

**MAHARSHI DAYANAND UNIVERSITY, ROHTAK**  
**SCHEME OF STUDIES & EXAMINATIONS**  
**B.Tech 2nd YEAR CIVIL ENGINEERING,**  
**3<sup>rd</sup> SEMESTER**  
**Proposed 'F' Scheme w.e.f 2010**

Subject Code	Subject Name	L	T	P	Total	Theory Marks	Class Marks	Practical Marks	Total Marks
MAT-201-F Or HUM-201-F	Mathematics-III Or Engineering Economics	3	1	0	4	100	50	0	150
HUM-203-F	Fundamental of Management	3	1	0	4	100	50	0	150
CE-201-F	Structural Analysis-I	3	1	0	4	100	50	0	150
CE-203-F	Building Construction Materials	3	1	0	4	100	50	0	150
CE-205-F	Fluid Mechanics-I	3	1	0	4	100	50	0	150
CE-207-F	Surveying-I	3	1	0	4	100	50	0	150
CE-209-F	Building Drawings	1	0	3	4	0	25	25	50
CE-211-F	Structural Analysis-I Lab	0	0	2	2	0	25	25	50
CE-213-F	Fluid Lab-I Lab	0	0	2	2	0	25	25	50
CE-215-F	Surveying-I Lab	0	0	2	2	0	50	50	100
	<b>Total</b>	<b>19</b>	<b>7</b>	<b>9</b>	<b>35</b>	<b>600</b>	<b>425</b>	<b>125</b>	<b>1150</b>

**MAT-201-F MATHEMATICS-III**  
(Common to CSE, ME, ECE, BME, EE, EEE, E&I, I&C, IT, CE)

<b>L</b>	<b>T</b>	<b>P</b>	<b>Class Work</b>	<b>: 50 Marks</b>
<b>3</b>	<b>1</b>	<b>-</b>	<b>Theory</b>	<b>: 100 Marks</b>
			<b>Total</b>	<b>: 150 Marks</b>
			<b>Duration of Exam.</b>	<b>: 3 Hrs.</b>

**NOTE:** Examiner will set 9 questions in total, with two questions from each section and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each section.

**Section-A**

**Fourier Series and Fourier Transforms :** Euler's formulae, conditions for a Fourier expansion, change of interval, Fourier expansion of odd and even functions, Fourier expansion of square wave, rectangular wave, saw-toothed wave, half and full rectified wave, half range sine and cosine series.

**Fourier integrals, Fourier transforms, Shifting theorem (both on time and frequency axes), Fourier transforms of derivatives, Fourier transforms of integrals, Convolution theorem, Fourier transform of Dirac-delta function.**

**Section-B**

**Functions of Complex Variable:** Definition, Exponential function, Trigonometric and Hyperbolic functions, Logarithmic functions. Limit and Continuity of a function, Differentiability and Analyticity.

**Cauchy-Riemann equations, necessary and sufficient conditions for a function to be analytic, polar form of the Cauchy-Riemann equations. Harmonic functions, application to flow problems. Integration of complex functions. Cauchy-Integral theorem and formula.**

**Section-C**

**Power series, radius and circle of convergence, Taylor's Maclaurin's and Laurent' series. Zeroes and singularities of complex functions, Residues. Evaluation of real integrals using residues (around unit and semi circle only).**

**Probability Distributions and Hypothesis Testing:** Conditional probability, Bayes theorem and its applications, expected value of a random variable. Properties and application of Binomial, Poisson and Normal distributions.

**Section-D**

**Testing of a hypothesis, tests of significance for large samples, Student's t distribution (applications only), Chi-square test of goodness of fit.**

**Linear Programming:** Linear programming problems formulation, solving linear programming problems using (i) Graphical method (ii) Simplex method (iii) Dual simplex method.

**TEXT BOOKS:**

1. Engineering Mathematics by Babu Ram (Pearson media Publication)
2. Advanced Engg. Mathematics: F Kreyszig.
3. Higher Engg. Mathematics: B.S. Grewal.

**REFERENCE BOOKS:**

1. Advance Engg. Mathematics: R.K. Jain, S.R.K.Iyenger.
2. Advanced Engg. Mathematics: Michael D. Greenberg.
3. Operation Research: H.A. Taha.
4. Probability and statistics for Engineers: Johnson. PHI.

**HUM-201-F ENGINEERING ECONOMICS**  
(Common to CSE, ME, ECE, BME, EE, EEE, E&I, I&C, IT, CE, TT, FAE, TC)

<b>L</b>	<b>T</b>	<b>P</b>	<b>Class Work</b>	<b>: 50 Marks</b>
<b>3</b>	<b>1</b>	<b>-</b>	<b>Theory</b>	<b>: 100 Marks</b>
			<b>Total</b>	<b>: 150 Marks</b>
			<b>Duration of Exam.</b>	<b>: 3 Hrs.</b>

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**SECTION-A**

**Definition of Economics - various definitions, Nature of Economic problem, Production possibility curve Economic laws and their nature. Relation between Science, Engineering, Technology and Economics.**

**Concepts and measurement of utility, Law of Diminishing Marginal Utility, Law of equi-marginal utility - its practical application and importance.**

**SECTION-B**

**Meaning of Demand, Individual and Market demand schedule, Law of demand, shape of demand curve, Elasticity of demand, measurement of elasticity of demand, factors effecting elasticity of demand, practical importance & applications of the concept of elasticity of demand.**

**Meaning of production and factors of production; Law of variable proportions, Returns to scale, Internal and External economics and diseconomies of scale.**

**SECTION-C**

**Various concepts of cost - Fixed cost, variable cost, average cost, marginal cost, money cost, real cost opportunity cost. Shape of average cost, marginal cost, total cost etc. in short run and long run.**

**Meaning of Market, Types of Market - Perfect Competition, Monopoly, Oligopoly, Monopolistic Competition (Main features of these markets)**

**SECTION-D**

**Supply and Law of Supply, Role of Demand & Supply in Price Determination and effect of changes in demand and supply on prices.**

**Nature and characteristics of Indian economy (brief and elementary introduction), Privatization - meaning, merits and demerits. Globalisation of Indian economy - merits and demerits. Elementary Concepts of VAT, WTO, GATT & TRIPS agreement.**

**TEXT BOOKS:**

- 1. Principles of Economics: P.N. Chopra (Kalyani Publishers).**
- 2. Modern Economic Theory – K.K. Dewett (S.Chand)**

## **REFERENCE BOOKS:**

1. **A Text Book of Economic Theory Stonier and Hague (Longman's Landon)**
2. **Micro Economic Theory – M.L. Jhingan (S.Chand)**
3. **Micro Economic Theory - H.L. Ahuja (S.Chand)**
4. **Modern Micro Economics : S.K. Mishra (Pragati Publications)**
5. **Economic Theory - A.B.N. Kulkarni & A.B. Kalkundrikar (R.Chand & Co.)**
6. **Indian Economy: Rudar Dutt & K.P.M. Sundhram**

**HUM-203-F FUNDAMENTALS OF MANAGEMENT**  
(Common to CSE, ME, ECE, BME, EE, EEE, E&I, I&C, IT, CE)

**L T P**  
**3 1 -**

**Class Work : 50 Marks**  
**Theory : 100 Marks**  
**Total : 150 Marks**  
**Duration of Exam. : 3 Hrs.**

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**Section-A**

**Meaning of management, Definitions of Management, Characteristics of management, Management vs. Administration. Management-Art, Science and Profession. Importance of Management. Development of Management thoughts.**

**Principles of Management. The Management Functions, Inter-relationship of Managerial functions.**

**Nature and Significance of staffing, Personnel management, Functions of personnel management, Manpower planning, Process of manpower planning, Recruitment, Selection; Promotion - Seniority Vs. Merit. Training - objectives and types of training.**

**Section-B**

**Production Management : Definition, Objectives, Functions and Scope, Production Planning and Control; its significance, stages in production planning and control. Brief introduction to the concepts of material management, inventory control; its importance and various methods.**

**Section-C**

**Marketing Management - Definition of marketing, marketing concept, objectives & Functions of marketing.**

**Marketing Research - Meaning; Definition; objectives; Importance; Limitations; Process. Advertising - meaning of advertising, objectives, functions, criticism.**

**Section-D**

**Introduction of Financial Management, Objectives of Financial Management, Functions and Importance of Financial Management. Brief Introduction to the concept of capital structure and various sources of finance.**

**TEXT BOOKS:**

- 1. Principles and Practice of Management - R.S. Gupta, B.D.Sharma, N.S. Bhalla. (Kalyani Publishers)**
- 2. Organisation and Management - R.D. Aggarwal (Tata Mc Graw Hill)**

**REFERENCE BOOKS:**

- 1. Principles & Practices of Management – L.M. Prasad (Sultan Chand & Sons)**
- 2. Management – Harold, Koontz and Cyrilo Donell (Mc.Graw Hill).**
- 3. Marketing Management – S.A. Sherlikar (Himalaya Publishing House, Bombay).**
- 4. Financial Management - I.M. Pandey (Vikas Publishing House, New Delhi)**
- 5. Management - James A.F. Stoner & R.Edward Freeman, PHI.**

## CE-201-F STRUCTURAL ANALYSIS -I

L T P  
3 1 -

Class Work : 50 Marks  
Theory : 100 Marks  
Total : 150 Marks  
Duration of Exam. : 3 Hrs.

### SECTION\_A

**Unit- I Introduction to structural analysis, Definition of determinate and indeterminate structure, degree of freedom, concept of stress and strain, Mohr's circle of stress and strain, principle stress and strain examples. Stress- strain relationship hook's law, examples, composite sections**

### SECTION-B

**Unit -II Concept of bending stresses, flexural formula, stress- strain diagram for beam, shear stress in beam, shear stresses in beam with different cross-section. Concept of torsion, torsion in circular shaft, torsion equation, shear stress in shaft due to torsion examples**

### SECTION-C

**Unit- III Theory of column, slenderness ratio, end connections, short column, Euler's critical buckling load, eccentric loaded short column, cylinder column subjected to eccentric loading, examples**

### SECTION-D

**Unit- IV Introduction to bending moment and shear force diagram in beam, introduction to slope and deflection in beam by differential equation, moment- area method and conjugate beam method, principle of virtual work, Maxwell law of reciprocal deflection, Willot-Mohr diagram.**

### BOOKS RECOMMENDED:

1. Strength of Materials Part-I, S.Timoshenko,Affiliated East-West Press,N.Delhi
2. Mechanics of Materials, Popov Nagarjan & Lu, Prentice Hall of India,N.Delhi
3. Mechanics of Solids, Prasad,V.S. Gakgotia Pub.,N.Delhi.
4. Elementary Structural Analysis, Jain,A.K.,Nem Chand & Bros,Roorkee.
5. Elementary Structural Analysis, Wibur & Nooris, McGraw Hill Book Co.,Newyork.
6. Structural Analysis, Bhavikatti,S.S.,Vikas Pub.House,N.Delhi.

## CE-203-F BUILDING CONSTRUCTION MATERIALS & DRAWING

L T P  
4 0 2

Class Work : 50 Marks  
Theory : 100 Marks  
Total : 150 Marks  
Duration of Exam. : 3 Hrs.

### SECTION-A

#### Unit-I: Masonry Construction

Introduction, various terms used, stone masonry-Dressing of stones, Classifications of stone masonry, safe permissible loads, Introduction to green building concept and methods, Brick masonry-bonds in brick work, laying brick work, structural brick work-cavity and hollow walls, reinforced brick work, Defects in brick masonry, composite stone and brick masonry, glass block masonry.

#### Unit-II: Cavity and Partition Walls

Advantages, position of cavity, types of non-bearing partitions, constructional details and precautions, construction of masonry cavity wall.

#### Unit-III: Foundation

Functions, types of shallow foundations, sub-surface investigations, geophysical methods, general feature of shallow foundation, foundations in water logged areas, design of masonry wall foundation, introduction to deep foundations i.e. pile and pier foundations.

### SECTION-B

#### Unit-IV: Roofs and Floors

Types of roofs, various terms used, roof trusses-king post truss, queen post truss etc. Floor structures, ground, basement and upper floors, various types of floorings.

#### Unit-V: Doors and Windows

Locations, sizes, types of doors and windows, fixtures and fasteners for doors and windows.

### SECTION-C

#### Unit-VI: Damp-Proofing and Water-Proofing

Defects and causes of dampness, prevention of dampness, materials used, damp-proofing treatment in buildings, water- proofing treatment of roofs including pitched roofs.

#### Unit-VII: Acoustics, Sound Insulations and Fire Protection

Classification, measurement and transmission of sound, sound absorber, classification of absorbers, sound insulation of buildings, wall construction and acoustical design of auditorium, fire-resisting properties of materials, fire resistant construction and fire protection requirements for buildings.

### SECTION-D

#### Unit-VIII: Material for green building, Stones

Classification, requirements of good structural stone, quarrying, blasting and sorting out of stones, dressing, sawing and polishing, prevention and seasoning of stone.

#### Unit-IX: Brick and Tiles

Classification of bricks, constituents of good brick earth, harmful ingredients, manufacturing of bricks, testing of bricks, Bricks prepared from fly ash.

**Tiles: Terra-cotta, manufacturing of tiles and terra-cotta, types of terra-cotta, uses of terra-cotta.**

**Unit-X: Limes, cement and mortars**

**Classification of lime, manufacturing, artificial hydraulic lime, pozzolona, testing of lime, storage of lime, cements composition, types of cement, manufacturing of ordinary portland cement, testing of cement, special types of cement, storage of cement.**

**Mortars: Definition, proportions of lime and cement mortars, mortars for masonry and plastering.**

**Unit-XI: Timber**

**Classification of timber, structure of timber, seasoning of timber, defects in timber, fire proofing of timber, plywood, fiber boards, masonite and its manufacturing, important Indian timbers.**

**Unit-XII: Paints and Varnishes**

**Basic constituents of paints, types of paints, painting of wood, constituents of varnishes, characteristics and types of varnishes.**

**BOOKS RECOMMENDED:**

- 1 Building Construction, Sushil Kumar, Standard Pub., N. Delhi**
- 2 Building Material, Rangawala**
- 3 Construction Engineering, Y.S. Sane**
- 4 Building Construction, Gurcharan Singh, Standard Pub., N. Delhi.**



## CE- 205-F FLUID MECHANICS-I

L T P  
3 1 -

Class Work : 50 Marks  
Theory : 100 Marks  
Total : 150 Marks  
Duration of Exam. : 3 Hrs.

### SECTION-A

**Unit-I: Introduction: Fluid properties, mass density, specific weight, specific volume and Specific volume and specific gravity, surface tension, capillarity, pressure inside a droplet and bubble due to surface tension, compressibility, viscosity, Newtonian and Non-Newtonian fluids, real and ideal fluids.**

**Unit-II: Kinematics of Fluid Flow: Steady & unsteady, uniform and non-uniform, laminar & turbulent flows, one, two & three dimensional flows, stream lines, streak lines and path lines, continuity equation in differential form, rotation and circulation, elementary explanation of stream function and velocity potential, rotational and irrotational flows, free and forced vortex flow, graphical and experimental methods of drawing flow nets.**

### SECTION-B

**Unit-III: Fluid Statics: Pressure-density-height relationship, gauge and absolute pressure, simple differential and sensitive manometers, two liquid manometers, pressure on plane and curved surfaces, centre of pressure, Buoyancy, stability of immersed and floating bodies, determination of metacentric height, fluid masses subjected to uniform acceleration,**

### SECTION-C

**Unit-IV: Dynamic of Fluid Flow: Euler's equation of motion along a streamline and its integration, limitation of Bernoulli's equation, Pitot tubes, manometer, Orificemeter, flow through orifices & mouth pieces, sharp crested weirs and notches, aeration of nappe.**

**Unit-V: Boundary layer analysis: Boundary layer thicknesses, boundary layer over a flat plate, laminar boundary layer, and turbulent boundary layer, laminar sub-layer, smooth and rough boundaries, local and average friction coefficient, separation and its control.**

### SECTION-D

**Unit-VI: Dimensional Analysis and Hydraulic Similitude: Dimensional analysis, Buckingham theorem, important dimensionless numbers and their significance, geometric, kinematic and dynamic similarity, model studies, physical modeling, similar and distorted models.**

### BOOKS RECOMMENDED:

- 1 Hydraulic and Fluid Mechanic by P.N.Modi & S.M.Seth
- 2 Introduction to Fluid Mechanics by Robert W.Fox & Alan T.McDonald
- 3 Fluid Mechanics Through Problems by R.J.Garde
- 4 Engineering Fluid Mechanics by R.J.Garde & A.G.Mirajgaoker

## CE-207-F SURVEYING-I

L T P  
3 1 -

Class Work : 50 Marks  
Theory : 100 Marks  
Total : 150 Marks  
Duration of Exam. : 3 Hrs.

### SECTION-A

**Unit-I: Fundamental Principles of Surveying: Definition, objects, classification, fundamental principles, methods of fixing stations.**

**Unit-II: Measurement of distances: Direct measurement, instruments for measuring distance, instruments for making stations, chaining of line, errors in chaining, tape corrections examples.**

### SECTION-B

**Unit-III: Compass and Chain Traversing: Methods of traversing, instruments for measurement of angles-prismatic and surveyor's compass, bearing of lines, local attraction, examples.**

**Unit-IV: Levelling: Definition of terms used in levelling, types of levels and staff, temporary adjustment of levels, principles of levelling, reduction of levels, booking of staff readings, examples, contouring, characteristics of contours lines, locating contours, interpolation of contours, Calculations of volume of earth works by means of contour lines.**

### SECTION-C

**Unit-V: Theodolite and Theodolite Traversing: Theodolites, temporary adjustment of theodolite, measurement of angles, repetition and reiteration method, traverse surveying with theodolite, checks in traversing, adjustment of closed traverse, examples, Electronic theodolite.**

**Unit-VI: Plane Table Surveying: Plane table, methods of plane table surveying, radiation, intersection, traversing and resection, two point and three point problems.**

### SECTION-D

**Unit-VII: Tacheometry: Uses of tacheometry, principle of tacheometric surveying, instruments used in tacheometry, systems of tacheometric surveying-stadia system fixed hair method, determination of tacheometric constants, tangential systems, examples.**

**Unit-VIII: Curves: Classification of curves, elements of simple circular curve, location of tangent points-chain and tape methods, instrumental methods, examples of simple curves. Transition Curves-Length and types of transition curves, length of combined curve, examples:**

**Vertical Curves: Necessity and types of vertical curves.**

### BOOKS RECOMMENDED:

1. Surveying Vol.I by B.C.Punmia
2. Surveying Vol.I by T.P.Kanitkar

## CE-209-F BUILDING DRAWING

**L T P**  
**1 - 3**

**Sessional : 25Marks**  
**Theory : 25Marks**  
**Total : 50Marks**  
**Duration of Exam: 3 Hrs**

**1. Typical drawings  
of: a) Cavity Wall  
b) Bonds in brick work c)  
Grillage foundation**

**2. Preparation of building drawing mentioning its salient features  
including the following details:**

**a) Ground floor plan**

**b) Two Sectional Elevations c)  
Front and Side Elevations**

**d) Plan and Sectional Elevation of stair- case, doors/ windows/ ventilators, floor  
and roof.**

**CE-211-F STRUCTURAL ANALYSIS -I LAB**

**L T P**  
**- - 2**

**Sessional : 25 Marks**  
**Theory : 25 Marks**  
**Total : 50 Marks**  
**Duration of Exam: 3 Hrs**

**LIST OF EXPERIMENTS**

- 1. Verification of reciprocal theorem of deflection using a simply supported beam.**
- 2. Verification of moment area theorem for slopes and deflections of the beam.**
- 3. Deflections of a truss- horizontal deflections & vertical deflections of various joints of a pin- jointed truss.**
- 4. Elastic displacements (vertical & horizontal) of curved members.**
- 5. Experimental and analytical study of 3 hinged arch and influence line for horizontal thrust.**
- 6. Experimental and analytical study of behavior of struts with various end conditions.**
- 7. To determine elastic properties of a beam.**
- 8. Uniaxial tension test for steel (plain & deformed bars)**
- 9. Uniaxial compression test on concrete & bricks specimens.**

## CE-213-F FLUID MECHANICS-I LAB

L T P  
- - 2

Sessional : 25 Marks  
Theory : 25 Marks  
Total : 50 Marks  
Duration of Exam: 3 Hrs

### LIST OF EXPERIMENTS

1. Verification of Bernoulli's Theorem
2. Calibration of V notch
- 3 Calibration of Rectangular Notch
4. Calibration of Trapezoidal notch
5. Determination of Metacentric height
- 6 Determination of coefficient  $C_d$ ,  $C_v$  and  $C_c$
- 7 Calibration of Venturimeter
- 8 Calibration of Orifice Plate
- 9 Determination of surface tension of liquids
- 10 Study the properties of vortex flow.

## CE-215-F SURVEYING-I LAB

L T P  
- - 2

Sessional : 25 Marks  
Theory : 25 Marks  
Total : 50 Marks  
Duration of Exam: 3 Hrs

### LIST OF EXPERIMENTS

1. Chain surveying: Chaining and chain traversing.
2. Compass traversing.
3. Plane tabling: methods of plane table surveying, two point & three point problems.
4. Leveling: Profile leveling and plotting of longitudinal section and cross sections, Y leveling. Permanent adjustment of level, reciprocal leveling, Contouring and preparation contour map.
5. Use of tangent clinometers.

**MAHARSHI DAYANAND UNIVERSITY, ROHTAK**  
**SCHEME OF STUDIES & EXAMINATIONS B.Tech**  
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**4<sup>th</sup> SEMESTER**  
**Proposed 'F' Scheme effective w.e.f 2010**

Subject Code	Subject Name	L	T	P	Total	Theory Marks	Class Marks	Practical Marks	Total Marks
MAT-201- F Or HUM 201-F	Maths III Or Engg. Economics	3	1	0	4	100	50	-	150
CE-202-F	Structural Analysis-II	3	1	0	4	100	50	0	150
CE-204-F	Fluid Mechanics- II	3	1	0	4	100	50	0	150
CE-206-F	Design of Concrete Structures-I	3	1	0	4	100	50	0	150
CE-208-F	Surveying-II	3	1	0	4	100	50	0	150
CE-210-F	Construction and concrete technology	3	1	0	4	100	50	0	150
CE-212-F	Structural Analysis-II Lab	0	0	2	2	0	25	25	50
CE-214-F	Fluid mechanics Lab	0	0	2	2	0	25	25	50
CE-216-F	Surveying Lab	0	0	2	2	0	25	25	50
CE-218-F	Concrete Lab	0	0	2	2	0	25	25	50
GP-202-F	General Proficiency	-	-	2	2	50	-	-	50
<b>Total</b>		<b>18</b>	<b>6</b>	<b>10</b>	<b>34</b>	<b>650</b>	<b>400</b>	<b>100</b>	<b>1150</b>

**Note:**

1. Students will be allowed to use non-programmable scientific calculator. However, sharing of Calculator and other materials will not be permitted in the examination.

2. Each student has to undergo practical training of 6 weeks during summer vacation and its evaluation shall be carried out in the V semester.

## MAT-201-F MATHEMATICS-III

L T P  
3 1 -

Class Work : 50 Marks  
Theory : 100 Marks  
Total : 150 Marks  
Duration of Exam. : 3 Hrs.

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**Fourier integrals, Fourier transforms, Shifting theorem (both on time and frequency axes), Fourier transforms of derivatives, Fourier transforms of integrals, Convolution theorem, Fourier transform of Dirac-delta function.**

### Section-B

**Functions of Complex Variable:** Definition, Exponential function, Trigonometric and Hyperbolic functions, Logarithmic functions. Limit and Continuity of a function, Differentiability and Analyticity.

**Cauchy-Riemann equations, necessary and sufficient conditions for a function to be analytic, polar form of the Cauchy-Riemann equations. Harmonic functions, application to flow problems. Integration of complex functions. Cauchy-Integral theorem and formula.**

### Section-C

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**Probability Distributions and Hypothesis Testing:** Conditional probability, Bayes theorem and its applications, expected value of a random variable. Properties and application of Binomial, Poisson and Normal distributions.

### Section-D

**Testing of a hypothesis, tests of significance for large samples, Student's t distribution (applications only), Chi-square test of goodness of fit.**

**Linear Programming:** Linear programming problems formulation, solving linear programming problems using (i) Graphical method (ii) Simplex method (iii) Dual simplex method.

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3. Operation Research: H.A. Taha.
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## HUM-201-F ENGINEERING ECONOMICS

<b>L</b>	<b>T</b>	<b>P</b>	<b>Class Work</b>	<b>: 50 Marks</b>
<b>3</b>	<b>1</b>	<b>-</b>	<b>Theory</b>	<b>: 100 Marks</b>
			<b>Total</b>	<b>: 150 Marks</b>
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**Definition of Economics - various definitions, Nature of Economic problem, Production possibility curve Economic laws and their nature. Relation between Science, Engineering, Technology and Economics.**

**Concepts and measurement of utility, Law of Diminishing Marginal Utility, Law of equi-marginal utility - its practical application and importance.**

### SECTION-B

**Meaning of Demand, Individual and Market demand schedule, Law of demand, shape of demand curve, Elasticity of demand, measurement of elasticity of demand, factors effecting elasticity of demand, practical importance & applications of the concept of elasticity of demand.**

**Meaning of production and factors of production; Law of variable proportions, Returns to scale, Internal and External economics and diseconomies of scale.**

### SECTION-C

**Various concepts of cost - Fixed cost, variable cost, average cost, marginal cost, money cost, real cost opportunity cost. Shape of average cost, marginal cost, total cost etc. in short run and long run.**

**Meaning of Market, Types of Market - Perfect Competition, Monopoly, Oligopoly, Monopolistic Competition (Main features of these markets)**

### SECTION-D

**Supply and Law of Supply, Role of Demand & Supply in Price Determination and effect of changes in demand and supply on prices.**

**Nature and characteristics of Indian economy (brief and elementary introduction), Privatization - meaning, merits and demerits. Globalisation of Indian economy - merits and demerits. Elementary Concepts of VAT, WTO, GATT & TRIPS agreement.**

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3. **Micro Economic Theory - H.L. Ahuja (S.Chand)**
4. **Modern Micro Economics : S.K. Mishra (Pragati Publications)**
5. **Economic Theory - A.B.N. Kulkarni & A.B. Kalkundrikar (R.Chand & Co.)**
6. **Indian Economy: Rudar Dutt & K.P.M. Sundhram**

## CE-202 F STRUCTURAL ANALYSIS -II

<b>L</b>	<b>T</b>	<b>P</b>	<b>Sessional</b>	<b>: 50 Marks</b>
<b>3</b>	<b>1</b>	<b>-</b>	<b>Theory</b>	<b>: 100 Marks</b>
			<b>Total</b>	<b>: 150 Marks</b>
			<b>Duration of Exam</b>	<b>: 3 Hrs</b>

**NOTE:** Examiner will set 9 questions in total, with two questions from each section and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each section.

### SECTION-A

**Unit-I:** Statically Indeterminate Structures-Introduction, Static and Kinematic Indeterminacies, Castigliano's theorems, Strain energy method, Analysis of frames with one or two redundant members using Castigliano's 2nd theorem. Concept of rolling load, design of maximum bending moment, shear force due to rolling load, concept of influence lines in beams, I.L diagram for shear force, B.M., deflection etc.

**Unit-II:** Slope deflection and moment Distribution Methods- Analysis of continuous beams & portal frames, Portal frames with inclined members.

### SECTION -B

**Unit-III:** Three hinged arch-horizontal thrust; shear force and bending moment diagrams. **Unit-IV** Bending moment and shear force in determinate beams and frames, definition and signs, conventions, axial force, shear force and B.M diagrams.

### SECTION-C

**Unit-V:** Unsymmetrical Bending Introduction, Centroidal principal axes of sections, Bending stresses in beams subjected to unsymmetrical bending, shear centre, shear centre for channel, Angles and Z sections.

**Unit-VI:** Cable and suspension Bridges - Introduction, uniformly loaded cables, Temperature stresses, and three hinged stiffening Girder and two hinged stiffening Girder.

### SECTION-D

**Unit-VII:** Analysis of statically determinate trusses-Introduction, various types, stability, analysis of plane trusses by method of joints and method of sections, analysis of space trusses using tension coefficient method.

### BOOKS RECOMMENDED:

1. Statically Indeterminate Structures, C.K. Wang, McGraw Hill Book Co., New York.
2. Advanced Structural Analysis, A.K. Jain, Nem Chand & Bros., Roorkee.
3. Indeterminate Structures, R.L. Jindal, S. Chand & Co., New Delhi.
4. Theory of Structures, Vol. I, S.P. Gupta & G.S.Pandit, Tata McGraw Hill, New Delhi.

## CE-204 F DESIGN OF CONCRETE STRUCTURES-I

<b>L</b>	<b>T</b>	<b>P</b>	<b>Sessional</b>	<b>: 50 Marks</b>
<b>3</b>	<b>1</b>	<b>-</b>	<b>Theory</b>	<b>: 100 Marks</b>
			<b>Total</b>	<b>: 150 Marks</b>
			<b>Duration of Exam</b>	<b>: 3 Hrs</b>

**NOTE:** Examiner will set 9 questions in total, with two questions from each section and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each section.

### SECTION-A

**Unit-I: Elementary treatment of concrete technology: Physical requirements of cement, aggregate, admixture and reinforcement, Strength and durability, shrinkage and creep. Design of concrete mixes, Acceptability criterion, I.S. Specifications.**

**Unit-II: Design Philosophies in Reinforced Concrete: Working stress and limit state methods, Limit state v/s working stress method, Building code, Normal distribution curve, characteristic strength and characteristics loads, design values, Partial safety factors and factored loads, stress -strain relationship for concrete and steel.**

### SECTION-B

**Unit-III: Working Stress Method: Basic assumptions, permissible stresses in concrete and steel, design of singly and doubly reinforced rectangular and flanged beams in flexure, steel beam theory, inverted flanged beams, design examples.**

**Unit-IV: Limit State Method: Basic assumptions, Analysis and design of singly and doubly reinforced rectangular flanged beams, minimum and maximum reinforcement requirement, design examples.**

**Unit-V: Analysis and Design of Sections in shear, bond and torsion -Diagonal tension, shear reinforcement, development length, Anchorage and flexural bond, Torsional, stiffness, equivalent shear, Torsional reinforcement, Design examples.**

### SECTION-C

**Unit-VI: Concrete Reinforcement and Detailing-Requirements of good detailing, cover to reinforcement, spacing of reinforcement, reinforcement splicing, Anchoring reinforcing bars in flexure and shear, curtailment of reinforcement.**

**Unit-VII: Serviceability Limit State -Control of deflection, cracking, slenderness and vibrations, deflection and moment relationship for limiting values of span to depth, limit state of crack width, Design examples.**

**Unit-VIII: One way and Two Ways Slabs -General considerations, Design of one way and two ways slabs for distributed and concentrated loads, Non-rectangular slabs, openings in slabs, Design Examples**

### SECTION-D

**Unit-IX: Columns and Footings-Effective length, Minimum eccentricity, short columns under axial compression, Uniaxial and biaxial bending, slender columns, Isolated and wall footings, Design examples.**

**Unit-X: Retaining Walls-Classification, Forces on retaining walls, design criteria, stability requirements, Proportioning of cantilever retaining walls, counterfort retaining walls, criteria for design of counterforts, design examples.**

**BOOKS RECOMMENDED:**

1. Design of Reinforced Concrete Structures, P. Dayaratnam, Oxford & IBH Pub., N. Delhi.
2. Reinforced Concrete-Limit State Design, A. K. Jain, Nem Chand & Bros., Roorkee.
3. Reinforced Concrete, I. C. Syal & A. K. Goel, A. H. Wheeler & Co. Delhi.
4. Reinforced Concrete Design, S. N. Sinha, TMH Pub., N. Delhi.
5. SP-16(S&T)-1980, Design Aids for Reinforced Concrete to IS:456, BIS, N. Delhi.
6. SP-34(S&T)-1987 Handbook on Concrete Reinforcement and Detailing, BIS, N. Delhi.

## CE-206-F FLUID MECHANICS-II

L	T	P	Sessional	: 50 Marks
3	1	-	Theory	: 100 Marks
			Total	: 150 Marks
			Duration of Exam	: 3 Hrs

**NOTE:** Examiner will set 9 questions in total, with two questions from each section and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each section.

### SECTION-A

**Unit-I: Turbulent flow:** Introduction to turbulent flow, mixing length theory, velocity distribution in turbulent flow, resistance of smooth and artificially roughened pipes, commercial pipes, aging of pipes. Losses due to sudden expansion and contraction, losses in pipe fittings and valves, concepts of equivalent length of pipe, hydraulic and energy gradient lines, pipes in series, pipes in parallel, branching of pipes, pipe network siphon, water Hammer (only quick closure case). transmission of power through pipelines.

### SECTION-B

**Unit-II: Flow in open channels:** Uniform flow Basic concepts, Resistance equations (Chezy's and mannings formulae), Uniform flow computations, Efficient channel section, specific energy concept critical flow and its computations, channel transitions.

**Unit-III: Flow in open channels:** Non-uniform flow gradually varied flow-basic assumptions and dynamic equations of gradually flow. Types of slopes and their characteristics, analysis and computations of flow profiles, brink dept analysis, surges in open channels.

### SECTION-C

**Unit-IV: Turbines:** Classification definitions, similarity laws, specific speed and unit quantities, Pelton turbines- their construction and settings, speed regulation dimensions of various element. Action of jet, torque, power and efficiency for ideal case, characteristic curves. Reaction turbines

Construction & setting draft tube theory, runaway speed, working proportion of hydraulic turbines and characteristic curves, cavitation. Forces on immersed bodies: types of drag drag on a sphere, a flat plate,

### SECTION-D

**Unit-V: Pumps: Centrifugal pumps:** Various types and their important components, manometric, total head, net positive suction head, specific speed, shut off head, cavitation. Principle of working and characteristic curves. Priming and maintenance. Submersible pumps.

**Reciprocating pumps :** principle of working, coefficient of discharge, slip, single acting and double acting pump. Manometric head, Acceleration head, Working of air vessels, simplex, duplex and three throw pumps, construction and discharge. Air lift pump

#### BOOKS RECOMMENDED:

1. Fluid Mechanics - Streeter & Wylie.
2. Fluid Mech. & Hyd. M/cs by Modi & Seth

- 3. Open channel Hydraulics - V.T. Chow.**
- 4. Hydraulic Machines - J.Lal.**
- 5. Fluid Mechanics by A.K. Jain**
- 6. Fluid Mechanics - Subramanyam.**

## CE-208 F SURVEYING-II

<b>L</b>	<b>T</b>	<b>P</b>	<b>Sessional</b>	<b>: 50 Marks</b>
<b>3</b>	<b>1</b>	<b>-</b>	<b>Theory</b>	<b>: 100 Marks</b>
			<b>Total</b>	<b>: 150 Marks</b>
			<b>Duration of Exam</b>	<b>: 3 Hrs</b>

**NOTE:** Examiner will set 9 questions in total, with two questions from each section and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each section.

### SECTION-A

**Unit-I: Trigonometrically Leveling:** Introduction, height and distances-base of the object accessible, base of object inaccessible, geodetical observation, refraction and curvature, axis signal correction, difference in elevation between two points.

**Unit-II: Triangulation:** Triangulation systems, classification, strength of figure, selection of triangulation stations, grade of triangulation, field work of triangulation, triangulation computations, introduction to E.D.M. instruments.

### SECTION-B

**Unit-III: Survey Adjustment and Treatment of Observations:** Definite weight of an observation, most probable values, type of error, principle of least squares, and adjustment of triangulation figures by method of least squares.

**Unit-IV: Astronomy:** Definitions of astronomical terms, star at elongation, star at prime vertical star at horizon, star at culmination, celestial coordinate systems, Napier's rule of circular parts, various time systems: sidereal, apparent, solar and mean solar time, equation of time-its cause, effect, determination of longitude, inter-conversion of time, determination of time, azimuth and latitude by astronomical observations.

### SECTION-C

**Unit-V: Elements of Photogrammetry:** Introduction: types of photographs, Terrestrial and aerial photographs aerial camera and height displacements in vertical photographs, stereoscopic vision and stereoscopies, height determination from parallax measurement, flight planning, plotting by radiline method, principle of photo interpretation and photogram metric monitoring in Civil Engineering.

### SECTION-D

**Unit-VI: Introduction of remote sensing and its systems.** Analysis /measurements on remote sensing analysis and interpretation of data

**Unit-VII: Concept of G.I.S and G.P.S-Basic Components, data input, storage & output.**

### BOOKS RECOMMENDED:

1. Surveying Vol.2 by B.C.Punmia
2. Surveying Vol.3 by B.C.Punmia
3. Surveying Vol.2 by T.P.Kanitkar



## CE-210-F CONSTRUCTION & CONCRETE TECHNOLOGY

<b>L</b>	<b>T</b>	<b>P</b>	<b>Sessional</b>	<b>: 50 Marks</b>
<b>3</b>	<b>1</b>	<b>-</b>	<b>Theory</b>	<b>: 100 Marks</b>
			<b>Total</b>	<b>: 150 Marks</b>
			<b>Duration of Exam</b>	<b>: 3 Hrs</b>

**NOTE:** Examiner will set 9 questions in total, with two questions from each section and one question covering all sections which will be Q.1. This Q.1 is compulsory and of short answers type. Each question carries equal mark (20 marks). Students have to attempt 5 questions in total at least one question from each section.

### SECTION-A

**Unit – I: CPM - Project Management, Bar Chart and Milestone Charts, Elements of network, development of network, network analysis.**

### SECTION-B

**Unit – II: Concrete Technology - Concrete making materials: cements, aggregates, water, admixtures, properties of fresh and hardened concrete, variability of concrete strength, extreme weather concreting, Testing of concrete mixes, prestressed concrete.**

### SECTION-C

**Unit – III: Mix Design-Principles of concrete mix design, basic considerations, Factors in the choice of mix design, outline of mix design procedure, ACI mix design practice, USBR method, British mix design method IS guidelines.**

### SECTION-D

**Unit – IV: Heavy Construction - Construction of large structures, dams, bridges, multi-storeyed buildings etc.**

**Unit – V: Construction Equipments - Introduction to heavy construction equipment, crushers, hot mix, plants, dozers etc.**

### BOOKS RECOMMENDED:

- 1. Handbook of mix design - BIS**
- 2. PERT & CPM by B.C. Punmia**
- 3. Concrete Technology by M.S. Shetty.**

## CE-212-F STRUCTURAL ANALYSIS -II LAB

L T P  
- - 2

Sessional : 25 Marks  
Theory : 25 Marks  
Total : 50 Marks  
Duration of Exam: 3 Hrs

### LIST OF EXPERIMENTS:

1. Experiment on a two- hinged arch for horizontal thrust & influence line for Horizontal thrust
2. Experimental and analytical study of a 3 bar pin jointed Truss.
3. Experimental and analytical study of deflections for unsymmetrical bending of a Cantilever beam.
4. Begg's deformeter- verification of Muller Breslau principle.
5. Experimental and analytical study of an elastically coupled beam.
6. Sway in portal frames - demonstration.
7. To study the cable geometry and statics for different loading conditions.
8. To plot stress-strain curve for concrete. Use of mechanical and electrical strain and stress gauges.

## CE-214-F FLUID MECHANICS- LAB

L T P  
- - 2

Sessional : 25 Marks  
Theory : 25 Marks  
Total : 50 Marks  
Duration of Exam: 3 Hrs

### LIST OF EXPERIMENTS

1. To determine the coefficient of drag by Stokes law for spherical bodies.
2. To study the phenomenon of cavitation in pipe flow.
3. To determine the critical Reynolds number for flow through commercial pipes.
4. To determine the coefficient of discharge for flow over a broad crested weir.
5. To study the characteristics of a hydraulic jump on a horizontal floor and sloping glacis including friction blocks.
6. To study the scouring phenomenon around a bridge pier model.
7. To study the scouring phenomenon for flow past a spur.
8. To determine the characteristics of a centrifugal pump.
9. To study the momentum characteristics of a given jet.
10. To determine head loss due to various pipe fittings.

## CE-216-F SURVEYING-II LAB

L T P  
- - 2

Sessional : 25 Marks  
Theory : 25 Marks  
Total : 50 Marks  
Duration of Exam: 3 Hrs

### LIST OF EXPERIMENTS

1. **Theodilite: Study of theodolite, measurement of horizontal angle, measurement of vertical angle, Permanent adjustment.**
2. **Tachometry: Tachometric constants, calculating horizontal distance and elevations with the help of tachometer.**
3. **Setting of simple circular curves by off set method, off set from chord produced, off set from long chord and by deflection angle method.**
4. **An exercise of triangulation including base line measurement.**

## CE- 218-F CONCRETE LAB

L T P  
- - 2

Sessional : 25 Marks  
Theory : 25 Marks  
Total : 50 Marks  
Duration of Exam: 3 Hrs

### TESTS ON CEMENT

- 1 Standard consistency of cement using Vicat's apparatus.
- 2 Fineness of cement by Sieve analysis and Blaine's air permeability method.
- 3 Soundness of cement by Le-Chatelier's apparatus.
- 4 Setting time of cement, initial and final.
- 5 Compressive strength of cement.
- 6 Measurement of specific gravity of cement.
- 7 Measurement of Heat of Hydration of cement.

### TESTS ON AGGREGATES

- 1 Moisture content and bulking of fine aggregate.
- 2 Fineness modulus of coarse and fine aggregates.

### TESTS ON CONCRETE

- 1 Workability of cement concrete by (a) Slump test (b) Compaction factor test (c) Flow table test
- 2 Compressive strength of concrete by (a) Cube test, (b) Cylinder test
- 3 Indirect tensile strength of concrete-split cylinder test.
- 4 Modules of rupture of concrete by flexure test
- 5 Bond strength between steel bar and concrete by pull-out test
- 6 Non-destructive testing of concrete

### BOOKS RECOMMENDED:

- 1 Concrete Manual-M.L.Gambhir, Dhanpat Rai & Sons, N.Delhi.
- 2 Concrete Technology -M.L.Gambhir, Tata McGraw Hill, N.Delhi

**GP-202-F GENERAL PROFICIENCY**

**L T P**  
**- - 2**

**Sessional : 50 Marks**  
**Total : 50 Marks**  
**Duration of Exam: 3 Hrs**

**Quiz & Aptitude,**  
**Comprehension,**  
**Communication for Specifics,**  
**Let's speak**

**Composition Skills –Formal Letter Writing based on the trends in practice in corporate culture.**

**Training on etiquettes & manners should be carried further and be observed during the general classes**

**Ethics in Engineering**

**Note:**

1. Students will be allowed to use non-programmable scientific calculator. However, sharing of Calculator and other materials will not be permitted in the examination.

2. Each student has to undergo practical training of 6 weeks during summer vacation and its evaluation shall be carried out in the V semester.

