of cost functions. Managerial uses of cost functions.
4. Price and output determination; Price concepts; pricing under different objectives; Profit and break even analysis. Differential pricing; Alternative market models; Market structure and Government intervention.
5. Investment analysis: time value of money. Cash flows and measures of investment worth; Investment analysis.
6. Money: Why money matters. Value of money- Quantity theory of Money; Index numbers. Interest rate determination.
7. The financial system: The Central Bank, Stock Exchange and the market for securities, Money market instruments.
8. International trade: Theories of international trade. The World Trading Environment Multilateralism and Bilateralism.
9. Emerging Economic and business environment.

Recommended Books:

1. Samuelson and Nordlhaus: Economics. Irwin McGraw Hill.
2. Gupta, G.S, Managerial Economics.
3. H.Davis Managerial Economics.
4. Sengupta A.K. and Agarwal M.K. Money Market Operations in India; Skylark Publications, New Delhi.

Part B: Principles of Management

Theory: 50 Sessional: 25

1. Management: concepts, status and functions. Role of management. Management skills. Effective versus successful managerial activities. Motivation - Early and contemporary theories on motivation- implication for managers and applications.
2. Group behaviour and Group dynamics: Foundations of group behaviour. Defining and classifying groups; stages of Group development; group interaction; External conditions; Group member resources; Group structure; Group processes; tasks and decision making.
3. Leadership- Leadership theories. Recent approach to leadership and contemporary issues in leadership.
4. Organisational Dynamics: Organisational change and stress management. Human factors in industry- fatigue and symptoms. Fatigue control.

5. Human Resource policies and Practices: Selection practices, Training and Development programmes; Performance Evaluation; Union — Management interface; Managing diversity in organisations.
6. Investment analysis: Time value of money. Cash flows and measures of investment worth; Investment analysis.

DESIGN OF STRUCTURE-I

SUB CODE: CE 512

7. Projects and Project evaluation: Economic and financial evaluation of projects. Economic and social cost benefit analysis.

Recommended Books:

1. Essentials of management- J.L. Marcis.
2. Organisational Behaviour. Concepts, Controversies and Applications - Stephen P. Robbins.
3. Gupta, G.S, Managerial Economics.

FIFTH SEMISTER

Theory-100 marks.
Sessional-50 marks.
Time- 3 Hours.

1. Properties of concrete and reinforcing steel, stress-strain characteristics, shrinkage and creep phenomenon. I.S. Specification.
2. Methods of Design: Elastic theory and Limit state theory.
3. Analysis and design of Sections in flexure by elastic and limit state methods: Singly and Doubly R.C. Section, T and L sections.
4. Analysis & design sections for shear and bond. Anchorage and Splicing of reinforcement, detailing of reinforcement.
5. Design of Simple and continuous beams.
6. Design of axially and eccentrically loaded short and long column.
7. Design of one-way and two-way slab, continuous slab.
8. Design of footing: Isolated and combined footing; strip footing.
9. Retaining wall: Cantilever and counterfort types with and without surcharge.

FIFTH SEMESTER

ENVIRONMENTAL ENGINEERING-I
SUB CODE: CE: 513

Marks: Theory – 100.
Sessional – 50.
Time – 3 hrs.

Introduction: water supply system, its objectives and components.

Water quantity: various demands of water, design period, population forecasting, percapita consumption – recommended rates, factors affecting consumption, variation of demand and its impact an design of water supply system, fire demand.

Water quality: Impurities of water and water born diseases, water analysis physical, chemical and bacteriological, sampling method, water quality standards.

Sources of water: surface and subsurface sources and their characteristics, rain water harvesting, impounding reservoir storage requirements, wells –different types, well components, construction, development and sanitary protection of wells, ground water recharge.

Intake works and conveyance of water: River, reservoir and channel intakes, selection of intake, rising main – type of conduits and its joints, pumps – types and selection of pumps.

Treatment of water: Method, purposes, sequence of treatments, aeration, sedimentation – plain and with coagulation, coagulants and their dosage, feeding units, mixing basins and flocculation units, sedimentation tanks and their design, filtration –principle, type of filters, slow and rapid sand filters, pressure, diatomite and multimedia filters.

Other treatments of water: Disinfection, necessity of chlorinating- chlorine dose, break point chlorination, feeding units, Ozonisation, hardness and softening of water, lime process, lime and soda ash process, base exchange process, removal of taste and odour, iron and manganese

Distribution system: Service reservoir necessity, types and estimation of capacity, system of supply, continuous and intermittent, distribution system, layout and design of distribution system, equivalent pipe method, Hardy –cross method, method of sections, circle method, maintenance of distribution system, detection of leakage and wastage and their prevention, gates and valves in distribution system.

Plumbing of buildings for water supply: Services connection, system of water supply in buildings. Fixture units, plumbing system, detection and remedies of defects in plumbing system .

Water pollution: Causes, effects and preventive measures.

FIFTH SEMESTER

**ENVIRONMENTAL ENGINEERING–I (PRACTICAL)
SUB CODE: CE: 513 L**

Marks-50.

Laboratory test for Water-

P^H-Value, Alkalinity, Acidity, Suspended matter, Hardness, Total solid, Chloride, Sulphate, Calcium, Magnesium, Nitrate, Sodium, Potassium and Conductivity.

FIFTH SEMESTER

TRANSPORTATION ENGINEERING – I
SUB CODE: CE 514

Theory – 100.
Sessional – 50.
Time – 3 hrs.

Introduction: Mode of transportation- advantages and limitations. Transportation plan- System approach, goals and objectives; 20-year road development plans of India, Classification of roads.

Geometric design: Design vehicle, design speed, capacity, horizontal and vertical alignment; super-elevation, widening on curves, gradients, sag curve and valley curve, sight distance, right-of-way, roadway width, curbs, camber and intersections. Highway safety; road accidents and traffic regulatory signs and road markings.

Highway alignment and survey: Requirements of an ideal alignment, Factors controlling alignment, Engineering surveys-Map study, Reconnaissance, Preliminary surveys, Final location and detailed surveys.

Road making materials: Tests on aggregate and bituminous binder, I.S. and I.R.C. specifications, strength of soil subgrade-C.B.R. test, Plate load test.

Pavement design: Types of pavement, Factors to be considered in design.

Design of flexible pavement-standard methods, I.R.C. guidelines.

Design of rigid pavement- Structural components of rigid pavement, Standard methods of design, IRC guidelines.

Traffic Engineering: Definition, traffic studies and analysis; traffic volume, speed and delay study, origin and destination study, traffic capacity, parking study, accident study. Traffic control devices- signs, signals, markings and island. Road intersections- intersection at grade e.g., channelized, unchannelized and rotary, grade separated intersections. Design of parking facility.

**FIFTH SEMESTER
TRANSPORTATION ENGINEERING
SUB CODE: CE 514 L**

**Marks-50.
Time – 4 Hrs.**

LABORATORY WORK: -

1. Compaction test.
2. C.B.R. test.
3. Sieve analysis.
4. Impact test.
5. Abrasion test.
6. Water Absorption test.
7. Crushing test. (Crushing strength test)
8. Flakiness Index test.
9. Elongation Index test.
10. Specific Gravity test.

**FIFTH SEMESTER
GEOTECHNICAL ENGINEERING
SUB CODE: CE 515**

**Theory – 100
Sessional - 50
Time – 3 hrs.**

Soil deposits based on origin, soil map of India, index properties, phase –relationships, particle size distribution, consistency and plasticity, fabric and structure, sensitivity & thixotropy, clay minerals – montmorillonite, illite & kaolinite, identification and classification of soils, classification of rocks, ROD, RMR system.

Effective stress principle, capillarity in soils.

Permeability of soil – Darcy's law, permeability – laboratory and field determination, quick condition, permeability of stratified deposits, factors affecting permeability.

Seepage through soils, Laplace equation, flownet –its construction and uses , seepage through homogeneous earth dam with and without filters .

Compaction of soils, compaction test, optimum moisture content and zero air void line field methods of control of compaction, methods of compaction of various types of deposits in field.

Compressibility and consolidation of soils – introduction to the process of consolidation (spring analogy), e-p curves, methods of estimating preconsolidation pressure, over consolidation ratio, Terzaghi's theory of one dimensional consolidation, consolidation test and determination of C_v , m_v and C_c , primary and secondary consolidation, compression characteristics of clays and settlement analysis.

Shear strength of soils, stress at a point, Mohr's stress circle, Mohr- coulomb failure criteria, definition of stress path, shear testing of soil, direct shear, triaxial, unconfined compression vane shear, undrained and drained strengths, shear characteristic of sand normally loaded and over consolidated clays, Skempton's pore pressure parameters, choice of test conditions and shear parameters

Stability of slopes:

Finite and infinite slopes, concept of factor of safety, Swedish method, Friction circle method, Taylor's stability number & chart, effect of submergence, steady seepage and sudden drawdown conditions.

**FIFTH SEMESTER
GEOTECHNICAL ENGINEERING
SUB CODE: CE 515 L**

**Marks-50.
Time – 4 Hrs.**

LABORATORY WORK: -

1. Liquid Limit test by Cone Penetrometer Apparatus.
2. Liquid Limit test by Casagrande Apparatus.
3. Plastic limit.
4. Sieve analysis.
5. Moisture content by oven dry method.
6. Moisture content by Infrared moisture meter method.
7. Dry Density by sand replacement method.
8. Dry Density by core cutter method.
9. Direct shear test.
10. Unconfined compression test.
11. Compaction test.
12. Permeability test.

13. Consolidation test.

**FIFTH SEMESTER
CONCRETE TECHNOLOGY
SUB CODE: CE 516**

**Theory-100.
Sessional-75.
Time-3 hrs.**

1. Concrete as a Building and its ingredients:

- i. Cement: Manufacture of Portland Cement, its composition, Hydration of cement, physical and chemical properties, concept of strength development. Gel Space Ratio, Powers Law, Gel Structure.
- ii. Testing of Cement for Physical and chemical properties as per BIS specifications.
- iii. Different types of cement such as Slag cement, Portland Pozzolona cement and high Alumina cement, their characteristics, composition, use and properties.
- iv. Aggregates and testing of Aggregates.
Classification, source, physical and mechanical properties. Testing of Aggregates for physical and mechanical properties.
- v. Water.

2. Production of Fresh Concrete:

- i. Proportioning of concrete, operations involved in concrete production, Workability, Factors Affecting workability, Measurement of workability. Problem of Segregation and bleeding and Laitance.
- ii. Properties of hardened Concrete:
Strength and durability, Factors affecting strength and durability of concrete.

3. Concrete Mix Design: Principle and methods, Statistical Quality control. Concrete Rheology, Maturity concept, IS method for concrete Mix Design.

4. Introduction to special concretes:

- (a) Admixtures in concrete.
- (b) Special concrete as lightweight concrete. High Density Concrete, Sulphur impregnated concrete, Polymer concrete, Lime concrete constituents and uses.
- (c) High strength concrete.
- (d) Fibre Reinforced Concrete.

5. Material testing and instrumentation:

Conventional vs. Non-Destructive testing. Methods & Principles of NDT.

Laboratory work:

1. Testing of cement.
Standard consistency, setting time (initial and final), fineness, soundness and compressive strength test (3 days, 7 days and 28 days).
2. Testing of Aggregates.

- (a) Fine aggregate.
Sieve analysis for zoning and fineness modulus (FM), Bulking of sand, Absorption and moisture content, specific gravity.
- (b) Coarse aggregate.
Sieve analysis for grading, absorption and moisture content, specific gravity flakiness index, Elongation index, Impact value, Crushing value and Abrasion value.
- 3. Compressive strength test of concrete, workability test of fresh concrete.
- 4. Concrete Mix design by IS method.

References:

1. Rai Mohan and Jai Singh M.P. "Advances in Building Materials and Construction-CBRI Roorkee".
2. "Civil Engineering Materials" "Technical Teachers" Training Institute Chandigarh, Tata McGraw Hill Publishing Company Ltd., New Delhi.
3. Spence RJS and Cook DJ-'Building Materials in Developing Countries' John Wiley and Sons.
4. Shetty M.S. "Concrete Technology, Theory and Practices". S. Chand & Company Ltd., New Delhi.
5. Neville A.M., Properties of Concrete, Pitman Publishing Company.
6. Gambhir M.L. "Concrete Technology"- Tata McGraw Hill Publishing Company Ltd., New Delhi.
7. Gambhir M.L. "Concrete Manual"- Dhanpal Rai & Sons, Delhi.

**FIFTH SEMESTER
CONCRETE TECHNOLOGY
SUB CODE: CE 516**

**Theory – 100.
Sessional – 50.
Time – 3 hrs.**

