

## **RAS501 Managerial Economics**

**L-T-P: 3-0-0**

**UNIT I** Introduction of Engineering Economics and Demand Analysis: Meaning and nature of Economics, Relation between science, engineering, technology and economics; Meaning of Demand, Determinants of Demand, shifts in demand, Law of Demand, Price Elasticity of Demand & Types, Income Elasticity, Cross price Elasticity, Determinants of Elasticity, uses and importance of elasticity.

**UNIT II** Concept of Supply: Law of Supply, Factors affecting Supply, Elasticity of supply. Demand Forecasting: Introduction, Meaning and Forecasting, Methods or Techniques of Demand Forecasting, Criteria for Good Demand Forecasting, Demand Forecasting for a New Product;

**UNIT III** Cost Analysis- Introduction, Types of Costs, Cost-Output Relationship: Cost Function, Cost-Output Relationships in the Short Run, and Cost-Output Relationships in the Long Run; Short run and long run, Break- Even Analysis; Production functions: laws of variable proportions, law of returns; Economies of scale: Internal and external.

**UNIT IV** Market Structure: Market Structure Perfect Competition, Imperfect competition – Monopolistic, Oligopoly, duopoly salient features of price determination and various market conditions.

**UNIT V** Nature and characteristics of Indian economy, concepts of LPG, elementary concepts of National Income, Inflation and Business Cycles, Concept of N.I. and Measurement., Meaning of Inflation, Types and causes, Phases of business cycle. Investment decisions for boosting economy (National income and per capital income)

## COURSE OUTCOMES

**Course Name: RAS501 Managerial Economics Year of study: 2019-20**

<b>On completion of this course, the students will be able to</b>	
<b>RAS 501.1</b>	Understand the basic concepts of Engineering Economics & theory of demand.
<b>RAS 501.2</b>	Understand concept of supply and make use of various methods of demand forecasting for estimating demand of any product.
<b>RAS 501.3</b>	Explain basic concepts related to production and cost.
<b>RAS 501.4</b>	Outline of various market structures.
<b>RAS 501.5</b>	Understand nature and structure of Indian economy and basic concepts related to NI, Inflation and business cycle.

### Mapping of Course Outcome and Program Outcome

<b>CO</b>	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO 10</b>	<b>PO 11</b>	<b>PO 12</b>
<b>RAS 501.1</b>	2		3	-	-	3	3	3	-	3	-	3
<b>RAS 501.2</b>	2	-	2	2	-	3	3	2	3	3	-	3
<b>RAS 501.3</b>	-	-	2	-	-	3	3	3	2	3	3	3
<b>RAS 501.4</b>	-	-	2	-	-	3	3	2	2	2	2	3
<b>RAS 501.5</b>	-	-	2	-	-	3	3	2	2	2	2	3
<b>Average</b>	<b>2</b>	<b>-</b>	<b>2.20</b>	<b>2</b>	<b>-</b>	<b>3</b>	<b>3</b>	<b>2.40</b>	<b>2.25</b>	<b>2.6</b>	<b>2.33</b>	<b>3</b>

### Mapping of Course Outcome and Program Specific Outcome

<b>CO</b>	<b>PSO 1</b>	<b>PSO 2</b>
<b>RAS 501.1</b>	-	-
<b>RAS 501.2</b>	-	-
<b>RAS 501.3</b>	-	-
<b>RAS 501.4</b>	-	-
<b>RAS 501.5</b>	-	-
<b>Average</b>	<b>1</b>	<b>-</b>

## **RAS502/ RAS602Sociology L-T-P: 3-0-0**

**UNIT I**Industrial Sociology: Nature, Scope and Importance of Industrial Sociology. Social Relations in Industry, Social Organisation in Industry- Bureaucracy, Scientific Management and Human Relations.

**UNIT II**Rise and Development of Industry: Early Industrialism – Types of Productive Systems – The Manorial or Feudal system. The Guild system, the domestic or putting-out system, and the Factory system. Characteristics of the factory system. Causes and Consequences of industrialization. Obstacles to and Limitations of Industrialization.Industrialization in India. Industrial Policy Resolutions – 1956.Science. Technology and Innovation Policy of India 2013.

**UNIT III**Contemporary Issues: Grievances and Grievance handling Procedure. Industrial Disputes: causes, Strikes and Lockouts. Preventive Machinery of Industrial Disputes: Schemes of Workers Participation in Management- Works Committee, Collective Bargaining, Bi-partite & Tri-partite Agreement, Code of Discipline, Standing Orders. Labour courts & Industrial Tribunals.

**UNIT IV**Visualizing the future: Models of industrialization- Collectivist, anarchist, free market, environmentalist, etc. Cultural issues, consumer society and sociological concerns.

## COURSE OUTCOMES

**Course Name:**RAS502/ RAS602:**Sociology****Year of study: 2019-20**

<b>On completion of this course, the students will be able to</b>	
<b>RAS 502.1</b>	Comprehend social relations in industry/organization and correlate the dynamics of diverse context of Indian society.
<b>RAS 502.2</b>	Understand the global rise and development of industry and empower themselves to analyze and evaluate different aspects of industrialization.
<b>RAS 502.3</b>	Demonstrate the implications of policies and its consequences in the context of industrialization and its growth in India.
<b>RAS 502.4</b>	Evaluate the social consequences of modernization, automation and industrial activities on the ecosystem thereby, sensitizing the engineers on public health and safety issues which shall serve as cornerstone for cultural, societal and environmental considerations.
<b>RAS 502.5</b>	Envisage prospective models of industrialization across the globe to understand the consumer society and the sociological concerns of industrial development in the present world.
<b>RAS 502.6</b>	Gain and recognize the need for bridging the implications of sociological theories with engineering sciences and encourage themselves for lifelong learning.

### Mapping of Course Outcome and Program Outcome

<b>PO CO</b>	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO1 0</b>	<b>PO 11</b>	<b>PO 12</b>
<b>RAS 502.1</b>	-	-	-	-	-	3	2	-	1	-	-	2
<b>RAS 502.2</b>	-	-	2	-	-	3	2	-	-	-	-	2
<b>RAS 502.3</b>	-	-	2	-	-	2	3	-	-	-	-	-
<b>RAS 502.4</b>	-	-	3	-	-	3	2	-	-	-	-	2
<b>RAS 502.5</b>	-	-	2	-	-	2	3	-	-	-	-	-
<b>RAS 502.6</b>	-	-	1	-	-	3	1	-	-	-	-	3
<b>Average</b>	-	-	<b>2</b>	-	-	<b>2.67</b>	<b>2.17</b>	-	<b>1</b>	-	-	<b>2.25</b>

### Mapping of Course Outcome and Program Specific Outcome

<b>PSO CO</b>	<b>PSO 1</b>	<b>PSO 2</b>
<b>RAS 502.1</b>	-	-
<b>RAS 502.2</b>	-	-
<b>RAS 502.3</b>	-	-
<b>RAS 502.4</b>	-	-
<b>RAS 502.5</b>	-	-
<b>RAS</b>	-	-

<b>502.6</b>		
<b>Average</b>	-	-

## **RCE 501 Geotechnical Engineering (L-T-P 3-0-0) Credit - 3**

**Unit I** Origin and classification: Preview of Geotechnical field problems in Civil Engineering, Soil formation, transport and deposit, Soil composition, Basic definitions, Weight volume relationships, Clay minerals, Soil structure, Index properties, sensitivity and thixotropy, Particlesize analysis, Unified and Indian standard soil classification system. [8]

**Unit II** Soil Hydraulics: Stress conditions in soil- total, effective and neutral stresses and relationships. Permeability - Darcy's Law, hydraulic conductivity, equivalent hydraulic conductivity in stratified soil. Seepage, flow nets, seepage calculation from a flow net, flow nets in anisotropic soils, seepage through earth dam, capillarity, critical hydraulic gradient and quick sand condition, uplift pressure, piping; [8]

**Unit III** Soil compaction, water content – dry unit weight relationships. Factors controlling compaction. Field compaction equipment; field compaction control; Proctor needle method. Consolidation: Primary and secondary consolidation, Terzaghi's one dimensional theory of consolidation, Consolidation test, Normal and Over Consolidated soils, Over Consolidation Ratio, determination of coefficient of consolidation, Contact pressure [8]

**Unit IV** Shear Strength: Mohr-Coulomb failure criterion, shear strength parameters and determination; direct and tri-axial shear test; unconfined compression test; pore pressure, Skempton's pore pressure coefficients. Earth pressure: Classical theories, Coulomb and Rankine's approaches for frictional and c-φ soils, inclined backfill, Graphical methods of earth pressure determination, Stability of slopes, Culman method & Method of slices, Stability number & chart. [8]

**Unit V** Sub surface structure: Bearing capacity of shallow foundations, SPT, Plate load test; Effect of water table. Deep foundations: Types of piles, Static and dynamic formulae, Pile group, Settlement of Pile Group, Negative skin friction. [8]

## COURSE OUTCOMES

**Course Name:RCE-501:Geotechnical EngineeringYear of study: 2019-20**

<b>On completion of this course, the students will be able to</b>	
<b>RCE 501.1</b>	understand basic terminology of soil mechanics and soil classification.
<b>RCE 501.2</b>	understand various laboratory tests.
<b>RCE 501.3</b>	analyse interaction between soil and water systems to understand capillary flow, permeability and seepage etc.
<b>RCE 501.4</b>	understand to apply relationships of dry unit weights and theory of compaction and consolidation
<b>RCE 501.5</b>	understand to analyse the shear strength and earth pressure theories.
<b>RCE 501.6</b>	understand to analyse bearing capacity of shallow and deep foundations

### Mapping of Course Outcome and Program Outcome

<b>CO</b>	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO 10</b>	<b>PO 11</b>	<b>PO 12</b>
<b>RCE 501.1</b>	2	2	-	-	-	2	-	-	-	-	-	1
<b>RCE 501.2</b>	3	-	-	-	-	3	-	-	-	-	-	2
<b>RCE 501.3</b>	3	2	1	1	-	2	-	-	-	-	-	2
<b>RCE 501.4</b>	3	2	1	1	-	3	-	-	-	-	-	2
<b>RCE 501.5</b>	3	2	1	1	-	3	-	-	-	-	-	2
<b>RCE 501.6</b>	3	2	1	1	-	3	-	-	-	-	-	2
<b>Average</b>	<b>2.83</b>	<b>0.66</b>	<b>0.33</b>	<b>0.33</b>	-	<b>2.67</b>	-	-	-	-	-	<b>1.83</b>

### Mapping of Course Outcome and Program Specific Outcome

<b>CO</b>	<b>PSO 1</b>	<b>PSO 2</b>
<b>RCE 501.1</b>	2	2
<b>RCE 501.2</b>	3	3

<b>RCE 501.3</b>	3	2
<b>RCE 501.4</b>	3	3
<b>RCE 501.5</b>	3	2
<b>RCE 501.6</b>	3	3
<b>Average</b>	<b>2.83</b>	<b>2.50</b>

## **RCE 502 Design of Structure 1**

**(L-T-P 3-1-0) Credit- 4**

**Unit I** Analysis of fixed beams, Continuous beams and simple frames with and without translation of joint by Slope-Deflection method, Moment Distribution method and Strain Energy method. [8]

**Unit II** Muller-Breslau's Principle and its applications for drawing influence lines for indeterminate beams, Analysis of two hinged and fixed arches, Influence line diagrams for maximum bending moment, Shear force and thrust in two hinge arches. Analysis of two and three hinged stiffening girders. [8]

**Unit III** Introduction to Suspension Bridges, Analysis of two and three hinged stiffening girders, Influence line diagrams for maximum bending moment and shear force for stiffening girders. [8]

**Unit IV** Basic Force and Displacement Matrix method for analysis of beams, frames and trusses. [8]

**Unit V** Basics of Plastic Analysis. Applications of Static and Kinematic theorem for Plastic Analysis of Beams and Single Storied Frames. [8]

### COURSE OUTCOMES

Course Name: RCE 502: DESIGN OF STRUCTURE 1

Year of study: 2019-20

On completion of this course, the students will be able to	
<b>RCE 502.1</b>	analyse the indeterminate beams and frames by slope deflection and moment distribution methods.
<b>RCE 502.2</b>	analyse the indeterminate beams to draw the influence line diagrams.
<b>RCE 502.3</b>	analyse two hinged arches for different loading conditions.
<b>RCE 502.4</b>	analyse the beams and frames by Plastic theory to calculate collapse load.
<b>RCE 502.5</b>	analyse the suspension bridges and stiffening girders.
<b>RCE 502.6</b>	analyse the beams and frames by force and displacement methods.

### Mapping of Course Outcome and Program Outcome

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>RCE 502.1</b>	3	3	-	-	-	3	-	-	-	-	-	3
<b>RCE 502.2</b>	3	3	-	-	-	3	-	-	-	-	-	3
<b>RCE 502.3</b>	3	3	-	-	-	3	-	-	-	-	-	3
<b>RCE 502.4</b>	3	3	-	-	-	2	-	-	-	-	-	2
<b>RCE 502.5</b>	2	2	-	-	-	3	-	-	-	-	-	3
<b>RCE 502.6</b>	3	3	1	1	-	3	-	-	-	-	-	3
<b>Average</b>	<b>2.83</b>	<b>2.83</b>	<b>0.16</b>	<b>0.16</b>	-	<b>2.83</b>	-	-	-	-	-	<b>2.83</b>

### Mapping of Course Outcome and Program Specific Outcome

CO	PSO	PSO 1	PSO 2
<b>RCE 502.1</b>		3	3
<b>RCE 502.2</b>		3	3
<b>RCE 502.3</b>		3	2
<b>RCE 502.4</b>		3	3



<b>RCE 502.5</b>	2	2
<b>RCE 502.6</b>	3	3
<b>Average</b>	<b>2.83</b>	<b>2.67</b>

### **RCE503 Quantity Estimation & Management (L-T-P 3-0-0) Credit - 3**

**UNIT I:** Quantity Estimation for Buildings Measurement units for various building materials, Centreline method, Long and short wall method of estimates, PWD schedule of rate, Delhi schedule of rate. [8]

**UNIT II:** Rate Analysis, Specification and Tenders Analysis of rates knowing cost of material, labour, equipment, overheads, profit, taxes etc, Specifications – Preparation of detailed and general specifications, Legal aspects of contracts, laws related to contracts, land acquisition, laboursafety and welfare. Different types of contracts, their relative advantages and disadvantages. Elements of tender preparation, process of tendering, pre-qualification of contracts, Evaluation of tenders, contract negotiation and award of work, monitoring of contract extra items. [8]

**UNIT III:** Elements of Management & Network Techniques Project cycle, Organization, planning, scheduling, monitoring, updating and management system in construction, Bar charts, milestone charts, work break down structure and preparation of networks. Network Techniques like PERT & CPM in construction management. Project monitoring and resource allocation through network techniques. [8]

**UNIT IV:** Equipment Management Productivity, operational cost, owning and hiring cost and the work motion study. Simulation techniques for resource scheduling. Construction Equipment for earth moving, earth compaction, Hauling Equipment, Hoisting Equipment, Conveying Equipment, Concrete Production Equipment, Tunnelling Equipment [8]

**UNIT V:** Project Cost Management Budgeting, Cost planning, Direct Cost, Indirect cost, Total Cost Curve, Cost Slope. Time value of money, Present economy studies, Equivalence concept, financing of projects, economic comparison, present worth method Equivalent annual cost method, discounted cash flow method, Depreciation and break even cost analysis. [8]

## COURSE OUTCOMES

**Course Name: RCE 503: Quantity Estimation & Management Year of study: 2019-20**

<b>On completion of this course, the students will be able to</b>	
<b>RCE 503.1</b>	learn estimation of quantities of buildings by different methods
<b>RCE 503.2</b>	analyse rates as per specifications of works
<b>RCE 503.3</b>	apply network techniques of CPM and PERT
<b>RCE 503.4</b>	understand the practical aspect of construction equipment management including earth moving, hauling and conveying equipment
<b>RCE 503.5</b>	learn the project cost control, budgeting and cost planning
<b>RCE 503.6</b>	understand the present economic studies and method of analysis including discounted cash flow and break even cost analysis

### Mapping of Course Outcome and Program Outcome

<b>CO</b>	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO 10</b>	<b>PO 11</b>	<b>PO 12</b>
<b>RCE 503.1</b>	3	2	-	-	-	2	-	-	-	-	2	2
<b>RCE 503.2</b>	2	2	-	-	-	3	-	2	-	-	2	2
<b>RCE 503.3</b>	3	3	1	1	-	3	-	-	-	-	3	3
<b>RCE 503.4</b>	3	3	-	-	-	3	1	-	-	-	3	3
<b>RCE 503.5</b>	3	3	-	-	-	2	-	-	-	-	3	3
<b>RCE 503.6</b>	3	3	-	-	-	2	-	-	-	-	3	3
<b>Average</b>	<b>2.83</b>	<b>2.67</b>	<b>0.16</b>	<b>0.16</b>	<b>-</b>	<b>2.50</b>	<b>0.16</b>	<b>0.33</b>	<b>-</b>	<b>-</b>	<b>2.67</b>	<b>2.67</b>

### Mapping of Course Outcome and Program Specific Outcome

<b>CO</b>	<b>PSO</b>	<b>PSO 1</b>	<b>PSO 2</b>
<b>RCE 503.1</b>		2	2
<b>RCE 503.2</b>		2	2
<b>RCE 503.3</b>		3	3

<b>RCE 503.4</b>	3	3
<b>RCE 503.5</b>	3	3
<b>RCE 503.6</b>	3	3
<b>Average</b>	<b>2.67</b>	<b>2.67</b>

## **RCE052 Concrete Technology**

**(L-T-P 3-0-0)**

**Credit - 3**

**Unit I** Cement: production, composition properties, types and cement chemistry. Introduction to supplementary cementitious materials. Aggregates: mineralogy, properties, test and standards. Quality of water for use in concrete. [8]

**Unit II** Introduction & study of accelerators, retarders, water reducers, air entrainers, water proofers, super plasticizers. Study of supplementary cementing materials like fly ash, silica fume, ground granulated blast furnace slag, metakaoline and pozzolana; their production, properties and effect on concrete properties. [8]

**Unit III** Principle of mix proportioning, properties related to mix design, mix design method (IS method and ACI method). Mix design of concrete: packing density, Rheology, mix design examples. [8]

**Unit IV** Concrete production, batching, mixing and transportation of concrete. Workability: test for workability of concrete (slump test, compacting factor test and Vee Bee test). Segregation and bleeding in concrete, curing of concrete and its methods. Determination of compressive and flexural strength as per BIS. Mechanical properties of concrete: elastic modulus, poisson's ratio, creep, shrinkage and durability of concrete. [8]

**Unit V** Study and uses of high strength concrete, self-compacting concrete, fiber reinforced concrete, ferro cement, ready Mix Concrete, recycled aggregate concrete and status in India. [8]

### COURSE OUTCOMES

Course Name: RCE 052: Concrete Technology

Year of study: 2019-20

On completion of this course, the students will be able to	
<b>RCE 052.1</b>	learn the cement composition and its hydration process
<b>RCE 052.2</b>	understand the effect of chemical admixtures on concrete properties
<b>RCE 052.3</b>	learn the applicability aspects of supplementary cementing materials on properties of concrete
<b>RCE 052.4</b>	design a concrete mix by using IS and ACI method
<b>RCE 052.5</b>	determine the mechanical properties of concrete.
<b>RCE 052.6</b>	learn the special types of concrete

### Mapping of Course Outcome and Program Outcome

CO	PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>RCE 052.1</b>	3		-	-	-	-	2	1	-	-	-	-	3
<b>RCE 052.2</b>	3		-	-	-	-	3	-	-	-	-	-	2
<b>RCE 052.3</b>	3		-	2	-	-	3	1	-	-	-	-	3
<b>RCE 052.4</b>	3	3	2	2	-	-	3	-	2	-	-	-	3
<b>RCE 052.5</b>	3		-	-	-	-	3	-	-	-	-	-	3
<b>RCE 052.6</b>	3		-	-	-	-	3	-	-	-	-	-	3
<b>Average</b>	<b>3.00</b>	<b>3.00</b>	<b>0.16</b>	<b>0.16</b>	-	-	<b>2.83</b>	<b>0.16</b>	<b>0.33</b>	-	-	-	<b>2.83</b>

### Mapping of Course Outcome and Program Specific Outcome

CO	PSO	PSO 1	PSO 2
<b>RCE 052.1</b>	2	2	2
<b>RCE 052.2</b>	2	2	2
<b>RCE 052.3</b>	3	3	3

<b>RCE 052.4</b>	3	3
<b>RCE 052.5</b>	3	3
<b>RCE 052.6</b>	3	3
<b>Average</b>	<b>2.67</b>	<b>2.67</b>

### **RCE551Geotechnical Engineering Lab (L-T-P 0-0-2) Credit- 1**

1. Determination of water content of a given moist soil sample by (i) oven drying method, (ii) pycnometer method.
2. Determination of specific gravity of a given soil sample by (i) density bottle, (ii) pycnometer method.
3. Determination of in situ dry density of soil mass by (i) core-cutter method, (ii) sand replacement method.
4. Determination of relative density of a given soil sample.
5. Determination of complete grain size distribution of a given soil sample by sieve analysis and sedimentation (hydrometer) analysis.
6. Determination of consistency limits (liquid, plastic and shrinkage limits) of the soil sample used in experiment no. 5 (grain-size analysis).
7. Determination of shear strength of soil by Direct shear test.
8. Determination of compaction characteristics (OMC & MDD) of a given soil sample.
9. Determination of permeability of a remoulded soil sample by constant head &/or falling head method.
10. Determination of consolidation characteristics of a remoulded soil sample by an odometer test.
11. Determination of shear strength characteristics of a given soil sample by U/U test from Triaxial Compression Machine.
12. Retrieving soil samples and conducting SPT tests by advancing boreholes through hand-held auger.

Note: Any 8 experiments are to be performed from the list of experiments.

### COURSE OUTCOMES

Course Name: RCE-551: Geotechnical Engineering Lab

Year of study: 2019-20

On completion of this course, the students will be able to	
<b>RCE 551.1</b>	perform specific gravity of a given soil sample & in-situ dry density of soil mass.
<b>RCE 551.2</b>	perform tests and applicability of complete distribution of soil grain size distribution & consistency limits of a given soil sample.
<b>RCE 551.3</b>	perform tests and applicability of compaction characteristics of a given soil sample & consolidation characteristics of a remoulded soil sample.

### Mapping of Course Outcome and Program Outcome

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
<b>RCE 551.1</b>	3	1	-	2	-	2	-	1	2	-	-	2
<b>RCE 551.2</b>	3	1	-	2	-	3	-	2	2	-	-	2
<b>RCE 551.3</b>	3	1	-	2	-	3	-	1	2	-	-	2
<b>Average</b>	<b>3.00</b>	<b>1.00</b>	<b>-</b>	<b>2.00</b>	<b>-</b>	<b>2.67</b>	<b>-</b>	<b>1.33</b>	<b>2.00</b>	<b>-</b>	<b>-</b>	<b>2.00</b>

### Mapping of Course Outcome and Program Specific Outcome

CO	PSO 1	PSO 2
<b>RCE 551.1</b>	3	2
<b>RCE 551.2</b>	3	2
<b>RCE 551.3</b>	3	2
<b>Average</b>	<b>3</b>	<b>2</b>

**RCE552 CAD LAB 1****(L-T-P0-0-2)****Credit- 1**

1. Working on Latest Version of ANALYSIS SOFTWARE LIKE ANSYS, ADINA, NISA, MATLAB
2. Working on Latest Version of DESIGN SOFTWARE LIKE STAAD PRO / STRUDS / SAP / ETAB / STRAP
3. Working on Latest Version of GEOTECHNICAL SOFTWARES like GEO-5 / PLAXIS

### COURSE OUTCOMES

Course Name: RCE552 CAD LAB 1

Year of study: 2019-20

On completion of this course, the students will be able to	
<b>RCE552.1</b>	carry out analysis of a steel bridge by STAAD PRO & design of a steel bridge by STAAD PRO
<b>RCE552.2</b>	perform to carry out analysis of a multi-storeyed frame by STAAD PRO & design of a multi-storeyed frame by STAAD PRO
<b>RCE552.3</b>	carry out analysis of a water tank by STAAD PRO.

### Mapping of Course Outcome and Program Outcome

PO CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
<b>RCE552.1</b>	3	3	-	2	3	-	-	2	-	-	-	3
<b>RCE552.2</b>	3	3	-	2	3	-	-	1	-	-	-	3
<b>RCE552.3</b>	3	3	-	2	3	-	-	2	-	-	-	3
<b>Average</b>	<b>3.00</b>	<b>3.00</b>	-	<b>2.00</b>	<b>3.00</b>	-	-	<b>1.67</b>	-	-	-	<b>3.00</b>

### Mapping of Course Outcome and Program Specific Outcome

PSO CO	PSO 1	PSO 2
<b>RCE552.1</b>	3	2
<b>RCE552.2</b>	2	3
<b>RCE552.3</b>	3	3
<b>Average</b>	<b>2.67</b>	<b>2.67</b>



### **RCE553Construction Management Lab (L-T-P 0-0-2)Credit-1**

1. Estimation of quantities for any one of the followings: Building/ Septic tank/Water supply pipe line/road/bridge.
2. Preparation of Bill of Quantities (BOQ) for above project.
3. Practice of MS Project/Primavera software for same problem.
4. Study of any full set of tender documents (Institute shall provide the set from ongoing/completed tenders).

These exercises will be done through use of software and spread in 8-10 classes.

### COURSE OUTCOMES

**Course Name: RCE 553: Construction Management Lab Year of study: 2019-2020**

On completion of this course, the students will be able to	
<b>RCE553.1</b>	to estimate the quantities of a residential building.
<b>RCE553.2</b>	to estimate the Bill of Quantities for a residential building.
<b>RCE553.3</b>	to learn the practical aspects of tender documents,

### Mapping of Course Outcome and Program Outcome

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12
<b>RCE 553.1</b>	3	-	-	2	-	2	-	1	-	-	-	2
<b>RCE 553.2</b>	3	-	-	2	-	2	-	2	-	-	-	2
<b>RCE 553.3</b>	3	-	-	2	-	2	-	1	-	-	-	2
<b>Average</b>	<b>3.00</b>	-	-	<b>2.00</b>	-	<b>2.00</b>	-	<b>1.33</b>	-	-	-	<b>2.00</b>

### Mapping of Course Outcome and Program Specific Outcome

CO	PSO 1	PSO 2
<b>RCE 553.1</b>	3	2
<b>RCE 553.2</b>	3	3
<b>RCE 553.3</b>	3	3
<b>Average</b>	<b>3</b>	<b>2.67</b>

**RCE554 Concrete Lab****(L-T-P 0-0-2)****Credit- 1**

1. Study of IS codes for (i) Aggregates (ii) Cements (iii) Admixtures (iv) Fly ash
2. Concrete Mix design computation by ACI 211.1-91 method, IS code method as per 10262-2007 & 456-2000, DOE method for given sample.
3. Preparation and testing of samples as per any one of the above-mentioned computations (Minimum grade of concrete is M30)
4. Tests on Concrete- (a) Workability tests - Slump cone test, compaction factor test, Vee-bee consistometer test, flow table test. (b) Strength tests- compressive strength, flexural strength, split tensile strength.
5. Effects of Admixture - Accelerator, Retarder, Super Plasticizer.
6. Non-destructive Testing - Rebound Hammer test, Ultrasonic Pulse Velocity test.

### COURSE OUTCOMES

**Course Name: RCE 554: Concrete Lab Year of study: 2019-20**

<b>On completion of this course, the students will be able to</b>	
<b>RCE554.1</b>	learn the properties of basic ingredients of concrete
<b>RCE554.2</b>	design the concrete mix by using IS and ACI method
<b>RCE554.3</b>	examine the properties of concrete in fresh and hardened state.

### Mapping of Course Outcome and Program Outcome

<b>CO</b>	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO 8</b>	<b>PO 9</b>	<b>PO 10</b>	<b>PO 11</b>	<b>PO 12</b>
<b>RCE554.1</b>	3	-	-	2	-	2	-	1	-	-	-	2
<b>RCE554.2</b>	3	-	-	2	-	2	-	2	-	-	-	2
<b>RCE554.3</b>	3	-	-	2	-	2	-	1	-	-	-	2
<b>Average</b>	<b>3.00</b>	-	-	<b>2.00</b>	-	<b>2.00</b>	-	<b>1.33</b>	-	-	-	<b>2.00</b>

### Mapping of Course Outcome and Program Specific Outcome

<b>CO</b>	<b>PSO 1</b>	<b>PSO 2</b>
<b>RCE554.1</b>	2	2
<b>RCE554.2</b>	2	2
<b>RCE554.3</b>	2	2

<b>3</b>		
<b>Average</b>	<b>2</b>	<b>2</b>