



**UTTARAKHAND BOARD OF TECHNICAL EDUCATION**  
**JOINT ENTRANCE EXAMINATION AND TRAINING, RESEARCH DEVELOPMENT CELL, DEHRADUN**  
**STUDY AND EVALUATION SCHEME FOR DIPLOMA PROGRAMME**

**BRANCH NAME: AGRICULTURAL ENGINEERING**

**SEMESTER – V**

Subject Code	Subject	L	T	P	T O T	EVALUATION SCHEME						Total Marks	Credit Point	
						Internal			External					
						Theory Max Marks	Practical Max Marks	Theory Hrs.	Theory Max Marks	Practical Max Marks	Practical Hrs.			
255004	Soil Science & Soil Mechanics	4	-	6	10	30	20	70	2.5	40	3.0	160	5	
255006	Rural Work Estimation & Costing	5	-	-	5	50	-	70	2.5	-	-	120	5	
255002	Dairy & Food Technology	5	-	4	9	30	20	70	2.5	40	3.0	160	6	
255003	Irrigation and Drainage Engineering	5	-	4	9	25	20	70	2.5	40	3.0	155	6	
255001	Computer Application in Agricultural Engineering Drafting, Design & Analysis	-	-	6	6	-	50	-	-	70	3.0	120	5	
255005	Reinforced Cement Concrete Design for Rural Construction	5	-	-	5	50	-	70	2.5	-	-	120	5	
255052	Industrial Exposure (Assessment at Inst. Level) +	-	-	-	-	-	20	-	-	-	-	20	1	
255053	Industrial Training	4 Weeks				-	50	-	-	-	70	3.0	120	1
015054	General Proficiency #	-	-	4	4	-	25	-	-	-	-	25	1	
<b>Total</b>		<b>24</b>	<b>-</b>	<b>24</b>	<b>48</b>	<b>185</b>	<b>205</b>	<b>350</b>	<b>-</b>	<b>260</b>	<b>-</b>	<b>1000</b>	<b>35</b>	

\*\* Common with diploma programme in Chemical Technology (Paint) and Chemical Technology (Rubber & Plastic).

# General Proficiency will comprise of various Co-curricular activities like games, hobby clubs, seminars, declamation contests, extension lectures, field visits, NCC, NSS and cultural activities, G.K., general study, elementary math and discipline.

++ Industrial visit compulsory at minimum two industries or departments.

**Note-** 1- Each period will be of 50 minutes. 2- Session will be of 16 weeks. 3- Effective teaching will be of at least 12.5 weeks.

**Branch Code - 25**



**FIFTH SEMESTER  
AGRICULTURAL ENGINEERING**



L	T	P
4	-	6

Subject Code : 255004

## RATIONALE

A diploma holder in agriculture engineering has to work with various types of soils in the field. This subject is aimed to equip the students with the capability of identifying various types of soils, their properties and behaviour in the field conditions.

In addition to above the knowledge of soil mechanics is also necessary in connection with the embankment or filling of earth while leveling the land. The curriculum of this subject has been developed to cater to the above mentioned needs.

## DETAILED CONTENTS

### A. Soil Science

#### 1. Origin and Classification of Soils (08 Periods)

Origin of soils, weathering of rocks and formation of horizon, composition of soils, structure of soils. Classification of soils (based on agriculture needs. IS classification of soil, triangular classification of soil. Distinction between clay, loam and sandy soils.

#### 2. Physical Proportion of Soil (08 Periods)

Texture, particle density, structure, bulk density, porosity, air and water in soil, temperature, consistency and organic matter

#### 3. Chemistry of Soils (08 Periods)

Soil water plant relation, soil mineral and chemical classification (Acid soil, calcareous soil and saline soil), elementary exposure. Methods of reclamation of acid and alkaline soil.

#### 4. Introduction to Bio-Fertilizers i.e. vermi-compost, organic fertilizer, FYM, its importance. (04 Periods)

### B. Soil Mechanics

#### 5. Introduction (12 Periods)

Natural, residual and transported soil. Weight, volume relationship, determination of soil unit weights, water content and void ratio. Structure of soil – granular and cohesive soil. Soil colloids and Brownian motion

Grain Size Distribution: Sieve analysis, Stock's law, hydrometer analysis (basic concept only), grain size accumulation curves-their plotting and interpretation, IS soil classification

## **6. Engineering Properties of Soil**

**(16 Periods)**

Consistency of soil: Atterburg's limit, method of determination of liquid limit and plastic limit, plasticity index, plotting of flow curve on semilog graph.

Permeability of soil: Darcy's law, coefficient of permeability, parameters affecting permeability, parameters, quick sand condition, seepage through soils.

Compaction and consolidation of soil: Concept of compaction and consolidation, difference between them, optimum moisture content, dry density, Procter compaction test, use of optimum moisture content in embankment

Shear strength of soil: Definition of shear strength, Coulomb's Law, direct shear box test and shear vane test

Bearing capacity of soil: Definition, net ultimate and safe bearing capacity, plate load test

## **7. Subsurface Investigation**

**(08 Periods)**

Preliminary exploration, test pit, different methods of boring, augers, methods of sampling, sealing of samples, disturbed, representative and undisturbed samples, split spoon sampler

## **LIST OF PRACTICALS**

### **(A) Soil Science**

1. Determination of moisture tension with Tensiometer
2. Determination of wilting point
3. PH value determination
4. Classification of soil and field identification test

### **(B) Soil Mechanics**

1. Determination of grain size distribution by sieve analysis
2. Determination of liquid limit and plastic limit

3. Determination of permeability by constant and variable head permameter.
4. Determination of shear strength by direct shear box test.
- 5 Determination of OMC by Procter compaction test.
- 6 Determination of field density by core cutter method and sand replacement method.

### RECOMMENDED BOOKS

1. Soil Mechanics and Foundation Engineering by KR Arora, Standard Book, Delhi
2. Soil Mechanics and Foundations by BC Punmia, Ashok K Jain and Arun K Jain, Luxmi Publishing, New Delhi
3. Soil Mechanics and Foundation Engineering by VNS Murthy, Dhanpat Rai and Sons, Jalandhar
4. Soil Mechanics by Alam Singh and BC Punmia, Standard Book House, Delhi

### SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	8	8
2	8	12
3	8	8
4	4	8
5	12	20
6	18	32
7	8	12
<b>Total</b>	<b>64</b>	<b>100</b>

# RURAL WORK ESTIMATION AND COSTING

L	T	P
5	-	-

Subject Code : 255006

## RATIONALE

This is one of the core subject of Agricultural engineering as it enables the students to estimate the cost of civil engg. They will know the working of contactors , estimators, supervisors & valuers. The study of this subject makes them efficient supervisors & good executives in Agricultural engg. Field.

## DETAILED CONTENTS

### 1- INTRODUCTION

(12 periods)

Definition of estimating , purpose, types of estimate, preliminary estimate, cubical content estimate, plinth area estimate, approximate quantity method estimate, detailed or item rate estimate, revised supplementary estimate, annual repair cost and special repair estimate . Bill of quantities, abstract of cost . prerequisites of estimating that is drawing , specification , rates, general and detailed specifications .

### 2- Measurement of Work.

(15 periods)

Units of measurement, general rules of taking measurement, units of payments, method of measuring quantities- centre line method, long and short wall, methods.

### 3- Analysis of Rates

(10 periods)

Schedule of rate , need of analysis of rates, requirements of labour for different work as per NBO, requirements of material for different works, preparation of analysis of rate of 10 important works.

### 4. Estimate of different work of a building & roads & farm structures:

(20 periods)

- (i) -Earth work in foundation, steps, dwarf wall, boundary wall.
- (ii) -Concrete in foundation .
- (iii) -Brick masonry in footing.
- (iv) -Brick masonry upto plinth
- (v) -Brick masonry in super structure
- (vi) -D.P.C.
- (vii) -R.B. and R.C works
- (viii) -Flooring
- (ix) -Sand/Earth filling

- (x)-Plastering and Pointing
- (xi)-White washing and colour washing
- (xii)- Site development
- (xiii)- Anti termite treatment
- (xiv)- Arches and roofs
- (xv)-Sanitary works:
  - a-Septic tank and soakpit
  - b-P.R.A. type latrine
- (xvi)-Doors and windows

5- Estimate of a complete Village House **(6 periods)**

**6- Calculation of Materials: (5 periods)**

Calculation of quantities of different materials from estimated quantities of item like brick work, cement concrete , R.B. and R.C. work.

**7- Estimate of earth work of road: (7 periods)**

Calculation of land areas and volumes-Prismoidal formula, mass diagram, methods of taking out and scheduling quantities for various items such as culverts and bunds. Earth work volumes by spot levels and contours.

**8- Estimates of pond irrigation and drainage channels: (5 periods)**

Specifications and estimating quantity and cost of pond irrigation and drainage channels.

### RECOMMENDED BOOKS

1. Estimation & costing by B.N. Suresh.
2. Estimation & costing by B.N. dutta.

### SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	12	10
2	15	10
3	10	10
4	20	25
5	6	15
6	5	10
7	7	10
8	5	10
<b>Total</b>	<b>80</b>	<b>100</b>



L	T	P
5	-	4

**Subject Code : 255002**

## **RATIONALE**

To provide in-depth knowledge in various unit operations and basic concepts in dairy processing and to provide in-depth understanding of advances in theoretical and practical aspects of food processing.

## **DETAILED CONTENTS**

### **UNIT I**

**(10 periods)**

Microbial and nutritional properties of milk and milk products, thermal processing for preservation . UHT processed milk products, their properties and prospects, types of UHT plants. Pasteurization. HTST.

### **UNIT II**

**(10 periods)**

Micro fluidization of milk: Principle, equipment, effects and applications, Homogenization and their applications in dairy industry. Dehydration: advances in drying of milk and milk products; freeze concentration, freeze dehydration, Water activity, sorption behaviour of foods, , Use of carbonation in extending the shelf life of dairy products.

### **UNIT III**

**(10 periods)**

Status of food processing industry in India and abroad; prospects and constraints in development of Indian food industry. Post harvest management of fruits and vegetables, Harvesting indices, Biochemical and physical changes during ripening of fruits & vegetables, respiration and factors affecting it, post harvest treatments for extension of shelf-life of fresh produce,

### **UNIT IV**

**(10 periods)**

Principles of chilling & refrigeration storage of foods, quality changes in cold stored products, controlled and modified atmospheric storage. Freezing of foods, principle and equipments for freezing, defects in frozen foods, freezing of fruits and vegetables, freeze concentration of fruit juices.

### **UNIT V**

**(10 periods)**

Application of heat energy to foods for preservation and processing, concept of

drying rate of foods, industrial drying processes of foods; changes during drying, advanced drying processes (Freeze drying, infra red drying and microwave drying), Canning of fruits & vegetables, unit processes involved in canning, types of cans for thermal processing of foods.

## **UNIT VI**

**(10 periods)**

Basic principles involved in fermentation, Technological aspects of pickled vegetables like sauerkraut, cucumbers, Technology of wine, beer and distilled alcoholic beverages, defects in alcoholic beverages. Developments in manufacturing processes for bakery products such as breads; biscuits; pizza bases, cake etc; changes during processing of bakery products. Utilization and importance of dairy ingredients in bakery products.

## **UNIT VII**

**(10 periods)**

Important group of enzymes involved in food processing; Application of enzymes in food processes like enzymes juice extraction, juice clarification, in bread manufacture, ice cream manufacture.

## **UNIT VIII**

**(10 periods)**

Newer concepts in food processing including organic foods, processing of organic raw material, genetically modified foods.

## **LIST OF PRACTICALS**

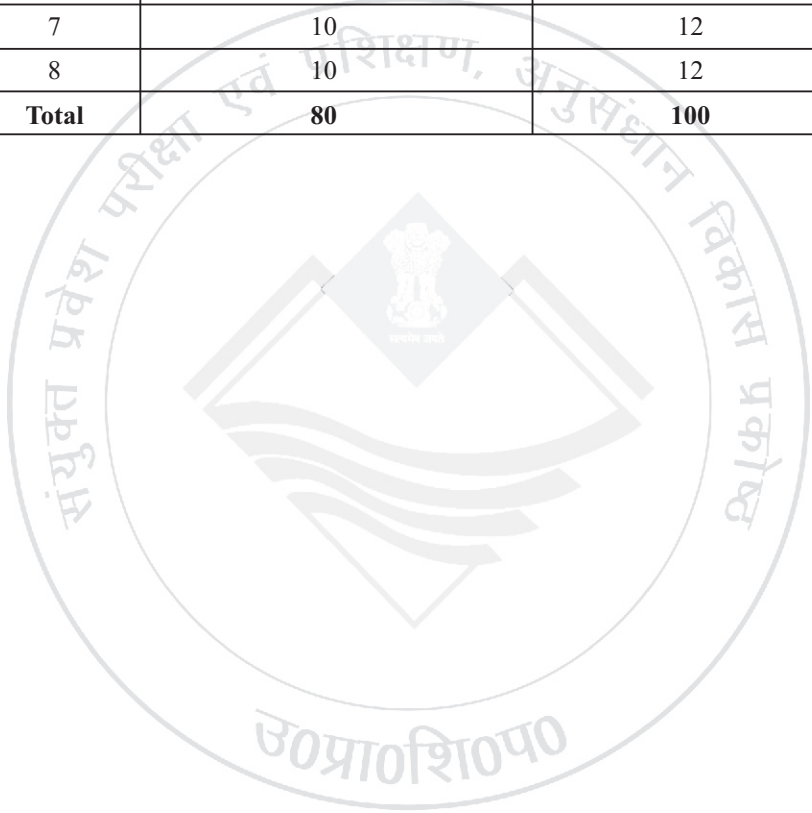
1. Study of different packaging materials.
2. Study of material conveying equipments.
3. Preparation of seasonal pickles, jams, jellies and ketchup
4. Study and sketch of cream separator.
5. Study of pasteurization process
6. Visit to a food processing plants.

## **BOOKS**

1. Unit of Agricultural processing by K.M Sahay and K.K Singh
2. Principles and practice of Post Harvest Technology by P.H. Pandey
3. "Introduction to Food Engineering" by Singh R.Paul. and Heldman R.Dennis
4. "Food Engineering and Dairy Technology" by Kessler H.G

## SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	10	14
2	10	14
3	10	12
4	10	12
5	10	12
6	10	12
7	10	12
8	10	12
<b>Total</b>	<b>80</b>	<b>100</b>



L	T	P
5	-	4

Subject Code : 255003

## RATIONALE

A diploma holder in agricultural engineering needs to learn the principles pertaining to the optimum use of water to achieve agricultural yield besides understanding engineering principles for solving problems of irrigation and drainage. After studying this subject, the students shall acquire adequate knowledge and skills about water requirement of crops, irrigation methods and drainage as reclamation techniques of salt affected water logged soils.

## DETAILED CONTENTS

### A. IRRIGATION ENGINEERING

#### 1. Introduction

(5 Periods)

Purpose of irrigation, sources of irrigation water, present status of development and utilization of different water resources of the state and country; advantages and disadvantages of irrigation. Types of irrigation viz. artificial (flow, lift etc.) and natural. Sources of irrigation water. Quality of irrigation water, surface water sources, ground water sources Measurement of irrigation water, weir, notches, flumes and orifices and other methods; water conveyance, design of irrigation field channels, underground pipe conveyance system, irrigation structures,

#### 2. channel lining;

(7 Periods)

#### 3. Water Requirement of Crops

(13 Periods)

Types of soils, soil properties in relation of irrigation and drainage, classes and availability of soil water, preparation of land for irrigation and drainage, quality of irrigation water, evaporation, transportation, evapotranspiration, consumptive use, estimating crop water methods of improving duty, principle crops of India. Assessment irrigation water requirement of different crops, estimation of depth and time of irrigation, different criteria for irrigation scheduling depending upon soil-plant-atmospheric factors

#### 4. Irrigation Methods

(15 Periods)

Surface and subsurface methods, sprinkler and drip system of irrigation and conjunctive use

## **5. Evaluation of Farm Irrigation Systems**

**(5 Periods)**

Measurement of irrigation efficiencies, water conveyance, storage, application, distribution and water use efficiency

## **6. Soil Moisture Movement**

**(5 Periods)**

Soil moisture measurement, soil moisture tension, soil moisture characteristics curve, saturation and field capacity, wilting point, moisture equivalent, percolation seepage, infiltration, hydraulic conductivity, permeability

## **7. Design of Irrigation Channels**

**(5 Periods)**

Non-erodible channels, design of open channels, maximum permissible velocity, channel slopes, free board, hydraulic sections, most economical section. Flow through pipes, losses

## **B. DRAINAGE ENGINEERING**

### **8. Introduction**

**(4 Periods)**

Definition, necessity, water logging, salinity, its control inter-relationship of irrigation drainage, drainage co-efficient, water table fluctuations

### **9. Drainage Investigation and Requirement**

**(6 Periods)**

Estimation of drainage requirements, required water table depths, lowering of water table, ground water contours, drainage depths for different crops

### **10. Drainage Systems**

**(8 Periods)**

Different types of surface and subsurface drainage systems, design of surface drainage systems, different types of subsurface drainage systems and their design, pipe drainage depth and spacing of pipe drains, field survey, installation and layout of drains, installation of pipe outlets

### **11. Special Methods of Drainage**

**(7 Periods)**

Vertical (single and multiple well point system) mole drains, drainage of irrigated lands in semi arid and arid areas. Bio drainage

## **LIST OF PRACTICALS**

1. Installation, operation and maintenance of sprinkler irrigation system
2. Installation and operation of drip irrigation system

3. Determination of infiltration rate of soil
4. To survey market and field for the availability, adaptability and selection of various types of pumps and irrigation systems in the region
5. Measurement of irrigation water in the field channels with the use of Parshall flumes and weir.
6. Measurement of advance and recession in border irrigation
7. Estimation of irrigation efficiency; measurement of advance and recession in furrow irrigation and estimation of irrigation efficiency;
8. Measurement of uniformity coefficient of sprinkler irrigation method;
9. Study tours to watershed management,
10. Visit of irrigation and drainage projects.

### **LIST OF BOOKS**

1. Ground Water and Well Drilling by Parveen Kumar; CBS Publishers and Distributors, Delhi
2. Sprinkler Irrigation by Sivanappan; Oxford & IBH Publication Co.
3. Irrigation Engineering by M. Lal & Etal; New India Publishing House.
4. Water use Efficiency in Agriculture by Giriappa; Oxford & IBH Publication Co.
5. Irrigation Practice & Water Management by FAO; Oxford & IBH Publication Co.
6. Irrigation Engineering by Sharma & Bari; Satya Parkashan Publishers.
7. Irrigation Engineering by B.L. Gupta; Satya Parkashan Publishers.
8. Irrigation Engineering (Vol. 1,2,3) by Sharma & Sharma; Oxford & IBH Publication Co.
9. Irrigation Water Power & Water Resource Engineering by K. R. Arora; Standard Publication.
10. Water well & Pump Engineering by A.M. Michael & S.P. Khepar; Tata McGraw Hill Publishing Co. Ltd., New Delhi.
11. Text Book of Irrigation Engineering (Vol. 2,3) by Sharma & Sharma; Oxford & IBH Publication Co.
12. Irrigation Theory and Practice by AM Michael; Vikas Publishing House (P) Ltd, Delhi
13. Land Drainage by Luthin
14. Micro irrigation by R Suresh, Standard Publishers and distributors, New Delhi

## SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	5	05
2	7	10
3	13	15
4	15	15
5	5	10
6	5	05
7	5	05
8	4	05
9	6	05
10	8	15
11	7	10
<b>Total</b>	<b>80</b>	<b>100</b>

# COMPUTER APPLICATIONS IN AGRICULTURAL ENGINEERING DRAFTING, DESIGN AND ANALYSIS

Subject Code : 255001

L	T	P
-	-	6

## RATIONALE

Today age is computer age. Most of our daily activities are being influenced by the use of computers. It has become necessary for diploma students to have a basic knowledge of computer applications related to their branch. This subject is being offered to provide further practice to students on MS Power Point and MS Access and acquaint them to Computer Aided Design software for modelling, assembling and drafting.

## DETAILED CONTENTS

### 1. MS Word

Introduction to MS word for preparing technical report. Use of different fonts, size, tables, and equations should be considered.

### 2. MS Excel

Creation of graphs such as bar chart, PI chart, line diagram using technical data, Examples: Load deformation data of any material may be given to the students and ask to convert these data to stress strain form and plot of stress strain curve. Determination of modulus of elasticity, yield strength, percentage elongation, ultimate strength, etc from the above curve. With given x-y data, plotting of the data and fitting various regression equations using Excel program.

### 3. MS Power Point

Templates, wizard, views, colour schemes, Introduction to various Power Point toolbars, Presentations using Power Point:-

Slide Views

Slide Formatting

Animation

Graphs

### 4. Computer Aided Design using any software such as AUTO CAD/ IDEAS/ etc

4.1 Concept of Auto CAD, Tool bars in Auto CAD, coordinate system, snap, grid, and ortho mode



- 4.2 Drawing commands – point, line, arc, circle, ellipse,
- 4.3 Editing commands – scale, erase, copy, stretch, lengthen and explode.
- 4.4 Dimensioning and placing text in drawing area
- 4.5 Sectioning and hatching
- 4.6 Inquiry for different parameters of drawing entity

## **5. Assembly and detail drawings of the following using AUTOCAD**

- 5.1 Tool post
- 5.2 Tail stock
- 5.3 Screw jack
- 5.4 Safety valve
- 5.5 Stuffing Box
- 5.6 Bench vice

## **6. Isometric Drawings by CAD**

Drawings of following on computer:

- Cone
- Cylinder
- Isometric view of objects

## **7. 3D Modelling**

3D modelling, Transformations, scaling, rotation, translation

## **8. Project work**

Technical report writing where all such chapters are to be used.

**NOTE :-** Practical work must be performed on the related contents as described above. Strategy should be made in such a way that at first student should be taught the contents theoretically than related practical works must be performed.

## **INSTRUCTIONAL STRATEGY**

1. Teachers should show model of the component/part whose drawing is to be made.

## **RECOMMENDED BOOKS**

- a) AutoCAD 2000 for you by Umesh Shettigar and Abdul Khader; Janatha Publishers, Udupi.

- b) Machine Drawing by P.S. Gill; Kataria and Sons, Ludhiana.
- c) A Text book of Machine Drawing by R.K. Dhawan , S.Chand and Company Ltd.,New Delhi.
- d) Engineering Drawing with AutoCAD 2000 by T. Jeyapooran; Vikas PublishingHouse, Delhi.
- e) Auto CAD for Engineering Drawing Made Easy by P. Nageswara Rao; Tata McGraw Hill, New Delhi.



# REINFORCED CEMENT CONCRETE DESIGN FOR RURAL CONSTRUCTION

Subject Code : 255005

L	T	P
5	-	-

## RATIONALE

This subject is an applied engineering subject. Diploma holders in Agricultural Engineering will be required to supervise RC Construction and fabrication. He may also be required to design simple structural elements, make changes in design depending upon availability of materials (bars of different diameters). This subject thus deals with elementary design principles as per IS:456-2000

## DETAILED CONTENTS

### 1- Introduction of concrete

(05 periods)

Concrete, advantages and disadvantages of concrete, mixing properties, workability, water cement ratio, non destructive testing.

### 2. Introduction of RCC

(04 periods)

2.1 Concept of Reinforced Cement Concrete (RCC)

2.2 Reinforcement Materials:

- Suitability of steel as reinforcing material
- Properties of mild steel and HYSD steel

2.3. Loading on structures as per IS: 875

### 3. Introduction to following methods of RCC design

(04 periods)

3.1 Working stress method

3.2 Limit state method

### 4. Shear and Development Length

(06 periods)

4.1 Shear as per IS:456-2000 by working stress method

- i) Shear strength of concrete without shear reinforcement
- ii) Maximum shear stress
- iii) Shear reinforcement

**5. Singly Reinforced Beam (Working stress method) (12 periods)**

- 5.1 Basic assumptions and stress strain curve, neutral axis, balanced, under reinforcement and over reinforced beams, Moment of resistance for singly reinforced beam.
- 5.2 Design of singly reinforced beam including sketches showing reinforcement details.

**6. Concept of Limit State Method (10 periods)**

- 6.1 Definitions and assumptions made in limit state of collapse (flexure)
- 6.2 Partial factor of safety for materials
- 6.3 Partial factor of safety for loads
- 6.4 Design loads
- 6.5 Stress block, parameters

**7. Singly Reinforced beam (11 periods)**

Theory and design of singly reinforced beam by Limit State Method. Check for shear, Check for deflection, check for development length

**8. One Way Slab (11 periods)**

Theory and design of simply supported one way slab including sketches showing reinforcement details (plan and section) by Limit State Method. Check for shear, Check for deflection,

**9 Axially Loaded Column (11 periods)**

- 11.1 Definition and classification of columns
- 11.2 Effective length of column,
- 11.3 Specifications for longitudinal and lateral reinforcement
- 11.4 Design of axially loaded square, rectangular and circular short columns by Limit State Method including sketching of reinforcement (sectional elevation and plan)

**10. Pre stressed Concrete (06 periods)**

- 12.1 Concept of pre-stressed concrete
- 12.2 Methods of pre-stressing : pre-tensioning and post tensioning
- 12.3 Advantages and disadvantages of prestressing
- 12.4 Losses in pre-stress

**Important Note:** Use of BIS:456-2000 is permitted in the examination.

## INSTRUCTIONAL STRATEGY

Teachers are expected to give simple problems for designing various RCC structural members. For creating comprehension of the subject, teachers may prepare tutorial sheets, which may be given to the students for solving. It would be advantageous if students are taken at construction site to show form work for RCC as well as placement of reinforcement in various structural members. Commentary on BIS:456 may be referred along with code for relevant clauses.

## RECOMMENDED BOOKS

1. Punmia, BC; "Reinforced Concrete Structure Vol I", Standard Publishers, Delhi
2. Ramamurtham, S; "Design and Testing of Reinforced Structures", Dhanpat Rai and Sons, Delhi
3. Gambhir, M.L., "Reinforced Concrete Design", Macmillan India Limited
4. Singh, Birinder "RCC Design and Drawing", Kaption Publishing House, New Delhi
5. Singh Harbhajan "Design of Reinforced Concrete Structures" Abhishek Publishers Ltd., Chandigarh
6. Mallick, SK; and Gupta, AP; "Reinforced Concrete", Oxford and IBH Publishing Co, New Delhi.
7. Singh Harbhajan "Limit State RCC Design" Abhishek Publishers Ltd., Chandigarh

## SUGGESTED DISTRIBUTION OF MARKS

Topic No.	Time Allotted (Hrs)	Marks Allotted (%)
1	5	15
2	4	15
3	4	15
4	6	10
5	12	10
6	10	10
7	11	7
8	11	6
9	11	6
10	6	6
<b>Total</b>	<b>80</b>	<b>100</b>





## LEARNING OUT COMES AND MEANS OF ASSESSMENT

### BRANCH NAME – AGRICULTURAL ENGINEERING

### SEMESTER – V

S.No.	Title of Subject/Unit	Learning Outcomes	Means of Assessment
1	Reinforced Cement Concrete Design for Rural Construction	At the end of the course, the student will be able to design simple structural elements like RCC beam, column, slab etc. by WSM & LSM using IS 456	Assignments, Quizzes, Seminars, Class Test, Power Point Presentation, Mid Term Examination & Semester examination.
	Dairy & Food Technology	At the end of the course the student will be able to get depth knowledge in various unit operations and basic concepts in dairy processing and to provide in-depth understanding of advances in theoretical and practical aspects of food processing.	Assignments, Quizzes, Seminars, Class Test, Power Point Presentation, Mid Term Examination & Semester examination. Practical assessment is done through practical test results, practical files and Viva voce.
2	Irrigation and Drainage Engineering	At the end of the course the student will be able to learn the principles pertaining to the optimum use of water to achieve agricultural yield besides understanding engineering principles for solving problems of irrigation and drainage. After studying this subject, the students shall acquire adequate knowledge and skills about water requirement of crops, irrigation methods and drainage as reclamation techniques of salt affected water logged soils.	Assignments, Quizzes, Seminars, Class Test, Power Point Presentation, Mid Term Examination & Semester examination.
3	Rural Work Estimating & Costing	At the end of the course, the student will be able to prepare estimates for various civil engineering works along with technical know/how of tender, contracts and principles of valuation.	Assignments, Quizzes, Seminars, Class Test, Power Point Presentation, Mid Term Examination & Semester examination.



4	Soil Science & Soil Mechanics	At the end of the course, the student will be able to Understand & classify the different types of soils, their physical properties. Student will be able to test soil parameters like compaction, shear strength & Atterberg's limits etc along with the technical knowhow of soil bearing capacity	Assignments, Quizzes, Seminars, Class Test, Power Point Presentation, Mid Term Examination & Semester examination. Practical assessment is done through practical test results, practical files and Viva voce.
5	Computer Application In Agricultural Engineering, Drafting, Design & Analysys	At the end of the course, the student will be able to use the various computer software available in solving problem related to agricultural engineering.	Assignments, Seminars, Power Point Presentation, Report, Viva voce & Practical examination.
6	Industrial Training	Industrial Training provides an opportunity to students to explore the culture and environment of industrial & field organizations and enables them to integrate theory with practice.	Industrial Training of 04 weeks done after 4th semester would be evaluated in 5th semester through Report and Viva-voce.