### ELECTIVE OPTION: SOIL SCIENCE

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B.Sc. Agriculture (Hons.) Syllabus (7th & 8th Semester) for 2018-19 & 2019-20

Outline of the Syllabus for Semester-VIII
B.Sc. Agriculture (Hons.) Course (Semester System)
Semester-VIII

**ELECTIVE OPTION: SOIL SCIENCE**

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### Outline of the Syllabus for Semester-VII

**B.Sc. Agriculture (Hons.) Course (Semester System)**

**Semester-VII**

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## Outline of the Syllabus for Semester-VIII

### B.Sc. Agriculture (Hons.) Course (Semester System) -VIII

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### Outline of the Syllabus for Semester-VII

**B.Sc. Agriculture (Hons.) Course (Semester System)**

**Semester-VII**

#### ELECTIVE OPTION: AGRONOMY

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**Outline of the Syllabus for Semester-VIII**  
**B.Sc. Agriculture (Hons.) Course (Semester System)**  
**Semester-VIII**

### ELECTIVE OPTION: AGRONOMY

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### Outline of the Syllabus for Semester-VII
B.Sc. Agriculture (Hons.) Course (Semester System)

#### SEMESTER-VII

**ELECTIVE OPTION: GENETICS AND PLANT BREEDING**

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Outline of the Syllabus for Semester-VIII
B.Sc. Agriculture (Hons.) Course (Semester System)
Semester-VIII

**ELECTIVE OPTION: GENETICS AND PLANT BREEDING**

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Mata Gujri College
Sri Fatehgarh Sahib
(An Autonomous College)
Affiliated to Punjabi University Patiala
Syllabus
For
B. Sc. Agriculture (Honors) Second Year
(8th Semester)

Academic Session 2018-2019 & 2019-20
B. Sc. Agriculture (Honors) Syllabus (4th Semester) for 2018-19 & 2019-20

B.Sc. AGRICULTURE (HONS.) VII SEMESTER

Gen.701: PRINCIPLES OF PLANT BIOTECHNOLOGY

Time: 3 Hours
Max. Marks: 75
Periods per Week: 3+1
Theory: 50
External Assessment: 40
Internal Assessment: 10
Practical: 25

Instructions for the Paper Setters

The question paper will consist of three sections A, B and C. Section A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

UNIT I

Concepts of Plant Biotechnology: History of Plant Tissue Culture and Plant Genetic Engineering; Scope and importance in Crop Improvement: Totipotency and Morphogenesis, Techniques of In-vitro cultures, Micro propagation. Introduction of anther culture, Pollen culture, Ovule culture, Embryo culture, Test tube fertilization, Endosperm culture.

UNIT II


Practical

1. Requirements for Plant Tissue Culture Laboratory;
2. Techniques in Plant Tissue Culture;
3. Media components and preparations;
4. Sterilization techniques and Inoculation of various explants; Aseptic manipulation of various explants;
5. Anther, Embryo and Endosperm culture;
6. Demonstration of Isolation of DNA.
7. Demonstration of gel-electrophoricsis techniques.

**Suggested Readings**

B.Sc. AGRICULTURE (HONS.) VII SEMESTER
Gen.702 FUNDAMENTALS OF FARM BUSINESS MANAGEMENT

Time: 3 Hours
Max. Marks: 75
Periods per Week: 3+1
Theory: 50
External Assessment: 40
Internal Assessment: 10
Practical: 25

Instructions for the Paper Setters
The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

UNIT I

UNIT II
reports for various activities in agriculture and allied sectors: Dairying, poultry, fisheries, agro-industries etc.

**Practical**

1. Study of input markets: seed, fertilizers, pesticides.
2. Study of output markets, grains, fruits, vegetables, flowers.
3. Study of product markets, retail trade commodity trading, value added products.
4. Study of financing institutions cooperatives commercial banks, RRBs, Agribusiness Finance Limited, NABARD; Preparations of projects.

**Suggested Reading**

B.Sc. AGRICULTURE (HONS.) VII SEMESTER

Soil.702 MANAGEMENT OF PROBLEMATIC SOIL AND WATER

Time: 3 Hours
Max. Marks: 75
Periods per Week: 3+1
Theory: 50
External Assessment: 40
Internal Assessment: 10
Practical: 25

Instructions for the Paper Setters

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

Unit I

Area and distribution of problem soils – acidic, saline, sodic and physically degraded soils; origin and basic concept of problematic soils, and factors responsible. Morphological features of saline, sodic and saline-sodic soils; characterization of salt-affected soils - soluble salts, ESP, pH; physical, chemical and microbiological properties.

Unit II

Management of salt-affected soils; salt tolerance of crops - mechanism and ratings; monitoring of soil salinity in the field; management principles for sandy, clayey, red lateritic and dry land soils. Reclamation of problematic soils.

Practical

2. Determination of cations (Na⁺, K⁺, Ca²⁺ and Mg²⁺) in ground water and soil samples.
3. Determination of anions (Cl⁻, SO₄²⁻, CO₃²⁻ and HCO₃⁻) in ground waters and soil samples.
4. Lime and gypsum requirements of acid and sodic soils.
Suggested Reading

B.Sc. AGRICULTURE (HONS.) VII SEMESTER

Soil.701: INTRODUCTION TO SOIL

Time: 3 Hours
Max. Marks: 75
Periods per Week: 3+1
Theory: 50
External Assessment: 40
Internal Assessment: 10
Practical: 25

Instructions for the Paper Setters

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

Unit I


Unit II

Practical

1. Collection and processing of soil sample.
2. Identification of rocks and minerals.
3. Determination of bulk density and particle density,
4. Soil moisture determination,
5. Soil moisture constants – Field capacity, permanent wilting point,
6. Maximum Water holding, capacity Infiltration rate,
7. Soil texture and mechanical analysis of soil by hydrometer and pipet method,
8. Soil temperature, Soil analysis for CEC, pH, EC, soluble cations & anions.

Suggested Reading

B.Sc. Agriculture (Honors) VII Semester

SOILS.703: SOIL AND PLANT ANALYSIS

Time: 3 Hours
Max. Marks: 75
Periods per Week 3+1
Theory: 50
External Assessment: 40
Internal Assessment: 10
Practical: 25

Instructions for the Paper Setters

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

Unit I


Unit II


Practical

2. Determination of water holding capacity and hydraulic conductivity of soil.
3. Estimation of moisture content of soils and plants.
4. Determination of pH, electrical conductivity, sodium adsorption ratio and exchangeable sodium percentage of soils.
5. Enumeration of soil microbes.
8. Soil fertility evaluation by Neubauer technique.

**Suggested Readings**

**B. Sc. Agriculture (Honors) Syllabus (4th Semester) for 2018-19 & 2019-20**

**B.Sc. AGRICULTURE (HONS.) VIII SEMESTER**

**Soil.704 ORGANIC FARMING AND SOIL HEALTH**

Time: 3 Hours  
Max. Marks: 75  
Periods per Week: 3+1  
Theory: 50  
External Assessment: 40  
Internal Assessment: 10  
Practical: 25

**Instructions for the Paper Setters**

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

**Theory**

**Unit I**


**Unit II**

Practical

1. Sampling of manure materials - moisture determination, bulk density, pH, E.C,
2. Estimation of organic carbon, total nitrogen, C:N ratio, phosphorus and potassium in manures/compost.
3. Estimation of heavy metals.
4. Preparation of soil samples for chemical and biological tests
5. Determination of soil biological activity by monitoring dehydrogenase activity.
6. Determination of urease activity in soil
7. Study of cellulose decomposition and CO2 evolution.

Suggested readings

ELECTIVE- AGRONYM
B.Sc. AGRICULTURE (HONS.) VII SEMESTER

Gen.701: PRINCIPLES OF PLANT BIOTECHNOLOGY

Time: 3 Hours
Max. Marks: 75
Periods per Week: 2+1
Theory: 50
External Assessment: 40
Internal Assessment: 10
Practical: 25

Instructions for the Paper Setters
The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

UNIT I

Concepts of Plant Biotechnology: History of Plant Tissue Culture and Plant Genetic Engineering; Scope and importance in Crop Improvement: Totipotency and Morphogenesis, Techniques of In-vitro cultures, Micro propagation. Introduction of anther culture, Pollen culture, Ovule culture, Embryo culture, Test tube fertilization, Endosperm culture.

UNIT II


Practical

1. Requirements for Plant Tissue Culture Laboratory;
2. Techniques in Plant Tissue Culture;
3. Media components and preparations;
4. Sterilization techniques and Inoculation of various explants;
5. Aseptic manipulation of various explants; Anther,
6. Embryo and Endosperm culture; Demonstration of Isolation of DNA.
7. Demonstration of gel-electrophoresis techniques.

Suggested Readings

B.Sc. AGRICULTURE (HONS.) VII SEMESTER

Gen.702 FUNDAMENTALS OF FARM BUSINESS MANAGEMENT

Time: 3 Hours
Max. Marks: 75
Periods per Week: 3+1
Theory: 50
External Assessment: 40
Internal Assessment: 10
Practical: 25

Instructions for the Paper Setters

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

Unit I

Unit II
Practical
1. Study of input markets: seed, fertilizers, pesticides.
2. Study of output markets, grains, fruits, vegetables, flowers.
3. Study of product markets, retail trade commodity trading, value added products.
4. Study of financing institutions cooperatives commercial banks, RRBs,
5. Agribusiness Finance Limited, NABARD;
6. Preparations of projects.

Suggested Reading
B. Sc. Agriculture (Honors) Syllabus (4th Semester) for 2018-19 & 2019-20

B.Sc. AGRICULTURE (HONS.) VII SEMESTER

AGRON 701- PRINCIPLES OF AGRONOMY

Time: 3 Hours
Max. Marks: 75
Periods per Week: 3+1
Theory: 50
External Assessment: 40
Internal Assessment: 10
Practical: 25

Instructions for the Paper Setters

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

Unit I


Unit II


Practical

1. Estimation of crop yield on the basis of yield attributes
2. Formulation of cropping schemes for various farm sizes
3. Calculation of cropping and rotational intensity.

Suggested Reading


B.Sc. AGRICULTURE (HONS.) VII SEMESTER

AGRON. 703- MODERN CONCEPTS IN CROP PRODUCTION

Time: 3 Hours
Max. Marks: 75
Periods per Week: 3+1
Theory: 50
External Assessment: 40
Internal Assessment: 10
Practical: 25

Instructions for the Paper Setters

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

Unit I

Crop growth analysis in relation to environment. Inverse yield nitrogen law; Mitscherlich and Baule unit. Effect of lodging in cereals; optimization of plant population and planting geometry, concept of ideotype of plant and crop modeling for desired crop yield.

Unit I

Scientific principles of crop production; concept of soil plant relations; yield and environmental stress. Integrated farming systems, organic farming, and resource conservation technology including modern concept of tillage; dry farming; determining the nutrient needs for yield potentiality of crop plants, and integrated nutrient management; precision agriculture. Hydroponics and Aeroponics.

Suggested Reading

B.Sc. AGRICULTURE (HONS.) VIII SEMESTER

Soil.702: ORGANIC FARMING AND SOIL HEALTH

Time: 3 Hours
Max. Marks: 75
Periods per Week: 3+1
Theory: 50
External Assessment: 40
Internal Assessment: 10
Practical: 25

Instructions for the Paper Setters

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

Unit I


Unit II


Practical

1. Sampling of manure materials
2. Determination of moisture, bulk density
4. Estimation of total nitrogen, phosphorus and potassium in manures/ compost.
5. Estimation of heavy metals.
6. Preparation of soil samples for chemical and biological tests
7. Determination of soil biological activity by monitoring dehydrogenase activity.
8. Study of cellulose decomposition and CO2 evolution.

Suggested Readings

B. Sc. Agriculture (Honors) Syllabus (4th Semester) for 2018-19 & 2019-20

B.Sc. AGRICULTURE (HONS.) VIII SEMESTER

AGRON. 704- DRYLAND FARMING AND WATERSHED MANAGEMENT

Time: 3 Hours
Max. Marks: 75
Periods per Week 2+1
Theory: 50
External Assessment: 40
Internal Assessment: 10
Practical: 25

Instructions for the Paper Setters

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

Unit I

Definition, concept, classification, and characteristics of dry land farming. Constraints limiting crop production in dry land areas; Drought: definition, types. Characterization of environment for water availability; crop planning for erratic and aberrant weather conditions. Adaptation of crop plants to drought, drought management strategies; Mid contingent plan for aberrant weather conditions.

Unit II

Tillage, tilth, and depth of cultivation, compaction in soil tillage; concept of conservation tillage; tillage in relation to weed control and moisture conservation; techniques and practices of soil moisture conservation (use of mulches, kinds, effectiveness and economics); antitranspirants, evaporation retardants, soil and crop management techniques, seeding and efficient fertilizer use. Watershed: Concept, components, problems, and management.

Practical

1. Seed treatment, seed germination and crop establishment in relation to soil moisture contents
2. Moisture stress effects and recovery behaviour of important crops.
3. Estimation of moisture index and aridity index.
4. Preparation of crop plans for different drought conditions
5. Study of field experiments relevant to dry land farming
6. Visit to dry land research stations and watershed projects.

Suggested Readings
ELECTIVE GENETICS & PLANT BREEDING

B.Sc. AGRICULTURE (HONS.) VII SEMESTER

Gen.701: PRINCIPLES OF PLANT BIOTECHNOLOGY

Time: 3 Hours
Max. Marks: 75
Periods per Week: 3+1
Theory: 50
External Assessment: 40
Internal Assessment: 10
Practical: 25

Instructions for the Paper Setters

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

Unit I

Concepts of Plant Biotechnology: History of Plant Tissue Culture and Plant Genetic Engineering; Scope and importance in Crop Improvement: Totipotency and Morphogenesis, Techniques of In-vitro cultures, Micro propagation. Introduction of anther culture, Pollen culture, Ovule culture, Embryo culture, Test tube fertilization, Endosperm culture. Somaclonal variation, Somatic embryogenesis and synthetic seed.

Unit II

Protoplast isolation, Culture, Manipulation and Fusion; Products of somatic hybrids and cybrids, Applications in crop improvement. Genetic engineering; Restriction enzymes. Transgenic plants and their applications. Blotting techniques – DNA finger printing – DNA based markers – RFLP, AFLP, RAPD, SSR. MAS and its application in crop improvement.

Practical

1. Requirements for Plant Tissue Culture Laboratory;
2. Techniques in Plant Tissue Culture;
3. Media components and preparations;
4. Sterilization techniques and Inoculation of various explants;
5. Aseptic manipulation of various explants;
6. Anther, Embryo and Endosperm culture;
7. Demonstration of Isolation of DNA.
8. Demonstration of gel-electrophoresis techniques.

Suggested Readings

BSc. AGRICULTURE (HONS.) VII SEMESTER
Gen.702 FUNDAMENTALS OF FARM BUSINESS MANAGEMENT

Time: 3 Hours
Max. Marks: 75
Periods per Week: 3+1
Theory: 50
External Assessment: 40
Internal Assessment: 10
Practical: 25

Instructions for the Paper Setters
The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

UNIT I

UNIT II
Practical

1. Study of input markets: seed, fertilizers, pesticides.
2. Study of output markets, grains, fruits, vegetables, flowers.
3. Study of product markets, retail trade commodity trading, value added products.
4. Study of financing institutions cooperatives commercial banks, RRBs, Agribusiness Finance Limited, NABARD; Preparations of projects.

Suggested Reading

B.Sc. AGRICULTURE (HONS.) VII SEMESTER

GPB 701 PRINCIPLES OF GENETICS

Time: 3 Hours
Max. Marks: 75
Periods per Week: 3+1
Theory: 50
External Assessment: 40
Internal Assessment: 10
Practical: 25

Instructions for the Paper Setters

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

Unit I

Genetics; definition and history, Early concepts of Inheritance; Mendel's laws; Chromosomal theory of inheritance; Multiple alleles; Gene interactions; Sex determination, differentiation and sex-linkage; Sex-influenced and sex limited traits; Linkage. Extra chromosomal inheritance; Nature, structure and replication of the genetic material.

Unit II

Genetic fine structure analysis; Split genes; Transposable genetic elements; Overlapping genes, Pseudogenes. Regulation of gene, mutation and mutagenesis, transposable (Tn) elements; gene expression and regulation in eukaryotes; DNA and its structure. Population- Mendelian population, random mating population.

Practical

1. Demonstration of genetic principles.
2. Chromosome mapping using three point test cross.
3. Induction and detection of mutations through genetic tests;
4. DNA extraction
5. Visit to experimental farm, glasshouse and learning some practical considerations.
Suggested Readings:

B.Sc. AGRICULTURE (HONS.) VII SEMESTER

GPB 702 PRINCIPLES OF PLANT BREEDING

Time: 3 Hours
Max. Marks: 75
Periods per Week: 3+1
Theory: 50
External Assessment: 40
Internal Assessment: 10
Practical: 25

Instructions for the Paper Setters

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

Unit I

History of Plant Breeding (Pre and post Mendelian era), Principles and objectives of plant breeding. Patterns of Evolution in Crop Plants- Centres of Origin-biodiversity and its significance; maintenance breeding, Plant breeders’ rights and regulations for plant variety protection and farmers rights. Plant introduction and role of plant genetic resources in plant breeding.

Unit II

Pure line theory; pure line selection and mass selection methods pedigree, bulk, backcross, single seed descent and multiline method; Special breeding techniques- Mutation breeding, Breeding for abiotic and biotic stresses. Self-incompatibility and male sterility in crop plants; concept of plant ideotype and its role in crop improvement.

Practical

1. Floral biology in self and cross pollinated species,
2. Selfing and crossing techniques in field crop.
3. Selection methods in segregating populations and evaluation of breeding material.
5. Learning techniques in hybrid seed production using male-sterility in field crops.

Suggested Readings

B.Sc. AGRICULTURE (HONS.) VIII SEMESTER

GPB 703 PRINCIPLES OF CYTOGENETICS

Time: 3 Hours
Max. Marks: 75
Periods per Week: 3+1
Theory: 50
Practical: 25

Instructions for the Paper Setters

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

Unit I

Architecture of chromosome in prokaryotes and eukaryotes; Chromonemata, chromosome matrix, chromomeres, centromere, secondary constriction and telomere
Artificial chromosome construction and its uses; Special types of chromosomes
Chromosomal theory of inheritance– Cell Cycle and cell division– mitosis and meiosis.

Unit II

Structural and Numerical variations of chromosomes and their implications -Symbols and terminologies for chromosome numbers- euploidy- haploids, diploids and polyploids; Polyploidy and role of polyploids in crop breeding; Role of aneuploids in basic and applied aspects of crop breeding; Apomixis: Synthesis of new crops (wheat, triticale and brassica)

Practical

1. Learning the cytogenetics laboratory, various chemicals to be used for fixation, dehydration, embedding, staining, cleaning etc.
2. Microscopy: various types of microscopes.
3. Studies on the course of mitosis in wheat, pearl millet.
4. Studies on the course of mitosis in onion.
5. Studies on the course of meiosis in cereals, millets and pulses
6. Studies on the course of meiosis in oilseeds and forage crops
7. Studies on anther culture and ovule culture.
Suggested Readings

B.Sc. AGRICULTURE (HONS.) VIII SEMESTER

GPB 704 FUNDAMENTAL OF SEED TECHNOLOGY

Instructions for the Paper Setters

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

Unit I

Variety Development and Maintenance- Define variety, cultivar, extant variety, essentially derived variety, independently derived variety, reference variety, farmers variety, hybrid, and population. Mode of pollination and reproduction in crop plants, generation system of seed multiplication; Hybrid Seed- Methods of development of hybrids; use of male sterility and self-incompatibility and CHA in hybrid seed production.

Unit II

One, two and three line system; Quality seed production technology of self and cross-pollinated crop varieties viz. cereals & millets (wheat, paddy, pearl millet, maize); pulses (greengram, blackgram, cowpea, pigeonpea, lentil); oilseeds (groundnut, linseed, rapeseed and mustard); fibres (cotton, jute) and vegetables (tomato, brinjal, capsicum, okra ).

List of Practical’s

1. Planning of Seed Production
2. Ear-to-row method and nucleus seed production
3. Main characteristics of released and notified varieties, hybrids and parental lines
4. Determination of isolation distance and planting ratios in different crops
5. Seed production techniques in different crops
6. Hybrid seed production technology of important crops
7. Hand emasculation and pollination in vegetables
8. Detasseling in Corn
9. Visits to seed production plots

Suggested Readings
ELECTIVE - HORTICULTURE
B.Sc. AGRICULTURE (HONS.) VII SEMESTER

Gen.701: PRINCIPLES OF PLANT BIOTECHNOLOGY

Time: 3 Hours
Max. Marks: 75
Periods per Week: 3+1
Theory: 50
External Assessment: 40
Internal Assessment: 10
Practical: 25

Instructions for the Paper Setters
The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

Unit I

Concepts of Plant Biotechnology: History of Plant Tissue Culture and Plant Genetic Engineering; Scope and importance in Crop Improvement: Totipotency and Morphogenesis, Techniques of In-vitro cultures, Micropropagation. Introduction of anther culture, Pollen culture, Ovule culture, Embryo culture, Test tube fertilization, Endosperm culture. Somaclonal variation, Somatic embryogenesis and synthetic seed.

Unit II

Protoplast isolation, Culture, Manipulation and Fusion; Products of somatic hybrids and cybrids, Applications in crop improvement. Genetic engineering; Restriction enzymes. Transgenic plants and their applications. Blotting techniques—DNA finger printing—DNA based markers—RFLP, AFLP, RAPD, SSR. MAS and its application in crop improvement.

Practical

1. Requirements for Plant Tissue Culture Laboratory;
2. Techniques in Plant Tissue Culture;
3. Media components and preparations;
4. Sterilization techniques and Inoculation of various explants;
5. Anther, Embryo and Endosperm culture;
6. Demonstration of Isolation of DNA.
7. Demonstration of gel-electrophoricsis techniques.

Suggested Readings

B.Sc. AGRICULTURE (HONS.) VII SEMESTER
Gen.702 FUNDAMENTALS OF FARM BUSINESS MANAGEMENT

Time: 3 Hours
Max. Marks: 75
Periods per Week: 3+1
Theory: 50
External Assessment: 40
Internal Assessment: 10
Practical: 25

Instructions for the Paper Setters

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

UNIT I

UNIT II
Practical
1. Study of input markets: seed, fertilizers, pesticides.
2. Study of output markets, grains, fruits, vegetables, flowers.
3. Study of product markets, retail trade commodity trading, value added products.
4. Study of financing institutions cooperatives commercial banks, RRBs, Agribusiness Finance Limited, NABARD;
5. Preparations of projects.

Suggested Reading
B. Sc. Agriculture (Honors) Syllabus (4th Semester) for 2018-19 & 2019-20

B.Sc. AGRICULTURE (HONS.) VII SEMESTER

ELECTIVE - HORTICULTURE

HORT. 701 INTRODUCTORY HORTICULTURE

Time: 3 Hours
Max. Marks: 75
Periods per Week 3+1
Theory: 50
External Assessment: 40
Internal Assessment: 10
Practical: 25

Instructions for the Paper Setters

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

Unit I


Unit II


List of Practical’s

2. Calculation of fertilizer doses
3. Preparation of vermicompost unit.
4. Preparation of standard solutions.
5. Calculation of irrigation requirement.
6. Dormancy breaking methods.
7. Weed management and types of mulching.
8. Identification of different horticultural crops.

**Suggested Readings:**

B.Sc. AGRICULTURE (HONS.) VII SEMESTER

HORT. 702 PROTECTED CULTIVATION OF HORTICULTURAL CROPS

Time: 3 Hours
Max. Marks: 75
Periods per Week 3+1
Theory: 50
External Assessment: 40
Internal Assessment: 10
Practical: 25

Instructions for the Paper Setters
The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

Unit I

Unit II

Practicals:
1. Designs of greenhouse, low cost poly tunnels, nethouse.
2. Regulation of light, temperature, humidity in greenhouses.
4. Greenhouse cooling systems.
5. Ventilation systems.
6. Fertigation systems.
7. Project preparation for greenhouses.
8. Visit to greenhouses.
Suggested Readings:

2. Riley, Robb Hall, Cornell University, Ithaca, New York.
5. Mears DR, Kim MK & Roberts WJ. 1971. Structural Analysis at an Experimental Cable-supported Air Inflated Green Houses. Trans.ASAE.
Instructions for the Paper Setters

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

Unit I

Definition and Importance of postharvest technology, maturity and ripening, Principles of Post harvest Technology, quality management for fresh fruits, vegetables and flowers marketing, storage of fruits, vegetables and flowers - ventilated, refrigerated, MAS, CA, evaporative cold storage, fruit and vegetable processing, canning of Fruits and Vegetables. Irradiation, packaging of fresh and processed fruit and vegetable products, fruit and vegetable based products- Squash, RTS, Syrup, tomato puree, paste, ketchup, sauces, Jam, Jellies, Marmalade and candied fruit, principal and methods of preservation.

Unit II

Layout and establishment of processing industry, FPO licence, quality assurance and quality control, TQM, GMP, Food standards – FPO, PFA, etc. Food laws and regulations, Food safety – Hazard analysis and critical control points (HACCP), Utilization of fruit and vegetable processing waste. Drying and dehydration of fruits, vegetables and flowers.

List of Practical’s

1. Physiological loss in weight of fruits and vegetables
2. Improved packing and storage of important horticultural commodities
3. Preparation and analysis of syrups and Brines for the preservation of fruits and vegetables.
4. Preparation of fruits and vegetable products e.g. Jam, jellies, marmalades, ketchup and sauces.
5. Collection of different type of packaging materials for solid and liquid food
6. Sensory evaluation of fresh and processed fruits and vegetables
7. Visit to cold storage and Processing units
8. Project preparation for fruits and vegetable products

**Suggested Readings**

5. FAO. *CODEX Alimentarius*: Joint FAO/WHO Food Standards Programme. 2nd Ed. Vol. VB. *Tropical Fresh Fruits and Vegetables*. FAO.
6. FAO. *Food Quality and Safety Systems – Training Manual on Food Hygiene and HACCP*. FAO.
B.Sc. AGRICULTURE (HONS.) VIII SEMESTER

HORT. 704: PROPAGATION AND NURSERY MANAGEMENT

Time: 3 Hours
Max. Marks: 75
Periods per Week 3+1
Theory: 50
External Assessment: 40
Internal Assessment: 10
Practical: 25

Instructions for the Paper Setters

The question paper will consist of three sections A, B and C. Section-A and B will have four questions from the respective sections of the syllabus and carry 6 marks each. Section - C will consist of 12 short answer type questions which will cover the entire syllabus uniformly and will carry ½ marks for each. Candidates are required to attempt two questions each from sections A and B of the question paper and the entire Section-C.

Theory

Unit I


Unit II


Practical

1. Model preparation of propagation structures
2. Cutting, Layering , Budding, Grafting
3. Commercial methods of raising of nursery for important fruits, vegetables and flower crops
4. Propagation Tools
5. Micro propagation, media preparation
6. Explant preparation, culturing and Hardening
7. Meristem culture
8. Visit to TC labs and Commercial nurseries.

**Suggested Readings:**