Final Year B. Tech. Agricultural Engineering (Revised Syllabus)

**SOIL AND WATER CONSERVATION STRUCTURES**

| Periods | | | | Evaluation Scheme | | | | | Credits |
|---|---|---|---|---|---|---|---|---|---|
| **L** | **T** | **P** | **Total** | **TA** | **CT** | **ESE** | **PR** | **Grand Total** | |
| **4** | **-** | **2** | **6** | 25 | 25 | 80 | 50 | **180** | **5** |

**Semester End Theory Examination Duration: 3 Hrs**

**OBJECTIVES:**

As an Agroneer, the student has to deal with various soil and water conservation structures in management of a hydrological watershed. Present syllabus is aimed for

1. Awareness of problems of soil erosion and various achievements in this regard.
2. Soil and water conservation programmes.
3. Design of some permanent soil and water conservation structures.
4. Design of Earthen embankments and farm ponds.
5. Sedimentation analysis of reservoirs.

**A. THEORY:**

| Unit | Content | Duration | Nature |
|---|---|---|---|
| **I** | Soil erosion problems and achievements in India, Soil and water conservation programmes and achievements, National land resources regions, | 05 hrs | Descriptive |
| **II** | Prerequisites for Soil and water conservation measures- Physiography of area, Soils, Vegetative covers, Rainfall, Runoff, Floods, Socioeconomic factors | 05 hrs | Descriptive & analytical |
| **III** | Water Resources Development- Earthen Embankments, design of small Earthen Embankments, Farm ponds, types, Components, site selection, Design of pond embankment. Seepage losses in ponds, Dug out ponds, Design and site selection for dugout ponds. Nala Bunding- location and execution. | 10 hrs | Descriptive & analytical |
| **IV** | Earthen Dam- Types, Design criteria, Design of earthen dam, Causes of Failure, Retaining wall- Types, Design of masonry retaining wall | 10 hrs | Descriptive & analytical |
| **V** | Land Use Capability Classification- Soil survey, mapping unit, soil and land use capability classifications, Identification of classes in the field, land use capability classification | 05hrs | Descriptive |
| **VI** | Erosion control structure Design-Hydrologic, hydraulic and structural design, design and estimation of Drop spillway, Drop inlet Spillway and Chute spillway with site selection and adaptabilities | 15hrs | Descriptive & analytical |
| **VII** | Reservoir Sedimentation- Sources of Sedimentation, factors affecting yield of sedimentation, types of load, sediment transportation, bed load estimation, sediment distribution in reservoir, factors affecting distribution pattern, estimation of sediment distribution, Rates of sedimentation, Reservoir sediment control | 10 hrs | Descriptive & analytical |

**Section A: I, II, III & IV Unit**
**Section B: V, VI &VII Unit**

**B. PRACTICALS:**
**The term work shall consist of following experiments (minimum ten)**

| Sr.No | Practical |
|---|---|
| 1 | Study of Soil and water conservation programmes and achievements in India |
| 2 | Design of farm pond |
| 3 | Design of earthen embankments (fill volume) |
| 4 | Design of earthen embankment (Storage capacity) |
| 5 | Design of Earthen dam |
| 6 | Design of retaining wall |
| 7 | Design of Drop spillway |
| 8 | Design of drop inlet spillway |
| 9 | Design of Chute spillway |
| 10 | Study of Bed load estimation methods of reservoir |
| 11 | Visit to site of Soil and water conservation structures |

**The assessment of the term work shall be done on the following basis**

- Continuous assessment.
- Record of the experiments submitted by the student
- Oral conducted on the syllabus and term work mentioned above

| **Practical Examination** |
|---|
| The practical examination shall consist of performing an experiment, based on the practical work done during the course, the record of the experiments submitted by the candidate and viva-voce based on the syllabus |

**C: SUGGESTED TEXT BOOKS AND REFERENCES**


1. Manual of Soil & Water Conservation Practices by Gurmel Singh, C. Venkataramanan, G. Sastry & B. P. Joshi. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.
2. Soil & Water Conservation Engineering by R. Suresh, Standard Publisher Distridutors, New Delhi.
3. Soil & Water Conservation Engineering by G. O. Schwab, R. K. Frevert, T. W. Edminster and K. K. Barnes.

**PATTERN OF QUESTION PAPER**

Faculty of Engineering and Technology

Final Year (B. Tech.) Agricultural Engineering (Revised Course) Examination

November/December, May/June 200__

Subject Name: **Soil and Water Conservation Structures**

Time: 3 hrs Maximum Marks: 80

"Please check whether you have got the right question paper"

N.B.:- i. All questions are compulsory

ii. Use separate answer book for each section

iii. …….

iv……..

**SECTION A**

Question no 1 **16 marks**

This question will consists of questions from all the chapters under section A mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 2 **12 marks**

OR

Question no 2

Question no 3 **12 marks**

OR

Question no 3

**Note:** 1. The questions will be memory based, application based and understanding type.

2. There should be intermixing in the questions.

**SECTION B**

Question no 4 **16 marks**

This question will consist of questions from all the chapters under section B mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 5 **12 marks**

OR

Question no 5

Question no 6 **12 marks**

OR

Question no 6

**Note:** 1. The questions will be memory based, application based and understanding type.

2. There should be intermixing in the questions.

## AGRICULTURAL ECONOMICS & FARM MANAGEMENT

| Periods | | | | Evaluation Scheme | | | | | Credits |
|---|---|---|---|---|---|---|---|---|---|
| L | T | P | Total | TA | CT | ESE | PR | Grand Total | |
| 4 | - | 2 | 6 | 25 | 25 | 80 | 50 | 180 | 5 |

**Semester End Theory Examination Duration: 3 Hrs**

**OBJECTIVES:**

To prepare a student with the modified & scientific knowledge of farm economic analysis and agricultural business assets.

**A. THEORY:**

| Unit | Content | Duration | Nature |
|---|---|---|---|
| I | Introduction: Basic terminologies, concepts of economics, scope of economics, microeconomics & macroeconomics, price ,value, | 12 hrs | Descriptive |
| II | Law of demand and market supply, factors governing supply, law of supply, markets & price determination under different market situations | 08 hrs | Descriptive & analytical |
| III | Meaning & scope & importance of farm management, farm planning and budgeting | 10 hrs | Descriptive & analytical |
| IV | Depreciation and methods of calculating depreciation cost of cultivation and cost of production ,economic size holding, economic feasibility of agricultural projects, BC ratio, IRR, payback period ,NPR | 10 hrs | Descriptive & analytical |
| V | Problems related to farm mechanization, management of land ,labour, capital, farm machinery and irrigation system, measures of farm efficiencies, government policy in sector of agriculture & finance, sources of farm finance | 10 hrs | Descriptive & analytical |
| VI | Basics of agri business management including planning, organizing ,controlling, leading, forecasting | 10 hrs | Descriptive |

**Section A: I, II, & III Unit**
**Section B: IV, V & VI Unit**

**B: PRACTICAL:**
**The term work shall consist of following experiments (minimum ten)**

| S.N. | Practical |
|---|---|
| 1 | Preparation of partial budget |
| 2 | Preparation of complete budget |
| 3 | Methods of calculating depreciation |
| 4 | Straight line method |
| 5 | Diminishing balance method |
| 6 | Sum of year digit method |
| 7 | Cost of cultivation of commercial crops |
| 8 | Estimation of cost of production |

| | |
|---|---|
| 9 | Working out economic feasibility of agricultural projects with BC ratio |
| 10 | Working out Net present value in respect of agricultural projects |
| 11 | Study of farm efficiency measures |
| 12 | Study of financial efficiency measures |
| 13 | Visit of agricultural project |

**The assessment of the term work shall be done on the following basis**

- Continuous assessment.
- Record of the experiments submitted by the student
- Oral conducted on the syllabus and term work mentioned above

**PRACTICAL EXAMINATION**

The practical examination shall consist of performing an experiment, based on the practical work done during the course, the record of the experiments submitted by the candidate and viva-voce based on the syllabus

**C: SUGGESTED TEXT BOOKS AND REFERENCES**


1. Fundamentals of farm business management by S.S.Joshi and T. R.kapur
2. Farm management by S.P. Dhondyal
3. Elementary economics by K.K.Dewett
4. Principles of economics by M.L.Seth
5. Agricultural production in India by Agrwal and Bansal
6. Principles & practices of marketing in India by R.L.Joshi

**PATTERN OF QUESTION PAPER**

Faculty of Engineering and Technology

Final Year (B. Tech) Agricultural Engineering (Revised Course) Examination

November/December, May/June 200__

Subject Name: **Agricultural Economics & Farm Management**

Time: 3 hrs Maximum Marks: 80

"Please check whether you have got the right question paper"

N.B.:- i. All questions are compulsory

ii. Use separate answer book for each section

iii. …….

iv……..

**SECTION A**

Question no 1 **16 marks**

This question will consists of questions from all the chapters under section A mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 2 **12 marks**

OR

Question no 2

Question no 3 **12 marks**

OR

Question no 3

**Note:** 1. The questions will be memory based, application based and understanding type.

2. There should be intermixing in the questions.

**SECTION B**

Question no 4 **16 marks**

This question will consist of questions from all the chapters under section B mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 5 **12 marks**

OR

Question no 5

Question no 6 **12 marks**

OR

Question no 6

**Note:** 1. The questions will be memory based, application based and understanding type.

2. There should be intermixing in the questions.

## ELECTRICAL TECHNOLOGY

| Periods | | | | Evaluation Scheme | | | | | Credits |
|---|---|---|---|---|---|---|---|---|---|
| L | T | P | Total | TA | CT | ESE | PR | Grand Total | |
| **4** | **-** | **2** | **6** | 25 | 25 | 80 | 50 | **180** | **5** |

**Semester End Theory Examination Duration: 3 Hrs**

**OBJECTIVES:**

The course is designed to provide students with basic energy conversion concepts and the physical phenomena in electrical machine operation. The study involves, D. C. Motors, Generators, three phase transformers, polyphase circuits and various special machines.

**A. THEORY:**

| Unit | Content | Duration | Nature |
|---|---|---|---|
| **I** | D. C. Motors- introduction, principles, torque equation, types of D. C. Motors, characteristics of all types of D. C. motors (Shunt, Series & Compound), speed control of D. C. motor, applications, armature reaction, losses, power stages. Numerical. | 08 hrs | Descriptive & analytical |
| **II** | D. C. Generator- operating principle, construction, emf equation, method of excitation, performance characteristics of generator, losses in generator power stages, commutation in generator, armature reaction, applications, numerical. | 07 hrs | Descriptive & analytical |
| **III** | Induction motors- Three phase induction motor, operating principle, types of three phase induction motor, Slip ring and squirrel cage three phase induction motor, construction of slip ring and squirrel cage, Starters in three phase induction motor, Direct online, stator resistance, star-delta, rotor resistance, autotransformer starters. Starting and running torque in three phase induction motor, power stages, efficiency, numerical. | 10 hrs | Descriptive & analytical |
| **IV** | Single phase Induction motor- double field revolving theory, types of single phase Induction motor. Operating principle, construction, applications. | 05 hrs | Descriptive |
| **V** | Synchronous motor- principle of operation, phasor diagram, V-Curve, Synchronous capacitor, starting method | 08 hrs | Descriptive |
| **VI** | Three Phase transformer-operating principle, types of three phase transformer, connections (star-star, star-delta, delta-star, delta-delta, open delta, scott connections), Advantages, applications, losses in transformer, numerical. | 10 hrs | Descriptive& analytical |
| **VII** | Special Machines- working principle and applications of A.C. & D. C. Servomotor, stepper motor, variable reluctance type, permanent magnet type and hybrid type motor, Rosenberg generator, Amplydyne and metadyne. | 08 hrs | Descriptive |
| **VIII** | Polyphase Circuits- introduction, phase sequence, star connection, balanced star delta conversion, power factor concept, numerical. | 04 hrs | Descriptive& analytical |

**Section A: I, II, III & IV Unit**
**Section B: V, VI, VII & VIII Unit**

**B. PRACTICALS:**
**The term work shall consist of following experiments (minimum ten)**

| S.N. | Practical |
|---|---|
| 1 | To perform Speed control of D. C. motor and reversal of direction. |
| 2 | Load test on D.C. shunt motor. |
| 3 | Load characteristics of separately and shunt excited D.C. generator. |
| 4 | To study D.C. motor starters. |
| 5 | Load test of three phase induction motor. |
| 6 | Speed control of Three phase induction motor |
| 7 | Study of operation of single phase induction motor. |
| 8 | Study of stepper motors |
| 9 | Verification of current and voltage relationship in star and delta connected balanced three phase load. |
| 10 | Three phase transformer connection and verification of voltage relationship. |
| 11 | Measurement of power by two wattmeter method in star or delta connected balanced three phase load. |
| 12 | Study of starters of three phase induction motor. |

**The assessment of the term work shall be done on the following basis**

- Continuous assessment.
- Record of the experiments submitted by the student
- Oral conducted on the syllabus and term work mentioned above

**PRACTICAL EXAMINATION:**

The practical examination shall consist of performing an experiment, based on the practical work done during the course, the record of the experiments submitted by the candidate and viva-voce based on the syllabus

**C: SUGGESTED TEXT BOOKS AND REFERENCES**


1. Electrical Technology, Vol. II by B. L. Theraja & A. K. Theraja, S. Chand publication.
2. Electrical Technology, Vol. I by B. L. Theraja & A. K. Theraja, S. Chand publication.
3. Fundamentals of Electrical Engineering by Ashfaque Hussain.
4. Rotating electric Machines and transformer technology by D. V. Richardson, prentice-Hall.
5. Electrical Technology by E. Huges.

**PATTERN OF QUESTION PAPER**

Faculty of Engineering and Technology

Final Year (B. Tech.) Agricultural Engineering (Revised Course) Examination

November/December, May/June 200__

Subject Name: **Electrical Technology**

Time: 3 hrs Maximum Marks: 80

"Please check whether you have got the right question paper"

N.B.: i. All questions are compulsory

ii. Use separate answer book for each section

iii. …….

iv……..

**SECTION A**

Question no 1 **16 marks**

This question will consists of questions from all the chapters under section A mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 2 **12 marks**

OR

Question no 2

Question no 3 **12 marks**

OR

Question no 3

**Note:**

1. The questions will be memory based, application based and understanding type.
2. There should be intermixing in the questions.

**SECTION B**

Question no 4 **16 marks**

This question will consist of questions from all the chapters under section B mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 5 **12 marks**

OR

Question no 5

Question no 6 **12 marks**

OR

Question no 6

**Note:**

1.The questions will be memory based, application based and understanding type.

2. There should be intermixing in the questions.

**FARM TECHNOLOGY**

| Periods | | | | Evaluation Scheme | | | | | Credits |
|---|---|---|---|---|---|---|---|---|---|
| **L** | **T** | **P** | **Total** | **TA** | **CT** | **ESE** | **PR** | **Grand Total** | |
| **4** | **-** | **2** | **6** | 25 | 25 | 80 | 50 | **180** | **5** |

**Semester End Theory Examination Duration: 3 Hrs**

**OBJECTIVES:**

With the awareness of basic agricultural engineering, an Agroneer must be aware with the advances that becoming essential parts in enhancing agricultural production. current syllabus is designed with following aims

1. Awareness about farm structures
2. To study recent advances related with fertilizer
3. To study various agricultural enterprises

**A. THEORY:**

| Unit | Content | Duration | Nature |
|---|---|---|---|
| **I** | **Farm Buildings:** planning of farmsteads & farm residence ,location size & arrangement of farmstead, design of improved farm house, septic tanks, fencing posts, estimating cost of buildings building materials foundation ,roofing, concrete, lime, cement, sand, surkhi, gravel, mortar, bricks, timber. | 10 Hrs | Descriptive & analytical |
| **II** | **Vermiculture & vermicompost:** Introduction, Advantages, Vermiculture & vermicompost, vermitechnology , turning garbeg into money, chemical composition of vermicompost, manufacturing at home, classification of earthworms ,physical & chemical effects of earthworms on soil , earthworms life cycle studies & pattern , earthworm breeding, fertilizer use & deterioration of soil environment, impact of vermicompost | 10 Hrs | Descriptive |
| **III** | **Sericulture:** scope & Importance of sericulture, History of sericulture, economy of sericulture sector, verities of mulberry, soil type requirement , rearing house | 10 Hrs | Descriptive |
| **IV** | **Poultry :** economics of poultry industry, site selection criteria of poultry , different breeds of poultry birds, different poultry houses, brooder houses, poultry equipment | 10 Hrs | Descriptive |
| **V** | **Energy in rural sector:** Introduction, energy sources, classification of energy, energy use in production agriculture, energy consumption in rural houses, energy scenario of Post harvest systems, electricity on farm, rural electrification, generated voltage, power transmission distribution, electric motors, A.C & D.C. motors, selection of electric motors | 10Hrs | Descriptive |

| | | | |
|---|---|---|---|
| **VI** | **Remote Sensing:** basic principles of remote sensing, energy sources & radiation principles, energy interaction in atmosphere & with earth surface features, active & passive remote sensing systems, applications of remote sensing for land & water resource management | 10Hrs | Descriptive & analytical |

**Section A: I, II, III. Units**
**Section B: IV, V & VI Units**

**B: PRACTICALS:**
**The term work shall consist of following experiments (minimum ten)**

| S.N. | Practical |
|---|---|
| 1 | Study of different farm structures |
| 2 | Study of Vermiculture |
| 3 | Study of vermiwash |
| 4 | Study of rearing house of sericulture |
| 5 | Study of various poultry houses |
| 6 | Study of energy in agriculture sector |
| 7 | Study of principles of remote sensing |
| 8 | Study of radiation principles & energy sources |
| 9 | Study of energy interaction |
| 10 | Study of active & passive remote sensing systems |
| 11 | Study of remote sensing applications |
| 12 | Visit to poultry farm |
| 13 | Visit to sericulture & Vermiculture plant |
| | |

**The assessment of the term work shall be done on the following basis**

- Continuous assessment.
- Record of the experiments submitted by the student
- Oral conducted on the syllabus and term work mentioned above

| **PRACTICAL EXAMINATION** |
|---|
| The practical examination shall consist of performing an experiment, based on the practical work done during the course, the record of the experiments submitted by the candidate and viva-voce based on the syllabus |

**C. SUGGESTED TEXT BOOKS AND REFERENCES**

1. Principles of Agricultural Engineering Vol I by Michael A.M
2. The complete technology book on Vermiculture & vermicompost published by National institute of industrial research Delhi-7 (India)
3. Handbook of sericulture-by central institute of sericulture Bangalore.
4. Introduction to Environmental Remote Sensing by E. C. Barret and L. F. Curtis, John Willey and sons Inc, New York.
5. Space remote sensing system-An introduction by H. S. Chem, Academic press Inc, New York.

**PATTERN OF QUESTION PAPER**

Faculty of Engineering and Technology

Final Year (B. Tech.) Agricultural Engineering (Revised Course) Examination

November/December, May/June 200__

Subject Name: **Farm Technology**

Time: 3 hrs Maximum Marks: 80

"Please check whether you have got the right question paper"

N.B.:- i. All questions are compulsory

ii. Use separate answer book for each section

iii. …….

iv……..

**SECTION A**

Question no 1 **16 marks**

This question will consists of questions from all the chapters under section A mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 2 **12 marks**

OR

Question no 2

Question no 3 **12 marks**

OR

Question no 3

**Note:** 1. The questions will be memory based, application based and understanding type.

2. There should be intermixing in the questions.

**SECTION B**

Question no 4 **16 marks**

This question will consist of questions from all the chapters under section B mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 5 **12 marks**

OR

Question no 5

Question no 6 **12 marks**

OR

Question no 6

**Note:** 1. The questions will be memory based, application based and understanding type.

2. There should be intermixing in the questions.

## COMMAND AREA DEVELOPMENT (EL-III)

| Periods | | | | Evaluation Scheme | | | | | Credits |
|---|---|---|---|---|---|---|---|---|---|
| L | T | P | Total | TA | CT | ESE | PR | Grand Total | |
| 4 | -- | 2 | 6 | 25 | 25 | 80 | - | 130 | 5 |

**Semester End Theory Examination Duration: 3 Hrs**

**OBJECTIVES:**

As an Agroneer the student must aware with various structures used in command area development. Present syllabus pertaining with following objectives

1. Design of specific discharge for canal irrigation system
2. Design of canal sections by various approaches
3. Hydraulic designs of canal outlets, Falls, Aqueducts, Siphon etc.
4. Awareness about Command Area Development

**A. THEORY:**

| Unit | Content | Duration | Nature |
|---|---|---|---|
| I | Introduction: Irrigation techniques, Necessity of irrigation, advantages and ill effects, Water distribution techniques in farms, Quality of irrigation water | 6 hrs | Descriptive |
| II | Water Requirement of crops: Basic terminologies, Duty-Delta relationship, Irrigation efficiencies, Soil-moisture-irrigation relationship, Examples. | 4 hrs | Descriptive & Analytical |
| III | Canal Irrigation System: alignment, distribution system, terminologies, Channel capacity, channel losses, | 4 hrs | Descriptive & Analytical |
| IV | Sediment transport: Importance, mechanics of sediment transport, Threshold motion of sediment, Shield's Entrainment method, design of stable channels in India, Regime channel, Kennedy's theory, Lacey's theory, Design procedure for irrigation channels, Fixing L-section, Maintenance of Irrigation channels. | 10 hrs | Descriptive& Analytical |
| V | Lining of Irrigation canals: Advantages, Financial justification, Design of lined channels, Types of lining | 6 hrs | Descriptive& Analytical |
| VI | Diversion Head works: Weir and Barrage, Diversion head work components, canal head regulator, barrage regulation and silt control, Hydraulic jump, types, energy loss, | 6 hrs | Descriptive& Analytical |
| VII | Canal Falls: location, types, Design principles of various types of canal falls | 8 hrs | Descriptive& Analytical |
| VIII | Regulators, Modules and other structures: Canal regulators, design of distributary head regulator and cross regulator, canal escapes, types, metering flumes, | 8 hrs | Descriptive& Analytical |

| | | | |
|---|---|---|---|
| | Modules, requirements, judging performance of modules, terminologies, miscellaneous canal structures | | |
| **IX** | Cross Drainage works: Types, selection of suitable type of cross drainage work, Aqueducts and siphon aqueducts, Design considerations, | 4 hrs | Descriptive& Analytical |
| **X** | Irrigation revenue rates: method s of pricing irrigation water, Economic water rates Recommendations of committee on pricing of irrigation water | 4 hrs | Descriptive |

**Section A: Unit I, II, III, IV & V**
**Section B: Unit VI, VII VIII, IX & X**

**B: PRACTICALS:**
**The term work shall consist of following experiments (minimum ten)**

| S.N. | Practical |
|---|---|
| 1 | To work out design specific discharge for canal irrigation system on duty delta basis. |
| 2 | Design of channel section by regime approach (Kennedy's and Lacey's theory) |
| 3 | Design of channel section by tractive force approach |
| 4 | Design of lined irrigation canal |
| 5 | Economic evaluation of canal lining |
| 6 | Fixing L-section of channel |
| 7 | Determination of cross section of channel along the L-section |
| 8 | Hydraulic design of canal outlet |
| 9 | Hydraulic design of straight glacis fall |
| 10 | Hydraulic design of aqueduct |
| 11 | Hydraulic design of siphon |
| 12 | Visit to CADA works |

| **The assessment of the term work shall be done on the following basis** |
|---|
| • Continuous assessment.<br>• Record of the experiments submitted by the student<br>• Oral conducted on the syllabus and term work mentioned above |

| **PRACTICAL EXAMINATION** |
|---|
| The practical examination shall consist of performing an experiment, based on the practical work done during the course, the record of the experiments submitted by the candidate and viva-voce based on the syllabus |

**C. SUGGESTED TEXT BOOKS AND REFERENCES**

1. Irrigation Engineering and Hydraulic structures by S. K. Garg, Khanna publication, New Delhi.
2. Irrigation-Theory and Practice by A. M. Michael, vikas publishing House, Delhi 2.
3. Land & Water Management Engineering by V. V. N. Murthy, Kalyani Publisher, New Delhi

**PATTERN OF QUESTION PAPER**

Faculty of Engineering and Technology

Final Year (B. Tech.) Agricultural Engineering (Revised Course) Examination

November/December, May/June 200__

Subject Name: **Command Area Development (EL-III)**

Time: 3 hrs Maximum Marks: 80

"Please check whether you have got the right question paper"

N.B.:- i. All questions are compulsory

ii. Use separate answer book for each section

iii. …….

iv……..

**SECTION A**

Question no 1 **16 marks**

This question will consists of questions from all the chapters under section A mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 2 **12 marks**

OR

Question no 2

Question no 3 **12 marks**

OR

Question no 3

**Note:** 1. The questions will be memory based, application based and understanding type.

2. There should be intermixing in the questions.

**SECTION B**

Question no 4 **16 marks**

This question will consist of questions from all the chapters under section B mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 5 **12 marks**

OR

Question no 5

Question no 6 **12 marks**

OR

Question no 6

**Note:** 1. The questions will be memory based, application based and understanding type.

2. There should be intermixing in the questions.

# GREEN HOUSE TECHNOLOGY (EL-III)

| Periods | | | | Evaluation Scheme | | | | | Credits |
|---|---|---|---|---|---|---|---|---|---|
| L | T | P | Total | TA | CT | ESE | PR | Grand Total | |
| 4 | -- | 2 | 6 | 25 | 25 | 80 | - | 130 | 5 |

**Semester End Theory Examination Duration: 3 Hrs**

**OBJECTIVES:**

In view of day- by day increasing population and decrease in cultivated land, it is very important to enhance the agricultural production. In this sense it is important to apply advance technology like greenhouse for getting more from same piece of land. Present syllabus dealing with

1. Design & Construction of Greenhouse
2. Cost estimation for Greenhouse
3. Techno-economic feasibility of Greenhouse

**A. THEORY:**

| Unit | Content | Duration | Nature |
|---|---|---|---|
| I | Introduction- History and development of greenhouse, scope of greenhouse technology, its applications in various field, Classifications of green house, advantages of greenhouse. | 10 hrs | Descriptive |
| II | Design of Greenhouse-site selection and orientation, structural design, planning and layouts, requirements for construction, green house covering materials, construction of typical greenhouse, design criteria of construction, construction of typical glass greenhouse, construction of pipe framed greenhouse. | 10 hrs | Descriptive & Analytical |
| III | Green house effect-Introduction, principle of green house effect, greenhouse gas, effect of greenhouse gas in agriculture | 10 hrs | Descriptive |
| IV | Environmental factors-plant response to greenhouse environment, light, temperature, relative humidity, carbon dioxide, greenhouse ventilation and computerized control system. | 10 hrs | Descriptive |
| V | Environmental requirements- Greenhouse cooling, greenhouse heating, temperature requirement of horticultural crops, light requirements and control methods for crops, pest and diseases control, integrated pest management. | 8 hrs | Descriptive |
| VI | Systems in greenhouse- Greenhouse irrigation, rules of watering, hand watering, perimeter watering, overhead sprinklers, boom watering, drip irrigation, advanced | 12 hrs | Descriptive |

| | | | |
|---|---|---|---|
| | protected agricultural systems such as plastic mulches, row cover, liquid hydroponics and aggregate hydroponics, fertigation, humidification, Economics of greenhouse production. | | |

**Section A: Unit I, II & III**
**Section B: Unit IV, V & VI**

**B: PRACTICALS:**
**The term work shall consist of following experiments**

| S.N. | Practical |
|---|---|
| 1 | Study of history, development & scope of greenhouse technology. |
| 2 | Study of different types of greenhouses |
| 3 | Study of components of greenhouse, their fabrication, erection and construction details. |
| 4 | Study of greenhouse covering material |
| 5 | Greenhouse cooling, heating and ventilation system |
| 6 | Role of Carbon Di-oxide in greenhouse. |
| 7 | Application of computer in greenhouse technology. |
| 8 | Light requirement of crops and lighting control methods |
| 9 | Economics of greenhouse production |
| 10 | Visit to Greenhouse. |

| **The assessment of the term work shall be done on the following basis** |
|---|
| • Continuous assessment.<br>• Record of the experiments submitted by the student<br>• Oral conducted on the syllabus and term work mentioned above |

| **PRACTICAL EXAMINATION** |
|---|
| The practical examination shall consist of performing an experiment, based on the practical work done during the course, the record of the experiments submitted by the candidate and viva-voce based on the syllabus |

**C. SUGGESTED TEXT BOOKS AND REFERENCES**


1. Greenhouse-Technology and Management by K. Radha Manohar and C. Igathinathane, B. S. Publications, Hyderabad.
2. Greenhouse operation management by Paul V. Nelson, Resort publication Co. Inc, Vergnina.
3. Greenhouse management by J. J. Hanan, W. D. Holley & K. L. Glodberry, Berilin Hidelherge New York.

**PATTERN OF QUESTION PAPER**

Faculty of Engineering and Technology

Final Year (B. Tech.) Agricultural Engineering (Revised Course) Examination

November/December, May/June 200__

Subject Name: **Green House Technology (EL-III)**

Time: 3 hrs Maximum Marks: 80

"Please check whether you have got the right question paper"

N.B.:- i. All questions are compulsory

ii. Use separate answer book for each section

iii. …….

iv……..

**SECTION A**

Question no 1 **16 marks**

This question will consists of questions from all the chapters under section A mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 2 **12 marks**

OR

Question no 2

Question no 3 **12 marks**

OR

Question no 3

**Note:** 1. The questions will be memory based, application based and understanding type.

2. There should be intermixing in the questions.

**SECTION B**

Question no 4 **16 marks**

This question will consist of questions from all the chapters under section B mentioned in the syllabus.

This will consists of objective type, multiple choice type, short questions, concept oriented problems.

Question no 5 **12 marks**

OR

Question no 5

Question no 6 **12 marks**

OR

Question no 6

**Note:** 1. The questions will be memory based, application based and understanding type.

2. There should be intermixing in the questions.

Final Year B. Tech. Agricultural Engineering (Revised Syllabus)

**PROJECT**

| Periods | | | | Evaluation Scheme | | | | | Credit |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Sessional Exam | | ESE | | Total | |
| L | T | P | Total | TA | CT | TH | PR | | 2 |
| ----- | ----- | 04 | 04 | 50 | ----- | ----- | 100 | 150 | |

**OBJECTIVE:**

The practical implementation of theoretical knowledge gained during your study to till date is important for Engineering Education. The student should be able implement their ideas/real time industrial problem/ current application of their engineering branch which they have studied in curriculum. This will definitely help in building the confidence in the student what he has learnt theoretically. The dependent study of the state of the art topics in a broad area of his/her specialization.

**GUIDELINES FOR STUDENTS AND FACULTY:**

1. Students have to finalize their project title based on Industrial Assignments.
2. The projects selected should be such so as to ensure the satisfaction of the urgent need to establish a direct link between education, national development and productivity and thus reduce the gap between the world of work and the world of study. The term work will consist of a report prepared by the student on the project allotted to them.
3. Project topics may be chosen by the student or group of students (maximum 3 students) with advice from the faculty members.
4. To design a project at adequate scale level for the following applications- It may be based (i) Entirely on study and analysis of a typical Instrumentation and Control System, (ii) Experimental verification, or (iii) Design, fabrication, testing and calibration of an Instrumentation system. The software based project can be considered based on its application for instrumentation and control purpose. The students are required to submit the report based on project work done.
5. Use appropriate tools for the preparation of the report.
6. Each student/group is required to-
   a. Submit a one page synopsis before the project talk for display on the notice board in the first week of their academic semester.
   b. Give a 10 minutes presentation through OHP, PC, and Slide projector followed by a 10 minute discussion in the second week of their academic semester.
   c. Submit a report on the project topic with a list of required hardware, software or other equipment for executing the project in the third week of their academic semester.
   d. Start working on the project and submit initial development and CPM/PERT planning drawing in the fourth week of their academic semester.
   e. Preparation of PCB layout, wiring diagram, purchase of components, software demo, flowchart, algorithm, program/code, assembling, testing, etc. should be submitted by student/s within next five/Six weeks and minimum one page report should be there for each major activity.
   f. Overall assembling, wiring, code writing, testing, commissioning, should completed within next two weeks.

g. At the last but one week of end of academic semester the internal assessment of project will be done by panel of internal faculties and they will decide marks out 25 marks for term work (TA).
h. In the last week, student/group will submit final project report to guide and thereafter guide will finalize marks out of the remaining 25 marks for term work (TA).

7. Projects are to be scheduled in the weekly scheduled time-table during the semester and any change in schedule should be discouraged.
8. Every assigned faculty/s should maintain separate file for evaluating progress of each student or group.
9. Award 50 TA, Sessional marks based on the assessment done by internal guide and panel during semester and the involvement of student/group in the work assigned related to the topic and its application.

10. The format and other guidelines for the purpose of the Project Submission in hard bound copies should be as follows,

**REPORT STRUCTURE**

Index/Contents/Intent
List of Abbreviations
List of Figures
List of Graphs
List of Tables
and List of if any other inclusion
1. Introduction
2. Literature survey
3. System development
4. Performance analysis
5. Conclusions
References
Appendices
Acknowledgement

1. INTRODUCTION
1.1 Introduction
1.2 Necessity
1.3 Objectives
1.4 Theme
1.5 Organization
2. LITERATURE SURVEY
Literature Survey
Related information available in standard Books, Journals, Transactions, Internet Websites *etc.* till date (More emphasis on last three to five years)
3. SYSTEM DEVELOPMENT
Model Development

- Analytical
- Computational
- Experimental
- Mathematical

- Statistical

(out of above methods at least one method is to be used for the model development) Some mathematical treatment or related information is required to be embodied

4. PERFORMANCE ANALYSIS

- Analysis of system developed either by at least two methods depending upon depth of standard
- These methods normally used are Analytical /Computational/Statistical/Experimental/ or Mathematical
- Results at various stages may be compared with various inputs
- Output at various stages with same waveforms or signals or related information/parameters
- Comparison of above results by at least two methods and justification for the differences or error in with theory or earlier published results

5. CONCLUSIONS

5.1 Conclusions

5.2 Future Scope

5.3 Applications

Contributions (if any,)

The innovative work/invention/new ideas generated from the analysis of the work which can be taken from the conclusions

**REFERENCES**

- Author, "Title", Name of Journal/Transactions/ Book, Edition/Volume, Publisher, Year of Publication, page to page (pp.__).

These references must be reflected in text at appropriate places in square bracket

In case of web pages complete web page address with assessing date has to be enlisted

List of references should be as per use in the text of the report

**APPENDICES**

Related data or specifications or referred charts, details computer code/program, *etc*.

(1 Page)

Expression of gratitude and thankfulness for helping in completion of the said task with name

Signed by the candidate

- General Guidelines
  Text should be printed on front and correct side of the watermark on quality bond paper
  Paper size- A4, 75 to 85 gsm paper
  Left Margin-1.5"
  Right Margin-3/4"
  Top Margin-1"
  Bottom Margin-1"
- First page of first chapter need not be printed anywhere ,second page onwards at right hand corner at ½ inch from right and top side from second chapter onwards starting page number of chapter should be printed at bottom center place report total pages –around.
  All Greek words must be italic

Report Heading -All Capital—16 Font
Chapter heading -All Capital—14 Font
Subchapter –title case-12 Font
Sub-Subchapter –First Alphabet Capital case-12 Font
Page numbers for Index/Contents/Intent should be in roman
Title of the Report should not be more than two lines
Text pages should be in times new roman
The page of the Index/Contents/Intent heading should be below the words for appropriate sub chapter or sub-sub chapter as shown in sample copy
Cover page should have (Mission statement of Institute) in inverted commas, Symbol of Institute, Name of Department, and Institute

Suitable flap with name of the candidate, Department and Institute name and symbol can be used with nylon strip.

*For more information and sample of hard copy please contact the respective Head of the Department*

Final Year B. Tech. Agricultural Engineering (Revised Syllabus)

**Semester VIII-**

**INPLANT TRAINING**

| | |
|---|---|
| (a) | **Rationale:**<br>The techniques and processes of production of goods and services do not demand only technical skills, but also a cluster or conglomerate of skills. A significant part of which is related to the total humanistic growth of the man. Such conglomerate skills technical and humanistic can not obviously be acquired through pure academic learning of concepts in formalized and institutional courses and in isolation of the actual work situation. It, therefore, naturally follows that no technical education will be complete till it has two components, one learning of concepts vis-a vis acquiring conceptual skill and other application of the concepts in real work situation vis-a vis acquiring manipulative or practicing skills. Technical education needs to have a complement of learning of the techniques of applying the concepts within the industry and business. |
| (b) | **Objective:**<br>1) The students of B.Tech course shall get an opportunity to work on live problems of the industry.<br>2) He/She shall apply his leaving concepts in the real work situation.<br>3) He/She shall get an exposure to the industrial environment and thereby enable himself/herself to appreciate the other related aspects of industry vis, human, economic, commercial and regulatory.<br>4) He/She shall identify career paths taking into account their individual strengths and aptitude.<br>5) He/She shall contribute for the achievement of economic goals and aspirations of the industry and our country as a whole. |
| | The curriculum for B.Tech students of final Year Course of Part-II shall consist of;<br>1) In plant training for a period of one full term, and the period of the term shall be as prescribed by the university from time to time.<br>2) A project on live problems of the industry shall be undertaken by the student/group of students undergoing atraining in the same establishment.<br>3) The term work shall consist of the in plant training record-daily diary, work diary, progress report, a record containing the literature survey in the field of appropriate branch of Engineering, a preliminary report related to project work etc.<br>4) Seminars will be arranged after successful completion of period specified in the scheme of semester VIII of B.Tech. The date and times will be decided according to the convenience of guide and student. |
| | **General Provisions, Rules And Regulation Of In-Plant Training**<br>**1. Definition**<br>• In-plant training means a course of training in any industry or establishment undergone in pursuance of memorandum of understanding between industry and institute and under the prescribed terms and conditions of Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.<br>• Institution means an academic Institution of higher learning associated and admitted under the privileges of university, I.e. Maharashtra Institute of Technology, affiliated to Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.<br>• Industry means any industry or business in which any trade, occupation or subject |

| | |
|---|---|
| | field in engineering or technology may be specified as a designated trade.<br>• Establishment includes any place where any industry is carried on.<br>• University means any of the universities mentioned in the schedule of Maharashtra University Act, 1994 i.e. Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.<br>• Collaboration means collaborative academic activity of the Institute with industry.<br>• Student means a B Tech Course student. |
| | **2. Memorandum of understanding:**<br>Maharashtra Institute of Technology, Aurangabad will enter into an agreement with the industry through 'Memorandum of Understanding' for creating facilities of in-plant training in the appropriate branch of Engineering according to the Course Curriculum and keep this agreement for a period of 10 years to foster a healthy industry- institute interaction for mutual benefits of both. |
| | **3. Admission to in-plant training:**<br>No student will be deputed for in-plant training unless he produces testimonial of having kept one term for the subject under B Tech Semester –VIII of final year course satisfactorily in Maharashtra Institute of Technology after passing the TY B Tech Examination (in the appropriate branch). |
| | **4. Period of in-plant training:**<br>The period of in-plant training will be the period of one term for the subject under B Tech course semester-VIII, which will be notified by Dr. Babasaheb Ambedkar Marathwada University, Aurangabad. |
| | **5. Contract of In-plant Training :**<br>• The student of Maharashtra Institute of Technology shall enter into a contract of in-plant training with the employing industry.<br>• The in-plant training shall be deemed to have commenced on the date, on which the contract of in-plant training has been entered into.<br>• Every contract of in-plant training will contain the Terms and Conditions to be agreed by both the parties.<br>• Every contract of in-plant training shall be registered with the Maharashtra Institute of Technology within 15 days from entering into the contract. |
| | **6. Violation of contract:**<br>Where an employer, with whom a contract for in-plant training has been entered into, is for any reason, unable to fulfill his obligation under the contract, the contract end with the consent of Maharashtra Institute of Technology. It is agreed between the employer, the student and any other employer that the student shall be engaged as an "in-plant trainee" under the other employer till the expiry period of the in-plant training. The agreement on registration with Maharashtra Institute of Technology shall be deemed to be the contract of in-plant training between the student and other employer, and from the date of such registration, the contract of in-plant training with the first employer shall terminate and no obligation under that contract shall be enforceable at the instance of any party to contract against the other party thereto. |

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|---|---|
| | **7. Termination of Contract:**<br>The contract of in-plant training shall terminate on the expiry of the period of in-plant training.<br>Either party to the contract of in-plant training make an application to Maharashtra Institute of Technology, Aurangabad for the termination of the contract.<br>After considering the content of the application, and objection, Maharashtra Institute of Technology by order in writing, will terminate the contract, if it is satisfied that the parties to the contract have/has failed to carry out the Terms and Conditions of the contract.<br>Provided that where a contract is terminated-<br>• For the failure on the part of the Employer, Maharashtra Institute of Technology will depute students to another Employer for providing facilities of in-plant training to the remaining period of training.<br>• For the failure on the part of the student, the student will not be allowed to continue his/her in-plant training in that term. The student shall be deputed for in-plant training in the next coming term. |
| | **8. Expectation from the Employer/Industry:**<br>The following expectations are derived for effective in-plant training.<br>• To provide legitimate facilities for the training and learning of all the processes.<br>• To guide the student for understanding a project of immense importance to industry and to help him/her for his/her career advancement. |
| | **9. Obligation of Students:**<br>• To learn his/her subject field in Engineering or Technology conscientiously and diligently at his place of training.<br>• To carry out all orders of his Employer and the Superior in the establishment.<br>• To abide by the Rules and Regulations of the Industry/Establishment in all matters of conduct and discipline.<br>• To carry out the obligation under the contract of in-plant training.<br>• The student shall maintain a report of his work during the period of his in-plant training in a proforma Annexure.<br>• Except in case of extreme urgency, the B.Tech student shall submit an application for all other leaves except the medical leave to the Manager/Gen. Manager (Personnel) of the concerned industry, where he is undergoing an in-plant training and obtain sanction before the leave is taken. In case of Medical Leave, he shall submit an application to Maharashtra Institute of Technology, Aurangabad. The shortage in attendance will be subjected to extending the period of in-plant training in which case, the student may not be allowed to appear for the test, project seminar and assessment of term work etc. which will be held immediately after successful completion of the in-plant training. |
| | **10. Maintenance of Record:**<br>Every student of B.Tech course shall maintain a daily record of the work done by him/her relating to the in-plant training in the proforma (Annexure). |

| | |
|---|---|
| | **11. Industry Sponsored Student Projects:**<br>The scheme envisages working out suitable programme for B.Tech students. They are required to complete their in-plant training in a given period. During this period, they shall be familiar with the understanding of the shop process and activities. The students can be asked to solve the mini-shop problem, which will make them think and try out short experiments as an improvement in the process, tools and equipment.<br>The student here is not expected to acquire the skills in operating machines values. He should appreciate the application of theory learnt.<br>The students in a group alone can undertake a project of immense importance for the benefit of the industry and also useful for the students for their advancementof career. Industry staff and Maharashtra Institute of Technology facultycan plan in advance to effectively complete the practical training with the project for preliminary studies on the floor.<br>The projects should aim mainly-<br>• Cost reduction<br>• Reducing cycle time<br>• Enhancing productivity<br>• Energy conservation measures<br>• Process Improvement technique<br>• Inventory control<br>• Quality control Technique<br>• Improvement in Material handling system<br>• Bottlenecks in material flow system and so on. |
| | **12. What will form a good project?**<br>Through the project, it is hoped to provide the students an exciting experience in solving line problems under practical constraints. Hence it is desired that the project should be a well defined problem, which can be completed and implemented within the project period. It may be a problem, evolving analysis, design, fabrication and/or testing. |
| | **13. Time Schedule for the Project:**<br>The following time schedule should be planned by each student or groups of students, who undertake the project.<br>• Proposal to be received before specifies date.<br>• Project acceptance before.<br>• Commencement of the project.<br>Completion of the project. |
| | **14. Commitment on the part of the Institute:**<br>• Providing a faculty member to supervise the project.<br>• Providing the Institute facilities to complete the project.<br>• Coordinator from industry will be invited to participate in the stage wise assessment of the students performance. |
| | **15. Assistance for completion of the Project:**<br>All the projects undertaken by the students are time bound. Although, every attempt results may not be achieved within the period available for the student. In such cases, the services of the associated faculty members can be sought for the completion of the same on mutually agreed terms. |

| | |
|---|---|
| | **16. Monitoring of In-Plant Training:**<br>The B.Tech students are expected to follow all the rules and discipline of the industry. However, because of other academic requirements and the nature of the project, the student may have to work in other places outside the industry. The faculty and Industry supervisor will work out a suitable arrangement to review the progress of the work from time to time. Maharashtra Institute of Technology, Aurangabad will monitor the progress of in-plant training in association with industry authority. |
| | **17. Conduct and Discipline:**<br>In all matters of the conduct and discipline, B.Tech student shall be governed by the rules and regulations (applicable to employees of the corresponding category) in the Establishment, where he/she is undergoing a training. |
| | **18. B.Tech Students are Trainees and not Workers:**<br>• Every B.Tech student undergoing an in-plant training in the respective branch of Engineering & Technology in any Establishment shall be treated as a trainee and not a worker and-<br>• The provision of any law with respect to labour will not apply to such a trainee. |
| | **19. Settlement of Disputes:**<br>Any disagreement or dispute between an industry and a B.Tech student trainee arising out of the contract of in-plant training shall be resolved both by Maharashtra Institute of Technology and the industry with mutual cooperation. The decision of both Maharashtra Institute of Technology and the industry shall be final. |
| | **20. Holding of Test and Grant of Certificate:**<br>The progress in in-plant training of every student shall be assessed by the industry and Maharashtra Institute of Technology faculty from time to time.<br>Every B.Tech student undergoing an in-plant training shall be issued a certificate of Proficiency on completion of his training to the satisfaction of the industry. |
| | **21. Offer of Stipend / Other Welfare Activities and Employment:**<br>It shall not be obligatory on the part of the Employer / Industry to offer any stipend and other welfare amenities available, if any, to the students of B.Tech courses undergoing an in-plant training. However, if the industry desirous to do so, at will be a privilege for the students and also for Maharashtra Institute of Technology in view of the bonding of better understanding and cooperation forever. |
| | **PRACTICAL EXAMINATION**<br>The Practical examination will be conducted after successful completion of the in-plant training for which guide will be internal examiner and external examiner will be appointed by the university. The date of practical examination will be same for the students of a branch and will be notified by the university. The assessment of the practical examination shall consist of<br>1. Seminar Performance<br>2. An oral on the project work done.<br>3. Assessment of the term work.<br><br>**Note:** A 'Guide Note' on In-Plant training approved by the University is prepared and made available in each faculty of B.Tech course. |

## Revised Syllabus Structure for Final Year B.Tech (Agricultural Engineering)

**Part - I**

| Sr. No. | Subjects | Periods | | | Evaluation Scheme | | | | | Credits |
|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | TA | CT | ESE | PR | Grand Total | |
| 1 | Soil and Water Conservation Structures | 4 | -- | 2 | 25 | 25 | 80 | 50 | 180 | 5 |
| 2 | Agricultural Economics & Farm Management | 4 | -- | 2 | 25 | 25 | 80 | 50 | 180 | 5 |
| 3 | Electrical Technology | 4 | -- | 2 | 25 | 25 | 80 | 50 | 180 | 5 |
| 4 | Farm Technology | 4 | -- | 2 | 25 | 25 | 80 | 50 | 180 | 5 |
| 5 | EL-II | 4 | -- | 2 | 25 | 25 | 80 | | 130 | 5 |
| 6 | Project | -- | -- | 4 | 50 | -- | -- | 100 | 150 | 2 |
| | **Total of Part - I** | **20** | **--** | **14** | **175** | **125** | **400** | **300** | **1000** | **27** |

**Part- II**

| Sr. No. | | Evaluation Scheme | | | | | Credits |
|---|---|---|---|---|---|---|---|
| | | TA | -- | -- | PR | Grand Total | |
| 1 | Inplant Training and Project Seminar (After complition of training of 8 weeks) | 75 | -- | -- | 75 | 150 | -- |
| 2 | Inplant Training and Project Seminar (After complition of training of 14 weeks) | 75 | -- | -- | 75 | 150 | -- |
| 3 | Inplant Training and Project Seminar (After complition of training of 20 weeks) | 100 | -- | -- | 200 | 300 | -- |
| | **Total of Part - II** | **250** | **--** | **--** | **350** | **600** | **--** |
| | **Grand Total of I & II** | **425** | **125** | **400** | **650** | **1600** | **27** |

Periods
L : Lecture Hours per week
T : Tutorial Hours per week
P : Practical Hours per week

Evaluation Scheme
TA : Teachers Assessment
CT : Class Test
PR: Practical Exam
ESE : End Semester Examination

Class Test Duration : I Hour

Elective-III

1. Command Area Development
2. Green House Technology