CURRICULUM
### B.Sc. (Agriculture) DEGREE PROGRAMME

#### DEPARTMENT WISE DISTRIBUTION OF COURSES

**ABSTRACT**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Department / Discipline</th>
<th>No. of courses</th>
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**DEPARTMENT OF PLANT BREEDING AND GENETICS**

**GENETICS AND PLANT BREEDING**

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<td>GPB 201</td>
<td>Principles of Plant Breeding</td>
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<td>GPB 202</td>
<td>Principles of Plant Biotechnology</td>
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<td>GPB 301</td>
<td>Breeding Field crops</td>
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**SEED SCIENCE AND TECHNOLOGY**

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<td>Principles of Seed Science and Technology</td>
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**CROP PHYSIOLOGY**

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### DEPARTMENT OF SOIL SCIENCE AND AGRICULTURAL CHEMISTRY

**SOIL SCIENCE AND AGRICULTURAL CHEMISTRY**

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<td>Introduction to Soil Science</td>
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<td>Soil Chemistry and Agrochemicals</td>
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<td>Manures, Fertilizers and Nutrient Management</td>
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### ENVIRONMENTAL SCIENCE

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### DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION

**AGRICULTURAL ECONOMICS**

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<td>Production Economics and Farm Management</td>
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<td>AEC 202</td>
<td>Agricultural Marketing, Trade and Prices</td>
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<td>Agricultural Finance, Banking and Co-operation</td>
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<td>Principles of Agribusiness Management</td>
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<td>Dimensions of Agricultural Extension</td>
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<td>Extension Methodologies and Transfer of Agricultural Technology</td>
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<td>Entrepreneurship development</td>
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### COMPUTER SCIENCE, MATHEMATICS AND STATISTICS

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<td>Pests of Field Crops and Their Management</td>
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<td>Pests of Horticultural crops and Their management</td>
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# DEPARTMENT OF PLANT PATHOLOGY

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<td>Fundamentals of Plant Pathology</td>
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<td>Applied Plant Pathology</td>
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<td>PAT 301</td>
<td>Diseases of Field Crops and Their Management</td>
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<td>Diseases of Horticultural crops and their management</td>
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# DEPARTMENT OF HORTICULTURE

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<td>Production Technology of Fruit Crops</td>
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<td>HOR 211</td>
<td>Production Technology of Vegetables and flowers</td>
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<td>HOR 311</td>
<td>Production Technology of spice, aromatic, medicinal and plantation crops</td>
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<td>HOR 312</td>
<td>Post harvest management and value addition of fruits and vegetables</td>
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# EXPERIENTIAL LEARNING COURSES

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## NON-CREDIT COURSES

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<td>English for effective communication</td>
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<td>Soft skills for Employability</td>
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<td>NCC101 / NSS101</td>
<td>National Cadet Corps / National Service Scheme</td>
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<td>PED 101</td>
<td>Physical Education</td>
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<td>Short Tour</td>
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<td>All India Tour</td>
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# SEMESTER WISE DISTRIBUTION OF COURSES

## SEMESTER I

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<tr>
<td>GPB 101</td>
<td>Principles of Genetics</td>
<td>2+1</td>
</tr>
<tr>
<td>SAC 101</td>
<td>Introduction to Soil Science</td>
<td>2+1</td>
</tr>
<tr>
<td>AGM 101</td>
<td>Agricultural Microbiology</td>
<td>2+1</td>
</tr>
<tr>
<td>CRP 101</td>
<td>Principles of Crop Physiology</td>
<td>2+1</td>
</tr>
<tr>
<td>COM 101</td>
<td>Computer applications in Agriculture</td>
<td>1+1</td>
</tr>
<tr>
<td>MAT 101</td>
<td>Mathematics for Agriculture</td>
<td>0+1</td>
</tr>
<tr>
<td>ENG 101</td>
<td>English for effective communication*</td>
<td>0+1</td>
</tr>
<tr>
<td>NCC101/ NSS101</td>
<td>National Cadet Corps*/ National Service Scheme*</td>
<td>0+1</td>
</tr>
<tr>
<td>PED 101</td>
<td>Physical Education*</td>
<td>0+1</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>11+10 = 21</strong></td>
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</table>

* Non-credit courses

## SEMESTER II

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Cr. Hr</th>
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</thead>
<tbody>
<tr>
<td>AGR 102</td>
<td>Fundamentals of Agricultural Meteorology</td>
<td>1+1</td>
</tr>
<tr>
<td>AEC 101</td>
<td>Principles of Agricultural Economics</td>
<td>1+1</td>
</tr>
<tr>
<td>AEX 101</td>
<td>Fundamentals of Rural Sociology and Educational Psychology</td>
<td>2+0</td>
</tr>
<tr>
<td>AEG 101</td>
<td>Farm Power and Machinery</td>
<td>1+1</td>
</tr>
<tr>
<td>HOR 111</td>
<td>Production Technology of Fruit Crops</td>
<td>2+1</td>
</tr>
<tr>
<td>ENS 101</td>
<td>Environmental Science</td>
<td>1+1</td>
</tr>
<tr>
<td>BIC 101</td>
<td>Fundamentals of Biochemistry</td>
<td>2+1</td>
</tr>
<tr>
<td>AMP 101</td>
<td>Livestock and Poultry Production Management</td>
<td>2+1</td>
</tr>
<tr>
<td>NCC101/ NSS101</td>
<td>National Cadet Corps*/ National Service Scheme*</td>
<td>0+1*</td>
</tr>
<tr>
<td>PED 101</td>
<td>Physical Education*</td>
<td>0+1*</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>12+7 =19</strong></td>
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</tbody>
</table>

* Non-credit courses continued from First semester
# SEMESTER III

<table>
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<tr>
<th>Course No.</th>
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<th>Cr. Hr</th>
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<tbody>
<tr>
<td>AGR 201</td>
<td>Weed Management</td>
<td>1+1</td>
</tr>
<tr>
<td>AGR 202</td>
<td>Irrigation Management</td>
<td>1+1</td>
</tr>
<tr>
<td>GPB 201</td>
<td>Principles of Plant Breeding</td>
<td>2+1</td>
</tr>
<tr>
<td>SST 201</td>
<td>Principles of Seed Science and Technology</td>
<td>2+1</td>
</tr>
<tr>
<td>AEC 201</td>
<td>Production Economics and Farm Management</td>
<td>1+1</td>
</tr>
<tr>
<td>AEN 201</td>
<td>Fundamentals of Entomology</td>
<td>2+1</td>
</tr>
<tr>
<td>ANM 201</td>
<td>Introductory Nematology</td>
<td>1+1</td>
</tr>
<tr>
<td>AEG 201</td>
<td>Fundamentals of Soil and Water Conservation Engineering</td>
<td>2+1</td>
</tr>
<tr>
<td>PAT 201</td>
<td>Fundamentals of Plant Pathology</td>
<td>2+1</td>
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<tr>
<td>NCC101/</td>
<td>National Cadet Corps* / National Service Scheme*</td>
<td>0+1*</td>
</tr>
<tr>
<td>PED 101</td>
<td>Physical Education*</td>
<td>0+1*</td>
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**TOTAL** 14+9 = 23

* Non-credit courses continued from First semester

# SEMESTER IV

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<tr>
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<th>Course Title</th>
<th>Cr. Hr</th>
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<tbody>
<tr>
<td>AGR 203</td>
<td>Agronomy of Field Crops- I</td>
<td>2+1</td>
</tr>
<tr>
<td>GPB 202</td>
<td>Principles of plant Biotechnology</td>
<td>2+1</td>
</tr>
<tr>
<td>SAC 201</td>
<td>Soil Chemistry and agrochemicals</td>
<td>2+1</td>
</tr>
<tr>
<td>AEC 202</td>
<td>Agricultural Marketing, Trade and Prices</td>
<td>1+1</td>
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<tr>
<td>AEX 201</td>
<td>Dimensions of Agricultural Extension</td>
<td>1+1</td>
</tr>
<tr>
<td>AEG 202</td>
<td>Renewable Energy</td>
<td>1+1</td>
</tr>
<tr>
<td>PAT 202</td>
<td>Applied Plant Pathology</td>
<td>1+1</td>
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<tr>
<td>HOR 211</td>
<td>Production Technology of Vegetables and flowers</td>
<td>2+1</td>
</tr>
<tr>
<td>STA 201</td>
<td>Applied Statistics</td>
<td>1+1</td>
</tr>
<tr>
<td>NCC101/</td>
<td>National Cadet Corps* / National Service Scheme*</td>
<td>0+1*</td>
</tr>
<tr>
<td>PED 101</td>
<td>Physical Education*</td>
<td>0+1*</td>
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**TOTAL** 13+9 = 22

* Non-credit courses continued from First semester
### SEMESTER V

<table>
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<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Cr. Hr</th>
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<tbody>
<tr>
<td>AGR 301</td>
<td>Crop Production - I</td>
<td>0+1</td>
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<tr>
<td>AGR 302</td>
<td>Agronomy of Field Crops - II</td>
<td>2+1</td>
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<tr>
<td>GPB 301</td>
<td>Breeding Field crops</td>
<td>2+1</td>
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<tr>
<td>AEC 301</td>
<td>Agricultural Finance, Banking and Co-operation</td>
<td>1+1</td>
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<tr>
<td>AEN 301</td>
<td>Pests of Field Crops and Their Management</td>
<td>2+1</td>
</tr>
<tr>
<td>AEX 301</td>
<td>Extension Methodologies and Transfer of Agricultural Technology</td>
<td>1+1</td>
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<tr>
<td>AEG 301</td>
<td>Post Harvest Technology and Food Engineering</td>
<td>1+1</td>
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<tr>
<td>PAT 301</td>
<td>Diseases of Field Crops and Their Management</td>
<td>1+1</td>
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<tr>
<td>HOR 311</td>
<td>Production Technology of spice, aromatic, medicinal and plantation crops</td>
<td>2+1</td>
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<tr>
<td>PJN 301</td>
<td>Short Tour*</td>
<td>0+1</td>
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**TOTAL** 12+10=22

* Non-credit course

### SEMESTER VI

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>AGR 303</td>
<td>Crop Production – II</td>
<td>0+1</td>
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<tr>
<td>AGR 304</td>
<td>Farming System and Dry Farming</td>
<td>2+1</td>
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<tr>
<td>AGR 305</td>
<td>Organic Farming</td>
<td>1+1</td>
</tr>
<tr>
<td>SAC 301</td>
<td>Manures, Fertilizers and Nutrient Management</td>
<td>2+1</td>
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<tr>
<td>AEC 302</td>
<td>Principles of Agribusiness Management</td>
<td>1+1</td>
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<tr>
<td>AEN 302</td>
<td>Pests of Horticultural crops and their management</td>
<td>2+1</td>
</tr>
<tr>
<td>AEX 302</td>
<td>Entrepreneurship development</td>
<td>1+1</td>
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<tr>
<td>PAT 302</td>
<td>Diseases of Horticultural crops and their management</td>
<td>2+1</td>
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<tr>
<td>HOR 312</td>
<td>Post harvest management and value addition of fruits and vegetables</td>
<td>1+1</td>
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<tr>
<td>ENG 301</td>
<td>Soft skills for Employability*</td>
<td>0+1</td>
</tr>
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**TOTAL** 12+10=22

* Non-credit course
## SEMESTER VII

<table>
<thead>
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<th>Course No.</th>
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<tbody>
<tr>
<td>AEX 401</td>
<td>Rural Agricultural Work Experience (RAWE)</td>
<td>0+18</td>
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<tr>
<td>PJN 401</td>
<td>All India Tour*</td>
<td>0+2</td>
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* Non-credit course

## SEMESTER VIII

<table>
<thead>
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<th>Course No.</th>
<th>Course Title</th>
<th>Cr. Hr</th>
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</thead>
<tbody>
<tr>
<td>EXP 4XX</td>
<td>Experiential learning – 1</td>
<td>0+5</td>
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<tr>
<td>EXP 4XX</td>
<td>Experiential learning – 2</td>
<td>0+5</td>
</tr>
<tr>
<td>EXP 4XX</td>
<td>Experiential learning – 3</td>
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<td>EXP 4XX</td>
<td>Experiential learning – 4</td>
<td>0+5</td>
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<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>0+20=20</strong></td>
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</table>

## ABSTRACT

<table>
<thead>
<tr>
<th>Year</th>
<th>Semester</th>
<th>Theory</th>
<th>Practical</th>
<th>Total</th>
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<td>IV</td>
<td>13</td>
<td>9</td>
<td>22</td>
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<tr>
<td>THIRD</td>
<td>V</td>
<td>12</td>
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<td>VI</td>
<td>12</td>
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<tr>
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<td>VIII</td>
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<td>TOTAL</td>
<td></td>
<td>74</td>
<td>95</td>
<td>169</td>
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</table>
I SEMESTER COURSES
Theory

Unit I: Agriculture-Evolution and Development

Agriculture – Definition – Importance and scope - Agriculture as Art, Science and Business – Branches of agriculture - Evolution of man and agriculture – Development of scientific Agriculture - National and International Agricultural Research Institutes - Indian agriculture - Indian economy - National income – Women in agriculture; multifaceted roles and tasks, work stress factors, Nutritional and rural life standards, role in household design making, drudgery reduction for farm women, women friendly agricultural technology. Empowerment of women; Group dynamics for farm women, rural women.

Unit II: History of Agriculture/Agrl. Heritage

History of agricultural development in the world and India. Agriculture heritage – Agriculture in ancient India – Stages of agriculture development - Era of civilization- Importance of Neolithic civilization - Chronological agricultural technology development in India- Kautilya’s Arthasasthra- Sangam literature - Indigenous Technical Knowledge (ITK)- Tamil Almanac and rainfall prediction.

Unit III: Agro ecology


Unit IV: Tillage, sowing and weeding


Unit V: Nutrients, irrigation and types of farming


Practical

Visit to college farm – Crop classification and identification of seeds - working out seed rate - Study of seed treatment practices. Study of tillage implements; ploughing; puddling; green manure crops (including calculations); Practice of methods of fertilizer
applications; Different methods of sowing; Study of seeding equipment’s - Study of inter-
cultivation implements and practice; Participation in ongoing field operations.

References

GPB 101 PRINCIPLES OF GENETICS 2+1

Theory
Unit I: Mendel’s laws and Gene action
Mendel’s laws of inheritance and exceptions to the laws; Types of gene action, Multiple alleles, Pleiotropism, Penetrance and expressivity; Quantitative traits, Qualitative traits and differences between them; Multiple factor hypothesis; Cytoplasmic inheritance, it’s characteristic features and difference between chromosomal and cytoplasmic inheritance;

Unit II: Mutation
Mutation and it’s characteristic features; Methods of inducing mutations and C I B technique. Gene expression and differential gene activation;

Unit III: Genes and Chromosomes
Lac operon and Fine structure of Gene; Ultra structure of cell and cell organelles and their functions; Study of chromosome structure, morphology, number and types, Karyotype and Idiogram;

Unit IV: Cell Division and Genetic Material
Mitosis and meiosis, their significance and differences between them; DNA and it’s structure, function, types, modes of replication and repair. RNA and its structure, function and types; Transcription, Translation, Genetic code and outline of protein synthesis;
Crossing over and factors affecting it; Mechanism of crossing over and Cytological proof of crossing over;

**Unit V: Linkage and chromosomal aberrations**

Linkage, Types of linkage and estimation of linkage; Numerical chromosomal aberrations (Polyploidy) and evolution of different crop species like Cotton, Wheat, Tobacco, Triticale and Brassicas; Structural chromosomal aberrations.

**Practical:**

Microscopy (Light microscopes and electron microscopes; Preparation and use of fixatives and stains for light microscopy; Preparation of micro slides and identification of various stages of mitosis; Preparation of micro slides and identification of various stages of meiosis; Preparation of micro slides and identification of various stages of meiosis; Preparation of micro slides and identification of various stages of meiosis; Monohybrid ratio and its modifications; Dihybrid ratio and its modifications; Trihybrid ratio; Chi-square analysis and Interaction of factors; Epistatic factors, Supplementary factors and Dihybrid factors; Complementary factors, Additive factors and Inhibitory factors; Linkage – Two point test cross; Linkage – Three point test cross; Induction of polyploidy using colchicines; Induction of chromosomal aberrations using chemicals.

**References:**


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**SAC 101** INTRODUCTION TO SOIL SCIENCE 2 + 1

**Theory**

**Unit I: Soil definition and formation**

Soil: Pedological and edaphological concepts, Origin of the earth, Earth’s crust; Composition: Formation and classification of Rocks and minerals. Weathering, Soil forming factors and processes. Components of soils; Soil profile.

**Unit II: Soil physical properties**

Soil physical properties, Soil texture, Textural classes, Particle size analysis, Soil structure Classification, Soil aggregates, evaluation of soil structure and its significance, Bulk density and particle density of soils & porosity, their significance and manipulation, Soil consistency, soil crusting, Soil compaction, Soil Colour, Soil water- Retention and potentials, Soil moisture constants, Movement of soil water, Infiltration, percolation, permeability, conductivity, Drainage, Methods of determination of soil moisture. Thermal properties of
soils, Soil temperature, Soil air, Gaseous exchange, Influence of soil temperature and air on plant growth.

**Unit III: Soil Chemical properties**

**Unit IV: Soil organisms**
Soil biology, Biomass, Soil organisms and their beneficial and harmful roles.

**Unit V: Soil Survey**
Soil survey- types and methods, soil classification, soil taxonomy, and soils of India and Puducherry.

**Practical**

**References**

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**AGM 101 AGRICULTURAL MICROBIOLOGY 2+1**

**Theory**
**Unit I: History of Microbiology and Microscopy**
Contributions of Anton Von Leeuwenhoek, Louis Pasteur, John Tyndall, Robert Koch, Edward Jenner, Joseph Lister, Beijerinck, Winogradsky and Waksman; Position of microorganisms in living world; Prokaryotes Vs Eukaryotes; Groups of microorganisms;
Bacterial size, shape and arrangement and morphology; Structure and organization of a bacterial cell; Microscopy – principles and types.

**Unit II: Microbial physiology, metabolism and genetics**

Bacterial growth, reproduction and factors influencing bacterial growth – Growth curve; Nutritional types and metabolic diversity of bacteria; Principles of energy generation and carbon metabolism; fermentation–respiration in bacteria. Bacterial viruses – Lytic and Lysogenic cycles; Genetic recombination.

**Unit III: Soil Microbiology**

Distribution and importance of soil microorganisms in soil fertility - factors affecting the activities of soil microorganisms; Rhizosphere microorganisms and Importance; Phyllosphere microorganisms - Plant-microbe and microbe-microbe interactions in soil.

**Unit IV: Microbial transformation of nutrients in soil**

Microbial transformation of nutrients in soil - Carbon, Phosphorous and Sulphur cycle; Nitrogen cycle, Biological nitrogen fixation - symbiotic and non-symbiotic microorganisms, Process of nodulation and nitrogen fixation; Silicate and zinc solubilising bacteria; Mycorrhizae.

**Unit V: Applied Microbiology**

Types and importance of biofertilizers in agriculture; Mass production and quality control of biofertilizers; Microbiology of water; Food microbiology-microbial spoilage and principles of food preservation; Microbial insecticides and biocontrol agents; Biogas production.

**Practical**

Microscopy - light microscopes; Staining techniques - simple and differential staining; Sterilization – Principles and techniques, equipment and apparatus used for sterilization; Media preparation; Isolation and enumeration of soil microorganisms; Purification and preservation of microorganisms; morphological and biochemical characters of bacteria. Qualitative analyses of soil microbial profile - Organic matter decomposition – measurement of CO₂ evolution; Isolation of N₂ fixing and phosphate solubilizing microorganisms; Infection by *Arbuscular mycorrhizae*; Winogradsky column - Mass production of bacterial biofertilizers – Mass production of algal and fungal biofertilizers; Demonstration of antibiotics.

**References**


CRP 101 PRINCIPLES OF CROP PHYSIOLOGY 2 + 1

Theory
Unit I: Seed Physiology

Unit II: Crop Water Relations
Physiological importance of water to plants, Soil water availability, Water absorption, Water potential and its components, measurement of water status in plants. Transpiration - significance, Transpiration in relation to crop productivity, Water Use Efficiency, WUE in C3, C4 and CAM plants, Factors affecting WUE.

Unit III: Nutriophyiology

Unit IV: Photosynthesis and Respiration
Unit V: Growth and Development


Practical

Preparation of solutions; Growth analysis: Calculation of growth parameters; Methods of measuring water status in roots, stems and leaves; Measurement of water potential by Potato tuber/Chardakov’s method; Quantification of chlorophyll content; Measurement of leaf area by various methods; Stomatal frequency and index; Leaf anatomy of C3 and C4 plants; Measurement of Transpiration by petiole dip method, Bioassay for cytokinin and GA. Estimation of chlorophyll stability index and proline content.

References


COM 101    COMPUTER APPLICATIONS IN AGRICULTURE    1+1

Theory

Unit I: Introduction to computers

Unit II: Introduction to Microsoft Office

Using MsWord - creating, saving, opening, editing document, changing font, font size, font color, bold, italic, underline, align left, right, center, justify, cut, copy, paste,
Using MsExcel - creating, saving, opening, editing spreadsheet, Creating graphs,
Using MsPowerpoint - Creating slide, Animation, Transition,
Using MsAccess - Creating Tables, Forms, Queries and Reports

Unit III: Introduction to Programming using C++

Cout, cin, if, if...else, for loop, single dimension array, two dimension array, switch..case statement

Unit IV: Introduction to Statistical Analysis software R

R Console, Creating vector using <-c(), Creating dataset using <-data.frame(), Workspace management using save.image() and load(), Import dataset from tab limited text file to data frame using read.table(), Export dataset from data frame to tab limited text file using write.table(), Edit dataset using fix() function, Stacked and Unstacked data form

Unit V: Use of MsExcel / R for Statistical Analysis

Descriptive Statistics, sum, mean, Standard deviation, Covariance, Correlation Coefficients, Two sample unpaired t test and paired T test, ANOVA, Simple and Multiple Linear regression, Simple plot

Practical

Internet browsing, Working with email, File management using Nautilus in Ubuntu Linux, Trash, LibreOffice, Windows Explorer in Windows, Recycle bin, Using MsWord / LibreOffice Writer / equivalent - creating, editing, saving document, changing font, font size, font color, bold, italic, underline, align left, right, center, justify, cut, copy, paste,
Using MsExcel / LibreOffice Calc / equivalent - creating, editing, saving spreadsheet, creating graphs, Using MsPowerpoint / LibreOffice Impress / equivalent - create slide, animation, & transition, Using MsAccess / LibreOffice Base / equivalent - create Tables, Forms, Queries and Reports, Using C++, create programs with cout, cin, if, if...else, for loop, single dimension array, two dimension array, switch..case statement, Using MsExcel / R / equivalent - Sum, Mean, Standard deviation, Descriptive Statistics, Correlation, Covariance, Regression, t test, ANOVA, Simple plot

References

MAT 101    MATHEMATICS FOR AGRICULTURE    0+1

Practical

Types of matrices – algebra of matrices - Determinants –inverse of a matrix by
adjoint method-solving system of equations by Cramer’s rule.

Permutation and Combination -meaning of nPr and nCr and simple problems.
Progressions - Arithmetic, Geometric and Harmonic progressions. Equations of a straight
line. Set theory-set operations, finite and infinite sets, operations of set.

Definition of differentiation-formulae of differentiation (without proof) - methods of
differentiation. Geometrical and physical meaning of the first derivative. Higher order
derivatives. Function of several variables- Partial differentiation –first and higher order-
direct and mixed higher order partial derivatives. Homogeneous function. Euler’s Theorem
(without proof).and its applications . Increasing and decreasing function-Maxima and
minima of single and several variables without constraints. Physical and Economic optimum-
Applications in agriculture.

Definition of Integration-indefinite and definite integrals-Formulae methods of
integration - substitution, method of partial fractions-Integration by parts -Simple
applications in finding the area and volume by integration.

Fitting of linear, quadratic and exponential curves to data from agricultural field
experiments.

References
   & Sons, New Delhi.
   Company Limited, New Delhi.
   Publications, Madras.
   Chand &Sons, New Delhi.
ENG 101     ENGLISH FOR EFFECTIVE COMMUNICATION     0 +1

Practical
Introduction to listening, kinds of listening, process of listening, listening mechanism - listening TOEFL, IELTS, BEC.

Reading: skimming, scanning, SQ3R, intensive reading, extensive reading, critical reading, Cloze texts for integrated grammar and vocabulary, including subtle differences between synonyms, Reading comprehension texts for civil service exams, Bank P.O. exams, IELTS, TOEFL and GRE

English phonemes – stress, intonation and rhythm - genres of speaking, techniques of speaking – public speaking (welcome address, vote of thanks, extempore talk)

Mechanics of writing, writing genres, five types of writing, précis paragraph writing, Essay writing- issue- based writing and argument based writing

Note-taking, note- making, summarizing, brainstorming and simulation

References
2. Steven Brown and Dorokyn Smith 2006. Active Listening: CUP, U.K.

NCC 101      NATIONAL CADET CORPS     0+1

NSS 101 NATIONAL SERVICE SCHEME 0+1


PED 101 PHYSICAL EDUCATION 0+1

Exercises for strength, agility, co-ordination, flexibility, co-operation, vital capacity endurance, speed and for various systems of our body and team spirit.

Exercise for Good Posture – Conditioning and calisthenics for various Athletic activities i.e. (a) Before start – Arm stretch, hand stretch and cat stretch (b) Loosening up jogging, bending and twisting (c) Standing – Lateral Arc, triangle and hands to feet pose (d) Sitting – camel kneel, spinal twist and supine knee bend (e) Relaxation – The corpse pose, quick and deep relaxation. Basic gymnastic exercises – participation of athletic events – running, throwing and jumping events.

Skill development in anyone of the following games

Warming up, suitable exercise, lead up games, advance skill for all the games.

Basket Ball: Dribbling, pass, two or three men pass, pivot, lay up shot, shooting, pass break, hook pass, screening, positional play, defence and offence tactics.
**Volley Ball**: Fingeri, under arm pass, over head pass, setting, spiking, back pass, jump pass, stunts, elementary dive, flaying dive, roll, blacking and various types of services.

**Badminton**: Grip, service, foot work, fore hand stroke, back hand stroke, lob, smash, volley, wall practice, spin service and defence tactics.

**Foot ball**: Dribbling, passing, dodging, kicking, heading, screening, chest pass, throwing, dragging, goal kick, defence and offence tactics.

**Hockey**: Grip, bully, dribbling, hitting, drive, push strokes, scoop, flick, stopping, various types of passes, dodging, defence and offence tactics.

**Kho-Kho**: Quadra ped, bi-ped, how to given kho, taking a direction, recede, parallel toe method, bullet tow method, distal method, foot out, dive, ring game, chains and persue and defence skills.

**Chess**: Moves, move of king, move of pawns, move of rooks, move of bishops, move of queen, move of knights, en passant, casting, check and notation.

**Kabaddi**: Raid, touch, cant, catch, struggle, various types of defence and offence tactics.

**Cricket**: Grip, bowling, spin, leg spin, off spin, medium, batting, dive, sweep, mode of delivery, fielding, rolling etc.

**Tennis**: Grip, forehand drive, back hand drive, stroke, backhand ground stroke, service, volley, smash, wall practice, foot work, defence and offence tactics.

**Table Tennis**: Grip, tossing and serving, spin serve, rally, smash, flick, defence and offence tactics.

**Shuttle Badminton**: Grip, foot work, service, setting, smash, volley, forehead and back hand stroke, back hand serve and defence.

**Gymnastics**: Balanced walk, execution, floor exercise, tumbling/acrobatics, grip, release, swinging, parallel bar exercise, horizontal bar exercise, flic-flac-walk and pyramids.

**Athletics**

(a) **Sprint**: Medium start, long start, bunch start, set, pick up, finish, upsweep, downsweep, placement, receiving and exchanging.

(b) **Jumps**: Western roll, belly roll, eastern cut off, fass ferry flop, approach, take off, straddle, hitch-kick, handging, clearance, landing, strides etc.

(c) **Throws**: Grip, momentum, pre shift, sub phase, the wind up, foot work, entry to the turn, shift, angle of release, follow throw, delivery, front cross step, rear cross step, hop step, fuck method pary obraine, discoput, rotation, carry and glide.

(d) **Hurdles**: Finding lead leg, use of lead leg and trial leg, flight, clearing, finish.

Lead up games, advance skills and game for any one of the above games.

Rules and regulations of anyone of the games and athletic events.

**Fundamentals of Yoga**

Introduction, Definition, Stages of Yoga, Benifits of Yoga

**Asanas**

Backward Bending Asanas (10 asanas); Forward Bending Asanas (10 asanas); Twisting Asanas (10 asanas); Inversion Asanas (10 asanas); Seated Asanas (10 asanas); Balancing Asanas (10 asanas); Suryanamaskar
Aspects to be covered in each and every asana: Warm-up and preparation techniques, steps, breathing methods, approach to final postures, variation, modifications, benefits, contraindications, injury prevention.

**Pranayamas**
- Nadi Shuddi Pranayama, Anuloma Viloma Pranayama, Seetkari Pranayama, Seetali Pranayama, Sadanta Pranayama, Bhastrika Pranayama, Ujjayi Pranayama, Moorcha Pranayama, Plavini Pranayama

**Mudras**
- Aswini Mudra, Yoga Mudra, Maha Mudra, Shanmukhi Mudra, Veepareetha Karani Mudra.
II SEMESTER COURSES
Theory

Unit I: Meteorology- Importance and scope
Meteorology - Agricultural Meteorology - Importance and scope in crop production - Co-ordinates of India and Tamil Nadu - Atmosphere - Composition and vertical layers of atmosphere (stratification) - Climate - Weather - Factors affecting climate and weather - Climatic types - Different agricultural seasons of India and Tamil Nadu – Agro-climatic zones of India and Tamil Nadu.

Unit II: Weather parameters

Unit III: Pressure systems

Unit IV: Forecasting and impacts
Weather forecasting - synoptic chart - crop weather calendar - Remote sensing and crop weather modeling - Impact of climate and weather on crop production and pest and diseases.

Unit V: Climate change
Climate change- climate variability – definition and causes of climate change - Impact of climate change on Agriculture, Forestry, Hydrology, marine and coastal ecosystem

Practical

References
2. IPPC Fourth Assessment report, 2007 (http://www.ipcc.ch)
AEC 101 PRINCIPLES OF AGRICULTURAL ECONOMICS 1+1

Theory

Unit I: Nature and Scope of Economics


Unit II: Theory of Consumption


Unit III: Theory of Production

Unit IV: Theory of Distribution


Unit V: Macroeconomic Concepts


Practical


References


AEX 101 FUNDAMENTALS OF RURAL SOCIOLOGY AND EDUCATIONAL PSYCHOLOGY 2+0

Theory

Unit I

Extension Education and Agricultural Extension – Meaning, Definition, Scope and Importance. Sociology and Rural Sociology, Meaning Definition, Scope, Importance of Rural Sociology in Agricultural Extension and Interrelationship between Rural Sociology & Agricultural Extension. Indian Rural Society, Important characteristics, Differences and Relationship between Rural and Urban societies. Social Groups – Meaning, Definition, Classification, Factors considered in formation and organization of groups, Motivation in
group formation and role of Social groups in Agricultural Extension. Social Stratification – Meaning, Definition, Basis for stratification, Forms of Social stratification – Characteristics and Differences between Class & Caste System.

Unit II
Cultural concepts – Culture, Customs, Folkways, Mores, Taboos, Rituals and Traditions – Meaning, Definition and their Role in Agricultural Extension. Social Values and Attitudes – Meaning, Definition, Types and Role of Social Values and Attitudes in Agricultural Extension. Social Institutions – Meaning, Definition, Major institutions in Rural society, Functions and their Role in Agricultural Extension. Social Organizations – Meaning, Definition, Types of organizations and Role of Social organizations in Agricultural Extension.

Unit III

Unit IV
Psychology and Educational Psychology – Meaning, Definition, Scope and Importance of Educational Psychology in Agricultural Extension. Intelligence – Meaning, Definition, Types, Factors affecting intelligence and Importance of intelligence in Agricultural Extension. Personality – Meaning, Definition, Types, Factors influencing the Personality and Role of personality in Agricultural Extension.

Unit V

References
Theory

Unit I: Farm Power

Farm power in India - sources, IC engines - working principles, two stroke and four stroke engines, IC engine terminology, different systems of IC engine. Tractors - Types, Selection of tractors and cost of tractor power - Tractor and implement selection for different agricultural operations

Unit II: Tillage implements

Tillage implements - primary and secondary tillage implements - ploughing methods - Field capacity and field efficiency.

Unit III: Sowing and planting machinery

Sowing methods - seed drills, seed cum fertilizer drills - implements for intercultural operations - wet land equipment - Paddy transplanter - field and nursery requirements

Unit IV: Plant protection equipments

Plant protection equipments - sprayer - dusters - their functions, classification - operation and maintenance.

Unit V: Harvesting machinery


Practical

Study of different components of IC engine, four stroke petrol engine, two stroke petrol engine. Study of MB plough, disc plough, seed-cum-fertiliser drills, their mechanisms. Operation of tractor and implements - operation and maintenance power tiller - Study of different inter-cultivation equipments - Sprayers and dusters - their operation, repairs and adjustment - Harvester for paddy, sugarcane and horticultural crops - Field capacity and cost analysis

References

2. Nakra C.P 1970. Farm Machinery and equipment,: Dhanpat Rai & Son
Theory

Unit I: Importance of fruit crops and classification of climatic zones

Unit II: Establishment of Orchard
Selection of site – Fencing and wind break – planting systems – High density planting – Planning and establishment.

Unit III: Methods of propagation, training and pruning and use of plant growth regulators
Propagation by cuttings and layering – budding and grafting – use of root stock – Methods of training and pruning – Use of PGR’s in fruit production.

Unit IV: Crop production technologies in major fruit crops

Unit V: Crop production technologies in minor fruit crops

Practical
Study of horticultural tools and implements and their uses; Containers, potting mixture, potting, depotting and repotting; Plant propagation, seed propagation, scarification, and stratification; Propagation by cuttings (soft wood, hard wood and semi-hardwood) layering (Simple layering, Air layering, Stooling in guava); Layout and planting systems (Traditional system and high density planting methods); Methods of pruning and training; Training of ber, grape and pomegranate; Pruning of ber, grape, phalsa, fig, apple, pear, peach; Description and identification of varieties of mango, guava, grape, papaya, apple and sapota; Description and identification of varieties of banana, citrus, (lime, lemon, sweet orange, mandarin, grape fruit) pomegranate, ber, pear and cherries; Irrigation methods in fruit crops including drip – Micro irrigation methods of establishment of orchard; Methods of Fertilizer application methods in fruit crops including fertigation technology; Visit to local commercial orchards; Preparation of growth regulators, powder, solution and lanolin paste for propagation; Application of growth regulators for improving fruit set, fruit size, quality, delaying ripening and hastening ripening.
**References**


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**ENS 101 ENVIRONMENTAL SCIENCE 1+1**

**Theory**

**Unit I: Introduction to Ecology and Environment**


**Unit II: Natural resources and Biodiversity**

Natural resources – Soil, Water, Air, Mineral, Energy – Renewable and non-renewable; Forest resources; Bio diversity - importance, hot spots and conservation

**Unit III: Environmental Pollution**

Pollution: Problems, types and sources; Soil, Water and Air pollution – Sources, effects and control measures; Noise Pollution - Sources, effects and control measures; Radioactive, thermal and nuclear pollution; Global warming and climate change – GHG emission, GH effect, impact on environment and agriculture- mitigation strategies.

**Unit IV: Solid and liquid waste management**


**Unit V: Environmental protection**


**Practical**

Estimation of population indices of an agro-ecosystem – Diversity of flora and fauna in agricultural ecosystem - Laboratory safety and handling of chemicals and Glass wares - Characterization of waste water and collection and sampling methods - Estimation of pH,

References
2. Sharma, P.D. 2009, Ecology and Environment, Rastogi Publications, Meerut, India

BIC 101 FUNDAMENTALS OF BIOCHEMISTRY 2+1

Theory

Unit I: Carbohydrates

Unit II: Lipids

Unit III: Proteins and Enzymes
Unit IV: Metabolism


Unit V: Secondary metabolites

Secondary metabolites - occurrence, classification and functions of phenolics, terpenes and alkaloids. Applications of secondary metabolites in food and pharma industries.

Practical


References

Theory

Unit I: Introduction to Livestock Management

Unit II: Dairy Cattle Management

Unit III: Sheep and Goat Management

Unit IV: Management of Swine
- Classification of breeds - Economic traits - Housing - Nutrition – creep feeding - Care and Management of Adult and Young Stock - Common disease- prevention and control.

Unit V: Poultry Management

Practical
- Study of external parts of Livestock - Identification of livestock and poultry - Tattooing-ear tags - wing and leg bands - Common restraining methods - Disbudding (or) Dehorning -Different methods of castration – Dentition - Type and design of animal and poultry houses -Selection of dairy cow and work bullock - Determination of specific gravity, fat percentage and total solids of milk - Common adulterants and Preservatives of milk - Demonstration of cream separation, butter, ice cream and ghee making - Identification of feeds and fodder - Economics Dairy, Goat and Swine farming - Study of external parts of Fowl - Preparation of Brooder House - Brooder management - Identification of layer and non-layer - Debeaking, delousing and deworming of poultry - Vaccination schedule for
broiler and layer - Dressing of broiler chicken - Economics of Broiler and Layer Farming - Visit to a modern Dairy plant and commercial layer and broiler farms - Demonstration of incubator and setter.

References
6. Prabakaran, R., 1998. Commercial Chicken Production. Publisher P.Saranya, 5/2, Ramalingam Street, Seven Wells, Chennai
III SEMESTER COURSES
Theory

Unit I: Introduction to Weeds
Weeds: Introduction, harmful and beneficial effects, characteristics of weeds, classification, propagation and dissemination; Weed biology and ecology, crop weed association, crop weed competition and allelopathy.

Unit II: Methods of weed control
Concepts of weed prevention, eradication and control; Methods of weed control: preventive, physical, cultural, chemical and biological methods. Integrated weed management.

Unit III: Herbicides

Unit IV: Selectivity and activity of herbicides
Introduction to selectivity of herbicides; Herbicide absorption and translocation; Mode and mechanisms of action of herbicides. Herbicide mixtures and rotation. Interaction of herbicides with other agro chemicals, Definitions of Herbicide resistance and Herbicide resistant crops.

Unit V: Weed management
Weed management in major field and horticultural crops, shift of weed flora in cropping systems, aquatic and problematic weeds and their control.

Practical
Preparation of herbarium of weeds; Identification of weeds; Survey of weeds in crop fields and other habitats; Biology of nut sedge, bermuda grass and parthenium and Echinochloa; Calculations on weed control efficiency and weed index; Herbicide label information; Computation of herbicide doses; Study of herbicide application equipment and calibration; Demonstration of methods of herbicide application; Preparation of list of commonly available herbicides; Study of phytotoxicity symptoms of herbicides in different crops; Economics of weed control practices; Tours and visits of problem areas.

References
Theory

Unit I: Irrigation- History and importance
History and development of irrigation in India – Importance of irrigation – Irrigation systems of India and Tamil Nadu- Water resources and irrigation potential of India and Tamil Nadu -Role of water in plant growth

Unit II: Soil-water-plant relationship

Unit III: Crop water requirement
Crop water requirement – Effective rainfall - Potential evapotranspiration (PET) and consumptive use – Definition and estimation – Factors affecting water requirement – Critical stages for irrigation and water requirement of crops.

Unit IV: Scheduling of irrigation

Unit V: Quality of irrigation water and drainage
Quality of irrigation water – irrigation management under limited water supply – Agronomic practices for use of poor quality water (saline, effluent and sewage water) for irrigation – tank irrigation, well irrigation – on-farm development – command area development - Agricultural drainage, importance and methods of drainage.

Practical
Estimation of soil physical parameters and moisture – Measurement of irrigation water through water measuring devices (flumes and weirs) – Calculation of irrigation water requirement (problems) – Acquiring skill in land shaping for different surface irrigation methods – Operation and economics of sprinkler and drip irrigation systems – Estimation of crop water requirement – Scheduling of irrigation based on different approaches – Irrigation efficiency - Irrigation water quality – On-farm irrigation structures – Visit to irrigation command area (Reservoirs and tanks) - Methods of drainage and observation of drainage structures.

References
GPB 201  PRINCIPLES OF PLANT BREEDING  2+1

Theory

Unit I: Introductory Plant Breeding
Classification of plants, Botanical description, Floral biology, Emasculation and Pollination techniques in cereals, millets, pulses, oil seeds, fibers, plantation crops etc. Aims and objectives of Plant Breeding;

Unit II: Modes of Pollination and Reproduction
Modes of reproduction, Sexual, Asexual, Apomixis and their classification; Significance in plant breeding; Modes of pollination, genetic consequences, differences between self and cross pollinated crops;

Unit III: Methods of Plant Breeding
Methods of breeding – introduction and acclimatization. Selection, Mass selection Johannson’s pure line theory, genetic basis, pure line selection; Hybridization, Aims and objectives, types of hybridization; Methods of handling of segregating generations, pedigree method, bulk method, back cross method and various modified methods;

Unit IV: Heterosis, Self Incompatibility and Male sterility
Incompatibility and male sterility and their utilization in crop improvement; Heterosis, inbreeding depression, various theories of Heterosis, exploitation of hybrid vigour development of inbred lines, single cross and double cross hybrids;

Unit V: Special Breeding Techniques
Population improvement programmes, recurrent selection, synthetics and composites; Methods of breeding for vegetatively propagated crops; Clonal selection; Mutation breeding; Ploidy breeding; Wide hybridization, significance in crop improvement.

Practical:
Botanical description and floral biology; Study of megasporogenesis and microsporogenesis; Fertilization and life cycle of an angiospermic plant; Plant Breeder’s kit; Hybridization techniques and precautions to be taken; Floral morphology, selfing,
emasculiation and crossing techniques; Study of male sterility and incomapribility in field plots; Rice and Sorghum; Maize and Wheat; Bajra and ragi; Sugarcane and coconut; Groundnut, Castor, Sunflower, Safflower and Sesamum; Redgram, Bengalgram and Greengram; Soybean and blackgram; Chillies, Brinjal and Tomato; Bhendi, Onion, Bottle gourd and Ridge gourd; Cotton and Mesta; Jute and Sunhemp

References:

SST 201 PRINCIPLES OF SEED SCIENCE AND TECHNOLOGY 2+1

Theory

Unit I : Introduction to Seed Production
Difference between seed and grain -Importance of Seed Production- Seed quality-Definition, Characters of good quality seed-Seed Replacement Rate-Seed Multiplication Ratio-Deterioration of crop varieties-Factors affecting deterioration and their control-Maintenance of genetic purity during seed production- Classes of seed-Generation system of seed multiplication- Production of nucleus and breeder’s seed- Maintenance and multiplication of seeds in varieties and hybrids of self and cross-pollinated crops.

Unit II : Seed Production
Foundation and certified seed production of rice and wheat (varieties and hybrids) -maize (varieties, hybrids, synthetics and composites) - sorghum and bajra (varieties, hybrids, synthetics and composites) - cotton and sunflower (varieties and hybrids) – ground nut-castor (varieties and hybrids)- tomato and brinjal (varieties and hybrids) - chillies and bhendi (varieties and hybrids) – onion and gourds.

Unit III : Post Harvest Handling and Management
Seed Drying: principle and methods of seed drying - Seed processing : Establishment of seed processing unit- air screen machine and its working principle, different upgrading equipments and their use- Gravity separator-Disc separator-Spiral separator-Colour sorter- Establishing a Seed Testing Laboratory- Seed testing procedures for quality assessment-Seed treatment: Importance – types- equipments used (Slurry and Mist-O-matic treater)-Seed Enhancement techniques-seed dormancy and breaking treatments-Seed hardening-Coating and Pelleting- Seed packing.
**Unit IV : Seed storage and Marketing**

Stages of seed storage, factors affecting seed longevity during storage - conditions required for good storage - General principles of seed storage - constructional features for good seed warehouse - measures for pest and disease control - temperature control - Mid storage correction - Seed marketing - Seed demand forecasting - Marketing structure - marketing organization - sales promotion - pricing policy - Factors affecting seed marketing - Seed production planning.

**Unit V : Seed quality control**


**Practical**

Identification of seed and seed structure in Field crops and Horticultural crops - Seed sampling : principles and procedures - Physical Purity analysis – Seed Germination test - Seed Moisture determination – Seed Viability test - Seed Vigour tests - Seed enhancement techniques: Dormancy and breaking methods – Egg floatation - Delinting - Hardening - Coating - Pelleting - Seed extraction in vegetables - Grow out tests and electrophoresis for varietal identification- Seed health test - Visit to varietal and hybrid Seed production plots of field and horticultural crops and Varietal identification - Visit to Seed processing plant - Visit to Seed testing laboratory - Seed production planning for certified, foundation and breeder seed production.

**References**

Theory
Unit I: Nature and Scope

Unit II: Factor-Product Relationship

Unit III: Factor- Factor Relationship

Unit IV: Product-Product Relationship

Unit V: Farm Planning and Budgeting

Practical
Problems on factor-product relationship- determination of least-cost combination- determination of optimum product combination-computation of cost

References

AEN 201 FUNDAMENTALS OF ENTOMOLOGY 2+1

Theory
Unit I: History and importance
Entomology as a science - its importance in Agriculture History of Entomology in India, Position of insects in the animal kingdom and their relationship with other classes of Arthropoda, Reasons for insect dominance.

Unit II: Morphology
General organization of insect body wall - structure and function, cuticular appendages, moulting. Body regions - insect head, thorax and abdomen, their structures and appendages

Unit III: Anatomy and physiology
Unit IV: Taxonomy of Apterygota and Exopterygota

Taxonomy, classification and nomenclature of insects, biotypes. Distinguishing characters of agriculturally important orders and families of Apterygotes - Collembola and Thysanura, Exopterygotes - Ephemeroptera, Odonata, Orthoptera, Phasmida, Dictyoptera, Embioptera, Dermaptera, Hemiptera, Isoptera, Psocoptera, Mallophaga, Siphunculata and Thysanoptera.

Unit V: Taxonomy of Endopterygota

Distinguishing characters of agriculturally important families of Lepidoptera, Coleoptera, Diptera, Hymenoptera, Siphonaptera, Strepsiptera and Neuroptera.

Practical


References


ANM 201 INTRODUCTORY NEMATOLOGY 1+1

Theory

Unit I: History and Importance of Nematodes


Unit II: Morphology and Taxonomy of Nematodes

Morphology and Anatomy of nematodes (cuticle, cephalic region, alimentary, excretory, reproductive and nervous system, sense organs) – Taxonomy of plant parasitic nematodes – Classification of plant parasitic nematodes based on feeding habits.
Identification of economically important plant nematodes up to generic level with the help of keys and description.

**Unit III: Symptoms, interaction and bio-ecology of nematodes**

Symptoms of nematode damage – interaction with other microorganisms (fungi, bacteria and viruses) – Biology and ecology of important plant parasitic nematodes. (*Meloidogyne*, *Heterodera*, *Rotylenchulus*, *Tylenchulus* and *Radopholus*).

**Unit IV: Nematode management**

Principles of nematode management - Legislative (plant quarantine); Physical methods (Soil solarisation, hot water treatment, seed cleaning); cultural methods (deep ploughing, fallowing, crop rotation, antinematic plants, other land management practices); host plant resistance to nematodes; biological control (nematode trapping fungi, egg parasitic fungi, obligate parasites, PGPR and predators); chemical control – soil fumigants and nematode management. Integrated nematode management.

**Unit V: Nematode pests of crops**

Major nematode parasites and their management in cereals (rice and wheat), millets (sorghum, and maize), pulses (redgram, blackgram, greengram and cowpea), oilseeds (castor, groundnut and gingelly), fibre crops (cotton), vegetables (tomato, brinjal, bhendi, chilli and potato), fruits (banana, citrus, grapevine and papaya), spices and plantation crops (turmeric, pepper, betelvine and coconut), flower crops (crossandra, jasmine and tuberose) and medicinal and aromatic plants, (medicinal coleus, diascorea, geranium and patchouli).

**Practical**

Methods of survey – sampling methods, collection of soil and plant samples; Extraction of nematodes from soil and plant tissues following combined Cobb’s decanting–sieving and Barman funnel technique and Modified Barman funnel Technique, counting and estimation of plant parasitic nematodes; Extraction of cyst nematodes from soil by Fenwick can and other methods. Preparation of temporary and permanent mounts; Study of perineal patterns for identification of *Meloidogyne* species; Study of Cone top structure for identification of cysts nematodes. Morphology of orders Tylenchida (*Hoplolaimus*), and Dorylaimida (*Xiphinema*) Study and identification of most important plant parasitic nematodes with special reference to their characteristics and symptomatology – *Meloidogyne*, *Pratylenchus*, *Hirschmanniella*, *Heterodera*, *Globodera*, *Tylenchulus*, *Radopholus*, *Rotylenchulus*, and *Helicotylenchus*. Study of life stages of *Meloidogyne*, *Rotylenchulus* and *Radopholus*. Experimental techniques used in pathogenicity studies with root knot nematode. Study of different types of nematicides, application methods and calculation of dosages.

**References**


AEG 201 FUNDAMENTALS OF SOIL AND WATER CONSERVATION ENGINEERING 2 + 1

Theory

Unit I: Surveying
Surveying and Levelling – Chain, Compass and Plane Table survey – leveling – Instrument - Land measurement and computation of area – Simpson’s rule and Trapezoidal rule.

Unit II: Soil erosion

Unit III: Soil conservation

Unit IV: Irrigation and drainage
Unit V: Wells and Pumps


Practical


References

PAT 201 FUNDAMENTALS OF PLANT PATHOLOGY 2 + 1

Theory

Unit I: Plant Pathogenic Organisms


Unit II: General Characters of Fungi and their Pathogenesis

General characters of fungi - Somatic structures - Types of fungal mycelia - Resting structures – Asexual and sexual reproduction - Fruiting bodies -Physiological specialization - Spread and survival -Pathogenesis - Mode of infection - Disease cycle-Symptoms of fungal diseases -Role of enzymes and toxins in pathogenesis.
Unit III: Classification of Kingdom: Protozoa, Chromista and Fungi


Unit IV: Phylum: Ascomycota and Basidiomycota

Phylum: Ascomycota, Classes: Taphrinomycetes (Taphinales), Dothideomycetes (Dothidiales and Pleosporales) Eurotiomycetes (Eurotiales), Leotiomycetes (Erysipheales) and Sordariomycetes (Hypocreales); Phylum: Basidiomycota, Classes: Agaricomycetes (Agaricales, Corticiales, Cantharellales and Polyporales), Pucciniomycetes (Pucciniales) and Ustilaginimycetes (Exobasidiales, Ustilaginales and Tillietiales).

Unit V: Bacteria, Viruses, Viroids, Algae and Phanerogamic parasites

Classification of bacteria - General characters, survival, spread, pathogenesis and symptoms of phytopathogenic bacteria - General characters and symptoms of Candidatus Phytoplasma, Fastidious vascular bacteria, Spiroplasma, Viruses, Viroids, Algae and Phanerogamic parasites.

Practical


References

IV SEMESTER COURSES
Theory

Unit I: Cereals -I
Rice and Maize, - Origin, geographic distribution, economic importance, soil and climatic requirements, varieties, cultural practices (from land preparation to harvest) and yield.

Unit II: Cereals -II
Wheat, Barley, Oat, Rye and Triticale - Origin, geographic distribution, economic importance, soil and climatic requirement, varieties, cultural practices (from land preparation to harvest) and yield

Unit III: Millets
Millets: Sorghum, Pearl millet, Finger millet, Minor millets, Foxtail millet, little millet, Kodo millet, common millet and barnyard millet - Origin, geographic distribution, economic importance, soil and climatic requirement, varieties, cultural practices and yield.

Unit IV: Pulses
Pulses: Red gram, Black gram, Green gram, Bengal gram, Horse gram, Cowpea, Soybean and Lentil, Peas and French bean- Origin, geographic distribution, economic importance, soil and climatic requirement, varieties, cultural practices and yield.

Unit V: Oil Seeds
Oil seeds: Ground nut, sesame, sunflower, castor, soybean, Rape seed and mustard, safflower, Linseed, Niger - Origin, geographic distribution, economic importance, soil and climatic requirement, varieties, cultural practices, yield.

Practical

References

GPB 202 PRINCIPLES OF PLANT BIOTECHNOLOGY 2+1

Theory
Unit I: Basic Concepts in Plant Biotechnology
Concepts of Plant Biotechnology: History of Plant Tissue Culture and Plant Genetic Engineering; Scope and importance in Crop Improvement: Totipotency and Morphogenesis.

Unit II: Techniques in Plant Tissue Culture
Nutritional requirements of in-vitro cultures; Techniques of In-vitro cultures, Micro propagation, Anther culture, Pollen culture, Ovule culture, Embryo culture, Test tube fertilization, Endosperm culture, Factors affecting above in-vitro culture; Applications and Achievements.

Unit III: Plant Tissue Culture in Crop Improvement
Somaclonal variation, Types, Reasons: Somatic embryogenesis and synthetic seed production technology; Protoplast isolation, Culture, Manipulation and Fusion; Products of somatic hybrids and cybrids, Applications in crop improvement.

Unit IV: Applications of Genetic Engineering in Crop Improvement

Unit V: Molecular Markers in Crop Improvement
Practical:
Requirements for Plant Tissue Culture Laboratory; Techniques in Plant Tissue Culture; Media components and preparations; Sterilization techniques and Inoculation of various explants; Aseptic manipulation of various explants; Callus induction and Plant Regeneration; Micro propagation of important crops; Anther, Embryo and Endosperm culture; Hardening / Acclimatization of regenerated plants; Somatic embryogenesis and synthetic seed production; Isolation of protoplast; Demonstration of Culturing of protoplast; Demonstration of Isolation of DNA; Demonstration of Gene transfer techniques, direct methods; Demonstration of Gene transfer techniques, indirect methods; Demonstration of Confirmation of Genetic transformation; Demonstration of gel-electrophorisis techniques.

References

SAC 201  SOIL CHEMISTRY AND AGROCHEMICALS  2+1

Theory
Unit I: Soil Chemistry
Soil chemistry - scope and importance. Soil colloids, Properties, nature, types and significance; Layer silicate clays, their genesis, structure and properties. Sources of charges – positive and negative charges. Adsorption of ions, Ion exchange, CEC and AEC - Factors influencing ion exchange and its significance. Electrical double layer – Helmholtz, Gouy-Chapman and Stern theories

Unit II: Soil Organic Matter

Unit III: Problem soils

Unit IV: Pesticides – Classification and formulation
Unit V: Properties of Pesticides

Synthetic organic insecticides, Major classes, Properties and uses of some important insecticides under each class. Herbicides – Major classes – Properties and uses of 2, 4-D, atrazine, glyphosate, butachlor benthiocarb; Fungicides – Major classes – Properties and uses of carbendazim, carboxin, captan, tridemorph and copper oxychloride – Insecticides Act. Fertilizer and insecticides and their effect on soil, water and air.

Practical


References


AEC 202 AGRICULTURAL MARKETING, TRADE AND PRICES 1+1

Theory

Unit I: Agricultural Marketing – Nature and Scope


Unit II: Marketing Functions and SCP Paradigm
Marketing functions: buying and selling- packaging and transportation --grading and standardization--storage and warehousing -- processing and value addition. Market Structure--Conduct--Performance paradigm (SCP) – MarketStructure meaning, components, dynamics of conduct and performance.

Unit III: Marketing Efficiency and Marketing Institutions

Unit IV: International Trade and Role of Institutions
Theories of Trade: Absolute and Comparative Advantage - Status of Agricultural exports/ imports from India and their share. Barriers to trade – tariff and non tariff measures. Role of institutions like GATT and WTO in promoting trade in agricultural products. Free Trade Agreements -Implications of AoA- Market access, Domestic support and export subsidies. New EXIM policy of India – Advantages of AEZs. – Export promotion organization: APEDA, MPEDA, Commodity boards.

Unit V: Agricultural Prices and Risk Analysis

Practical
Farm Survey - Preparation of survey schedules - Farmers' marketing practices - Regulated market and its role in marketing of farm produce - Cooperative marketing society – Farmers' Market - Estimation of marketed and marketable surplus - Identification of marketing channels - Price spread estimation for agricultural / horticultural / livestock products - Role of Food Corporation of India (FCI)/Civil Supplies Corporation in Marketing of Agricultural Produce - Central Warehousing Corporation (CWC) / State Warehousing Corporation (SWC) and their role in storage of farm produce – Functions of NAFED - AGMARK Laboratory/Grading institutions - Commodity Boards - Export oriented units - Index numbers.
References

AEX 201 DIMENSIONS OF AGRICULTURAL EXTENSION 1+1

Theory
Unit I:

Unit II:

Unit III:

Unit IV:
Importance of women in Agriculture - Women Development programmes – Development of Women and Children in Rural Areas (DWCRA), Rashtriya Mahila Kosh
(RMK), Integrated Child Development Scheme (ICDS) and Mahila Samriddi Yojana (MSY). National Mission for Women – objectives and salient features.

Unit V:
Reorganized extension system (T&V System) – Salient features, Fort night Meetings, Monthly workshops, Linkages, Merits and Demerits, Emergence of Broad Based Extension (BBE). ATMA, ATIC, NATP, NAIP. Extension infrastructure of ICAR & GOI.

Practical
Visits to Department of Agriculture, DRDA/BDO to study the ongoing development programmes. Visits to village to study the functioning of Gram Panchayat (GP). Participation in RE Interface Sessions of ATMA. Visit to study SHGs, NGOs - Organizing PRA techniques in a village to identify the agricultural problems.

References

AEG 202    RENEWABLE ENERGY    1 + 1

Theory
Unit I: Energy scenario
Introduction - energy crisis - energy sources - classification - availability - renewable energy sources - significance - potential and achievements in India. Energy requirements of important agricultural crops.

Unit II: Methods of energy conversion and Biogas Technology
Methods of energy conversion - thermo - chemical and biochemical conversion methods - combustion, pyrolysis and gasification - applications - biogas and ethanol production - applications. Biogas technology - science of production - feed stocks - factors affecting biogas production - types and capacity of biogas plants - KVIC, Janata and Deen
Bandhu model biogas plants - construction and working principles - comparison features of biogas plants. Applications of biogas - biogas requirements - biogas appliances - environmental considerations - enrichment and uses of biodigested slurry (BDS).

**Unit III: Thermochemical conversion methods**


**Unit IV: Applications of solar energy**


**Unit V: Wind energy, energy plantation and bio-fuels**


**Practical**

Constructional details of KVIC and Deen Bandu type biogas plants - Constructional details of different types of gasifiers and testing. Briquette preparation from biomass - to study and find the efficiency of solar cooker - solar still - solar dryers - solar photovoltaic pumping system and domestic solar water heater; solar lantern - solar street light- wind mills - Field visit - Improved chulhas - Liquid bio fuels, bio ethanol and bio methanol - Bio - diesel production.

**References**


**PAT 202**  **APPLIED PLANT PATHOLOGY**  **1+1**

**Theory**

**Unit I: Epidemiology, Disease Assessment and forecasting**
- Epidemiology of crop diseases - Role of host, pathogen and weather in disease development - Disease surveillance and assessment - Disease forecasting and remote sensing

**Unit II: Principles of Crop Disease Management**
- Avoidance - Exclusion - Plant quarantine; Eradication - Cultural, physical, chemical methods; Protection - Cultural, physical, chemical methods; Immunization - Types and mechanism of resistance - 'R' genes - Cross protection

**Unit III: Fungicides and Antibiotics**
- Fungicides - Characteristics of an ideal fungicide - Classification and groups of fungicides - Antibiotics - Formulation of fungicides - Methods of application of fungicides to manage seed, soil, foliar and post-harvest diseases - Compatibility and phytotoxicity - Precautions and safety measures in handling

**Unit IV: Biocontrol, Biotechnological approaches and Integrated Disease Management**
- Biological control - Role - Biocontrol agents (Fungi, VAM and PGPR) - Characters and mechanisms of biocontrol and PGPR - Methods of application - Botanicals and antiviral principles - Methods of application - Application of biotechnology in crop disease management - Integrated Disease Management (IDM) - Concepts, advantages and importance

**Unit V: Diagnostic Techniques and Mushroom Production**
- Diagnostic techniques for detecting plant pathogen - Biological diagnosis, Chemodiagnosis and Serodiagnosis - Seed health testing - Mushroom Importance - Nutritive and pharmaceutical values - Cultivation techniques of oyster, milky, button and paddy straw mushrooms

**Practical**
- Various groups of fungicides and antibiotics - Preparation of Bordeaux mixture, Bordeaux paste and fungicidal spray solution - Phytotoxicity - Methods of application - Seed treatment, Soil and foliar application - Special methods of application - Corn injection, root feeding, capsule application and acid delinting Post harvest treatment of fungicide - Production of immunized seedlings in citrus - Mass production of *Trichoderma, Pseudomonas* and *Bacillus* spp and methods of application. Preparation of plant extracts, oil emulsions and anti-viral principles. Survey and assessment of crop diseases. Biological and chemical diagnosis of plant diseases. Cultivation techniques of oyster, milky, button and paddy straw mushrooms
References

HOR 211 PRODUCTION TECHNOLOGY OF VEGETABLES AND FLOWERS 2+1

Theory
Unit I: Vegetable production
Importance of vegetable growing –area and production of vegetables in India - Nutritive value of vegetables –classification of vegetables –types of vegetable growing – vegetable forcing –kitchen garden-market garden-truck garden and nutrition garden
Unit II: Production technology of vegetable crops
Climate and soil – varieties and hybrids – seeds and sowing – nutrient management – irrigation and fertigation management – weed management – cropping systems in vegetable crops - vegetable production under protected structures – maturity indices and harvest of Tomato, chilli, capsicum, okra, brinjal, bhendi, onion, gourds, peas, french beans and dolichos bean, potato, cassava, sweet potato, carrot, radish, turnip, beetroot, cabbage, cauliflower, amaranthus, palak, coccinia, curry leaf and moringa

Unit III: Production technology of commercial flower crops

Unit IV: Ornamental gardening
Importance and Planning of ornamental gardens - Types and styles of ornamental gardens - Use of trees and shrubs - Use of climbers and palms - Use of houseplants and seasonal flowers in the gardens - Ornamental Horticulture – importance of gardening – Designing garden – components of gardening

Unit V: Landscape gardening - lawn making
Basic principles of landscaping – Lawn and Lawn making – use of important trees, shrubs and climbers – annuals – biennials and herbaceous perennials in gardening.

Practical

References
1. Mandal, R.C. 2006. Tropical root and tuber crops. Agrobiios (India)
STA 201       APPLIED STATISTICS       1+1

Theory

Unit I: Introduction to statistics
Introduction: Definition of Statistics and its use and limitations; Frequency Distribution and Frequency Curves; Measures of Central Tendency: Characteristics of Ideal Average, Arithmetic Mean; Median, Mode, Merits and Demerits of Arithmetic Mean; Measures of Dispersion: Standard Deviation, Variance and Coefficient of Variation.

Unit II: Sampling
Probability: Definition and concept of probability; Normal Distribution and its properties; Introduction to Sampling: Random Sampling; the concept of Standard Error.

Unit III: Tests of significance
Tests of Significance- Types of Errors, Null hypothesis and Alternate hypothesis, Level of Significance and Degrees of Freedom, Steps involved in testing of hypothesis; Large Sample Test- SND test for Means (Single Sample and Two Samples); Small Sample Test for Means, Student's t-test for Single Sample, Two Samples (with equal variance) and Paired t test. F test for variances; Chi-Square Test in 2x2 Contingency Table, Yates' Correction for continuity.

Unit IV: Correlation and regression
Correlation: Types of Correlation and identification through Scatter Diagram, Computation of Correlation Coefficient 'r'. Linear Regression: of Y on X and X on Y. Inter-relation between 'r' and the regression coefficients, fitting of regression equations.

Unit V: Experimental designs
Experimental Designs: Basic principles of designs, Completely Randomized Design (CRD), Layout and analysis with equal number of observations, Randomized Block Design (RBD), Layout and analysis, Latin Square Design (LSD), Layout and analysis.
Practical

Construction of Frequency Distribution Tables and Frequency Curves; Computation of Arithmetic Mean for Un-Grouped and Grouped data; Computation of Median for Un-Grouped data; Computation of Mode for Un-Grouped data; Computation of Standard Deviation, Variance and Coefficient of Variation for Un-Grouped data; SND test for Means, Single Sample; SND test for Means; Two Samples; Student's t-test for Single Sample; Student's t-test for Two Samples; Paired t test and F test; Chi-Square Test in 2x2 Contingency Table, Yates' Correction for continuity; Computation of Correlation Coefficient 'r'; Fitting of regression equations- Y on X and X on Y; Analysis of Completely Randomized Design (CRD); Analysis of Randomized Block Design (RBD); Analysis of Latin Square Design (LSD).

References

V SEMESTER COURSES
AGR 301   CROP PRODUCTION – I   0+1

1. Each student will be allotted a minimum land area of 2.5 cents/ 5.0 cents.
2. He/ she will do all field operations in the allotted land from field preparation to harvesting and processing.

Practical
Field preparation, seed treatment, raising a nursery, sowing, nutrient management, weed management and management of insect pests and disease of crops, harvesting, threshing, drying, winnowing, storage and marketing of produce. Exposure to mechanized rice cultivation-Preparation of balance sheet including cost of cultivation, net returns per student and as well as team of group of students.

References

AGR 302   AGRONOMY OF FIELD CROPS – II   2+1

Theory
Unit I: Sugar crops
Sugar crops: Sugarcane and Sugarbeet - Origin, geographic distribution, economic importance, soil and climatic requirement, varieties, cultural practices and yield.

Unit II: Fibre crops
Fibre crops: Cotton, Jute, Mesta and Sunnhemp: Origin, geographic distribution, economic importance, soil and climatic requirement, varieties, cultural practices and yield.

Unit III: Forage Crops and Green Manure Crops
Forage Crops: Sorghum, Maize, Pearl millet, Oats, Bajra-Napier Hybrid grass, Guinea grass, Cenchrus grass, Cluster bean, Cowpea, Lucerne, Hedge Lucerne, Berseem and Desmodium- Economic importance, soil and climatic requirement, varieties, cultural practices and yield.

Green Manure crops: Daincha, Sunhemp, S.rostrata, Glyricidia, Tephrosia - Origin, geographic distribution, economic importance, soil and climatic requirement, Varieties, cultural practices and yield.
Unit IV: Medicinal and Aromatic crops
Medicinal and Aromatic crops: Isabgol, Posta, Mint, Lemon Grass, Citronella and Palmarosa - Origin, geographic distribution, economic importance, soil and climatic requirement, Varieties, cultural practices, yield and post harvest handling

Unit V: Tuber crops and Narcotics
Tuber crops and Narcotics: Tapioca, Potato and Tobacco - Origin, geographic distribution, economic importance, soil and climatic requirement, Varieties, cultural practices and yield.

Practical
Identification of sugar crops, fibre crops, forage crops, Green Manures crops, medicinal and aromatics crops, tuber crops and narcotics - Calculation of seed rate - Seed treatment techniques -Nursery preparation and management for sugarcane, cotton and tobacco - Propagation techniques for medicinal & aromatics crops - Main field preparation - Sowing and manuring – Estimation of population – After cultivation practices - Study of growth and yield parameters and yield estimation, harvesting of above crops; Fodder preservation techniques - Silage and hay making- Economic analysis of cultivation of important crops – Visit to institutes and industries – Farmers’ fields.

References

**GPB 301 BREEDING FIELD CROPS 2+1**

**Theory**

**Unit I: Concepts in Crop Breeding and Hardy – Weinberg law**

Breeding objectives and important concepts of breeding self pollinated, cross pollinated and vegetatively propagated crops; Hardy-Weinberg Law.

**Unit II: Origin and Distribution of cereals, Pulses and oil seeds**

Study in respect of origin, distribution of species, wild relatives and forms, Cereals, (rice, wheat, maize, millets, sorghum, bajra, ragi); Pulses (redgram, greengram, blackgram, soybean); Oilseeds (Groundnut, sesame, sunflower, safflower, castor, mustard) etc. Fibers (Cotton, kenaf, roselle, jute) etc.

**Unit III: Origin and Distribution of Fodder and commercial crops**

Forage and Fodder crops (Guinea grass, cumbu Napier Hybrids, Lucern, Forage cow pea, Subabul); Narcotic crops – Masticatories and fumitories (Tobacco, Beetle vine, Arecanut); Beverages - Coffee and Tea.

**Unit IV: Breeding Procedure for Crop Improvement**

Major breeding procedures for development of hybrids / varieties of various crops; Plant Genetic Resources their conservation and utilization in crop improvement; Ideotype concept in crop improvement; Breeding for resistance to biotic and abiotic stresses variability in pathogens and pests; Mechanisms of resistance in plant to pathogens and pest; Genetic basis of adaptability to unfavourable environments.

**Unit V: Biometrics and IPR**

Definition of biometrics, assessment of variability i.e., additive, dominance and epistasis and their differentiation; Genotype x Environment interaction and influence on yield/performance, IPR and its related issues.

**Practical:**

Emasculation and Hybridization techniques; Handling of segregating generations, pedigree methods; Handling of segregating generations, bulk methods; Handling of segregating generations, back cross methods; Field lay out of experiments; Field trials, maintenance of records and registers; Estimation of Heterosis and inbreeding depression;
Estimation of Heritability, GCA and SCA; Estimation of variability parameters; Parentage of released varieties/hybrids; Problems on Hardy, Weinberg Law; Study of quality characters; Sources of donors for different characters; Visit to seed production and certification plots; Visit to AICRP trials and programmes; Visit to grow out test plots; Visit to various research stations; Visit to other institutions

References:

AEC 301 AGRICULTURAL FINANCE, BANKING AND CO-OPERATION 1+1

Theory
Unit I: Agricultural Finance – Nature and Scope
Agricultural finance - importance – nature and scope - definition. Agricultural credit – meaning, definition, need, classification. Sources of credit – Role of institutional and non-institutional agencies - advantages and disadvantages. Rural indebtedness. History and development of rural credit in India.

Unit II: Financial Institutions

Unit III: Co-operation
Co-operation – philosophy and principles. History of Indian Co-operative credit movement – pre and post independence periods. Co-operation in different plan periods. Co-operative credit institutions – structure - short term and long term credit - functions. Strength and weakness of co-operative credit system. Policies for revitalizing co-operative credit - salient features of Vaithiyathan Committee on revival of rural co-operative credit institutions. Reorganization of Co-operative credit structure in Andhra Pradesh and single window system. Successful co-operative credit systems in Gujarat, Maharashtra, Punjab, etc. Special Co-operatives – LAMPS, FSS – objectives, role and functions.
Unit IV: Banking and Insurance


Unit V: Farm Financial Analysis


Practical

Visit to Farm - estimation of credit needs, identification of problems and suggestions in the use of farm credit. Visit to a Primary Agricultural Co-operative Credit Society and DCCB to study their functions. Visit to a Commercial Bank Branch to study its functions. Visit to Lead bank to study the preparation and implementation of credit plans. Visit to NABARD to study its role and functions. Time value of money – compounding and discounting. Project preparation and appraisal - undiscounted and discounted methods. Visit to SHGs. Study of crop insurance products. Banking procedure for availing loan. Repayment plans.

References


AEN 301 PESTS OF FIELD CROPS AND THEIR MANAGEMENT 2+1

Theory

Unit I: Insect Ecology and Components of Pest Management

Insect Ecology- Effect of abiotic and biotic factors on insect population. Pest – definition, categories of pests, factors governing pest outbreaks. Losses caused by pests –
Concept of Economic Threshold Level and Economic Injury Level, pest surveillance and forecasting. Principles and Components of pest management

Unit II: Methods of Pest Control

Unit III: Pests of Cereals, Millets and Pulses
Distribution, Bionomics, symptoms of damage and management strategies for insects and non-insect pests of rice, wheat, maize, sorghum, cumbu, ragi, tenai, mesta and pulses (redgram, green gram, black gram, bengal gram, cowpea.).

Unit IV: Pests of Oilseeds, Cotton and Sugarcane
Distribution, Bionomics, symptoms of damage and management strategies of insects and non-insect pests of groundnut, castor, gingelly, sunflower, safflower, jatropha, soybean, mustard, Cotton and Sugarcane.

Unit V: Pests of Green Manures, Forage Crops, Tobacco, Stored Products Pests and Non Insect Pests

Practical
Study of symptoms and types of damage caused by insect pests. Assessment of insect population and damage. Study and identification of different types of parasitoids, predators and entomopathogens. Behavioral approaches in pest management – Pheromones, light traps, sticky traps and other traps. Study of pesticides – different groups and formulations. Pesticide application equipment – types and uses. - Preparations of spray fluids and botanicals for field application. Identification of symptoms of damage and life stages of important pests of different field crops: cereals, millets, pulses, oilseeds, cotton, sugarcane, green manures, forage crops and stored product pests. Non insect pests.

References

AEX 301 EXTENSION METHODOLOGIES AND TRANSFER OF AGRICULTURAL TECHNOLOGY 1+1

Theory
Unit I:
Communication – meaning, definition, models, elements and their characteristics, types and barriers in communication. extension programme planning – meaning, definitions of planning, programme, project, importance, principles and steps in programme development process, monitoring and evaluation of extension programmes.

Unit II:
Extension teaching methods – meaning, definition, functions and classification individual contact methods – farm and home visit, result demonstration, field trials – meaning, objectives, steps, merits and demerits. group contact methods – group discussion, method demonstration, field trips – meaning, objectives, steps, merits and demerits. mass contact methods – campaign, exhibition, kisan mela, radio & television – meaning, importance, steps, merits and demerits. factors influencing in selection of extension teaching methods and combination (media mix) of teaching methods.

Unit III:
Ict in extension – internet, cyber cafes, video conferences, kisan call centers, consultancy clinics, mobile technology, expert systems

Unit IV:
Diffusion – meaning and elements. attributes of innovations. adoption of innovations – meaning, definition, models of adoption process, innovation – decision process – elements, adopter categories and their characteristics, factors influencing adoption process.

Unit V:
Capacity building of extension personnel and farmers – meaning, definition, types of training, training to farmers, farm women and rural youth – ftc and KVK.
Practical


References


AEG 301 POST HARVEST TECHNOLOGY AND FOOD ENGINEERING 1+1

Theory

Unit I: Post harvest losses, moisture content and properties

Post harvest losses – causes and estimates – unit operations of crop processing – moisture content – methods of estimation - engineering properties of grains – mass, volume, density, porosity, sphericity - applications and effect of moisture content on properties.

Unit II: Threshing, cleaning and grading

Threshing – threshers for different crops - parts, terminology – operational safety and maintenance - winnowing – manual and power operated winnowers- cleaning, grading and sorting - types of screens - air screen cleaner- reciprocating and rotary types - construction and operation-care and maintenance - construction and working principles of spiral separator, magnetic separator, specific gravity separator, colour sorter and inclined belt separator.

Unit III: Shelling, drying and storage

Unit IV: Cereals, pulses and oilseed processing


Unit V: Material handling and food plant layout


Practical

Determination of moisture content - study of thresher, winnowers and graders – components, operations, adjustment and performance - determination of efficiency of maize sheller, groundnut decorticators, cleaners and graders, rice milling and pulse milling - experiments on tray and thin layer drier- experiments on screw conveyor and bucket elevator, study of improved grain storage structures - exercises on location analysis and preparation of plant layout for food processing industry – visit to food processing industry.

References

Theory
Unit I: Diseases of Cereals and Millets
Symptoms, etiology, mode of spread, survival, epidemiology and integrated management practices of important diseases of rice, wheat, sorghum, maize, pearl millet, finger millet and other minor millets.

Unit II: Diseases of Pulses
Symptoms, etiology, mode of spread, survival, epidemiology and integrated management practices of important diseases of pigeonpea, chickpea, urdbean, mungbean, cowpea, lablab and soybean

Unit III: Diseases of Oilseeds
Symptoms, etiology, mode of spread, survival, epidemiology and integrated management practices of important diseases of groundnut, gingelly, sunflower, castor, linseed, mustard and jatropha

Unit IV: Diseases of Cash crops
Symptoms, etiology, mode of spread, survival, epidemiology and integrated management practices of important diseases of cotton, jute, sugarcane, sugarbeet, tobacco, mulberry, betelvine and turmeric.

Unit V: Post Harvest Spoilage of Grains
Microorganism involved in spoilage - Field and storage fungi - Storage conditions in relation to development of spoilage - Types of spoilage caused by microorganism - Mycotoxins - Prevention and control of post-harvest spoilage

Practical
Study of disease symptoms and host-parasite relationship of Cereals and Millets - Rice, wheat, sorghum, maize, pearl millet, finger millet and minor millets, Pulses - Pigeonpea, chickpea, urdbean, mungbean, lablab, cowpea and soybean, Oilseeds - Groundnut, gingelly, castor, sunflower, linseed, mustard, jatropha and Cash crops - Cotton, jute, sugarcane, sugar beet, tobacco, mulberry, betel vine and turmeric and storage diseases.

References

HOR 311 PRODUCTION TECHNOLOGY OF SPICE, AROMATIC, MEDICINAL AND PLANTATIONS CROPS 2+1

Theory

Unit-I: Crop production techniques in spice crops
Introduction-classification of spices – scope and importance –current status of area and production - Soil and Climate- varieties and related species – propagation and planting – training and pruning practices - weed and water management – Nutrient management- drip and fertigation – Harvesting and processing for the following crops
Black Pepper, Cardamom, Turmeric, Ginger, Coriander, Cumin, Fenugreek

Unit-II: Crop production techniques in aromatic crops
Lemon grass, Citronella, Palmarose, Vetiver, Geranium, Dawana

Unit-III: Crop production techniques in plantation crops
Coconut, arecanut, betelvine, cashew, cocoa, coffee, oilpalm

Unit-IV: Crop production techniques in medicinal plants - I
Medicinal plants – scope and importance –current status of area and production - Soil and Climate- varieties and related species – propagation and planting – weed and water management – Nutrient management- Harvesting – Postharvest Handling – extraction of secondary metabolites for the following crops
Diascoria, rauvolfia, opium, ocimum, perwinkle, aloe, guggul, belladonna

Unit-V: Crop production techniques in medicinal plants - II
Nuxvomica, Solanum khasiamum, aonla, senna, plantago, stevia, coleus and Acorus
Practical

Botanical description and identification of varieties in aromatic plants (Lemon grass, Citronella, Palmarose, Vetiver, Geranium, Dawana) – spices (Black Pepper, Cardamom, Turmeric, Ginger, Coriander, Cumin, Fenugreek) - plantation crops (Coconut, arecanut, betelvine, cashew, cocoa, coffee, oilpalm) - medicinal plants (Nuxvomica, Solanum khasiamum, aonla, senna, plantago, stevia,coleus and Acorus) – Propagation techniques in spice crop - planting methods in turmeric and ginger - plantation crops- aromatic crops and medicinal plants - Selection of mother palm and seed nuts in coconut and oil palm - Distillation procedures for aromatic crops. Harvesting procedures in aromatic plants - Processing and curing of spices (ginger, turmeric and black pepper) Training methods in betel vine - Rejuvenation practices in cashewnut – Products and value added products of spices and plantation crops - Procedures for oleoresin extraction - Visit to local commercial plantations, Aromatic & medicinal plant nurseries and seed spices field.

References


PJN 301 SHORT TOUR 0+1

The students will undertake the short tour during fifth semester for seven days covering KVK’s, Research stations, other SAU campuses and ICAR institutes in Puducherry and Tamil Nadu. The study tour will provide an exposure to the students to know about the soil, climatic conditions and cropping patterns in various agro-climatic zones. The students will also have first-hand information on latest technologies on various crops and allied activities.
VI SEMESTER COURSES
1. Each student will be allotted a minimum land area of 2.5 cents.
2. He/she will do all field operations in the allotted land from field preparation to harvest and processing.

**Practical**

Management techniques for irrigated dry (ID) crop: Field preparation, seed treatment, raising a nursery, sowing, nutrient management, weed management and management of insect pests and disease of crops, harvesting, threshing, drying, winnowing, storage and marketing of produce. Exposure to mechanized irrigated dry crop cultivation-Preparation of balance sheet including cost of cultivation, net returns per student and as well as team of group of students.

**References:**

**AGR 304 FARMING SYSTEM AND DRY FARMING 2+1**

**Theory**

**Unit I: Cropping system**

Cropping systems - Definition - Principles - Concepts - Classification – mono cropping – intensive cropping - cropping systems of India and Tamil Nadu - Interaction between different cropping systems – Cropping system management – Resource management – land, nutrient, water and weed - Indices for evaluation of cropping systems - Land use - yield advantages - Economic evaluation

**Unit II: Farming systems**

Farming systems - Definition - Principles - Concepts - Enterprises selection and management - interaction between different enterprises with cropping – scope and advantages of Integrated Farming system – evaluation indicators of integrated farming
system - Integrated farming system models for different agro eco-systems - LEIA & HEIA-concepts and principles.

Unit III: Dryland farming and rainfed farming
Dryland farming and rainfed farming - Significance of dry farming in India- History of dry land agriculture- Distribution of Arid and semiarid regions in World, India and Tamil Nadu – Major crops of Dryland in India and Tamil Nadu - Characteristics - constraints

Unit IV: Drought and its management
Drought – Definition - Types and effects of Drought on crop production - Drought management - Contingent crop planning – Mid season correction – Mulching – anti-transpirants - Soil moisture conservation techniques and approaches - Water harvesting, storage and recycling - Integrated dry land technologies – Mechanization - Watershed management

Unit V: Resource management in drylands

Practical
Preparation of cropping scheme - working out input requirements for crops, cropping systems - preparation of calendar of operations for wetland, irrigated upland and dry land cropping system - visit to cropping system experiments – working out indices for evaluation of cropping systems – visit to different units: dairy, goat, poultry, fishery. Mushroom, sericulture and biogas - study on evaluation indicators on farming system - preparation of integrated farming system models for different eco-systems - on farm field visit - analysis of farming system models - Zonation of Dry farming regions of Tamil Nadu, India and World - study of tools and implements and machineries for tillage, sowing and after cultivation - assessing their efficiencies -study of drought management technologies in dryland agriculture - Preparation of contingency crop plan for aberrant rainfall situations – Visit to watershed area to study the impact of various soil and moisture conservation methods.

References

AGR 305 ORGANIC FARMING 1+1

Theory

Unit I: Types of farming and impacts of green revolution farming
Types of farming – Impacts of green revolution farming – Fate of chemicals in agro ecosystem

Unit II: Organic farming - Concepts and principles

Unit III: Nutrient sources in organic farming
Organic sources of nutrients – on farm and off farm sources – organic waste recycling-methods - Soil and crop management - inter cropping, crop rotation, green manures, cover crops, mulching - bio fertilizers. Panchagavya and other organic solutions – Preparation and usage

Unit IV: Pest and disease management in organic farming
Bio intensive pest and diseases management - physical, cultural, mechanical and biological methods – non-chemical weed management methods: preventive, physical, cultural, mechanical and biological control measures - good crop husbandry practices

Unit V: Certification, exports and ITK
Practical
Raising of field crop – experiencing organic farming practices – soil, seed, nutrient, weed, water, pest and diseases, post-harvest management - hands on experience on bio composting, vermicomposting, ITK based biological preparations, bio-inoculants - quality analysis of inputs and products - grading, packaging, post-harvest management – visit to organic farms, market outlets and organic certification centers.

References

SAC 301 MANURES, FERTILIZERS AND NUTRIENT MANAGEMENT 2+1

Theory
Unit I: Essential Nutrients

Unit II: Nutrient Dynamics
Nutrients – sources, forms, mobility, transformations, fixation, losses and availability of nitrogen, phosphorus, potassium, calcium, magnesium, sulphur, iron, manganese, zinc, copper, boron and molybdenum in soils.

Unit III: Fertilizers
Fertilizers – Definition and classification, sources, properties and reactions of macro and micro nutrient fertilizers in soil. Manufacture of urea, ammonium sulphate, NH₄NO₃, NH₄SO₄NO₃, SSP, enriched SSP, DAP, MOP and SOP. Complex, mixed fertilizers, and Micro nutrient mixtures- preparation, methods of fertilizer application – Fertigation, characteristics and compatibility of fertilizers - Fertilizer Control Order (FCO).

Unit IV: Manures
Manures – Bulky and concentrated – FYM, Composts – Different methods, Mechanical compost plants, Vermicomposting, Green manures, Oil cakes, Sewage and sludge – Biogas plant slurry, Plant and animal refuges
Unit V: Nutrient Management


Practical


References


AEC 302 PRINCIPLES OF AGRIBUSINESS MANAGEMENT 1+1

Theory

Unit I: Agribusiness

Agribusiness – Definition – Structure of Agribusiness (input, farm and product sectors) Agribusiness Management - Special features of Agribusiness - Importance of Agribusiness in Indian Economy.

Unit II: Management

Unit III: Management functions I

Unit IV: Management Functions II

Unit V: Management Functions III

Practical

References
AEN 302   PESTS OF HORTICULTURAL CROPS AND THEIR MANAGEMENT   2+1

Theory

Unit I: Pests of Vegetable crops
Distribution, bionomics, symptoms of damage and management strategies of insect and non insect pests of Brinjal, Bhendi, Tomato, Crucifers, Cucurbits, Moringa and Amaranthus.

Unit II: Pests of Fruit crops
Distribution, bionomics, symptoms of damage and management strategies of insect and non insect pests of Mango, Sapota, Citrus, Banana, Grapevine, Guava, Jack, Custardapple, Pomegranate, Pine apple, Papaya, Ber, Apple and Aonla

Unit III: Pests of Tuber crops
Distribution, bionomics, symptoms of damage and management strategies of insect of Potato, Sweet potato, Yam and Tapioca

Unit IV: Pests of Spices and Plantation Crops
Distribution, bionomics, symptoms of damage and management strategies of insect of Chillies, Onion, Garlic, Ginger, Turmeric, Coriander and Curry leaf. Coconut, Areca nut, Coffee, Tea, Cashew, Rubber, Cocoa, Cardamom, Pepper and Betelvine

Unit V: Pests of Ornamentals, Medicinal Plants and Tree Crops
Distribution, bionomics, symptoms of damage and management strategies of insect and non insect pests of Rose, Jasmine, Crossandra, Chrysanthemum, Tuberose and Gloriosa, Coleus, Phyllanthus, Aswagantha, Neem, Teak, Sandalwood, Eucalyptus.

Practical
Identification of symptoms of damage and life stages of important pests of different horticultural crops: vegetables, fruits, spices, ornamentals, tubers, plantation crops, medicinal plants lawn, turf, cut flowers, tree crops, dry fruits, nuts and other Horticultural products. Establishment and maintenance of honeybee colonies

References
Theory

Unit I:
Concept of entrepreneurship; entrepreneurial and managerial characteristics; Assessing overall business environment in the Indian economy. Globalisation and the emerging business / entrepreneurial environment. Overview of Indian social, political and economic systems and their implications on agricultural entrepreneurs.

Unit II:
Managing an enterprise; motivation and entrepreneurship development; importance of planning, monitoring, evaluation and follow up; managing competition; SWOT analysis, Generation, incubation and commercialization of ideas and innovations.

Unit III:
Entrepreneurship development programs; Government schemes and incentives for promotion of entrepreneurship. Government policy on Small and Medium Enterprises (SMEs) / SSIs. Export and Import Policies relevant to agriculture sector.

Unit IV:

Unit V:
Organisational communication- definition, objectives, importance, process, methods and barriers. Leadership – Definition, styles, difference between leaders and Managers.

Practical
Listening and note taking, writing skills, oral presentation skills; Reading and comprehension of general and technical articles, precise writing, summarizing, abstracting, individual and group presentations. Analysing cases, Practicing SWOT analysis. Visiting Agri clinics/Agri based industries/Agri Financing Institutions. Sample Project formulation and report preparation.

References
PAT 302 DISEASES OF HORTICULTURAL CROPS AND THEIR MANAGEMENT 2+1

Theory

Unit I: Diseases of Fruit Crops
Symptoms, etiology, mode of spread, survival, epidemiology and integrated management practices of important diseases of tropical fruits - mango, banana, citrus, grapes, guava, sapota, pomegranate, papaya, pineapple, annona, jack, ber, aonla and temperate fruits - Apple, pear, plum and peach and post harvest diseases of fruits

Unit II: Diseases of Vegetable Crops
Symptoms, etiology, mode of spread, survival, epidemiology and integrated management practices of important diseases of tomato, brinjal, bhendi, potato, cucurbits, crucifers, beans, peas, sweet potato, carrot, beetroot, cassava, yam and colocasia and post harvest diseases of vegetables

Unit III: Diseases of Spices and condiments
Symptoms, etiology, mode of spread, survival, epidemiology and integrated management practices of important diseases of onion, garlic, chillies, pepper, coriander, ginger, cardamom, cinnamon, nutmeg and clove.

Unit IV: Diseases of Plantation crops
Symptoms, etiology, mode of spread, survival, epidemiology and integrated management practices of diseases of tea, coffee, coconut, arecanut, oilpalm, rubber, cocoa and vanilla.

Unit V: Diseases of Flower crops and Medicinal plants
Symptoms, etiology, mode of spread, survival, epidemiology and integrated management practices of important diseases of flower crops - Jasmine, rose, crossandra, chrysanthemum, marigold, carnation, dahlia, zinnia and tuberose and medicinal plants - Gloriosa, Stevia, Coleus and Aloe

Practical
Study of symptoms and host parasite relationship of the following crops: Tropical fruits - Mango, banana, citrus, grapes, guava, sapota, pomegranate, papaya, pineapple, annona, jack, ber, aonla and Temperate fruits - Apple, pear, plum and peach; Vegetables - Tomato, brinjal, bhendi, potato, cucurbits, crucifers, beans, peas, sweet potato, carrot, beetroot, cassava, yam and colocasia and post harvest diseases of vegetables; Spices and Condiments - Onion, garlic, chillies, pepper, coriander, ginger, cardamom, cinnamon, nutmeg and clove; Plantation crops - tea, coffee, coconut, arecanut, oilpalm, rubber, cocoa and vanilla; Flower crops – Rose, jasmine, crossandra, chrysanthemum, marigold, carnation, dahlia, zinnia and tuberose and Medicinal plants - Gloriosa, Stevia, Coleus and Aloe.

References

HOR 312 POST HARVEST MANAGEMENT AND VALUE ADDITION OF FRUITS AND VEGETABLES  1+1

Theory

Unit I: Post-harvest losses

Post Harvest Losses and Post Harvest Management – Definition and importance - Post harvest technology scenario of horticultural crops in India – Factors of post harvest losses- Maturity indices and harvesting methods of fruits and vegetables – Harvesting for specific market requirement.

Unit II: Management of Post harvest losses

Preharvest factors affecting post harvest quality and shelf life of fruits and vegetables – pre and post harvest treatments for enhancing shelf life – grading - pre cooling and pre storage treatments- maturity and ripening of fruits – physiological and biochemical changes associated with ripening – role of ethylene and ethylene management .

Unit III: Packaging and storage

Packaging and cushioning materials – advanced packaging technologies for fruits and vegetables – crop specific packaging to meet export standards in mango, banana, grapes, mandarin and sweet orange - Storage methods – traditional and advanced methods of storage (controlled atmospheric storage, hypobaric storage, irradiation and low cost storage structure) – physiological disorders during storage.
Unit IV: Post harvest pests and Diseases
Browning in fruits and vegetables - Post harvest disease and insect management Hot water treatment, irradiation, vapour heat treatment, chemical treatment and use of bio agents.

Unit V: Preservation

Practical

Reference
7. Sumanbhatti and Uma Varma. 1995. Fruit and vegetable processing. CBS publishers and distributors, New Delhi
Practical

Soft skills and hard skills – career skills and corporate skills – lateral thinking - ego styles – different types – on being a professional.

Attitude - Psychological and Sociological definitions – types of attitude (positive and negative) and consequences – suggestions to keep a good attitude. Emotional Intelligence - Introduction and Definitions – four branch model of EQ and its detailed explanation - five point scale to measure EI – suggestions to improve EI. Inter personal skills - Study of character traits - discussion of formal interpersonal skills like greeting, enquiring, answering, complimenting and acknowledging. Self Development/Empowerment - Self awareness and motivation – Maslow's theory of hierarchy and needs - Self analysis through SWOC and Johari Window – Elements and seven rules of motivation – Goal setting based on principle of SMART – Strategies of self motivation – Knowledge enhancing through reading of Newspapers, magazines and journals.


Corporate Skills - Definition - basic requirements – ( responsibility - self – knowledge - knowledge of, and rapport with subordinates- knowledge of the assignment- goal setting- decision making – team work ) leadership with primates – leadership and vision. Select definitions – functions of negotiation – two kinds of negotiation – phases of the process – rules – steps to improve negotiation skills. Basic

References
VII SEMESTER COURSES
Practical:
During RAWE programme, the students will be placed in villages, Department of Agriculture / KVKs / Research Stations, industries and non-government organizations (NGOs) for a period of 16 weeks as given below.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Programme</th>
<th>Duration (weeks)</th>
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<tbody>
<tr>
<td>1.</td>
<td>Orientation</td>
<td>1</td>
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<td>2.</td>
<td>Village attachment</td>
<td>8</td>
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<tr>
<td>3.</td>
<td>Attachment with Department of Agriculture / KVK</td>
<td>2</td>
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<td>4.</td>
<td>Attachment with industries</td>
<td>2</td>
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<tr>
<td>5.</td>
<td>Attachment with NGOs</td>
<td>2</td>
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<tr>
<td>6.</td>
<td>Project report preparation, exhibition and evaluation</td>
<td>1</td>
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<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>16</strong></td>
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Component I: Village attachment
- Study of rural situation – village settlement pattern, demography, climate, land utilization pattern, resources inventory, infrastructural facilities, rural institutions, organizations, groups, customs, beliefs and value systems
- Study of cropping pattern, cropping systems, extent of adoption of latest technologies and constraints – Yield gap – constraints in production
- Understanding social participation, leadership pattern, scientific orientation and role of women and youth in agricultural development
- Extension methods and Audio Visual Aids – Practicing individual, group and mass contact methods
- Studying the existing indigenous technical knowledge and its importance for technology generation.
- Knowing the communication pattern in villages
- Gathering the farm women’s association / farmers association / commodity groups and knowing their functioning and use their services for dissemination
- Conducting need based skill demonstrations in the village
- Developing Whole Village Development Plan
- Contacting individual farmers to assess the differential farming system practiced by marginal, small, medium, big farmers and Farm Women
- Preparation of Individual farm plan

Component II: Attachment with Department of Agriculture / KVK
- Study of Agricultural Department – Organization pattern, role and functions of Department of Agriculture and other allied departments
• Study of on-going agricultural development programmes of the agricultural and allied institutions.

• Participating in the extension activities of the agricultural and allied institutions.

Component III: Attachment with Industries
The students will undergo internship in any one of the following industries / companies.
• Food processing industries / units
• Sugar mills / Rice mills
• Seed industries / companies
• Fertilizer industries
• Pesticide industries
• Other agro-based industries

Component IV: Attachment with NGO
• Study of NGO – Roles and objectives – organization pattern – sources of funding – extension activities of NGO – Contacting target groups
• Study of SHG, Agri business, Agri clinic and documentation of success stories of the farmers
• Participating in the extension activities of the NGO’s.

PJN 401       ALL INDIA TOUR     0+2

The students will visit various National and International Institutions related to Agriculture, Horticulture, Forestry and other allied fields in various regions of the country. The students will gain first hand knowledge about different agro-climatic zones, crops grown, cultivation practices, socio-cultural and economic status of the farming communities in different parts of the country. The duration of the tour will be 15 days (institutional visits and intermediate journey) exclusive of onward and return journey.
VIII SEMESTER COURSES
EXP 401 AGRICULTURAL PROJECT ANALYSES 0+5

Offering Department: Agricultural Economics

Objective
To enable the students understand the concepts and techniques of evaluation of agricultural development programs and projects

Activities

Deliverables
Students who complete this course will gain enough confidence and technical knowledge on various aspects of agricultural project preparation and economics appraisal of agricultural projects

Suggested Reading

EXP 402 FARM PLANNING AND BUDGETING 0+5

Offering Department: Agricultural Economics

Objective
To expose the students to the concept, significance and uses of farm planning and budgeting.

Activities
Farm planning: importance, types, essential elements of farm planning, stages of farm planning, characteristic of good farm plan, Farm planning procedure. Visit the farm and prepare the farm plan based on the concepts of farm plan.

Farm Budgeting: definition and types- partial budgeting ,complete budgeting, enterprise budgeting- cash flow budgeting- limitation of budgeting. Visit the farm and workout the partial and complete budgeting.

Computation of cost concepts: collect the data from the farmers and workout the cost of cultivation and depreciation: depreciation, Methods of computation of depreciation; Analysis of Net worth statement, balance sheet, IRR, NPW.

Deliverables
Students who complete this course will be able to plan and budget for establishing commercial farms.

Suggested Reading

EXP 403  NATURAL RESOURCE ECONOMICS AND MANAGEMENT  0+5
Offering Department: Agricultural Economics

Objective  
To understand the issues and economic principles related to natural resource economics and management.

Activities  
Deliverables
Students who complete this course will be able to analyses the causes, consequences and ways of dealing with natural resources problems.

Suggested Reading

EXP 404   AGRICULTURAL MARKETING MANAGEMENT     0+5

Offering Department: Agricultural Economics

Objective
To impart adequate knowledge and analytical skills in addressing the issues of Agrl.marketing and enhance expertise in managing Agrl.marketing.

Activities

Marketing Strategy: Marketing strategy formulations- Key drivers of marketing strategies-Consumer marketing- Competitor analysis-Strategic marketing mix components.


Deliverables
The student who completes this course will be increase his/her skill and expertise in managing / marketing of agricultural commodities.
**Suggested Reading**


**EXP 405 BEHAVIOURAL SKILLS 0+5**

**Offering Department: Agricultural Extension**

**Objective**

To empower the students in order to strengthen them from within to emerge as competent individuals in any given situation and to make them better prepared to meet the challenging demands of the outside world and especially the corporate sector and thereby, to perform and excel well in their preferred career.

**Activities**

**Understanding self:** Employing self inventory Scale and Johari’s Window- Building self Esteem – Assessing self confidence level – Building self confidence – Assessing Self Motivation level – developing self motivation.

**Managing Self:** Emotional Intelligence – Self awareness – Self development – Social awareness – Relationship Management.

**Interpersonal skills:** Understanding IP traits – Learning the mannerisms of IP situations – Practicing the ways of improving the IP skills.

**Communication skills:** Learning the basics – working towards better communication – Understanding and using body language – Understanding and using gestures – Learning to listen – Asking Questions - Exchanging information – Making contact – Passing on information – Using phone – Using IT tools – Writing letter.

**Leadership skills:** Assessing leadership skills – Learning to lead – Leading others – Improving leading effectiveness.

**Team Building and Managing skills:** Understanding how team works – Setting up a team – Improving team efficiency – Rating team leadership skills.

**People management skills:** Developing basic people skills – Understanding people’s need – Building confidence in people – Gaining trust and Commitment.

**Deliverables**

By the completion of the Behavioural skills course, the students should be able to:
1. Develop all-round personalities with a mature outlook to function effectively in different circumstances.
2. Become self-confident individuals by mastering inter-personal skills, team management skills, and leadership skills and demonstrate effective communication and people management skills

**Suggested Reading**


**EXP 406 CYBER EXTENSION 0+5**

**Offering Department: Agricultural Extension**

**Objectives**

1. To learn the advanced developments in the field of communication and its applicability in agricultural extension.
2. To have an access to the recent developments in the area of agricultural communication like E-mail, Internet, E-journals, e-choupal, digital library etc.,
3. To enable students to gain hands-on-experience in planning, designing the cyber extension tools
4. To study various ICT projects which are successful in delivering the services to the clientele fulfilling the objective of Transfer of Technology

**Activities**

- Applicability of internets in transfer of technology
- Access to various kinds of available websites on agriculture and rural development
- ICTs projects, case studies in India and developing world
- ICT use in the field of extension
- Creation of website on agricultural communication
Creation of multimedia modules - Expert systems on selected crops and enterprises - Access to e-journals, availability in Internet - Access to video conferencing - Access to various on-line consultancy services - Access to global agriculture knowledge network and various CD-ROMS on Agriculture - Visit to Village Resource Centres (VRC) - Project on preparing Self learning Multi media CDs on package of practices, diseases and pest management.

**Deliverables**

Students will gain knowledge and skills in understanding the concepts of Cyber extension and how these tools can be used for Agricultural Extension. Besides, he studies various cyber extension projects which are successful in delivering the services to the clientele fulfilling the objective of Transfer of Technology. They will get hands on training in preparation of various teaching aids like leaflet, folders, web pages, ,power point, video conferencing, multimedia etc.,

**Suggested Reading**


**EXP 407 INTEGRATED FARMING SYSTEM 0+5**

 Offering Department: Agronomy

**Objective**

To enable students to gain hands-on-experience in commercial Integrated Farming System and to train the students in establishing a commercial IFS unit.

**Activities**

Farming systems models- Definition - Principles - Concepts - Enterprises selection and management - interaction between different enterprises- scope and advantages of Integrated Farming system -Study of models of Integrated Farming System-Wetland-Garden land- Dryland-Various components of IFS- related enterprise. Visit to different units: dairy, goat, poultry, fishery. Mushroom, sericulture and biogas - study on evaluation indicators on farming system - on farm field visit.

**Deliverables**

The student who completes this course will be able to establish and run integrated farm with various enterprises.
**Suggested Reading**

**EXP 408 DAIRY FARMING 0+5**

**Offering Department: Animal Husbandry**

**Objective**
To develop students as entrepreneurs and managers by providing hands on experience in all the aspects of dairy farming.

**Activities**

**Deliverables**
The student who completes this course will be able to establish and run a commercial dairy farm.

**Suggested Reading**

EXP 409 CAPRINE PRODUCTION AND MANAGEMENT 0+5

Offering Department: Animal Husbandry

Objective

To develop students as entrepreneurs and managers by providing hands on experience in all the aspects of goat production.

Activities


Deliverable

The student who completes this course will be able to establish and run commercial goat farm.

Suggested Reading

EXP 410  COMMERCIAL BROILER AND LAYER PRODUCTION  0+5

Offering Department: Animal Husbandry

Objective

To develop students as entrepreneurs and managers by providing hands on experience in all the aspects of broiler and layer farming.

Activities


Deliverable

The student who completes this course will be able to establish and run commercial broiler and layer farms.

Suggested Reading

Objective
To enable students to gain hands-on-experience in commercial micro-propagation and to train the students in establishing a commercial plant tissue culture unit.

Activities
Design for a commercial tissue culture laboratory – Stock solution and medium preparation – liquid and semi solid – Surface sterilization of different explants – Stage 1 – Aseptic culture establishment – Stage 2 – Multiple shoot induction and sub culturing for further multiplication – Stage 3 – Shoot elongation and Rooting of micro-shoots – Invitro and in vivo – Stage 4 – Hardening and field establishment of micropropagated plants – Visit to commercial Units – Project preparation – Target crops – Banana, Sugarcane, Bamboo, Rose, Chrysanthemum, Gerbera, Orchids or any other commercially important crop and rare medicinal plants.

Deliverables
Students who completes this course will gain enough confidence and technical skills to establish a plant tissue culture unit.

Suggested Reading
EXP 412  MOLECULAR BREEDING  0+5

Offering Department: Plant Breeding and Genetics

Objective
To enable students to gain knowledge and hands-on-experience in use of advanced molecular techniques for crop improvement.

Activities

Deliverables
Students who complete this course will gain enough knowledge, confidence and technical skills in handling various molecular techniques.

Suggested Reading

EXP 413  COMMERCIAL SEED PRODUCTION  0+5

Offering Department: Seed Science and Technology

Objective
To enable students to gain hand-on experience in commercial seed production and also to train the students to start a commercial seed production unit / farm.

Activities

**Deliverables**

Students who complete this course will gain enough confidence and technical skills to start a seed business.

**Suggested Reading**


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**EXP 414 **

**COMPOSTING TECHNOLOGY** 0+5

**Offering Department: Soil Science and Agricultural Chemistry**

**Objective**

To enable students to gain hands on experience in composting techniques and to train the students in establishing a commercial large scale composting unit.

**Activities**

Identification of raw materials, availability, types and segregation of wastes – Characterization – Preparation of Indore, Bangalore, Coimbatore method of composting – Windrow compost making – Vermicomposting – Acceleration of composting and enrichment of compost with bio-inoculants- Instrumentation techniques in compost analysis – Monitoring the changes during composting – Compost maturity analysis – Physical, Chemical and biological maturity tests – Quality standards – Economics of compost making and marketing – Field visit to small scale compost units – Agro-industrial composting sites and municipal waste composting – Preparation of large scale composting project.

**Deliverable**

The student who completes this course will gain enough skills and confidence to run commercial composting unit.

**Suggested Reading**

EXP 415 MANAGEMENT OF PROBLEMATIC SOILS AND WATER 0+5

Offering Department: Soil Science and Agricultural Chemistry

Objective
To educate students about basic concepts of problem soils and poor quality water and their management in relation to crop production.

Activities

Determination of physical parameters in soils with physical constraints - bulk density, porosity, aggregate stability, hydraulic conductivity and infiltration rate and their management.

Analysis of poor quality water and Determination of pH, EC - Total solids, Total dissolved solids and Total suspended solids - cations and anions in irrigation water - Estimation of BOD and COD and etc., in poor quality waters - quality appraisal in irrigation water.- management of poor quality water.

Deliverable
The student who completes this course will gain enough confidence in managing crop production activities with problematic soil and water resources.

Suggested Reading
3. USDA Handbook No. 60. 1954. Diagnosis and improvement of Saline and Alkali Soils. Oxford and IBH.
EXP 416     FARM ADVISORY ON SOIL HEALTH, WATER QUALITY AND PLANT NUTRITION   0+5

Offering Department: Soil Science and Agricultural Chemistry

Objective

This course aims to acquire skill in identifying farm level soil constraints and to offer suitable management technologies in the selected farm holdings. To prescribe balanced fertilization schedule, to assess the suitability of water for irrigation and to infuse confidence in offering farm advisory services.

Activities

Identification and Selection of farm holdings - Collection of soil samples, Assessment of soil quality indices and interpretation - Identifying soil constraints and Development of Soil Constraint Management Package (SCMP) - Assessment of the Land suitability for different crops - Water sample collection, quality assessment and assessing the land suitability for irrigation. Issue of Soil Health Card and Fertilizer prescription using DSSIFER software - Diagnosis of nutrient deficiencies using VDK software and corrective measures - Formulating the most viable farm plan for the selected farm holdings.

Deliverables

Students who complete this course will gain enough confidence and technical knowledge in establishing soil and plant health clinic.

Suggested Reading


Objective
To enable students to gain hands on experience in bee keeping and production of honey.

Activities


Deliverables
Students who complete this course will gain enough confidence as an entrepreneur in bee keeping and production of honey.

Suggested Reading
Objective
To enable students to gain hands on experience in silkworm rearing and production of silk

Activities
Sericulture—selection of suitable mulberry varieties for chawki rearing. Cultivation practices for producing chawki leaves—Identification of nutrient deficiency symptoms and pests and diseases of mulberry—pruning and harvesting in relation to feeding of chawki worm—Searing house—model house—low cost rearing house—disinfectants—disinfection techniques—rearing appliances for chawki rearing—Visit to grainage—egg production techniques—egg incubation—egg transportation—mother moth examination—acid treatment of eggs—physiological changes in egg by acid treatment—egg storage—hibernnation schedule—Mass multiplication techniques for predator, hyperparasites and antagonistic fungi of sericulture importance

Visit to cocoon market—fixing up of cocoon price—selection of cocoon as raw material—auction procedures—Visit to silk reeling centre—practicing various activities like stifling, cooking, reeling, rereeling, twisting, winding, bleaching, dyeing and weaving for developing entrepreneurship skill in reeling section


Deliverables
Students who complete this course will gain enough confidence as an entrepreneur in silkworm rearing and production of silk.

Suggested Reading
EXP 419  IPM FOR FIELD AND STORAGE PESTS  0+5

Offering Department: Agricultural Entomology

Objective
To enable students to gain hands on experience in identifying field and storage problems and their management

Activities
Types of pests. Study of the different types of symptoms of pests -population and damage levels, loss assessment. Agro ecosystem analysis – recording of data on weather parameters, other factors contributing to yield and yield attributes – finalizing and adoption of the IPM strategies in major crops.

Studies on the pests of stored products – biology, nature of damage, management-prophylactic, curative methods. Methods of domestic and commercial management of insect infestation on stored commodities. Storage structures-underground and above ground structures- rural, improved and modern. Post harvest management of field crop pests- fruit flies, stone weevil – visit to farmer’s fields and FCI godown.

Deliverables
Students who complete this course will gain enough confidence identifying field and storage pest problems and their management.

Suggested Reading

EXP 420  URBAN ENTOMOLOGY AND PEST MANAGEMENT  0+5

Offering Department: Agricultural Entomology

Objective
To enable students to gain hands on experience in urban pests and their management
Activities
Identification of major urban pests, vectors - storage pests in urban conditions - Identification of termite species and their habitats - Termites and ant eradication and preventive control – visit to termite control operation in buildings - rodent control techniques - storage pest control and fumigation - Moth and insect management in libraries and food storage - Pest control techniques in cattle, pet animals and poultry - Studies on insecticides and appliances for urban pest management - Visit to storage and cattle shed facilities - construction sites and vector management operations - visit to VCRC Puducherry.

Deliverables
Students who complete this course will gain enough confidence as an entrepreneur in relation to public health management

Suggested Reading

EXP 421       IDM FOR CROP DISEASES       0+5
Offering Department: Plant Pathology

Objective
To emphasize the importance and need of IDM in the management of diseases of important crops

Activities
Tools of disease management - components of integrated disease management - their limitations and implications - Application of biological, cultural, chemical and biocontrol agents, their compatibility and integration in IDM; demonstration of IDM in rice, rice fallow, pulses, cotton, sesame, groundnut, vegetable crops and fruit crops as project work

Deliverables
Students who complete this course will gain confidence to do consultancy service in IDM packages to farmers at field level.

Suggested Readings


EXP 422 MUSHROOM CULTIVATION 0+5

Offering Department: Plant Pathology

Objective
To develop mushroom cultivation skills for entrepreneurial activity.

Activities
Cultivation techniques of oyster, milky, paddy straw and button mushrooms – Problems in cultivation - Post harvest technology - Cost analysis and Project preparation- Agricultural Finance.

Deliverables
Students who complete this course will gain technical competence to run spawn and mushroom production unit independently.

Suggested Readings
Objective
To develop biocontrol agent and biopesticides production skills for entrepreneurial activity

Activities

Isolation and mass multiplication of fungal biocontrol agents (Trichoderma and VAM) and PGPR (Pseudomonas fluorescens and Bacillus subtilis) - Delivery systems - Quality parameter studies - Cost analysis and Project preparation - Specifications for establishing biocontrol laboratory - Agricultural Finance - Preparation of botanical pesticides and antiviral principles - Delivery systems.

Cost analysis and project preparation: Principles of enterprise management - preparation of agricultural project reports - project analysis and financial management - agricultural finance - source of finance - acquisition - ratio analysis - principles of costing - economics of farm enterprise - visit to biocontrol laboratory at KVK, Puducherry.

Deliverables
Students who complete this course will gain technical competence to start biocontrol agent production unit independently.

Suggested Readings

**EXP 424 BIOINOCULANTS PRODUCTION TECHNOLOGY 0+5**

**Offering Department: Agricultural Microbiology**

**Objective**

Understanding the principles of bioinoculants production technology; to update the knowledge on bioinoculants technology with current scenario and to impart entrepreneurship to the undergraduate students.

**Activities**

Production of various bioinoculants: nitrogenous bioinoculants - *Rhizobium, Azospirillum, Azotobacter, Glucanoacetobacter diazotrophicus, Azolla, Blue Green Algae*; phosphatic bioinoculants - phosphate solublisers AM fungi; PGPR- PPFM, Pseudomonas fluorescence. BIS/FCO standards for commercial bioinoculants production and quality testing of various bioinoculants. Application of bioinoculants to crops. Evaluation of plant response to bioinoculants application. Establishment of bioinoculants production unit: facilities and equipments required for laboratory scale, pilot scale and large scale production and marketing of products and project preparation.

1. To understand and gain practical knowledge on various techniques related to bioinoculants production and application methods.
2. To build confidence on planning enterpreneurial tasks for bioinoculants production.

**Deliverables**

The student who completes this course will gain skill and technical knowledge to start bio-inoculants production unit.

**Suggested Readings**

EXP 425      COMMERCIAL NURSERY TECHNOLOGY     0+5

Offering Department: Horticulture

Objective
To enhance the technical expertise related to propagation of commercial horticultural crops and to inculcate entrepreneurial capacity by providing hands on training and practical exposure for the students to effectively manage horticultural nurseries.

Activities
Types of nurseries and economical importance – Tools and implements – Different types of media – Practices in preparation of media for fruit plants – Flowering annuals, foliage and indoor plants – Containers for propagation – Seed propagation – Visit to community nurseries producing hybrid vegetable seedlings in pro trays – Visit to shade net houses to study cost of erection of net house – Calculating requirement and working out cost economics – Mother plant block or scion block establishment – Hands on training in preparation of various types of cuttings, layering, budding and grafting – Raising of root stocks - After care of propagated plants - Commercial propagation of horticultural crops – Mango, Sapota, Aonla, Guava, Jasmine, foliage ornamental plants, important flowering climbers, ornamental trees – Maintenance of records in nursery – Project preparation for the establishment of commercial nursery.

Deliverables
Students who complete this course will gain confidence and technical skills to establish a commercial nursery.
Suggested Readings


EXP 426  ORNAMENTAL GARDENING AND LANDSCAPING  0+5

Offering Department: Horticulture

Objective
To equip students in identifying various landscape elements and application in landscape designing

Activities

Deliverables
Students on completing the course will become professionals in landscaping home and other gardens of public importance

Suggested Readings

1. Arora, J.S.Introductory Ornamental Horticulture
Objectives
1. Understanding the principles and theoretical aspects of protected cultivation of high value vegetable crops
2. Developing skills in erection of protected structures and cultivation of vegetable crops

Activities
Study of various protected structures, importance and function – Location, planning and various components of green house – Layout and erection of different types of structures – Green house heating, cooling, shading and ventilation system – CO2 generation and monitoring – Lighting systems – Growing of vegetables crops i.e. Tomato, Cucumber, Capsicum, Lettuce – Containers and substrates – Soil sterilization – Drip and fertigation system – Water and nutrient management – Weed management – Special horticultural practices i.e. training and pruning – IPM & IDM – Harvest indices – Harvesting techniques, post harvest handling techniques – visit to commercial vegetables production units – Project preparation to establish a commercial green house.

Deliverables
Students who complete this course will gain confidence and technical skills to establish a commercial green house.

Suggested Readings