SCHEME OF COURSES FOR B.TECH. CIVIL ENGINEERING FOR 2011 BATCH AND ONWARDS

B. TECH. Ist SEMESTER

Course No.	Course title	L	T	P	C
CIV-102	Engineering Drawing	2	0	4	4

B. TECH. 2nd SEMESTER

Course No.	Course title	L	T	P	C
CIV-201	Engineering Mechanics	3	1	0	4

B.TECH. 3RD SEMESTER (CIVIL)

Course No.	Course title	L	T	P	C
CIV-301	Structural Analysis- I	2	2	0	4
CIV-301(P)	Structural Engineering Lab- I	0	0	2	1
CIV-302	Fluid Mechanics-I	2	1	0	3
CIV-302(P)	Fluid Mechanics Lab-I	0	0	2	1
CIV-303	Surveying-I	2	1	0	3
CIV- 303(P)	Surveying Lab-I	0	0	3	2
MTH-303	Mathematics-I	2	1	0	3
ELE-304	Basic Electrical Engineering	2	1	0	3
ELE-304(P)	Basic Electrical Engineering Lab.	0	0	2	1
HSS-301	Humanities & Social Science-I	2	1	0	3
CIV-300	Professional Development Activities	0	0	2	1
Total Contact Hours and Credits		30			25
COURSES OFFERED TO OTHERS DEPARTMENTS (METALLURGY)					
CIV- 304	Geology & Mineralogy	2	2	0	4
CE-304(P)	Geology & Mineralogy Lab.	0	0	2	1

National Institute of Technology Srinagar

1. Name of the Department: Department of Civil Engineering
2. Subject Code: CIV-301 Course Title: **STRUCTURAL ANALYSIS-1**
3. Contact Hours: L: 2 T: 2 P: 0
4. Examination Duration (Hrs.): **Minor-I: 1; Minor-II: 1; Major: 3**
5. Relative Weightage: **Minor-I:20; Minor-II:20; Major:50; Class Performance:10**
6. Credits: 4
7. Semester: 3rd (Autumn)
8. Pre-requisite: Nil
9. Objective: To develop the understanding of basic principles of Analysis of Determinate Structures.

Details of Course

S. No.	Contents	Lecture Hours
1	**INTRODUCTION TO STRUCTURAL ANALYSIS:** Structure; Structural Engineering ; History of Structural Engineering ; The Engineering Design Process ; Structural Analysis ; Structural Form ; Simplifications for Purpose of Analysis ; Types of Loads ; Evaluation of Gravity Loads On Various Components with Reference to IS : 875.	4
2	**BASIC CONCEPTS OF STRUCTURAL ANALYSIS:** Forces ; Specification of a Force ; Free Body Diagrams ; Equations of Equilibrium ; Condition Equations ; Displacements ; Compatibility ; Boundary Conditions ; Principle of Superposition ; Stiffness & Flexibility; Types of Structural Supports.	2
3	**BENDING AND SHEAR STRESS IN BEAMS:** Flexural formula, bending stress and shear stress diagrams for homogeneous beam sections of various shapes.	8
4	**COMPOUND STRESSES:** Principal stresses and strains, evaluation by analytical and graphical methods - Mohr's Circle.	8
5	**SLOPES AND DEFLECTIONS:** Slope and deflection of determinate beams by differential equation, moment area, conjugate beam and energy methods. Castigliano's first energy theorem and its applications to deflection of simple determinate trusses.	10
6	**COLUMNS:** Stresses in columns, short and long columns, buckling phenomenon. Euler's,Rankine's theory - Crippling loads evaluation. stresses in eccentrically loaded columns.	6
7	**INDETERMINATE STRUCTURES:** Introduction to Indeterminate structures; Degrees of Freedom, Kinematic & Static Indeterminacy of Structures.	2

REFRENCES :

1. Structural Analysis : Jack C. McCormac.

2. Nash, William A. "Theory and Problems of Strength of materials 4/e". Tata McGraw Hill, New Delhi,2004.
3. Fundamentals of Structural Analysis : West.
4. Introduction to Structural Engineering : John M. Biggs.
5. Indeterminate Structures : C.K.Wang .
6. Determinate Structures : R.L.Jindal.
7. Reddy, C.S. "Basic Structural Analysis" , Tata McGraw Hill, New Delhi,2003.

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1. Name of the Department: Department of Civil Engineering
2. Subject Code: CIV-301(P) Course Title: **STRUCTURAL ENGINEERING LAB-I**
3. Contact Hours: L: 0 T: 0 P: 2
4. Examination Duration (Hrs.): **Viva-Voce at the end of semester**
5. Credits: 1
6. Semester: 3rd (Autumn)
7. Pre-requisite: Nil
8. Objective: To develop the understanding of basic principles of Analysis of Determinate Structures.
9. Details of the course

S.No.	Name of experiment	objective
1.	Tensile Test of Steel	To determine yield strength, ultimate tensile strength, percentage elongation and modulus of elasticity (Plot, stress strain curve).
2.	Tensile and Compressive strength of Timber	i. Parallel to grains ii. Perpendicular to grains.
3.	Shear test of steel/timber	To measure ultimate shear strength. Shear modulus. Plot shear stress strain Curve.
4.	Torsion test of steel	To measure angle of twist. Ultimate torsional strength stress strain Curve.
5.	Buckling load of columns various end conditions.	To determine crippling load of columns with different end conditions and compare theoretical values.
6.	Verification of Maxwell's Theorem.	To verify the Principle of Maxwell's theorem
7.	Testing of Bricks and Stones as per IS Specifications.	
8.	Verification of horizontal thrust in a three hinged arch	To evaluate experimentally horizontal thrust in a three hinged arch and draw influence line diagram for the horizontal thrust.

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NAME OF THE DEPTT. CENTRE: **Department of Civil Engineering**

1. Subject Code: CIV -302 Course Title: Fluid Mechanics-I
2. Contact Hours: L: 2 T: 1 P: 0
3. Examination Duration (Hrs.): Minor –I = 1 Minor –II =1 Major = 3
4. Relative Weightage: Minor-I: 20 Minor-II: 20 Major: 50 C.I+ C.A: 10
5. Credits: 3
6. Semester: 3rd. (Autumn)
7. Pre-requisite:Nil
8. Objective: To develop the understanding of basic principles of mechanics of fluids at rest and in motion and their applications in solving the real engineering problems.
9. Details of course:

S.No	Contents	Lecture Hours
1.	INTRODUCTION: Physical properties of fluids viz, mass density, viscosity, compressibility, vapour pressure, surface tension, capillarity, etc. Ideal Fluids and Real Fluids; Newtonian and Non-Newtonian Fluids.	3
2.	FLUID STATICS: Pressure Intensity, Pascal's law; Pressure- density- height relationships, manometers; pressure on plane and curved surfaces, centre of pressure; Buoyancy, Stability of immersed and floating bodies.	5
3.	KINEMATICS OF FLUID FLOW: Steady and unsteady, uniform and non uniform, laminar and turbulent flows; one, two and three dimensional flows; Stream lines, Streak lines and path lines; Continuity equation; Rotation and Circulation; Elementary explanation of stream function and velocity potential; Graphical and Experimental methods of drawing flow nets.	6
4.	DYNAMICS OF FLUID FLOW: Euler's equation of motion along a streamline and its integration to yield Bernoulli's equation; Flow measurement, flow through orificemeter, Venturimeter, orifices, mouth pieces, pitot and prandtl tubes, sluice gates under free and submerged conditions, Various types of Notches and weirs under free and submerged flow conditions, Aeration of nape.	10
5.	MOMEMTUM EQUATION: Momentum equation and its application to stationary and moving vanes, pipe bends.	4
6.	DIMENSIONAL ANALYSIS AND HYDRAULIC SIMILITUDE: Dimensional analysis, Buckingham's theorem, Important dimensionless numbers and their significance, Geometric, Kinematic and dynamic similarity; Model analysis.	4
7.	BOUNDARY LAYER ANALYSIS:	6

	Boundary layer thicknesses, Boundary layer over a flat plate, Laminar boundary layer, Application of momentum equation, Turbulent boundary layer, Laminar sub-layer, smooth and rough boundaries, local and Average friction coefficients, separation.	
	Total	38

10. Suggested Books:

S.No	Name of Books/authors/Publishers	Year of Publication
1.	Kumar, D.S. "Fluid Mechanics and Fluid Power Engineering". Seventh Ed. S.K. Kataria& Sons Publishers, New Delhi,	2008-2009
2	Garde R.J " Engineering Fluid Mechanics"	1988
3.	Kumar, K.L. " Engg. Fluid Mechanics", Eurasia Publishing House (P) Ltd. New Delhi, 1984.	1998
4.	Streter, V.L., Wylie, E.B. and Bedford, K.W. "Fluid Mechanics" McGraw Hill , New York,	2001
5.	Asawa, GL, Fluid Flow in Pipes & Cannels 2008? CBS Puyblishers, new Delhi.	2000.
6.	Mohanty " Fluid Mechanics"Printice Hall of India second Ed.	2010

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NAME OF THE DEPTT. /CENTRE: **Department of Civil Engineering**

1. Subject Code: CIV-302(P) Course Title: Fluid Mechanics Laboratory-I
2. Contact Hours: L: 0 T: 0 P: 2
3. Examination Duration (Hrs.): Theory: 0 Practical's: 2
4. Relative Weightage: (%) Mid Term: 50 End Term: 50
5. Credits: 1
6. Semester: 3rd. (Autumn)
7. Pre-requisite:Nil
8. Objective: To develop skills in understanding the measurement of fluid characteristics.
9. Details of the course

List of Experiments:

1. To determines experimentally the metacentric height of a ship model.
2. To verify the Bernoulli's equation experimentally.
3. To determine the coefficient of discharge, coefficient of velocity and coefficient of contraction of an orifice or a mouthpiece of a given shape.
4. To calibrate an orifice meter and to study the variation of coefficient of discharge with Reynold's number.
5. To calibrate a venturimeter and to study the variation of coefficient of discharge with Reynold's Number.
6. To calibrate sharp crested rectangular and triangular weir.
7. To verify momentum equation experimentally.

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NAME OD DEPTT/CENTRE: Department of Civil Engineering
1. Subject Code: CIV-303 Course Title: Surveying-I
2. Contact Hours: L = 2 T= 1 P = 3
3. Examination Duration (Hrs): Minor = 1 Major = 3 Practical = 3
4. Evaluation Weightage (%): Minor-I=20 Minor-II=20 Major =50 C.P.=10
5. Credits: 3 6. Semester: Autumn 7. Subject Area: Civil Engg
8. Pre-requisite: Nil

9. Objective: To impart basic understanding of various aspects related to system of Geometrics and other physical measurements in the field of Civil Engg.

10. Details of Course

Unit No.	Course Contents	Lecture Hours
Unit -1	**a. Introduction**: Importance, Principles of Surveying. Types of Surveying.	4
	b. Chain Surveying: Field Equipment, Methods of chaining, Offsets, corrections in chaining, obstacles in chain-surveying; plotting; Degree of accuracy. Tape and chain corrections	7
Unit - 2	**a. Prismatic compass surveying**. Instruments; Principle, Procedure and precautions. Closed traverse; corrections; local attraction; plotting.	6
	b. Plane Table Surveying; Field equipments, Methods of plane tabling, Two point and Three point problem, Precautions, Accuracy	6
Unit - 3	**a. Levelling**; Instruments; Field book recording, Bench mark & its types, methods of reduction of levels, various types of field works; contouring; Plotting. Testing and permanent adjustments. Sensitivity of bubble tube.	9
	b. Areas and Volumes: Methods of determining areas and volumes viz., Borrow - pits.	4
	Total	36

BOOKS RECOMMENDED

1. Surveying Vols. I & II by Dr. K.R.Arora
2. Surveying Vols. I & II, by Duggal, S.K.
3. Surveying & Levelling by Basak
4. Surveying & Levelling Vols. I & II by Kanetkar,T. P. and Kulkarni, S.V
5. Surveying & Levelling by P.B. Shahni
6. Surveying Vol. I & II, by Punmia, B. C
7. J.K. Ghosh

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NAME OF DEPTT/CENTRE: Department of Civil Engineering

1. Subject Code: CIV-303 (P) Course Title: Surveying Laboratory-I
2. Contact Hours: L = 0 T= 0 P = 3
3. Examination Duration (Hrs): Minor = 0 Major = 0 Practical = 3
4. Evaluation Weightage (%): Internal Teacher = 40 End Term = 60
5. Credits: 2 6. Semester: Autumn 7. Subject Area: Civil Engg
8. Pre-requisite: Nil

9. Objective: To impart basic understanding of various aspects related to system of Geometrics and other physical measurements in the field of Civil Engg.

10. Details of Course

Sr. No.	Course Contents	Lecture Hours
1	**CHAIN SURVEYING:** 1. Ranging / chaining a line and recording the field book. 2. Setting-out Right Angles using Tape. 3. Taking offsets and setting-out Right Angles using:- (i) Cross Staff (ii) Indian Optical Square 4. Testing of Adjustment of Indian Optical Square 5. Testing and Adjustment of Chain.	9
2	**COMPASS SURVEYING:** 1. Study of Prismatic Compass 2. Field Work in Compass Surveying: Measurement of Angles between the lines meeting at a point, and Compass Traversing and Taking Observations	6
3	**PLANE TABLE SURVEYING:** 1. Study of Equipment 2. Setting-up the plane table- Temp. Adjustments. 3. Marking North Direction and Orientation by: (i). Magnetic Needle/Trough Compass (ii). Back- sighting. 4. Plotting a few points by Radiation Method. 5. Plotting a few points by Inter-Section Method. 6. Two point and three point problem.	9
4	**LEVELLING:** 1. Study of Equipment and levelling staff. 2. Temporary adjustment of levelling Instruments. 3. Field work using levelling Instrument: (i) Taking Staff readings and (ii) Recording the field book. 4. Longitudinal Section of Road/Railway/Canal/Dam 5. Cross Section of a Road/Railway/Canal/Dam.	12

	6. Taking Staff readings on different stations / finding difference of level between them.	
	Total	**36**

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NAME OF DEPT./CENTRE: **Department of Civil Engineering**

1. Subject Code: CIV-304 Course Title: Geology and Mineralogy

2. Contact Hours: **L: 2** **T: 1** **P: 2/2**
3. Examination Duration (Hrs.): **Theory: 3** **Practical: 2**
4. Relative Weightage: **M1: 20** **M2: 20** **CI: 10** **Major: 50**
5. Credits: **3** 6. Semester: **Autumn** 7. Subject Area:
8. Pre-requisite: **Nil**
9. Objective: To impart the basic understanding of the formation of rocks and minerals and to expose the students to the basic erosional and depositional processes.
10. Details of Course:

S. No.	Contents	Lecture Hours
	Part A Physical Geology	
1.	Introduction to the science of geology.	**3**
2.	Crust of earth and its composition.	**3**
3.	Minerals and Rocks.	**3**
4.	Weathering of Rocks; Erosion, transportation and deposition by wind, Water and ice.	**6**
5.	Introduction to geological structures.	**3**
	Part B Mineralogy	
1.	Rock forming minerals and ore forming minerals. Processes of mineral formation. Physical properties of minerals.	**4**
2.	Introduction to ore minerals. Principle ore minerals of Aluminum, Copper, Lead, Zinc, Antimony, Nickel, Tin, Chromium, Magnesium and Iron, their important properties, mode of formation, mode of occurrence, uses and distribution in India.	**10**
3.	Study of Refractory minerals, coal and petroleum.	**4**
	Total	**36**

11. **Books recommended**

S.No.	Name of Books/ Authors/ Publishers	Year of Publication
1.	Bangar, K.M, Principles of Engineering Geology, Standard Publishers Distributors, New Delhi.	**1995**
2.	Parbin Singh Engineering Geology, Katson Publishers New Delhi.	**2009**
3.	Billings, M.P., Structural Geology, Prentice-Hall India, New Delhi.	**1974**
4.	Blyth, F.G.H and de Freitas, M.H. Geology for Engineers, ELBS, London.	**1974**
5.	Gokhale, KVG.K and Rao, D.M., Experiments in Engineering Geology, Tata- McGraw Hill, New Delhi.	**1981**

6.	Kesavulu, C. Textbook of Engineering Geology, Macmillan, India Ltd. New Delhi.	**1993**
7.	Geology for Civil Engineers by McLean and Gribble, Spon Press, Taylor &Francis Group, London.	**1999**

NAME OF DEPT./CENTRE: **Department of Civil Engineering**

1. Subject Code: CIV-304(P) Course Title: Engineering Geology Laboratory
2. Contact Hours: **L: 0** **T: 0** **P: 2/2**
3. Examination Duration (Hrs.): **Theory: 0** **Practical: 2**
4. Relative Weightage: Mid Term = 40 End Term = 60
5. Credits: **1** 6. Semester: **Autumn** 7. Subject Area:

8. Pre-requisite: **Nil**
9. Objective: To impart the basic skills for determination of characteristics of rocks and minerals.
10. Details of Course:

S. No.	Contents	Lecture Hours
	List of Experiments	
1.	The study of Physical Properties of Minerals.	**6**
2.	Determination of Specific Gravity by: a) Jolly's Spring Balance b) Walkers Steel Yard Balance c) Beam Balance	**6**
3.	Study of Rocks and their Characteristics.	**4**
4.	Study and Sketching of various types of Geological Structures.	**6**
5.	Determination of Dip and Strike with a Clinometer Compass.	**6**

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NAME OF THE DEPARTMENT: **Electrical Engineering**

1	Subject Code	ELE-302	Course Title	**Electrical Engineering Technology. [Civil]**								
2	Contact Hours		L	2	T	1	P	0				
3	Examination Duration (Hrs):		Theory	02	Practical	00						
4	Relative Weight age	M-I	20	M-II	20	ASM	10	ME	50	PRE	00	
5	Credits:	03	3rd Semester	Autumn	√	Spring						

6 **Objective:**
To acquire knowledge and become familiar with the different techniques to solve the different complex Electrical, Electronics Circuits, Electrical Machine & their applications.

7. **Details of the Course:**

S.No	Particulars	Contact Hours
1.	**Electrical Circuit Laws** Basic Electric Circuit terminology, Ohm's Law, Kirchoffs Laws, circuit parameters series and parallel combinations of circuit elements, voltage and current sources.	06
2.	**D.C and A.C circuit Analysis.** Power and energy relations, analysis of series & parallel D.C circuits, loop and nodal methods, Delta Star (Δ-Y) transformation, superposition theorem, Thevenin's and Norton's theorems, maximum power transfer theorem. Basic terminology and definitions, phasor and complex number representation, solutions of sinusoidal excited RLC circuits, power and energy relation in A.C circuits, resonance in series and parallel circuits, concept of active and reactive power.	10
3.	**Steady State Three Phase AC Circuits.** Characteristics of 3-phase systems, concept of 3-phase voltage, Y-circuits, Δ-circuits, Y- Δ and Δ-Y current and voltage relations in 3 phase circuits, balanced / unbalanced systems.	10
4.	**Electrical Installation Practice:** Symbols of various electrical apparatus viz. switches / MCB's transformers / generators etc. Specification of overhead line conductor and underground cables layout of electrification schemes of buildings etc.	10
5.	**Electric Machines & Transformers.** Gen-principle of operation, construction and working of i) dc machines ii) A.C machines iii) Single phase transformers.	06
	Total Contact Hours	42

8. **Suggested Books:**

S.No	Name of Book	Author	Publisher
1	Fundamentals of Electric Circuits	Alexander and Sadiku	McGraw- Hill,
2	Basic Engineering Circuit Analysis	J. Irwin, R.Delms	John Wiley
3	Electric Circuits Fundamentals	Franco	Harcourt Brace College (O.U.P)
4	Electric Circuit Analysis	Johnson, Johnson and Hilburn	John Wiley
5	Electric Machines	Nagarath, I.J. & Kothari,	Tata McGraw-Hill Company,
6	Engineering Circuit Analysis	Hayt & Kimmerly	Tata McGraw-Hill Company

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NAME OF THE DEPARTMENT: Electrical Engineering

1	Subject Code	ELE-302P	Course Title	**Electrical Engineering Technology Lab [Civil]**					
2	Contact Hours		L	0	T	0	P	1	
3	Examination Duration (Hrs):		Theory	00	Practical	02			
4	Relative Weight age		MSLE	25	ESLE	25			
5	Credits:	01	3rd Semester	Autumn	√	Spring			

6 **Objective:**
To acquire knowledge and become familiar with the different techniques to solve the different complex Electrical, Electronics Circuits & Electrical Machines.

7. Lab. Experiments:

S.No	Experiments
1	To study the colour coding of resistors
2	Connection of Ammeters, Voltmeters, Wattmeters and multi-meters in DC and AC circuits and selection of their ranges.
3	Use of LCR Q-meter.
4	To study the series / parallel operation of resistors and verifying their effective values by LCR Q-meter.
5	To verify the KVL and KCL in DC circuits.
6	To verify the star delta transformation of networks.
7	To verify the superposition theorem.
8	To verify the maximum power transfer theorem
9	Basic R, L, C circuits excited from A.C
10	To measure electric power in single-phase AC circuits with resistive load, RL load and RLC load.
11	To measure the power and power factor in three phase AC circuits.
12	To study the series resonance.
13	To study the parallel resonance.
14	To study the handling of CRO and use it for the study of different voltage waveforms.
15	Computer Aided Circuit Analysis (3 experiments)

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DEPARTMENT OF MATHEMATICS

3rd. Semester (Maths)
Civil Engineering Branch
Course No. MTH-303

L	T	P	
2	2	-	**Credit-4**

Statistics and Probability:

Measures of Central Tendency and Measures of variations (Dispersions), Moments, Measures of Skewness and Kurtosis. Random experiment, sample space, Events, Classical Statistical and Axiomatic definitions of probability. Statements and proof of Theorems on addition and multiplication of probabilities. Simple problems. Baye's Theorem on Conditional probability.Random variables, Derivation of formulae for mean, variance and moments of random variables for discrete and continuous cases. Laws of expectation, Binomial, Poisson and normal distributions, Method of least squares, fitting a straight line and parabola of degree 'p'. Regression and correlation.

Fourier Transform :

Fourier series, Harmonic analysis, Definition of Fourier transform. Fourier sine and cosine transform. Fourier integral formula, Applications to solutions of boundary value problems.

Books Recommended:

1. Fundamentals of Mathematical Statistics by S.C.Gupta and V.K.Kapoor, Sultan Chand & Sons.
2. Statistical Theory and Methodology in Science and Engineering by Rownlee John Wiley and Sons.
3. Introduction to Mathematical Statistics by R.E. Walpole 3rd editio New York Macmillan publication.
4. Data Analysis for Scientists and Engineers by Meyer, John Wiley an Sons.

ester 8th Sem "Department of Information Technology"

ct Code HU-401 Course Title **Business Economics & Management**

act Hours: **L:T:P** 3:0:0 **Credits**: 03

ctive: This course is designed to introduce the students to the basic concept of Economi
gement so as to enable them to give optimal performance during professional life.

f Course

S. No	Contents
1	**INDUSTRIAL ECONOMICS:** Meaning and importance of industrialisation. Organisations- various types of organisations. Division of Economics, Basic Constituents(Micro & Macro Economics)
2	**CONSUMPTION AND MARKET STRUCTURE:** Law of Demand and Elasticity of Demand, Consumer's surplus, Utility and its measurement. Types of market structure – Perfect, Monopoly, Monopolistic and Oligopoly, Demand forecasting techniques. Meaning and factors influencing location of Industrial Units, Scale of production- large vs Small Industrial Units
3	**MANAGEMENT- INTRODUCTION TO MANAGEMENT:** Management and its nature, purpose and definitions. Process and functions of management- Planning, Organising, Actuating and controlling, Functional areas of management, skills and role of Management
4	**PLANNING:** Nature and purpose of planning, types of plans, steps in planning process. **Objectives** nature and importance of objectives, Types of objectives, primary, secondary, individual and personal objectives. Guidelines for setting objectives **Decision Making**: Importance and limitations of rational decision making, types of decisions- programmed and non programmed decision making. Process of decision making under certainty, uncertainty and risk.
5	**ORGANISING:** Nature and purpose of organising: steps in organising/ process of organising, formal and informal organisations; span of control & factors determining effective span. **Decentralisation of Authority**: Nature of decentralisation, degree of decentralisation, decentralisation as philosophy and policy **Delegation of authority:** Meaning of authority/delegation, steps in the process of delegation, factors determining the degree of delegation, art of delegation. **Line/staff organisation:** Line organisation, staff organisation, line and staff organisation, functional and committee organisation, the nature of line and staff relationship.
6	**ACTUATING:** Nature and purpose of Actuating, steps in actuating process. **Essentials of Human Resource Management:** Importance and functions of Human resource management, Importance of Human resource planning, Recruitment,

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	selection, training and development, performance appraisal, compensation packages, promotions, transfers demotion and separation etc. **Leadership:** Meaning and importance. Leadership qualities. **Motivation:** The need – want - satisfaction chain.
7	**CONTROLLING:** Nature and purpose of controlling, steps in controlling/ process of controlling, types of controls, recruitments of effective controls.

References

- Industrial Organisation and Management – Y.K. Bhushan
- Principles of Management - A.K. Chatterjee
- Principles of Management – George Terry
- Industrial Organisation and Management – V.D. Sinha and Gadgil
- Management – Stoner, Freeman and Gilbert
- Elementary Economics Theory – KK Dewett and JD Verma
- An Introduction to Economics – ML Sethi
- Advanced Economics - K.P.M
- Indian Economics KK Dewett and JJ verma