FACULTY OF LIFE SCIENCES

CURRICULUM AND SCHEME OF EXAMINATIONS: 2020- 21

For

B.Sc. (Hons.) Agriculture
(Semester- III-VI)

(Under Continuous Evaluation Grading System)

The Heritage Institution

KANYA MAHA VIDYALAYA JALANDHAR (Autonomous)

Kanya Maha Vidyalya, Jalandhar (Autonomous)

CURRICULUM AND SCHEME OF EXAMINATIONS OF FOUR YEAR DEGREE PROGRAMME

Bachelor of Science (Honours.) Agriculture

Session- 2020-21

Semester III

Course code	Course Name	Course Type	Marks				Examination time (in hours)
			Total	Mode of Assessment			
				External		Internal	
				L	P	CA	
BACL-3011	Problematic Soils and their Management	C	50	40	0	10	3
BACM-3012	Fundamentals of Plant Breeding	C	75	40	20	15	3+3
BACM-3013	Introductory Agro-meteorology and Climate Change	C	50	25	15	10	3+3
BACM-3014	Production Technology For Vegetables and Spices	C	50	25	15	10	3+3
BACM-3015	Principles of Seed Technology	C	75	20	40	15	3+3
BACM-3016	Crop Production Technology-I (*Kharif Crops*)	C	50	25	15	10	3+3
BACM-3177	Agricultural Finance and Co-operation	C	75	40	20	15	3+3
BACM-3178	Statistical Methods	C	50	25	15	10	3+3
BACM-3229	Environmental Studies and Disaster Management	C	75	40	20	15	3+3
SECG-3532	*Gender Sensitization	AC	25	10	10	5	1
			550				

C-Compulsory
AC-Audit Course

Bachelor of Science (Honours.) Agriculture (Session: 2020-21)

Semester IV

Course code	Course Name	Course Type	Marks				Examination time (in hours)
			Total	Mode of Assessment			
				External		Internal	
				L	P	CA	
BACL-4011	Farming System & Sustainable Agriculture	C	25	20	-	5	3
BACM-4012	Production Technology for Ornamental crops, MAP & Landscaping	C	50	25	15	10	3+3
BACM-4013	Renewable Energy & Green Technology	C	50	25	15	10	3+3
BACM-4014	Production Technology For Fruits & Plantation Crops	C	50	25	15	10	3+3
BACM-4015	Farm Machinery & Power	C	50	25	15	10	3+3
BACM-4016	Crop Production Technology-II (*Rabi Crops*)	C	50	25	15	10	3+3
BACM-4017	Livestock & Poultry Management	C	100	60	20	20	3+3
BACM-4128	Agri Informatics	C	50	25	15	10	3+3
BACM-4099	Agricultural Marketting, Trade & Prices	C	75	40	20	15	3+3
	Elective Courses						
BACM-4010 (OPT-I)	Biopesticides & Biofertilizers/	E	75	40	20	15	3+3
BACM-4010 (OPT-II)	Landscaping	E	75	40	20	15	3+3
			575				

Bachelor of Science (Honours.) Agriculture (Session: 2020-21)

Semester V

Course code	Course Name	Course Type	Marks				Examination time (in hours)
			Total	Mode of Assessment			
				External		Internal	
				L	P	CA	
BACM-5011	Crop Improvement-I (*Kharif Crops*)	C	50	25	15	10	3+3
BACM-5012	Principles of Integrated Pest and Disease Management	C	75	40	20	15	3+3
BACM-5013	Manures, Fertilizers and Soil Fertility Management	C	75	40	20	15	3+3
BACM-5014	Pests of Crops and Stored Grain and their Management	C	75	40	20	15	3+3
BACM-5015	Diseases of Field and Horticultural Crops and their Management -I	C	75	40	20	15	3+3
BACM-5016	Post-harvest Management and Value Addition of Fruits and Vegetables	C	50	25	15	10	3+3
BACM-5017	Principles of Organic Farming	C	50	25	15	10	3+3
	Elective Courses						
BACM-5018 (OPT-I)	Mushroom Cultivation	E	75	40	20	15	3+3
BACM-5018 (OPT-II)	Micro propagation Techniques	E	75	40	20	15	3+3
BACM-5099	Entrepreneurship Development and Business Communication	C	50	25	15	10	3+3
BACP-5010	Practical Crop Production – I (*Kharif crops*)	C	50	-	40	10	3
			625				

C-Compulsory
E-Elective

Bachelor of Science (Honours.) Agriculture (Session: 2020-21)

Semester VI

Course code	Course Name	Course Type	Marks				Examination time (in hours)
			Total	Mode of Assessment			
				External		Internal	
				L	P	CA	
BACL-6011	Principles of Food Science & Nutrition	C	50	40	0	10	3
BACL-6012	Intellectual Property Rights	C	25	20	0	5	3
BACM-6013	Crop Improvement-II (*Rabi Crops*)	C	50	25	15	10	3+3
BACM-6014	Management of Beneficial Insects	C	50	25	15	10	3+3
BACM-6015	Rainfed Agriculture & Watershed Management	C	50	25	15	10	3+3
BACM-6016	Protected Cultivation and Secondary Agriculture	C	50	25	15	10	3+3
BACM-6017	Diseases of Field and Horticultural Crops and their Management-II	C	75	40	20	15	3+3
BACM-6018	Farm Management, Production & Resource Economics	C	50	25	15	10	3+3
BACM-6019	Geoinformatics and Nano-technology and Precision Farming	C	50	25	15	10	3+3
	Elective Courses						
BACM-6020 (OPT-I)/	Weed Management/	E	75	40	20	15	3+3
BACM-6020 (OPT-II)/	Food Safety & Standards/	E	75	40	20	15	3+3
BACM-6020 (OPT-III)	Hi-Tech Horticulture	E	75	40	20	15	3+3
BACP-6010	Practical Crop Production-II (*Rabi Crops*)	C	50	0	40	10	3
			575				

C – Compulsory

E – Elective

Bachelor of Science (Honours.) Agriculture

(Session: 2020-21)

Programme Specific Outcomes (PSO)–

Upon successful completion of this course, students will be able to:

PSO1. Acquire, integrate, and apply the plant-science knowledge in a holistic manner needed for agriculturists.

PSO2. Develop interdisciplinary knowledge and have the ability to actually perform physical tasks that require practice and training.

PSO3. Develop creative skills to solve problems and improve current systems and can intervene to make improvements or correct deficiencies.

PSO4. Develop leadership skills and exhibit a high level of professionalism and effective communication.

B.Sc. (Hons.) Agriculture (Semester-III)

(Session: 2020-21)

Course Code: BACL-3011

PROBLEMATIC SOILS AND THEIR MANAGEMENT

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Learn about the soil quality, health, wasteland and problematic soils in India.

CO2: Learn about reclamation procedures of problematic soils and bioremediation.

CO3: Have knowledge about quality & standards of irrigation water and utilization of saline water in Agriculture.

CO4: Understand the importance of Remote Sensing & GIS in diagnosing and managing problem soils.

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B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACL-3011

PROBLEMATIC SOILS AND THEIR MANAGEMENT

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**
Theory: 40
C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Soil quality and health, Distribution of Waste land and problem soils in India. Their categorization based on properties.

Unit – II

Reclamation and management of Saline and sodic soils, Acid soils, Acid Sulphate soils, Eroded and Compacted soils, Flooded soils, Polluted soils.

Unit – III

Irrigation water – quality and standards, utilization of saline water in agriculture. Remote sensing and GIS in diagnosis and management of problem soils.

Unit – IV

Multipurpose tree species, bio remediation through MPTs of soils, land capability and classification, land suitability classification. Problematic soils under different Agro-ecosystems.

SUGGESTED READINGS

1. Indian Society of Soil Science (2012). Fundamentals of Soil Science. IARI, New Delhi.
2. Das, D.K. (2015). Introductory Soil Science, 4th edition, Kalyani Publishers, New Delhi.
3. Bhattacharya, Lata (2018). Textbook of soil chemistry. Discovery.
4. Saha, Arun Kumar (2014). Methods of physical and chemical analysis of soil. Kalyani Publishers, New Delhi.
5. Brady Nyle C and Weil Ray R. (2017). Nature and properties of soils. Pearson Publications.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3012

FUNDAMENTALS OF PLANT BREEDING

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Understand about the genetic basis and methods of breeding of self-pollinated & cross pollinated crops

CO2: Understand the concept of polyploidy, mutation, DNA markers and marker assisted selection in plant breeding,

CO3: Learn the application of plant breeding techniques for crop improvement.

CO4: Learn about IPR, patenting, Plant Breeders & Farmer's Rights.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3012

FUNDAMENTALS OF PLANT BREEDING

(THEORY)

Time: 3 Hrs. **Max. Marks: 75**

Theory: 40

Practical: 20

C.A: 15

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Historical development, concept, nature and role of plant breeding, major achievements and future prospects; Genetics in relation to plant breeding, modes of reproduction and apomixis, self – incompatibility and male sterility- genetic consequences, cultivar options. Domestication, Acclimatization, introduction; Centres of origin/diversity, components of Genetic variation; Heritability and genetic advance.

Unit – II

Genetic basis and breeding methods in self- pollinated crops; mass and pure line selection, hybridization techniques and handling of segregating population; Multiline concept. Concepts of population genetics and Hardy-Weinberg Law, Genetic basis and methods of breeding cross pollinated crops, modes of selection.

Unit – III

Heterosis and inbreeding depression, development of inbred lines and hybrids, composite and synthetic varieties; Breeding methods in asexually propagated crops, clonal selection and hybridization; Wide hybridization and pre-breeding.

Unit – IV

Polyploidy in relation to plant breeding, mutation breeding methods and uses; Biotechnological tools-DNA markers and marker assisted selection. Participatory plantbreeding; Intellectual Property Rights, Patenting, Plant Breeders and Farmer’s Rights.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3012

FUNDAMENTALS OF PLANT BREEDING

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Understand floral morphology of self and cross pollinated crops and germplasm variations.

CO2: Learn emasculation & hybridization techniques in self & cross pollinated crops

CO3: Study different breeding methods for crop improvement and procedures for evaluating performance of crops

CO4: Utilize statistical methods, various designs used in plant breeding.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3012

FUNDAMENTALS OF PLANT BREEDING

(PRACTICALS)

Time: 3 Hrs **Marks: 20**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1 Plant Breeder's kit.
2 Study of germplasm of various crops.
3 Study of floral structure of self-pollinated and cross pollinated crops.
4 Emasculation and hybridization techniques in self & cross pollinated crops. Consequences of inbreeding on genetic structure of resulting populations.
5 Study of male sterility system. Handling of segregation populations.
6 Methods of calculating mean, range, variance, standard deviation, heritability.
7 Designs used in plant breeding experiment, analysis of Randomized Block Design.
8 To work out the mode of pollination in a given crop and extent of natural out crossing. Prediction of performance of double cross hybrids.

SUGGESTED READINGS

1. Allard, Robert W (2018). Principles of plant breeding. John Wiley & Sons.
2. Singh B.D. (2017). Plant breeding: principles and methods. Kalyani Publishers, New Delhi.
3. Phundan Singh (2018). Essentials of plant breeding. Kalyani Publishers, New Delhi.
4. Phundan Singh (2017). Plant Breeding: Molecular and new approaches. Kalyani Publishers, New Delhi.
5. Bahl P. N, Salimath P. M (1997). Genetics, cytogenetics and breeding of crop plant Vol. II. Oxford & IBH.
6. Ram, Hari Har (2016). Crop breeding and biotechnology. Kalyani Publishers, New Delhi.
7. Sharma A.K and Sharma Ramavt (2014). Crop improvement and mutation breeding. Scientific Publishers.

B.Sc. (Hons.) Agriculture (Semester-III)

(Session: 2020-21)

Course Code: BACM-3013

INTRODUCTORY AGROMETEOROLOGY & CLIMATE CHANGE

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Have understanding about earth's atmosphere, climate and weather parameters.

CO2: Learn about precipitation, monsoon status of India and concept of artificial rainmaking.

CO3: Learn about the significance of weather and weather hazards in crop production.

CO4: Understand the process of weather forecasting, climate change and its widespread impact on agriculture.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3013

INTRODUCTORY AGROMETEOROLOGY & CLIMATE CHANGE

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**
Theory: 25
Practical: 15
C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Meaning and scope of agricultural meteorology, Earth atmosphere- its composition, extent and structure, Atmospheric weather variables, Atmospheric pressure- its variation with height, Wind, types of wind, daily and seasonal variation of wind speed, cyclone, anticyclone, land breeze and sea breeze.

Unit – II

Nature and properties of solar radiation, solar constant, depletion of solar radiation, short wave, longwave and thermal radiation, net radiation, albedo, Atmospheric temperature, temperature inversion, lapse rate, daily and seasonal variations of temperature, vertical profile of temperature, Energy balance of earth; Atmospheric humidity, concept of saturation, vapor pressure, process of condensation, formation of dew, fog, mist, frost, cloud.

Unit – III

Precipitation, process of precipitation, types of precipitation such as rain, snow, sleet, and hail, cloud formation and classification, Artificial rainmaking. Monsoon- mechanism and importance in Indian agriculture, Weather hazards - drought, floods, frost, tropical cyclones and extreme weather conditions such as heat-wave and cold-wave.

Unit – IV

Agriculture and weather relations; Modifications of crop microclimate, climatic normals for crop and livestock production. Weather forecasting- types of weather forecast and their uses. Climate change, climatic variability, global warming, causes of climate change and its impact on regional and national Agriculture.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3013

INTRODUCTORY AGROMETEOROLOGY & CLIMATE CHANGE

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: develop understanding about various meteorological instruments and their working.

CO2: Acquire skills in measuring radiation, air and soil temperature, atmospheric pressure, wind speed and direction.

CO3: Learn about determination of vapor pressure and relative humidity, dew point temperature.

CO4: understand about evapotranspiration, soil water balance and rainfall variation and heat units and measuring precipitation

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3013

INTRODUCTORY AGROMETEOROLOGY & CLIMATE CHANGE

(PRACTICALS)

Time: 3 Hrs **Marks: 15**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. Visit of Agrometeorological Observatory, site selection of observatory, exposure of instruments and weather data recording.
2. Measurement of total, shortwave and longwave radiation, and its estimation using Planck's intensity law.
3. Measurement of albedo and sunshine duration, computation of Radiation Intensity using BSS.
4. Measurement of maximum and minimum air temperatures, its tabulation, trend and variation analysis.
5. Measurement of soil temperature and computation of soil heat flux.
6. Determination of vapor pressure and relative humidity.
7. Determination of dew point temperature.
8. Measurement of atmospheric pressure and analysis of atmospheric conditions.
9. Measurement of wind speed and wind direction, preparation of wind rose.
10. Measurement, tabulation and analysis of rain.
11. Measurement of open pan evaporation and evapotranspiration.
12. Computation of PET and AET.

References:

1. Lenka D (2015). Climate, weather and crops in India. Kalyani Publishers, New Delhi.
2. Mavi, H.S. (2016). Introduction to agrometerology. Oxford & IBH Publishing.
3. Gouindan K (2016). Agricultural meteorology and dry farming. Kalyani Publishers, New Delhi.
4. Mahi G.S. and Kingra P.K. (2016). Fundamentals of Agrometeorology. Kalyani Publishers, New Delhi.
5. Sahu, D.D, Chopra, M.C and Kac. (2015). Practical agrometeorology. Agrobios

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3014

PRODUCTION TECHNOLOGY FOR VEGETABLES AND SPICES

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Understand importance of vegetables & spices in human nutrition and national economy.

CO2: Learn about origin, area, production, cultural practices and seed production of important vegetable groups.

CO3: Learn about origin, area, production, cultural practices and seed production of important spices.

CO4: Learn about harvesting technique and post-harvest handling and economics of commercial vegetable and spice cultivation.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3014

PRODUCTION TECHNOLOGY FOR VEGETABLES AND SPICES

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**
Theory: 25
Practical: 15
C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Importance of vegetables & spices in human nutrition and national economy, kitchen Gardening, brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disorders, of and seed production of tomato, brinjal, chilli, capsicum.

Unit – II

Origin, area, climate, soil, improved varieties and cultivation practices and seed production of root crops viz. carrot, radish, beetroot etc, bulb crops viz. onion, garlic etc and cole crops viz. cabbage, cauliflower, knol-khol etc.

Unit – III

Origin, area, production, improved varieties and cultivation practices and seed production of cucurbitaceous crops viz. cucumber, melons, gourds, pumpkin etc, leafy crops viz. amaranth, palak, perennial vegetables etc and leguminous crops viz. peas, french bean and tuber crops viz. potato, sweet potato, colocasia etc.

Unit – IV

Origin, area, production, improved varieties and cultivation practices and seed production of important spices.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3014

PRODUCTION TECHNOLOGY FOR VEGETABLES AND SPICES

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Identify various vegetable crops & their seeds.

CO2: Learn about nursery raising & transplanting techniques.

CO3: Plan and lay out vegetable garden and production practices

CO4: Learn about harvesting technique and post-harvest handling and economics of commercial vegetable and spice cultivation.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3014

PRODUCTION TECHNOLOGY FOR VEGETABLES AND SPICES

(PRACTICALS)

Time: 3 Hrs **Marks: 15**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1 Identification of vegetables & spice crops and their seeds.
2 Nursery raising of vegetable crops.
3 Direct seed sowing and transplanting.
4 Study of morphological characters of different vegetables & spices.
5 Fertilizers applications.
6 Offseason production of nursery
7 Vegetables & spices seed extraction.
8 Harvesting & preparation for market.
9 Economics of vegetables and spices cultivation.

SUGGESTED READINGS

1 Anonymous (2018). Package of practices for cultivation of vegetable crops. Punjab Agricultural University, Ludhiana.
2 Dhaliwal, Major Singh (2017). Handbook of vegetable crops. Kalyani Publishers, New Delhi.
3 Gopalakrishnan, T.R. (2007). Vegetable crops. New India Publishing Agency.
4 Hazra P and Som M. G. (2016). Vegetable seed production and hybrid technology. Kalyani Publishers, New Delhi.
5 Prasad S and Bhardwaj Raju L. (2016). Production technology of spices, aromatic, medicinal and plantation crops. Agrobios (India), Jodhpur.
6 Rana, M.K. (2015). Technology for Vegetable Production. Kalyani Publishers, New Delhi.
7 Thamburaj, S and Narendra Singh (2016). Vegetables, tuber crops and spices. ICAR, New Delhi.

B.Sc. (Hons.) Agriculture (Semester-III)

(Session: 2020-21)

Course Code: BACM-3015

PRINCIPLES OF SEED TECHNOLOGY

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Learn about maintenance of genetic purity and quality seed production.

CO2: Have sound knowledge of different breeding tools used in seed production

CO3: Learn about different seed testing methods, the process of seed certification and seed act.

CO5: Learn about seed processing, packing, storage, pest control and marketing.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3015

PRINCIPLES OF SEED TECHNOLOGY

(THEORY)

Time: 3 Hrs. **Max. Marks: 75**
Theory: 20
Practical: 40
C.A: 15

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Seed and seed technology: introduction, definition and importance. Deterioration causes of crop varieties and their control; Maintenance of genetic purity during seed production. Seed quality- Definition, Characters of good quality seed, different classes of seed.

Unit – II

Foundation and certified seed production of important cereals, pulses, oilseeds, fodder and vegetables. Seed certification, phases of certification, procedure for seed certification, field inspection. Seed Act and Seed Act enforcement. Duty and powers of seed inspector, offences and penalties. Seeds Control Order 1983. Varietal Identification through Grow Out Test and Electrophoresis, Molecular and Biochemical test.

Unit – III

Detection of genetically modified crops, Transgene contamination in non-GM crops, GM crops and organic seed production. Seed drying, processing and their steps, seed testing for quality assessment, seed treatment, its importance, method of application and seed packing. Seed storage; general principles, stages and factors affecting seed longevity during storage.

Unit – IV

Measures for pest and disease control during storage. Seed marketing: structure and organization, sales, generation activities, promotional media. Factors affecting seed marketing, Role of WTO and OECD in seed marketing. Private and public sectors and their production and marketing strategies.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3015

PRINCIPLES OF SEED TECHNOLOGY

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Learn seed production in major cereals, pulses, oilseeds and vegetable crops.

CO2: Experience seed sampling and testing technique.

CO3: Acquire information about seed certification process.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3015

PRINCIPLES OF SEED TECHNOLOGY

(PRACTICALS)

Time: 3 Hrs **Marks: 40**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1 Seed production in major cereals: Wheat, Rice, Maize, Sorghum, Bajra and Ragi.
2 Seed production in major pulses: Urd, Mung, Pigeonpea, Lentil, Gram, Field bean, pea.
3 Seed production in major oilseeds: Soybean, Sunflower, Rapeseed, Groundnut and Mustard.
4 Seed production in important vegetable crops.
5 Seed sampling and testing: Physical purity, germination, viability, etc.
6 Seed and seedling vigour test.
7 Genetic purity test: Grow out test.
8 Seed certification: Procedure, Field inspection, Preparation of field inspection report.
9 Trizolium chloride test for seed viability.
10 Modification of storage environment for temperature and relative humidity.

SUGGESTED READINGS

1. Agarwal, R.L.1995. Seed Technology. Oxford and IBH Publication Co., New Delhi.
2. Dhrendra Khare and Mohan S. Bhale. 2007. Seed Technology. Scientific Publishers (India), Joghpur.
3. Phundan Singh (2016). Objective seed technology. Kalyani Publishers, New Delhi.
4. Phundan Singh (2017). Principles of seed technology. Kalyani Publishers, New Delhi.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3016

CROP PRODUCTION TECHNOLOGY-I (*KHARIF CROPS*)

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Learn about basic principles of crop production practices of kharif crops.

CO2: Understand about cultural operations for raising kharif crops.

CO3: Precisely understand about qualitative and quantitative input requirements for *Kharif* crop production.

CO4: Learn about various management practices for commercial crop production.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3016

CROP PRODUCTION TECHNOLOGY-I (*KHARIF CROPS*)

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**
Theory: 25
Practical: 15
C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of kharif crops. Cereals – rice, maize, sorghum, pearl millet and finger millet.

Unit – II

Cultural practices and yield of kharif crops – pulses – pigeonpea, mungbean and urdbean.

Unit – III

Cultural practices and yield of kharif crops – oilseeds – groundnut and soybean; fibre crops – cotton & jute.

Unit – IV

Cultural practices and yield of kharif crops – forage crops – sorghum, cowpea, cluster bean and napier bajra.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3016

CROP PRODUCTION TECHNOLOGY-I (*KHARIF CROPS*)

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Raise nursery of rice crop and do transplanting.

CO2: Learn about sowing, nutrient requirements of various kharif crops.

CO3: Realize the effect of seed size and sowing depth on germination of seeds and develop the idea of yield contributing factors and its calculation. .

CO4: Identify various problematic weeds of kharif crops and their management.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3016

CROP PRODUCTION TECHNOLOGY-I (*KHARIF CROPS*)

(PRACTICALS)

Time: 3 Hrs **Marks: 15**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1 Rice nursery preparation.
2 Transplanting of rice.
3 Sowing of soybean, pigeonpea & mungbean. Maize, groundnut & cotton.
4 Effect of seed size on germination and seedling vigour of kharif season crops.
5 Effect of sowing depth on germination of kharif crops.
6 Identification of weeds in kharif season crops.
7 Top dressing & foliar feeding of nutrients.
8 Study of yield contributing characters and yield calculation of kharif season.
9 Study of crop varieties and important agronomic experiments at experimental farm.
10 Study of forage experiments, morphological description of kharif season crop.
11 Visit to research centres of related crops.

SUGGESTED READINGS

1. Anonymous (2018) Package of practices for cultivation of Kharif Crops, Punjab Agricultural University, Ludhiana.
2. Indian Council of Agricultural Research (2017). Handbook of Agriculture, ICAR, New Delhi.
3. Jeyaraman S (2018). Field crops production and management Vol. 1. CBS.
4. Panda S.C. (2018). Agronomy of fodder & forage crop, Kalyani Publishers, New Delhi.
5. Reddy, S.R. Agronomy of Field Crops, Kalyani Publishers, Ludhiana.
6. Reddy S R (2016). Introduction to agronomy and principles of crop production. Kalyani Publishers, New Delhi.
7. Singh S S and Singh R (2018). Crop management. Kalyani Publishers, New Delhi.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3177

AGRICULTURAL FINANCE AND CO-OPERATION

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Understand the concept of Agricultural Finance& Agricultural credit.

CO2: Have knowledge about various sources of agricultural finance and micro-financing.

CO3: Learn about various finance institutions like NABARD, RBI, ADB, IMF, World Bank etc

CO4: Describe the concept of Agricultural Co-operation in India.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3177

AGRICULTURAL FINANCE AND CO-OPERATION

(THEORY)

Time: 3 Hrs. **Max. Marks: 75**

Theory: 40

Practical: 20

C.A: 15

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Agricultural Finance- meaning, scope and significance, credit needs and its role in Indian agriculture. Agricultural credit: meaning, definition, need, classification. Credit analysis: 4 R's, and 3C's of credits.

Unit – II

Sources of agricultural finance: institutional and non-institutional sources, commercial banks, social control and nationalization of commercial banks, Micro financing including KCC. Lead bank scheme, RRBs, Scale of finance and unit cost.

Unit – III

An introduction to higher financing institutions – RBI, NABARD, ADB, IMF, world bank. Insurance and Credit Guarantee Corporation of India. Cost of credit. Recent development in agricultural credit. Preparation and analysis of financial statements – Balance Sheet and Income Statement. Basic guidelines for preparation of project reports.

Unit – IV

Agricultural Cooperation – Meaning, brief history of cooperative development in India, objectives, principles of cooperation, significance of cooperatives in Indian agriculture. Agricultural Cooperation in India- credit, marketing, consumer and multi-purpose cooperatives, farmers service cooperative societies, processing cooperatives, farming cooperatives, cooperative warehousing; role of ICA, NCUI, NCDC, NAFED.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3177

AGRICULTURAL FINANCE AND CO-OPERATION

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Analyse the progress and performance of co-operatives from published data.

CO2: Acquire knowledge about management, schemes and procedures of commercial banks, co-operative banks and societies.

CO3: Estimate the credit requirement of farm business, analyze balance sheet and income statement.

CO4: Understand techno-economic parameters for preparation of projects and appraisal procedures of loan proposal.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3177

AGRICULTURAL FINANCE AND CO-OPERATION

(PRACTICALS)

Time: 3 Hrs **Marks: 20**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. Determination of most profitable level of capital use.
2. Optimum allocation of limited amount of capital among different enterprise.
3. Analysis of progress and performance of cooperatives using published data.
4. Analysis of progress and performance of commercial banks and RRBs using published data.
5. Estimation of credit requirement of farm business – A case study.
6. Preparation and analysis of balance sheet – A case study.
7. Preparation and analysis of income statement – A case study.
8. Appraisal of a loan proposal – A case study.
9. Visit to a commercial bank, cooperative bank and cooperative society to acquire firsthand knowledge of their management, schemes and procedures.

SUGGESTED READINGS:

1. Subba Reddy, S. and P. Raghuram, P., Sastry, T.V.N. and Bhavani Devi, I. (2016). Agricultural Economics. Oxford &IBH Publishing Company Private Ltd. New Delhi.
2. Mukhi, H.R. (1983). Cooperation in India and Abroad. New Heights Publishers, New Delhi.
3. Muniraj,R. (1987). Farm Finance for Development. Oxford &IBH Publishing Company Ltd., New Delhi.
4. John, J. Hamptron. (1983). Financial decision making: Concepts, Problems and Cases of India. New Delhi John,

B.Sc. (Hons.) Agriculture (Semester-III)

(Session: 2020-21)

Course Code: BACM-3178

STATISTICAL METHODS

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Get introduced with Statistics and its application in Agriculture.

CO2: Learn about graphical representation of data, measures of central tendancy & dispersion, correlation & regression.

CO3: Get familiarize with test of significance, chi-square test, ANOVA test etc.

CO4: Know about various sampling methods.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3178

STATISTICAL METHODS

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**
Theory: 25
Practical: 15
C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Introduction to Statistics and its Applications in Agriculture, Graphical Representation of Data, Measures of Central Tendency & Dispersion.

Unit – II

Definition of Correlation, Scatter Diagram. Karl Pearson's Coefficient of Correlation. Linear Regression Equations. Introduction to Test of Significance, One sample & two sample test t for Means

Unit – III

Chi-Square Test of Independence of Attributes in 2 X 2 contingency table. Introduction to Analysis of Variance, Analysis of One Way Classification.

Unit – IV

Introduction to Sampling Methods, Sampling versus Complete Enumeration, Simple Random Sampling with and without replacement.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3178

STATISTICAL METHODS

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Learn about graphical representation of data.

CO2: Practice measures of central tendancy and dispersion of various forms of data.

CO3: Get introduced with moments, correlation & regression analysis.

CO4: Acquaint with the knowledge of one-sample and two-sample t-test, chi-square test.

CO5: Learn about One way ANOVA.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3178

STATISTICAL METHODS

(PRACTICALS)

Time: 3 Hrs **Marks: 15**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1 Graphical Representation of Data.
2 Measures of Central Tendency (Ungrouped data) with Calculation of Quartiles, Deciles & Percentiles.
3 Measures of Central Tendency (Grouped data) with Calculation of Quartiles, Deciles & Percentiles.
4 Measures of Dispersion (Ungrouped Data).
5 Measures of Dispersion (Grouped Data).
6 Moments, Correlation & Regression Analysis.
7 Application of One Sample t-test and Two Sample Fisher's t-test.
8 Chi-Square test of Goodness of Fit and Chi-Square test of Independence of Attributes for 2 X 2 contingency table.
9 Analysis of Variance One Way Classification. Analysis of one way.
10 Analysis of variance in two-way (Factorial analysis).

SUGGESTED READINGS

1 Chandel SRS. Hand Book of Agricultural Statistics. Achal Prakashan Mandir Publications, New Delhi.
2 Dhamu K.P. & Ramamoorthy K. (2009). Fundamentals of Agricultural Statistics. Scientific Publishers.
3 Nageswara Rao, G (2007). Statistics for Agricultural Sciences. B.S Publications, Hyderabad.
4 Rangaswamy R (1995). A Text Book of Agricultural Statistics. New Age International (P) Ltd., Publishers, Hyderabad.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3229

ENVIRONMENTAL STUDIES AND DISASTER MANAGEMENT

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Understand about value of natural resources like forest, water, minerals, energy, land and associated problems

CO2: Basic ecological principles, ecosystem and its functions

CO3: Learn about conservation of biodiversity, environmental pollution in relation with human population and other social issues.

CO4: Learn all about natural as well as man made disasters and their management practices.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM-3229

ENVIRONMENTAL STUDIES AND DISASTER MANAGEMENT

(THEORY)

Time: 3 Hrs. **Max. Marks: 75**

Theory: 40

Practical: 20

C.A: 15

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Multidisciplinary nature of environmental studies Definition, scope and importance. Natural Resources: Renewable and non-renewable resources, Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources. Case studies. f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

Unit – II

Ecosystems: Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem. Ecological succession, Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) 106 107 Report of the ICAR Fifth Deans' Committee Report of the ICAR Fifth Deans' Committee Biodiversity and its conservation: - Introduction, definition, genetic, species & ecosystem diversity and biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels, India as a mega-diversity nation. Hot-sports of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit – III

Environmental Pollution: definition, cause, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear hazards. Solid Waste Management: causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Social Issues and the Environment: From Unsustainable to Sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management. Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. dies. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness. Human Population and the Environment: population growth, variation among nations, population explosion, Family Welfare Programme. Environment and human health: Human Rights, Value Education, HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health.

Unit – IV

Natural Disasters- Meaning and nature of natural disasters, their types and effects. Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves, Climatic change: global warming, Sea level rise, ozone depletion. Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation, industrial waste water pollution, road accidents, rail accidents, air accidents, sea accidents. Disaster Management- Effect to migrate natural disaster at national and global levels. International strategy for disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of NGOs, community –based organizations and media. Central, state, district and local administration; Armed forces in disaster response; Disaster response; Police and other organizations.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3229

ENVIRONMENTAL STUDIES AND DISASTER MANAGEMENT

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Understand pollution problems through case studies and field work.

CO2: Acquire skills in documentation of various environmental assets.

CO3: Learn about biodiversity in relation to different habitats and study different ecosystem.

CO4: Learn about dealing in emergency about with natural calamities.

B.Sc. (Hons.) Agriculture (Semester-III)
(Session: 2020-21)

Course Code: BACM-3229

ENVIRONMENTAL STUDIES AND DISASTER MANAGEMENT

(PRACTICALS)

Time: 3 Hrs **Marks: 20**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. Visit to the Agricultural field and study the components of agroecosystem.
2. Visit to the Pond/River ecosystem to study biotic and abiotic components.
3. Study the bioindicators of agro/pond/river ecosystem.
4. Visit to Botanical Garden or undisturbed forest.
5. Pollution case studies and pollution indicator plants/insects or birds.
6. Visit to the sewage treatment plants.
7. Estimation of chlorides in the effluent treatment.
8. Collection, processing and storage of industrial effluent samples.
9. Case Studies- Field work: Visit to a local area to document environmental assets river/ forest/ grassland/ hill/ mountain
10. Visit to a local polluted site-Urban/Rural/Industrial/ Agricultural.

SUGGESTED READINGS

1. Benny Joseph (2017). Environmental studies simplified. Tata McGraw Hill.
2. Cunningham W (2016). Principles of Environmental Science; Inquiry and application. McGraw Hill.
3. Moo-young M. (2007). Environmental biotechnology: principles and application. Springer.
4. Nagar Ranita (2010). Disaster Management. APH Publishing Corporation.
5. Narayan B. (2000). Disaster Management. APH Publishing Corporation.
6. Wong M.H. (2013). Environmental Contamination: Health risks & ecological restoration. CRC Press.

B.Sc. (Hons.) Agriculture (Semester-IV)

(Session: 2020-21)

Course Code: BACL-4011

FARMING SYSTEM AND SUSTAINABLE AGRICULTURE

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Understand about cropping systems &patterns and evaluation methods.

CO2: Recognize various tools for determining efficiency of farming systems..

CO3: Understand sustainable and conservation Agriculture problems and impact

CO4: Understand value of Integrated Farming System and its models.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACL-4011

FARMING SYSTEM AND SUSTAINABLE AGRICULTURE

(THEORY)

Time: 3 Hrs. **Max. Marks: 25**
Theory: 20
C.A: 5

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Farming System-scope, importance, and concept, Types and systems of farming system and factors affecting types of farming, Farming system components and their maintenance, Cropping system and pattern, multiple cropping system, Efficient cropping system and their evaluation.

Unit – II

Allied enterprises and their importance, Tools for determining production and efficiencies in cropping and farming system; Sustainable agriculture-problems and its impact on agriculture, indicators of sustainability, adaptation and mitigation, conservation agriculture strategies in agriculture, HEIA, LEIA and LEISA and its techniques for sustainability.

Unit – III

Integrated farming system-historical background, objectives and characteristics, components of IFS and its advantages, Site specific development of IFS model for different agro-climatic zones, resource use efficiency and optimization techniques.

Unit – IV

Resource cycling and flow of energy in different farming system, farming system and environment, Visit of IFS model in different agro-climatic zones of nearby states University/ institutes and farmers field.

SUGGESTED READINGS

1. Dahama A.K. (2018). Organic farming for sustainable agriculture. Agrobios (India), Jodhpur.
2. Heege Hermann J. (2013). Precision in crop farming. Springer Netherland.
3. Joshi, Mukund (2015). Sustainability through organic farming. Kalyani Publishers, New Delhi.
4. Panda S C (2017). Organic farming for sustainable agriculture. Kalyani Publishers, New Delhi.
5. Reddy S R (2016). Farming system and sustainable agriculture. Kalyani Publishers, New Delhi.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM-4012

PRODUCTION TECHNOLOGY FOR ORNAMENTAL CROPS, MAP AND LANDSCAPING

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Learn about importance and scope of ornamental crops and MAPs.

CO2: Know about principles of landscaping and landscape use of plants.

CO3: Acquire knowledge about production technology of important cut flowers in both protected and open conditions.

CO4: Learn about cultivation practices of loose flowers under open conditions, processing and value addition.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM-4012

PRODUCTION TECHNOLOGY FOR ORNAMENTAL CROPS, MAP AND LANDSCAPING

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**
Theory: 25
Practical: 15
C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Importance and scope of ornamental crops, medicinal and aromatic plants and landscaping. Principles of landscaping. Landscape uses of trees, shrubs and climbers.

Unit – II

Production technology of important cut flowers like rose, gerbera, carnation, lilium and orchids under protected conditions. Production technology of important cut flowers like gladiolus, tuberose, chrysanthemum under open conditions.

Unit – III

Package of practices for loose flowers like marigold and jasmine under open conditions.Production technology of important medicinal plants like ashwagandha, asparagus, aloe, costus, Cinnamomum, periwinkle, isabgol.

Unit – IV

Production technology of important aromatic plants like mint, lemongrass, citronella, palmarosa, ocimum, rose, geranium, vetiver. Processing and value addition in ornamental crops and MAPs produce.

B.Sc. (Hons.) Agriculture (Semester-IV)

(Session: 2020-21)

Course Code: BACM-4012

PRODUCTION TECHNOLOGY FOR ORNAMENTAL CROPS, MAP AND LANDSCAPING

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Gain skills in identifying ornamentals, medicinal & aromatic plants.

CO2: Learn to prepare nursery bed, seed sowing, training & pruning techniques.

CO3: Design the layout of different styles of gardening.

CO4: Post harvest management of ornamental crop flowers

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM-4012

PRODUCTION TECHNOLOGY FOR ORNAMENTAL CROPS, MAP AND LANDSCAPING

(PRACTICALS)

Time: 3 Hrs **Marks: 15**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1 Identification of Ornamental plants.
2 Identification of Medicinal and Aromatic Plants.
3 Nursery bed preparation and seed sowing.
4 Training and pruning of Ornamental plants.
5 Planning and layout of garden.
6 Bed preparation and planting of MAP.
7 Protected structures – care and maintenance.
8 Intercultural operations in flowers and MAP.
9 Harvesting and post-harvest handling of cut and loose flowers.
10 Processing of MAP.
11 Visit to commercial flower/MAP unit.

SUGGESTED READINGS

1. Arora J.S. (2016). Introductory Ornamental Horticulture. Kalyani Publishers, New Delhi.
2. Joshi S. K. (2007). Medicinal plants. Oxford & IBH.
3. Grewal H.S & Parminder Singh. Landscape designing and ornamental plants. Kalyani Publishers, New Delhi.
4. Laurie, Alex and Ries, V.H. (2012). Floriculture fundamentals and practices. Agrobios
5. Prasad S and Bhardwaj, Raju L. (2016). Production technology of spices, aromatic, medicinal and plantation crops. Agrobios.
6. Randhawa G.S. and Mukhopadhyaya A. (1994). Floriculture in India. Allied Publishers Pvt. Ltd., New Delhi.
7. Raj, Desh (2017). Floriculture at a glance. Kalyani Publishers, New Delhi.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM-4013

RENEWABLE ENERGY & GREEN TECHNOLOGY

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Know about various types of energy & importance in Agriculture.

CO2: Learn about biomass utilization, bio-fuel production and gasification

CO3: Learn about wind energy, its types and application

CO4: Familiarize with solar energy and its application and various solar gadgets.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM-4013

RENEWABLE ENERGY & GREEN TECHNOLOGY

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**

Theory: 25

Practical: 15

C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Classification of energy sources and their contribution in Agricultural sector. Familiarization with biomass utilization for bio-fuel production and their application, types of biogas plants.,

Unit – II

Familiarization with types of biogas plants and gasifiers, biogas, bioalcohol, biodiesel and bio-oil production and their utilization as bioenergy resource.

Unit – III

Introduction to solar energy, collection and their applications. Familiarization with solar energy gadgets: solar cooker, solar water heater.

Unit – IV

Application of Solar Energy: Solar drying, Solar pond, Solar pump, Solar distillation, Solar photovoltaic system and their application. Introduction of wind energy and their application.

B.Sc. (Hons.) Agriculture (Semester-IV)

(Session: 2020-21)

Course Code: BACM-4013

RENEWABLE ENERGY & GREEN TECHNOLOGY

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Learn about biogas plants and gasifiers.

CO2: Experience production process of bio-diesel & bio-fuels and about briquetting machine.

CO3: Gain an understanding of solar cooker, solar drying system & solar distillation.

CO4: Learn about performance of wind mill.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM-4013

RENEWABLE ENERGY & GREEN TECHNOLOGY

(PRACTICALS)

Time: 3 Hrs **Marks: 15**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1 Familiarization with renewable energy gadgets.
2 To study biogas plants.
3 To study Gasifiers.
4 To study the production process of bio diesel.
5 To study briquetting machine.
6 To study the production process of bio-fuels.
7 Familiarization with different solar energy gadgets.
8 To study solar photovoltaic system: solar light, solar pumping and solar fencing.
9 To study solar cooker.
10 To study solar drying system.
11 To study solar distillation and solar pond.
12 To study the performance of wind mill.

SUGGESTED READINGS

1. Chakravarthy A. and Amalendu Chakravarthy (1989). Biotechnology and other Alternative Technologies for Utilization of Biomass-Agriculture wastes. 1st edition, Oxford and IBH Publishers, New Delhi.
2. Rai G.D. (2004). Non-Conventional Energy Sources. Khanna Publishers, New Delhi.
3. Rajput R.K. (2012). Non-Conventional Energy Sources. S. Chand Publishers, New Delhi.
4. Rathore N.S., Mathur A.N. and S. Kothari. Alternate sources of energy. ICAR, New Delhi.
5. Tiwari G.N. (2012). Greenhouse technology for controlled environment. Narosa Pub.

B.Sc. (Hons.) Agriculture (Semester-IV)

(Session: 2020-21)

Course Code: BACM-4014

PRODUCTION TECHNOLOGY FOR FRUITS AND PLANTATION CROPS

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Learn about importance & scope of fruit and plantation crops.

CO2: Develop understanding of use of rootstock and high density planting.

CO3: Know about production technologies for cultivation of major and minor fruits.

CO4: Plan and lay out of the orchard and its management.

B.Sc. (Hons.) Agriculture (Semester- IV)
(Session: 2020-21)

Course Code: BACM-4014

PRODUCTION TECHNOLOGY FOR FRUITS AND PLANTATION CROPS

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**
Theory: 25
Practical: 15
C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Importance and scope of fruit and plantation crop industry in India. Importance of rootstocks.

Unit – II

Production technologies for the cultivation of major fruits-mango, citrus, grape.

Unit – III

Production technologies for the cultivation of major fruits-pear, peach, plum, almond, guava, litchi, papaya.

Unit – IV

Production technologies for the cultivation of minor fruits- pineapple, pomegranate, jackfruit, strawberry, cashew, tea, coffee.

B.Sc. (Hons.) Agriculture (Semester- IV)

(Session: 2020-21)

Course Code: BACM-4014

PRODUCTION TECHNOLOGY FOR FRUITS AND PLANTATION CROPS

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Learn about scarification, stratification & propagation of seeds.

CO2: Familiarize with propagation methods for fruit and plantation crops.

CO3: Describe & identify fruits along with their pests, diseases and physiological disorders.

CO4: Learn about preparation and usage of bio-regulators.

B.Sc. (Hons.) Agriculture (Semester- IV)
(Session: 2020-21)

Course Code: BACM-4014

PRODUCTION TECHNOLOGY FOR FRUITS AND PLANTATION CROPS

(PRACTICALS)

Time: 3 Hrs **Marks: 15**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1 Seed propagation.
2 Scarification and stratification of seeds.
3 Propagation methods for fruit and plantation crops including Micro-propagation.
4 Description and identification of fruit.
5 Preparation of plant bio regulators and their uses.
6 Identification of Pests, diseases and physiological disorders of above fruit and plantation crops.
7 Use of girdling in grapes.
8 Pruning of grapes.
9 Fruit thinning.
10 Visit to commercial orchard.

SUGGESTED REFERENCES.

1. Bal J.S. (2014). Fruit Growing. Kalyani Publishers, New Delhi.
2. Bal, J.S. (2018). Fruit science Culture and technology V – I. NIPA.
3. Mishra Vishwanath and Chaturv. (2016). Handbook of practical horticulture. Kalyani Publishers, New Delhi.
4. Prasad, S. and Bharadwaj, R. L. (2015). Production technology of fruit crops. Agrobios.
5. Prasad S and Bhardwaj Raju L. (2016). Production technology of spices, aromatic, medicinal and plantation crops. Agrobios.
6. Singh Amar (2014). Fruit Physiology and Production. Kalyani Publisher, New Delhi.
7. Singh, S.P. (2017). Commercial fruits. Kalyani Publishers, New Delhi.

B.Sc. (Hons.) Agriculture (Semester-IV)

(Session: 2020-21)

Course Code: BACM-4015

FARM MACHINERY AND POWER

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Learn about farm power machinery in India and its manufacturers.

CO2: Learn about the fundamentals of 2-stroke & 4-stroke engine and operating system of tractor.

CO3: Learn about primary & secondary implements and various sowing and intercultural operations.

CO4: Learn about plant protection equipment and harvesting & threshing equipments.

B.Sc. (Hons.) Agriculture (Semester- IV)
(Session: 2020-21)

Course Code: BACM-4015

FARM MACHINERY AND POWER

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**
Theory: 25
Practical: 15
C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Status of Farm power in India &Sources, IC engines, Working Principle of 2-stroke & 4-Stroke engine, study of different components of I.C engine, I.C engine terminology and solved problems, Familiarization with different systems of I.C engine: Air cleaning, cooling, lubrication, fuel supply and hydraulic control system of tractor.

Unit – II

Familiarization with Power transmission system: clutch, gear box, differential and final drive of a tractor, Tractor types, Cost analysis of tractor power and attached implement, Familiarization with Primary & Secondary tillage implements, implement for hill agriculture.

Unit – III

Implementation for intercultural operations, Familiarization with sowing & planting equipment, Calibration of seed drill and solved examples.

Unit – IV

Familiarization with Plant protection equipment, Familiarization with Harvesting & Threshing equipment.

B.Sc. (Hons.) Agriculture (Semester- IV)
(Session: 2020-21)

Course Code: BACM-4015

FARM MACHINERY AND POWER

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Learn about different components of IC Engine.

CO2: Get aware of various operational systems of tractor.

CO3: Acquire knowledge about mould board, disc plough & disc harrow plough.

CO4: Get familiarize with application of seed-cum-fertilizer drill, types of sprayers & dusters, harvesting & threshing machinery.

B.Sc. (Hons.) Agriculture (Semester- IV)
(Session: 2020-21)

Course Code: BACM-4015

FARM MACHINERY AND POWER

(PRACTICALS)

Time: 3 Hrs **Marks: 15**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. Study of different Components of IC engine.
2. To study air cleaning and cooling system of engine
3. Familiarization with Clutch, Transmission, Differential and Final drive of tractor.
4. Familiarization with lubrication and fuel supply system of engine.
5. Familiarization with Brake, Steering, Hydraulic Control system of engine
6. Learning of tractor driving.
7. Operation of Power tillers.
8. Implements for hill agriculture.
9. Familiarization with different types of primary and secondary tillage implements: mould board plough, disc plough and disc harrow
10. Study of seed-cum-fertilizer drills their seed metering mechanism and calibration, planters and transplanter.
11. Familiarization with different types of sprayers & dusters.
12. Familiarization with Harvesting and Threshing equipment.

SUGGESTED READINGS

1. Jain, S.C. and Rai, C.R. Farm Tractor: maintenance and repair. Standard Publishers Distributors.
2. Ojha T.P. and Michael A.M. (2018). Principles of Agricultural Engineering. Vol.I. Jain brothers, New Delhi.
3. Sahay Jagdishwar (2018). Elements of agricultural engineering. Standard Publishers Distributors.
4. Selvam, R.K.Veera (2016). Farm machinery and power. Oxford & IBH.
5. Surendra Singh- Farm machinery –Principles and applications, ICAR, New Delhi.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM-4016

CROP PRODUCTION TECHNOLOGY-II (*RABI CROPS*)

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Understand about crop husbandry of different kharif crops.

CO2: Learn the scientific management of different field, cereals, pulses and oilseeds crops

CO3: Understand agronomic practices of medicinal and aromatic crops.

CO4: Learn about post-harvest management principles of cereals, pulses and oilseeds crops.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM-4016

CROP PRODUCTION TECHNOLOGY-II (*RABI CROPS*)

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**

Theory: 25

Practical: 15

C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of cereals –wheat and barley.

Unit – II

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of pulses-chickpea, lentil, peas & oilseeds-rapeseed, mustard and sunflower.

Unit – III

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of sugar crops-sugarcane; medicinal and aromatic crops-mentha, lemon grass and citronella.

Unit – IV

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of forage crops-berseem, lucerne and oat

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM-4016

CROP PRODUCTION TECHNOLOGY-II (*RABI CROPS*)

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Learn about sowing practices of Rabi crops.

CO2: Identify morphological differences of various rabi crops and their weeds.

CO3: Understand yield contributing characters of rabi crops.

CO4: Learn about forage crops and oil extraction from medicinal crops.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM-4016

CROP PRODUCTION TECHNOLOGY-II (*RABI CROPS*)

(PRACTICALS)

Time: 3 Hrs **Marks: 15**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1 Sowing methods of wheat and sugarcane.
2 Study of morphological characteristics of rabi crops.
3 Identification of weeds in rabi season crops.
4 Study of yield contributing characters of rabi season crops.
5 Study of yield and juice quality analysis of sugarcane.
6 Study of important agronomic experiments of rabi crops at experimental farms.
7 Study of rabi forage experiments.
8 Study of oil extraction of medicinal crops.
9 Visit to research stations of related crops.

SUGGESTED READINGS

1. Anonymous (2018) Package of practices for cultivation of Rabi Crops, Punjab Agricultural University, Ludhiana
2. Chandrasekaran B, Annadurai. (2018). Textbook of Agronomy. New age publication.
3. Panda S C (2014). Forage crops and grasses. Agrobios
4. Reddy, S.R. and Reddi Ramu. 5th edition. Agronomy of Field Crops, Kalyani Publishers, New Delhi.
5. Singh S.S and Singh Rajesh (2018). Principles and practices of agronomy. Kalyani Publishers, New Delhi.
6. Tomar Suresh Singh, Mishra Y (2018). Production technology of RABI crops. Biotech

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM-4017

LIVESTOCK AND POULTRY MANAGEMENT

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Understand role of livestock in rural household and Indian economy.

CO2: Know about reproduction in farm animals & poultry.

CO3: Familiarize with management principles of livestock & poultry.

CO4: Learn about exotic breeds of livestock & poultry and disease management.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM-4017

LIVESTOCK AND POULTRY MANAGEMENT

(THEORY)

Time: 3 Hrs. **Max. Marks: 100**

Theory: 60

Practical: 20

C.A: 20

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Role of livestock in the national economy. Reproduction in farm animals and poultry. Housing principles, space requirements for different species of livestock and poultry. Management of calves, growing heifers and milch animals.

Unit – II

Management of sheep, goat and swine. Incubation, hatching and brooding. Management of growers and layers. Important Indian and exotic breeds of cattle, buffalo, sheep, goat, swine and poultry. Improvement of farm animals and poultry.

Unit – III

Digestion in livestock and poultry. Classification of feedstuffs. Proximate principles of feed. Nutrients and their functions. Feed ingredients for ration for livestock and poultry. Feed supplements and feed additives. Feeding of livestock and poultry.

Unit – IV

Introduction of livestock and poultry diseases. Prevention (including vaccination schedule) and control of important diseases of livestock and poultry.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM-4017

LIVESTOCK AND POULTRY MANAGEMENT

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Learn about planning and layout of housing for various types of livestock.

CO2 Learn about management techniques of livestock and poultry

CO3: Understand and develop formulation of concentrate mixtures for livestock.

CO4 Learn about economics of livestock and poultry farm.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM-4017

LIVESTOCK AND POULTRY MANAGEMENT

(PRACTICALS)

Time: 3 Hrs **Marks: 20**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. External body parts of cattle, buffalo, sheep, goat, swine and poultry.
2. Handling and restraining of livestock.
3. Identification methods of farm animals and poultry
4. Visit to IDF and IPF to study breeds of livestock and poultry and daily routine farm operations and farm records.
5. Judging of cattle, buffalo and poultry.
6. Culling of livestock and poultry.
7. Planning and layout of housing for different types of livestock.
8. Computation of rations for livestock and formulation of concentrate mixtures.
9. Hatchery operations, incubation and hatching equipments.
10. Management of chicks, growers and layers.
11. Debeaking, dusting and vaccination.
12. Economics of cattle, buffalo, sheep, goat, swine and poultry production.

SUGGESTED READINGS

1. Benerjee, G.C (ed.), 1998. A Textbook of Animal Husbandry, Oxford & IBH Publishing Company Ltd., New Delhi.
2. Dhama, P S. A Handbook of Animal Husbandry. ICAR, New Delhi.
3. Prasad, Jagdish (2016). Principles and Practices of dairy farm management. Kalyani Publishers, New Delhi.
4. Sastri N S R, Thomas C K, Singh R A (2015).Livestock Production and Management. Kalyani Publishers, New Delhi.
5. Singh Prakash (2018). Modern livestock and poultry production. Biotech
6. Tomar S.S (2016). Textbook of animal breeding. Kalyani Publishers, New Delhi.

B.Sc. (Hons.) Agriculture (Semester-IV)

(Session: 2020-21)

Course Code: BACM-4128

AGRI-INFORMATICS

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Learn about computers and various operating systems.

CO2: Work with applications of MS office, database and use in Agriculture

CO3: Use e-Agriculture and exploitation of ICT tools in Agriculture.

CO4: Understand computer models for agricultural production.

B.Sc. (Hons.) Agriculture (Semester- IV)
(Session: 2020-21)

Course Code: BACM-4128

AGRI-INFORMATICS

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**
Theory: 25
Practical: 15
C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Introduction to Computers, Operating Systems, definition and types, Applications of MS-Office for document creation & Editing, Data presentation, interpretation and graph creation, statistical analysis, mathematical expressions, Database, concepts and types, uses of DBMS in Agriculture.

Unit – II

World Wide Web (WWW): Concepts and components. Introduction to computer programming languages, concepts and standard input/output operations, e-Agriculture, concepts and applications, Use of ICT in Agriculture. Computer Models for understanding plant processes.

Unit – III

IT application for computation of water and nutrient requirement of crops, Computer-controlled devices (automated systems) for Agri-input management, Smartphone Apps in Agriculture for farm advises, market price, postharvest management etc, Geospatial technology for generating valuable agri-information.

Unit – IV

Decision support systems, concepts, components and applications in Agriculture. Agriculture Expert System, Soil Information Systems etc for supporting Farm decisions. Preparation of contingent crop-planning using IT tools.

B.Sc. (Hons.) Agriculture (Semester- IV)
(Session: 2020-21)

Course Code: BACM-4128

AGRI-INFORMATICS

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Learn about computer and its various components and different operating

CO2: Use MS Word, MS PowerPoint and MS Excel

CO3: Acquire knowledge about World Wide Web as well as programming languages.

CO4: Understand Crop Simulation Models and computation of water and nutrient requirements of crop IT tools.

B.Sc. (Hons.) Agriculture (Semester- IV)
(Session: 2020-21)

Course Code: BACM-4128

AGRI-INFORMATICS

(PRACTICALS)

Time: 3 Hrs **Marks: 15**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1 Study of Computer Components, accessories, practice of important DOS Commands.
2 Introduction of different operating systems such as windows, Unix/ Linux, Creating, Files & Folders, File Management.
3 Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific Document.
4 Use of MS-EXCEL - Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data.
5 Use of MS-ACCESS: Creating Database, preparing queries and reports, demonstration of Agri-information system.
6 Introduction to World Wide Web (WWW). Introduction of programming languages.
7 Hands on Crop Simulation Models (CSM) such as DSSAT/Crop-Info/CropSyst/ Wofost; Computation of water and nutrient requirements of crop using CSM and IT tools.
8 Hands on Decision Support System.
9 Preparation of contingent crop planning.

SUGGESTED READINGS

1 Vanitha G (2011). Agro-Informatics. New India Publishing Agency.

ADDITIONAL RESOURCES:

Web sites: http://www.agrimoon.com/
http://www.agriinfo.in/ eagri.org
http://www.agriglance.com/
http://agritech.tnau.ac.in/

B.Sc. (Hons.) Agriculture (Semester-IV)

(Session: 2020-21)

Course Code: BACM-4099

AGRICULTURAL MARKETING TRADE & PRICES

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Understand the concept, structure and classification of Agricultural Marketing.

CO2: Have knowledge about meaning, stages, characteristics, strategies and pricing of product Life Cycle.

CO3: Learn about role of Government in Agricultural Marketing.

CO4: Describe concept of International Trade and its need, present status and prospects of international trade in agri-commodities.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM-4099

AGRICULTURAL MARKETING TRADE & PRICES

(THEORY)

Time: 3 Hrs. **Max. Marks: 75**

Theory: 40

Practical: 20

C.A: 15

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Agricultural Marketing: Concepts and definitions of market, marketing, agricultural marketing, market structure, marketing mix and market segmentation, classification and characteristics of agricultural markets; demand, supply and producer's surplus of agri-commodities: nature and determinants of demand and supply of farm products, producer's surplus – meaning and its types, marketable and marketed surplus, factors affecting marketable surplus of agri-commodities

Unit – II

Product life cycle (PLC) and competitive strategies: Meaning and stages in PLC; characteristics of PLC; strategies in different stages of PLC; pricing and promotion strategies: pricing considerations and approaches – cost based and competition based pricing; market promotion – advertising, personal selling, sales promotion and publicity – their meaning and merits & demerits; marketing process and functions: Marketing process-concentration, dispersion and equalization; exchange functions – buying and selling; physical functions – storage, transport and processing; cilitating functions – packaging, branding, grading, quality control and labeling (Agmark).

Unit – III

Market functionaries and marketing channels: Types and importance of agencies involved in agricultural marketing; meaning and definition of marketing channel; number of channel levels; marketing channels for different farm products; Integration, efficiency, costs and price spread: Meaning, definition and types of market integration; marketing efficiency; marketing costs, margins and price spread; factors affecting cost of marketing; reasons for higher marketing costs of farm commodities; ways of reducing marketing costs; Role of Govt. in agricultural marketing: Public sector institutions- CWC, SWC, FCI, CACP & DMI – their objectives and functions; cooperative marketing in India.

Unit – IV

Risk in marketing: Types of risk in marketing; speculation & hedging; an overview of futures trading; Agricultural prices and policy: Meaning and functions of price; administered prices; need for agricultural price policy; Trade: Concept of international Trade and its need, theories of absolute and comparative advantage. Present status and prospects of international trade in agri-commodities; GATT and WTO; Agreement on Agriculture (AoA) and its implications on Indian agriculture; IPR.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM-4099

AGRICULTURAL MARKETING TRADE &PRICES

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Study relationship between market arrivals and prices of commodities.

CO2: Acquire knowledge about computation of marketable and marketed surplus of important commodities.

CO3: Study various marketing functions performed by different agencies.

CO4: Learn the application of principles of comparative advantage of international trade.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM-4099

AGRICULTURAL MARKETING TRADE & PRICES

(PRACTICALS)

Time: 3 Hrs **Marks: 20**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. Plotting and study of demand and supply curves and calculation of elasticities.
2. Study of relationship between market arrivals and prices of some selected commodities.
3. Computation of marketable and marketed surplus of important commodities.
4. Study of price behaviour over time for some selected commodities.
5. Construction of index numbers.
6. Visit to a local market to study various marketing functions performed by different agencies.
7. Identification of marketing channels for selected commodity, collection of data regarding marketing costs, margins and price spread and presentation of report in the class.
8. Visit to market institutions – NAFED, SWC, CWC, cooperative marketing society, etc. to study their organization and functioning.
9. Application of principles of comparative advantage of international trade.

SUGGESTED READINGS

1 Acharya, S.S and Agarwal, N. (2017). Agricultural Marketing in India. Oxford & IBM.
2 Panda S.C (2010). Farm Management and Agricultural Marketing. Kalyani Publishers, New Delhi.
3 Reddy S. Subba, Devi Bhava (2012). Agricultural Economics. Oxford & IBH Publishing Co. Pvt. Ltd.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM- 4010 (OPT-I)

BIOPESTICIDES & BIOFERTILIZERS

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Get introduced with the concept, importance and scope of biopesticide and biofertilizers.

CO2: Know about characteristics of various biopesticides and biofertilizers.

CO3: Familiarize with methods of application, production and quality control of biopesticides as well as biofertilizers.

CO4: Learn about limitations and factors influencing efficacy of biopesticides and biofertilizers.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM- 4010 (OPT-I)

BIOPESTICIDES & BIOFERTILIZERS

(THEORY)

Time: 3 Hrs. **Max. Marks: 75**
Theory: 40
Practical: 20
C.A: 15

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

History and concept of biopesticides. Importance, scope and potential of biopesticide. Definitions, concepts and classification of biopesticides viz. pathogen, botanical pesticides, and biorationales.

Unit – II

Botanicals and their uses. Mass production technology of bio-pesticides. Virulence, pathogenicity and symptoms of entomopathogenic pathogens and nematodes. Methods of application of biopesticides. Methods of quality control and Techniques of biopesticides. Impediments and limitation in production and use of biopesticide.

Unit – III

Biofertilizers - Introduction, status and scope. Structure and characteristic features of bacterial biofertilizers- Azospirillum, Azotobacter, Bacillus, Pseudomonas, Rhizobium and Frankia; Cynobacterial biofertilizers- Anabaena, Nostoc, Hapalosiphon and fungal biofertilizers- AM mycorrhiza and ectomycorhiza. Nitrogen fixation -Free living and symbiotic nitrogen fixation. Mechanism of phosphate solubilization and phosphate mobilization, K solubilization.

Unit – IV

Production technology: Strain selection, sterilization, growth and fermentation, mass production of carrier based and liquid biofertiizers. FCO specifications and quality control of biofertilizers. Application technology for seeds, seedlings tubers, sets etc. Biofertilizers - Storage, shelf life, quality control and marketing. Factors influencing the efficacy of biofertilizers.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM- 4010 (OPT-I)

BIOPESTICIDES & BIOFERTILIZERS

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Learn about isolation and purification of biopesticides and biofertilizers.

CO2 Learn about identification and multiplication of biopesticides.

CO3: Understand the methodology of mass multiplication and inoculum production of biofertilizers.

CO4 Learn about mass production of AM inoculations.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM- 4010 (OPT-I)

BIOPESTICIDES & BIOFERTILIZERS

(PRACTICALS)

Time: 3 Hrs **Marks: 20**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1 Isolation and purification of important biopesticides: *Trichoderma Pseudomonas, Bacillus metarhyzium* etc. and its production.
2 Identification of important botanicals.
3 Visit to biopesticide laboratory in nearby area.
4 Field visit to explore naturally infected cadavers.
5 Identification of entomopathogenic entities in field condition.
6 Quality control of biopesticides.
7 Isolation and purification of *Azospirillum , Azotobacter, Rhizobium,* P-solubilizers and cyanobacteria.
8 Mass multiplication and inoculums production of biofertilizers.
9 Isolation of AM Fungi -Wet sieving method and sucrose gradient method. Mass production of AM inoculants.

SUGGESTED READINGS

1 Ghosh G.K. Biopesticide and integrated pest management. A.P.H
2 Kanniyan S, Kumar K and Govi (2013). Biofertilizers technology. Scientific Publications.
3 Panda H (2011). Manufacture of Biofertilizer and Organic Farming. Asia Pacific Business.
4 Rai, M. K. (2006). Handbook of Microbial Biofertilizers. IBDC
5 Somani, L.L. (2009). Handbook of biofertilisers. ATPA
6 Sharma R.A et.al (2004). Biofertilizer technology. ATPA
7 Tiwari, V.N and Pandey, M.R (2015). Organic agriculture and biopesticides. Agrobios

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM- 4010 (OPT-II)

LANDSCAPING

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Get introduced with the concept, importance, scope and principles of landscaping.

CO2: Know about propagation, planting scheme and management of various ornamental trees, shrubs, climbers, herbaceous perennials, succulents etc.

CO3: Familiarize with Bio-aesthetic planning and landscaping of urban, rural, peri-urban areas as well as schools, hospitals, industries, airport etc.

CO4: Learn about principles and management of Bonsai as well as establishment of lawns.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM- 4010 (OPT-II)

LANDSCAPING

(THEORY)

Time: 3 Hrs. **Max. Marks: 75**

Theory: 40

Practical: 20

C.A: 15

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Importance and scope of landscaping. Principles of landscaping, garden styles and types, terrace gardening, vertical gardening, garden components, adornments, lawn making, rockery, water garden, walk-paths, bridges, other constructed features etc. gardens for special purposes.

Unit – II

Trees: selection, propagation, planting schemes, canopy management, shrubs and herbaceous perennials: selection, propagation, planting schemes, architecture. Climber and creepers: importance, selection, propagation, planting.

Unit – III

Annuals: selection, propagation, planting scheme, Other garden plants: palms, ferns, grasses and cacti succulents. Pot plants: selection, arrangement, management. Bio-aesthetic planning: definition, need, planning; landscaping of urban and rural areas, Peri-urban landscaping,

Unit – IV

Landscaping of schools, public places like bus station, railway station, townships, river banks, hospitals, play grounds, airports, industries, institutions. Bonsai: principles and management, lawn: establishment and maintenance. CAD application.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM- 4010 (OPT-II)

LANDSCAPING

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Learn about identification, propagation and maintenance of trees, shrubs, annuals, pot plants etc.

CO2 Learn about identification of tools and implements used in landscaping.

CO3: Get skills in layout of formal, informal and special type of gardens.

CO4 Learn about use of computer software for landscaping.

B.Sc. (Hons.) Agriculture (Semester-IV)
(Session: 2020-21)

Course Code: BACM- 4010 (OPT-II)

LANDSCAPING

(PRACTICALS)

Time: 3 Hrs **Marks: 20**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. Identification of trees, shrubs, annuals, pot plants.
2. Propagation of trees, shrubs and annuals.
3. Care and maintenance of plants, potting and repotting.
4. Identification of tools and implements used in landscape design.
5. Training and pruning of plants for special effects.
6. Lawn establishment and maintenance.
7. Layout of formal gardens, informal gardens, special type of gardens (sunken garden, terrace garden, rock garden)and designing of conservatory and lathe house.
8. Use of computer software.
9. Visit to important gardens/ parks/ institutes.

SUGGESTED READINGS

1. Ashraf, Syed Mahboob (2012). Handbook of landscape gardening and environment. Agrobios
2. Grewal, H.S and Parminder Singh (2014). Landscape designing and ornamental plants. Kalyani Publishers, New Delhi.
3. Trivedi Pratibha P (2014). Home gardening. ICAR, New Delhi.
4. Raj, Desh (2017). Floriculture at a glance. Kalyani Publishers, New Delhi.
5. Laurie, Alex and Ries, V.H (2012). Floriculture fundamentals and practices. Agrobios
6. Randhawa G.S and Mukhopadhyay (2016). Floriculture in India. Allied Publishers

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5011

Crop Improvement-I (*Kharif Crops*)

(THEORY)

COURSE OUTCOMES (CO):

After the course students will be able to:

CO1: recognize the biodiversity in *kharif* crops and understand the floral morphology.

CO2: identify characteristics of self- and cross-pollinated plants.

CO3: master various techniques in varietal development in *kharif* crops.

CO4: maintain the germplasm for the improvements in varieties.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5011

Crop Improvement-I (*Kharif Crops*)

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**
Theory: 25
Practical: 15
C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds; fibres; fodders and cash crops; vegetable and horticultural crops.

Unit – II

Plant genetic resources, its utilization and conservation, study of genetics of qualitative and quantitative characters; Important concepts of breeding self-pollinated, cross pollinated and vegetatively propagated crops

Unit – III

Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional).

Unit – IV

Hybrid seed production technology in Maize, Rice, Sorghum, Pearl millet and Pigeonpea, etc. Ideotype concept and climate resilient crop varieties for future.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5011

Crop Improvement-I (*Kharif Crops*)

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: understanding floral biology of major commercial crops & various hybridization techniques.

CO2: identify characteristics of self- and cross-pollinated plants.

CO3: master various techniques in varietal development in *kharif* crops.

CO4: maintain the germplasm for the improvements in varieties.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5011

Crop Improvement-I (*Kharif Crops*)

(PRACTICAL)

Time: 3 Hrs **Marks: 15**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. Floral morphology of kharif cereals crop (rice, maize, sorghum and pearl millet).
2. Floral biology in kharif pulse and oilseed crops (pigeon pea, mung bean, cowpea and groundnut).
3. Emasculation and hybridization in cereals - rice and maize sorghum and bajra
4. Emasculation and hybridization in major pulses and oilseed crops. (pigeonpea, urd bean, mung bean and cowpea)
5. Floral morphology in cotton and vegetables crop species (brinjal, okra and cucurbitaceous crops).
6. Emasculation and hybridization in vegetables crop species (brinjal, okra and cucurbitaceous crops)
7. Handling of germplasm and segregating populations by different methods like pedigree, bulk and single seed decent .
8. Estimation of heterosis, inbreeding depression and heritability.
9. Study of field techniques for seed production and hybrid seeds production in *Kharif* crops
10. Study of donor parents for quality characters
11. To visit to seed production plots of different field crops

SUGGESTED READINGS

1. Chahal G S and Gosal S S 2002. Principles and procedure of plant breeding: biotechnological and conventional approaches. CRC Press, Florida.
2. Chopra, V L 2000. *Breeding of field crops (*edt.). Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
3. Manjit S. Kang 2004. *Crop improvement: challenges in the twenty-first century* (edt). International Book Distributing Co., Lucknow.
4. Sharma, A K 2005. *Breeding technology of crop plants* (edt.). Yash Publishing house, Bikaner.
5. Ram. H H. 2005. *Vegetable breeding — principles and practices.* Kalyani publishers, New Delhi.

Selected websites:

https://www.agrimoon.com/breeding-of-field-horticultural-crops-icar-ecourse-pdf-book/
http://www.battaly.com/science/flowerlab_no.htm
http://www.agriquest.info/hybrid_seed.php
http://en.citizendium.org/wiki/Crop_origins_and_evolution
http://www.encyclopedia.com/sc/107249-agriculture-and-horticulture.htm

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5012

Principles of Integrated Pest and Disease Management

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: develop an expertise in identification of crop pests, disease causing organisms and losses caused by them.

CO2: analyze varied measures for management of pest and diseases in *kharif* crops.

CO3: develop a plan for ecologically sound pest management tactics.

CO4: justify the short and longer benefits of blended management approach for pests and diseases productivity.

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B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5012

Principles of Integrated Pest and Disease Management

(THEORY)

Time: 3 Hrs.

Max. Marks: 75
Theory: 40
Practical: 20
C.A: 15

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Categories of insect pests and diseases, IPM: Introduction, history, importance, concepts, principles and tools of IPM. Economic importance of insect pests, diseases and pest risk analysis. Methods of detection and diagnosis of insect pest and diseases.

Unit – II

Calculation and dynamics of economic injury level and importance of Economic threshold level. Methods of control: Host plant resistance, cultural, mechanical, physical, legislative, biological and chemical control.

Unit – III

Introduction to conventional pesticides for the insect pests and disease management. Survey surveillance and forecasting of Insect pest and diseases. Development and validation of IPM module.

Unit – IV

Implementation and impact of IPM (IPM module for Insect pest and disease. Safety issues in pesticide uses. Political, social and legal implication of IPM. Case histories of important IPM programmes. Case histories of important IPM programmes.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5012

Principles of Integrated Pest and Disease Management

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: identify major insect pests and diseases of different crops.

CO2: estimate plant diseases and yield losses of crops.

CO3: develop strategies and tactics of IPM, pest monitoring and decision making.

CO4: compare the benefits of pest and diseases management with IPM.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5012

Principles of Integrated Pest and Disease Management

(PRACTICAL)

Time: 3 Hrs **Marks: 20**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. To identify insect pests of different crops
2. To identify plant diseases of different crops
3. To study koch's postulates for the confirmation of plant pathogens
4. To study pest surveillance and forecasting of insect pests and plant diseases.
5. Crop monitoring and assessment of crop yield losses.
6. Identification of biocontrol agents, different predators and natural enemies.
7. Mass multiplication of *Trichoderma*, *Pseudomonas*, *Trichogramma*, NPV etc.
8. Identification and nature of damage of important insect pests and diseases and their management.
9. Population dynamics of a selected insect pest and diseases.
10. IPM and decision making.
11. Awareness campaign at farmers fields.

SUGGESTED READINGS

1. Rangaswamy, G and Mahadevan, A. 2001. Diseases of crop plants in India. Prentice Hall of India Pvt Ltd., New Delhi.

2. Dhaliwal G S, Ram Singh & Jindal Vikas 2013. A textbook of integrated pest management. Kalyani Publ, Ludhiana.

3. Dhaliwal G S & Arora Ramesh 2004. Principles of insect pest management by. Kalyani Publ, Ludhiana.

4. Agrios G N 2005. *Plant pathology*. 5th ed. Academic Press, New York. (Indian ed.)

5. Mehrotra, R S and Aggarwal A. 2007. Plant pathology. Tata Mcgraw Hill Publishing Co. Ltd., New Delhi

Selected websites:

http://vikaspedia.in/agriculture/crop-production/integrated-pest-managment/ipm-for-cerels/ipmstrategies-for-wheat/wheat-pests

http://agritech.tnau.ac.in/crop_protection/crop_prot_crop_insectpest%20_cereals_paddymain.html

http://agritech.tnau.ac.in/crop_protection/crop_prot_crop_insect_agri_pest.html

http://agritech.tnau.ac.in/crop_protection/crop_prot_crop_insect_horti_pest_spices_plant.html

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5013

Manures, Fertilizers and Soil Fertility Management

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: identify soil types and ways to improve soil fertility.

CO2: interpret soil analytical data with a view to assess fertilizer requirements.

CO3: chalk out strategies for using this information to guide farmers for soil *management.*

CO4: work out the details for integrated soil nutrient management optimizing organic, inorganic and biological components.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5013

Manures, Fertilizers and Soil Fertility Management

(THEORY)

Time: 3 Hrs. **Max. Marks: 75**

Theory: 40

Practical: 20

C.A: 15

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Introduction and importance of organic manures, properties and methods of preparation of bulky and concentrated manures. Green/leaf manuring. Fertilizer recommendation approaches. Integrated nutrient management.

Unit – II

Chemical fertilizers: classification, composition and properties of major nitrogenous, phosphatic, potassic fertilizers, secondary & micronutrient fertilizers, Complex fertilizers, nano fertilizers Soil amendments, Fertilizer Storage, Fertilizer Control Order. History of soil fertility and plant nutrition. criteria of essentiality.

Unit – III

Role, deficiency and toxicity symptoms of essential plant nutrients, Mechanisms of nutrient transport to plants, factors affecting nutrient availability to plants. Chemistry of soil nitrogen, phosphorus, potassium, calcium, magnesium, sulphur and micronutrients.

Unit – IV

Soil fertility evaluation, Soil testing. Critical levels of different nutrients in soil. Forms of nutrients in soil, plant analysis, rapid plant tissue tests. Indicator plants. Methods of fertilizer recommendations to crops. Factor influencing nutrient use efficiency (NUE), methods of application under rainfed and irrigated conditions.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5013

Manures, Fertilizers and Soil Fertility Management

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: interpret soil analytical data with a view to predicting fertilizer requirements.

CO2: demonstrate advanced knowledge of the soil-plant system to improve plant growth and yield.

CO3: interpret soil analytical data with a view to predicting fertilizer requirements.

CO4: work out the details for integrated soil nutrient management optimizing organic, inorganic and biological components.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5013

Manures, Fertilizers and Soil Fertility Management

(PRACTICAL)

Time: 3 Hrs **Marks: 20**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. Introduction of analytical instruments and their principles.
2. Colorimetry and flame photometry.
3. Determination of soil organic carbon.
4. Estimation of alkaline hydrolysable N in soils.
5. Estimation of soil extractable P in soils.
6. Estimation of exchangeable K, Ca and Mg in soils
7. Estimation of soil extractable S in soils.
8. Estimation of DTPA extractable Zn in soils.
9. Estimation of N in plants.
10. Estimation of P in plants.
11. Determination of K in plants.

SUGGESTED READINGS

1. Rajesh Singh and Singh S S 2014. Soil fertility and nutrient management. Kalyani Publ, Ludhiana.
2. Brady N C & Weil R R 2017. The nature and properties of soils. Pearson Education, India.
3. Biswas T D & Mukherjee S K 2006. Text book of soil science. Tata Mcgraw Hill Publishing Co. Ltd, New Delhi.
4. Rai M M 2002. Principal of soil science. Mac Millan India Ltd, New Delhi.
5. ISSS 2002. Fundamental of soil science. Div. of Soil Science, IARI, New Delhi.

Selected websites:

1. http://agritech.tnau.ac.in/agriculture/agri_nutrientmgt_integrntrientmgt.html
2. agritech.tnau.ac.in/org farm/orgfarm_manure.html
3. http://www.agriinfo.in/default.aspx?page=topic&superid=1&topicid=360
4. https://www.jove.com/.../soil-nutrient-analysis-nitrogen-phosphorus-and-potassium Chemistry of major nutrients
5. http://krishi.bih.nic.in/Acts-Rules/Fert_Order_1985.pdf

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Pests of Crops and Stored Grain and Their Management

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: identify the insect pests on various crops and stored grains

CO2: be judgmental in deciding about proper time of pest management based on bionomics and their nature of damage.

CO3: select appropriate safe pesticide and calculate doses and techniques for pesticides applications.

CO4: devise the pest management techniques in storage of grain and food products.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5014

Pests of Crops and Stored Grain and Their Management

(THEORY)

Time: 3 Hrs. **Max. Marks: 75**
Theory: 40
Practical: 20
C.A: 15

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

General account on nature and type of damage by different arthropods pests. Scientific name, order, family, host range, distribution, biology and bionomics, nature of damage, and management of major pests.

Unit – II

Scientific name, order, family, host range, distribution, nature of damage and control practice other important arthropod pests of various field crop, vegetable crop, fruit crop, plantation crops, ornamental crops, spices and condiments.

Unit – III

Factors affecting losses of stored grain and role of physical, biological, mechanical and chemical factors in deterioration of grain.

Unit – IV

Insect pests, mites, rodents, birds and microorganisms associated with stored grain and their management. Storage structure and methods of grain storage and fundamental principles of grain store management.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5014

Pests of Crops and Stored Grain and Their Management

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: identify the insect pests on various crops and stored grains.

CO2: select appropriate safe pesticide and calculate doses and techniques for pesticides applications.

CO3: devise pest management strategies for agricultural and horticultural crops.

CO4: devise the pest management techniques in storage of grain and food products.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5014

Pests of Crops and Stored Grain and Their Management

(PRACTICAL)

Time: 3 Hrs **Marks: 20**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1 Identification of types of damage caused by insect pests.
2 Identification of insect pests of rice and sorghum and their management.
3 Identification of insect pests of wheat and maize and their management
4 To study the pests of sugarcane and cotton and their management
5 To study the pests of pulses and oil seeds crops and their Management
6 Estimation of crop losses caused by pests
7 Calculations on the doses of insecticides application technique.
8 Identification of pests of vegetable crops and their management
9 Identification of pests of fruit crops and their management
10 Fumigation of grain store / godown.
11 Identification of rodents and rodent control operations in godowns.
12 Visit to nearest FCI godowns.

SUGGESTED READINGS

1. Atwal A S. and Dhaliwal, G S 2002. Agricultural pests of South Asia and their management. Kalyani Publishers, Ludhiana.
2. Srivastava K P 2004. A text book of applied entomology vol 1 & 2. Kalyani Publishers, Ludhiana.
3. Sehgal P K & Mir M A 2014. A text book of agricultural entomology. Kalyani Publishers, Ludhiana.
4. Dhaliwal G S & Ramesh A 2014. Integrated pest management. Kalyani Publishers, Ludhiana.
5. Awasthi V B 2017. Agricultural insect pests and their control 2nd ed. Scientific Publishers, Jodhpur.

Selected websites:

http://gardeningsolutions.ifas.ufl.edu/care/pests-and-diseases/pests/management/different-pestsdifferent-damage.html
http://vikaspedia.in/agriculture/crop-production/integrated-pest-managment/ipm-for-cerels/ipmstrategies-for-wheat/wheat-pests
http://agritech.tnau.ac.in/crop_protection/crop_prot_crop_insectpest%20_cereals_paddymain.html
http://agritech.tnau.ac.in/crop_protection/crop_prot_crop_insect_agri_pest.html
http://agritech.tnau.ac.in/crop_protection/crop_prot_crop_insect_horti_pest_spices_plant.html

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5015

Diseases of Field and Horticultural Crops and Their Management –I

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: acquire scientific knowledge about diseases and disorders of field & fruit crops.

CO2: apply knowledge to identify and solve problems based on disease symptoms produced during different stages of field & fruit crops plant development.

CO3: gain awareness about disease cycle of various pathogens associated with field & fruit crop disease.

CO4: extend their knowledge over disease associated with tropical and temperate fruit crops.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5015

Diseases of Field and Horticultural Crops and Their Management –I

(THEORY)

Time: 3 Hrs. **Max. Marks: 75**
Theory: 40
Practical: 20
C.A: 15

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Symptoms, etiology, disease cycle and management of major diseases of following crops: Field Crops: Rice: blast, brown spot, bacterial blight, sheath blight, false smut, khaira and tungro; Maize: stalk rots, downy mildew, leaf spots; Sorghum: smuts, grain mold and anthracnose, Bajra: downy mildew and ergot; Groundnut: early and late leaf spots, wilt.

Unit – II

Soybean: Rhizoctonia blight, bacterial spot, seed and seedling rot and mosaic; Pigeonpea: Phytophthora blight, wilt and sterility mosaic; Finger millet: Blast and leaf spot; black & green gram. Cercospora leaf spot and anthracnose, web blight and yellow mosaic; Castor: Phytophthora blight; Tobacco: black shank, black root rot and mosaic.

Unit – III

Horticultural Crops: Guava: wilt and anthracnose; Banana: Panama wilt, bacterial wilt, Sigatoka and bunchy top; Papaya: foot rot, leaf curl and mosaic, Pomegranate: bacterial blight; Coconut: wilt and bud rot; Tea: blister blight; Coffee: rust.

Unit – IV

Cruciferous vegetables: Alternaria leaf spot and black rot. Brinjal: Phomopsis blight and fruit rot and Sclerotinia blight; Tomato: damping off, wilt, early and late blight, buck eye rot and leaf curl and mosaic; Okra: Yellow Vein Mosaic; Beans: anthracnose and bacterial blight; Ginger: soft rot; Colocasia: Phytophthora blight.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5015

Diseases of Field and Horticultural Crops and Their Management –I

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: acquire scientific knowledge about diseases and disorders of field & fruit crops.

CO2: apply knowledge to identify and solve problems based on disease symptoms produced during different stages of field & fruit crops plant development

CO3: gain awareness about disease cycle of various pathogens associated with field & fruit crop disease.

CO4: Gain familiarity with regard to field- and lab-based approaches for the diagnosis of diseases and pathogens in field & fruit crops.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5015

Diseases of Field and Horticultural Crops and Their Management –I

(PRACTICAL)

Time: 3 Hrs **Marks: 20**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1 Collection and preservation of plant diseased specimens for Herbarium
2 Symptoms, etiology, disease cycle and management of diseases of : Rice
3 ---------- do ---------- Maize
4 ---------- do ---------- Pearl & finger millet
5 ---------- do ---------- Soybean, Groundnut and Castor
6 ---------- do ---------- Black gram and Green gram
7 ---------- do ---------- Papaya and Guava
8 ---------- do ---------- Banana and Mango
9 ---------- do ---------- Tomato, Okra and Brinjal
10 ---------- do ---------- of Cruciferous Crops
11 ---------- do ---------- Ginger and Bean crops
12 To visit Field for diagnosis of plant diseases

SUGGESTED READINGS

1. Singh, R S 2006. Diseases of fruit crops. Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
2. Singh R S 2007. Plant diseases (8th ed). Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi.
3. Gupta V K & Paul Y S 2008. Diseases of field crops (2nd ed.). Kalyani publishing co. ND.
4. Mehrotra R S & Aggarwal A 2012. Plant pathology (12th ed.). Tata Mcgraw Hill Publishing Co Ltd. ND.
5. Rangaswamy G & Mahadevan A 2012. Diseases of crop plants in India (4th ed.). Prentice Hall of India Pvt Ltd, New Delhi.

Selected websites:

https://www.agro.basf.co.za/agroportal/za/media/basf_ap_training_presentations/BASF_Cereal_Disease_Encyclopedia.pdf
http://agritech.tnau.ac.in/crop_protection/crop_prot_crop_diseases.html Diseases of cereal crops
http://ecourses.iasri.res.in/e-Leaarningdownload3_new.aspx?Degree_Id=01
http://agritech.tnau.ac.in/crop_protection/crop_prot_crop_diseases_agri.html
http://www.croppro.com.au/crop_disease_manual/ch01s01.php

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5016

Post-Harvest Management and Value Addition of Fruits and Vegetables

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: understand the causes of postharvest loss and changes in fruits and vegetables.

CO2: describe different storage techniques for horticultural produce.

CO3: discuss principle and methods of processing or value addition.

CO4: prepare value added product from fruit and vegetable.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5016

Post-Harvest Management and Value Addition of Fruits and Vegetables

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**
Theory: 25
Practical: 15
C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Importance of post-harvest processing of fruits and vegetables, extent and possible causes of post harvest losses; Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening

Unit – II

Respiration and factors affecting respiration rate; Harvesting and field handling; Storage (ZECC, cold storage, CA, MA, and hypobaric); Value addition concept

Unit – III

Principles and methods of preservation; Intermediate moisture food- Jam, jelly, marmalade, preserve, candy – Concepts and Standards; Fermented and non-fermented beverages.

Unit – IV

Tomato products- Concepts and Standards; Drying/ Dehydration of fruits and vegetables – Concept and methods, osmotic drying. Canning -– Concepts and Standards, packaging of products.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5016

Post-Harvest Management and Value Addition of Fruits and Vegetables

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: understand the causes of postharvest loss and changes in fruits and vegetables.

CO2: describe different storage techniques for horticultural produce.

CO3: discuss principle and methods of processing or value addition.

CO4: prepare value added product from fruit and vegetable.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5016

Post-Harvest Management and Value Addition of Fruits and Vegetables

(PRACTICAL)

Time: 3 Hrs **Marks: 15**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. Identification of important tools/equipments/ machines and chemicals required for PHT laboratory
2. Applications of different types of packaging, containers for shelf life extension.
3. Effect of temperature on shelf life and quality of produce(drying and dehydration).
4. Demonstration of chilling and freezing injury in vegetables and fruits.
5. Extraction and preservation of pulps and juices.
6. Preparation of jam, jelly, RTS, nectar, squash,
7. Tomato products, pickles and canned products.
8. Osmotically dried products,
9. Fruit bar and Candy
10. Quality evaluation of products -- physico-chemical and sensory.
11. Visit to processing unit/ industry.

SUGGESTED READINGS

1. Pantastiko E B 1975. Post-harvest Physiology, Handling and Utilization of Tropical and Sub-tropical Fruits and Vegetables, Westport (Connecticut).
2. Pandey P H 2007. Principles and Practices of Post-harvest Technology. Kalyani Publ, N. Delhi.
3. Sharma S K and Nautiyal M C 2009. Post-harvest technology of Horticultural Crops. New India Publishing Agency, Pitampura, New Delhi.
4. Bhutan R C 2012. Fruits and Vegetable Preservation. Biotech Book, N. Delhi.
5. Srilaxmi B 2016. Food Science. New Age International Publ., N. Delhi.

Selected Websites

http://agritech.tnau.ac.in/postharvest/pht_intro.htmlS

http://eagri.org/eagri50/HORT381/pdf/lec01.pdf

http://www.fao.org/docrep/005/y4358e/y4358e05.htm Post-harvest handling considerations for fresh fruits and vegetables

https://extension.umn.edu/preserving-and-preparing/making-jams-marmalades-preserves-and-conserves

https://content.ces.ncsu.edu/packaging-requirements-for-fresh-fruits-and-vegetables Packaging of fruit and vegetable.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5017

Principles of Organic Farming

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: learn about basic principles of organic farming.

CO2: optimize the soil nutrients utilizing organic and biological means for raising kharif crops.

CO3: precisely understand about qualitative and quantitative input requirements for *Kharif* crop production and ecologically sound.

CO4: learn about various management practices for commercial crop production with more dependence on organic inputs.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5017

Principles of Organic Farming

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**
Theory: 25
Practical: 15
C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Organic farming, principles and its scope in India; Initiatives taken by Government (central/ state), NGOs and other organizations for promotion of organic agriculture.

Unit – II

Organic ecosystem and their concepts; Organic nutrient resources and its fortification; Restrictions to nutrient use in organic farming

Unit – III

Choice of crops and varieties in organic farming; Fundamentals of insect, pest, disease and weed management under organic mode of production; Operational structure of NPOP

Unit – IV

Certification process and standards of organic farming; Processing, leveling, economic considerations and viability, marketing and export potential of organic products.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5017

Principles of Organic Farming

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: identify the key components of organic farming.

CO2: optimize the soil nutrients utilizing organic and biological means for raising kharif crops.

CO3: precisely understand about qualitative and quantitative input requirements for kharif crop production and ecologically sound.

CO4: analyze the information about the Operational structure of NPOP.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5017

Principles of Organic Farming

(PRACTICAL)

Time: 3 Hrs **Marks: 15**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. Visit of organic farms to study the various components and their utilization.
2. Preparation of enrich compost, vermicompost, bio-fertilizers/bio-inoculants and their quality analysis.
3. Indigenous technology knowledge (ITK) for nutrient, insect, pest disease and weed management.
4. Cost of organic production system.
5. Post-harvest management.
6. Quality aspect, grading, packaging and handling.

SUGGESTED READINGS

1. Rai N & Yadav D S 2005. 'Approaches for Organic Farming'. *Advances in Vegetable Production*. Research Book Centre, N. Delhi.

2. Joshi Mukand & Parbhakarashetty 2005. Sustainability through Organic Farming. Kalyani Publ, N. Delhi.

3. Trivedi P C 2011. Organic Farming for Sustainable Agriculture. Aavishkar Publ. Jaipur.

4. Singh S S & Singh Rajesh 2007. Sustainable Agriculture for Secured Survival. Kalyani Publ, N. Delhi.

5. Veeresh G K 2006. Organic Farming. Cambridge University Press India Pvt. Ltd, N. Delhi.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACP-5010

Practical Crop Production – I (*Kharif crops*)

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: describe intercultural operations of different kharif crops.

CO2: grasp bout cultural operations for raising kharif crops.

CO3: demonstrate plant protection measures of different crops.

CO4: calculate economics of different crops for commercial crop production.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACP-5010

Practical Crop Production – I (*Kharif crops*)

(PRACTICAL)

Time: 3 Hrs **Marks: 20**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. Crop planning.
2. Raising field crops in multiple cropping systems.
3. Field preparation, application of manures and fertilizers
4. Selection of crop and varieties, seed treatment and sowing of crops
5. Observation of germination
6. Thinning and gap filling
7. Intercultural operations-hoeing and weeding
8. Water management- application of irrigation water and demonstrating methods of irrigation
9. Top dressing of fertilizer (urea) and insect-pest and disease management technologies
10. Harvesting, threshing, winnowing and storage
11. Preparation of balance sheet including cost of cultivation, net returns per student as well as per team of 8-10 students.

SUGGESTED READINGS

1. Das N R 2007. Introduction to crops of India. Scientific Publishers, Jodhpur.
2. Yawalkar K S Aggarwal J P & Bokde S 2008. Manures and fertilizers (10th ed.). Agri-horticultural Publishing House, Nagpur.
3. Balasubramaniyam P & Palaniappan, S P 2016. Principles and practices of Agronomy. Agrobios, Jodhpur.
4. Reddy S R 2016. Principles of Agronomy (5th ed.). Kalyani Publishers, Ludhiana.
5. Singh S S & Singh Rajesh 2015. Principles and practices of Agronomy (5th re-set). Kalyani Publishers, Ludhiana.

Selected Websites:

http://www.icar.org.in/en/node/9072
agricoop.nic.in/programmesandschemes/integrated-nutrient-management Integrated nutrient management
http://www.eolss.net/sample-chapters/c10/E5-15-02-04.pdf
http://www.fao.org/docrep/006/Y4360E/y4360e0a.htm Field preparation.
http://ppqs.gov.in/PDF/Seed%20Treatment%20Rabi123.htm

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5099

Entrepreneurship Development and Business Communication

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: understand entrepreneurship and business start-up planning.

CO2: prepare a concept to identify the business skills, potential team members, partners, customers and investors.

CO3: develop a sound knowledge about legal and ethical business.

CO4: analyze basic skills to start their enterprises communicate effectively both orally and in business writings as well deliver effective presentations.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5099

Entrepreneurship Development and Business Communication

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**
Theory: 25
Practical: 15
C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Concept of Entrepreneur, Entrepreneurship Development, Characteristics of entrepreneurs; SWOT Analysis & achievement motivation, Government policy and programs and institutions for entrepreneurship development

Unit – II

Impact of economic reforms on Agribusiness/ Agri-enterprises, Entrepreneurial Development Process; Business Leadership Skills; Developing organizational skill (controlling, supervising, problem solving, monitoring & evaluation).

Unit – III

Developing Managerial skills, Business Leadership Skills (Communication, direction and motivation Skills), Problem solving skill.

Unit – IV

Supply chain management and Total quality management, Project Planning Formulation and report preparation; Financing of enterprise, Opportunities for agri-entrepreneurship and rural enterprise.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5099

Entrepreneurship Development and Business Communication

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: understand entrepreneurship and business start-up planning.

CO2: prepare a concept to identify the business skills, potential team members, partners, customers and investors.

CO3: develop a sound knowledge about legal and ethical business.

CO4: analyze basic skills to start their enterprises communicate effectively both orally and in business writings as well deliver effective presentations.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5099

Entrepreneurship Development and Business Communication

(PRACTICAL)

Time: 3 Hrs **Marks: 15**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1– 2 Assessing entrepreneurial traits, problem solving skills, managerial skills and achievement motivation.
3- -4 Exercise in creativity, time audit through planning, monitoring and supervision.
5- -6 Identification and selection of business idea.
7- -9 Preparation of business plan and proposal writing.
10 -11 Visit to entrepreneurship development institute and entrepreneurs.

SUGGESTED READINGS

1. Harold Koontz & Heinz Weihrich 2004. Essentials of management: an international perspective, (2nd ed.) Tata Mc-graw Hill Publishing Pvt Ltd., New Delhi.
2. Mohanty S K 2007. Fundamentals of entrepreneurship. Prentice Hall India Ltd., New Delhi.
3. Poornima Charantimath 2006. Entrepreneurship development: small business enterprise. Pearson Education, New York.
4 Jayashree, K, Anil Kumar, Mini K. Abhraham & Poornima S C 2015. Entrepreneurship development. New Age International, New Delhi.
5. Nandan H 2011. Fundamentals of entrepreneurship. Phi Learning Pvt Ltd, India.

Selected websites:

http://ecoursesonline.iasri.res.in/mod/page/view.php?id=49544
https://shodhganga.inflibnet.ac.in/bitstream/10603/103242/11/11_chapter%204.pdf
https://www.geospatialworld.net/article/impact-of-economic-reforms-on-indian-agricultural-sector-application-ofgeomatics
https://www.indiatrust.org/docs/22%20INTRODUCTION%20LESSION%20AS%20ENTREPRENEURSHIP.pdf
https://en.wikipedia.org/wiki/Total_quality_management

B.Sc. (Hons.) Agriculture (Semester-V)

(Session: 2020-21)

Course Code: BACM-5018 (Opt-I)

Mushroom Cultivation

(Theory)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: will gain necessary competencies for isolating and culturing the different species of edible fungus.

CO2: develop mushroom spawn under lab conditions as pure culture.

CO3: become skillful for mushroom cultivation under natural environmental conditions.

CO4: identify the various pest and disease conditions in mushroom houses.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5018 (Opt-I)

Mushroom Cultivation

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**
Theory: 25
Practical: 15
C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Introduction to mushroom fungi, Identification of edible and poisonous type, edible mushrooms -- *Pleurotus*, *Volvariella* and *Agaricus*, medicinal value of mushrooms, preparation of culture, mother spawn production, multiplication of spawn.

Unit – II

Cultivation Technology of button, oyster, paddy straw; and milky mushrooms harvesting, packing and storage; problems in cultivation --- diseases, pests and nematodes, weed moulds and their management strategies. Economics of cultivation, postharvest technologies.

Unit – III

Equipment and sterilization techniques for culture media, isolation of mother culture, spawn preparation and maintenance of mushroom beds, oyster mushroom, *Volvariella* and *Agaricus.*

Unit – IV

Processing and preservation of mushrooms, economics of spawn and mushroom production and Project cost - analysis for mushroom cultivation

B.Sc. (Hons.) Agriculture (Semester-V)

(Session: 2020-21)

Course Code: BACM-5018 (Opt-I)

Mushroom Cultivation

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: will gain necessary competencies for isolating and culturing the different species of edible fungus.

CO2: develop mushroom spawn under lab conditions as pure culture.

CO3: become skillful for mushroom cultivation under natural environmental conditions.

CO4: identify the various pest and disease conditions in mushroom houses.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5018 (Opt-I)

MUSHROOM CULTIVATION

(PRACTICAL)

Time: 3 Hrs **Marks: 15**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. Identification of common, edible and poisonous mushrooms
2. To study preparation of media for mycelial culture of mushroom.
3. Preparation of mushroom spawn.
4. Compost preparation for button mushroom production.
5. Button mushroom cultivation conditions for small medium and large scale.
6. Harvesting and packaging techniques of mushroom.
7. Pests and diseases of mushrooms.
8. Oyster mushroom cultivation
9. Cultivation technology of paddy straw and milky mushroom
10. Cost benefit ratio of mushroom cultivation and project formulation
11. Visit to mushroom industrial unit

SUGGESTED READINGS

1. Agrimoon Team 2016. Mushroom culture -horticulture ICAR pdf book.
2. Suman B C & Sharma V P 2007. Mushroom cultivation in India. Daya Publishing House, New Delhi.
3. Biswas S, Datta M & Ngachan S V 2012. Mushrooms: A Manual for Cultivation, PHI Learning Pvt. Ltd., New Delhi, India.
4. Manjit Singh, Bhuvnesh Vijay, Shwet Kamal and Wakchaure G C (2011). Mushrooms cultivation, marketing and consumption. Publisher: Directorate of Mushroom Research, Solan, Himachal Pradesh-India.
5. Bahl Neeta 2006. Handbook on Mushrooms, Oxford and IBH Publishing

Selected Websites:

http://nhb.gov.in/pdf/Cultivation.pdf
http://ecoursesonline.iasri.res.in/mod/page/view.php?id=103099
http://agricoop.nic.in/sites/default/files/ICAR_8.pdf
http://www.extension.psu.edu/plants/vegetable-fruit/mushrooms/mushroomsubstrate/substrate-preparation-for-white-button-mushrooms
http://www.agritech.tnau.ac.in/farm_enterprises/Farm%20enterprises_%20Mushroom_Post%20harvest.html

B.Sc. (Hons.) Agriculture (Semester-V)

(Session: 2020-21)

Course Code: BACM-5018 (Opt-II)

Micro Propagation Technologies

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: learn about basic principles of crop production practices of *kharif* crops.

CO2: understand about cultural operations for raising *kharif* crops.

CO3: precisely understand about qualitative and quantitative input requirements for *kharif* crop production.

CO4: learn about various management practices for commercial crop production.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5018 (Opt-II)

Micro Propagation Technologies

(THEORY)

Time: 3 Hrs. **Max. Marks: 75**
Theory: 40
Practical: 20
C.A: 15

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Introduction, History, Advantages and limitations; Types of cultures (seed, embryo, organ, callus, cell)

Unit – II

Stages of micropropagation, Axillary bud proliferation (Shoot tip and meristem culture, bud culture)

Unit – III

Organogenesis (callus and direct organ formation), Somatic embryogenesis, cell suspension cultures

Unit – IV

Production of secondary metabolites, Somaclonal variation, Cryopreservation

B.Sc. (Hons.) Agriculture (Semester-V)

(Session: 2020-21)

Course Code: BACM-5018 (Opt-II)

Micro Propagation Technologies

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: demonstrate the knowledge of the tissue culture maintenance *techniques*.

CO2: use lab equipment and develop expertise in culture media preparation sterilization and raising callus from organ explants.

CO3: successfully maintain cultures with good viability, minimal contamination and appropriate documentation.

CO4: recognize and troubleshoot problems common to routine cell culture.

B.Sc. (Hons.) Agriculture (Semester-V)
(Session: 2020-21)

Course Code: BACM-5018 (Opt-II)

Micro Propagation Technologies

(PRACTICAL)

Time: 3 Hrs **Marks: 20**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. Identification and use of equipments in tissue culture Laboratory.
2. Composition. and preparation of Nutrition media
3. Sterilization techniques for media, containers and small instruments.
4. Sterilization techniques for explants.
5. Preparation of stocks and working solution.
6. Preparation of selective medium.
7. Culturing of explants: Seeds, shoot tip and single node.
8. Callus induction.
9. Induction of somatic embryos regeneration of whole plants from different explants.
10. Hardening procedures.

SUGGESTED READINGS

1. Chawala H S 2000. Introduction to Plant Biotechnology. Oxford & IBH, New Delhi

2. Gupta, P. K. 2008. Elements of Biotechnology. Rastogi Publications, Meerut

3. Shekhawat M. S. 2011. Plant Biotechnology: In vitro Principles, Techniques and Applications. MJP Publishers, Chennai

4. Mascarenhas A. F. 2008. Hand Book of Plant Tissue Culture. ICAR, New Delhi

5. Singh B D 2005. Biotechnology, Expanding Horizons. Kalyani Publishers, Ludhiana.

Selected Websites

http://agritech.tnau.ac.in/bio-tech/biotech_tc_notes.html

https://en.wikipedia.org/wiki/Micropropagation
https://www.researchgate.net/publication/236028153_Advanced_technology_in_micropropagation_of_some_important_plants
https://www-pub.iaea.org/MTCD/publications/PDF/te_1384_web.pdf
https://www.isaaa.org/resources/publications/pocketk/14/default.asp

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACL- 6011

PRINCIPLES OF FOOD SCIENCE AND NUTRITION

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: understand about various food groups, balanced diet, principles of meal planning and relationship between food, nutrition and health.

CO2: understand and interpret about digestion, absorption and function of various nutrients and their sources.

CO3: have a working knowledge about avoiding food spoilage and wastage.

CO4: learn about food preservation methods.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACL- 6011

PRINCIPLES OF FOOD SCIENCE AND NUTRITION

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**

Theory: 40

C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Concepts of Food Science (definitions, measurements, density, phase change, pH, osmosis, surface tension, colloidal systems etc.); Food composition and chemistry (water, carbohydrates, proteins, fats, vitamins, minerals, flavours, colours, miscellaneous bioactives, important reactions)

Unit – II

Food microbiology (bacteria, yeast, moulds, spoilage of fresh & processed foods, Production of fermented foods)

Unit – III

Principles and methods of food processing and preservation (use of heat, low temperature, chemicals, radiation, drying etc.); Food and nutrition, Malnutrition (over and under nutrition), nutritional disorders

Unit – IV

Energy metabolism (carbohydrate, fat, proteins); Balanced/ modified diets, Menu planning, New trends in food science and nutrition.

SUGGESTED READINGS

1. Shakuntala M and Shadaksharaswamy (2010). Food facts and principles. New Age International.
2. Srilaxmi B (2015). Nutrition Science. New Age International.
3. Potter Norman N (2012). Food Science. CBS Publishers & Distributors Pvt. Ltd.
4. P H Pandey (2007). Principles & Practices of Post-Harvest Technology. Kalyani Publishers, ND.

SUGGESTED WEBSITES

Web sites: http://www.agrimoon.com/
http://www.agriinfo.in/ eagri.org
http://www.agriglance.com/
http://agritech.tnau.ac.in/

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACL- 6012

INTELLECTUAL PROPERTY RIGHTS

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: understand about basic concepts of Intellectual Property Rights (IPR).

CO2: learn about legislations covering IPR in India.

CO3: learn about UPOV for protection of plant verities and PPV and FR Act in India.

CO4: discuss the relevance and futuristic need for IPR.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACL- 6012

INTELLECTUAL PROPERTY RIGHTS

(THEORY)

Time: 3 Hrs. **Max. Marks: 25**

Theory: 20

C.A: 5

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Introduction and meaning of intellectual property, brief introduction to GATT, WTO, TRIPs and WIPO, Treaties for IPR protection: Madrid protocol, Berne Convention, Budapest treaty, etc. Types of Intellectual Property and legislations covering IPR in India:-Patents, Copyrights, Trademark, Industrial design, Geographical indications, Integrated circuits, Trade secrets.

Unit – II

Patents Act 1970 and Patent system in India, patentability, process and product patent, filing of patent, patent specification, patent claims, Patent opposition and revocation, infringement, compulsory licensing, Patent Cooperation Treaty, Patent search and patent database.

Unit – III

Origin and history including a brief introduction to UPOV for protection of plant varieties, Protection of plant varieties under UPOV and PPV&FR Act of India, Plant breeder's rights, Registration of plant varieties under PPV&FR Act 2001, breeders, researcher and farmers rights. Traditional knowledge-meaning and rights of TK holders.

Unit – IV

Convention on Biological Diversity, International treaty on plant genetic resources for food and agriculture (ITPGRFA). Indian Biological Diversity Act, 2002 and its salient features, access and benefit sharing.

SUGGESTED READINGS

1. Bhandari M K (2011). Central law publication's law relating to Intellectual Property Rights Central Law Publication.
2. Lokganathan E T (2015). Intellectual property rights (IPRS). New Century Publications.
3. Pathak Manju (2014). Introduction to intellectual property rights. NIPA

SUGGESTED WEBSITES

Web sites: http://www.agrimoon.com/
http://www.agriinfo.in/ eagri.org
http://www.agriglance.com/
http://agritech.tnau.ac.in/

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6013

CROP IMPROVEMENT-II (*RABI CROPS*)

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: understand the diversity pattern in flowers of rabi crop

CO2: apply knowledge for varietal development in crops

CO3: grasp and interpret about various breeding technique for crop improvement

CO4: learn and apply practical skills in plant breeding

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6013

CROP IMPROVEMENT-II (*RABI CROPS*)

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**

Theory: 25

Practical: 15

C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds; fodder crops and cash crops; vegetable and horticultural crops

Unit – II

Plant genetic resources, its utilization and conservation; study of genetics of qualitative and quantitative characters

Unit – III

Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional)

Unit – IV

Hybrid seed production technology of rabi crops. Ideotype concept and climate resilient crop varieties for future.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6013

CROP IMPROVEMENT-II (*RABI CROPS*)

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: differentiate and understanding the biodiversity pattern in rabi crops.

CO2: develop and equip students with various breeding technique for crop improvement.

CO3: discuss briefly about different techniques involved in varietal development in crops.

CO4: apply knowledge and practical skills in plant breeding.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6013

CROP IMPROVEMENT-II (*RABI CROPS*)

(PRACTICAL)

Time: 3 Hrs **Marks: 15**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. To study the flower structure and reproductive parts in crops
2. Emasculation and hybridization techniques in Wheat, Oat, Barley.
3. To study the floral biology, emasculation and hybridization techniques in Chickpea, Lentil and Field pea.
4. To study the floral biology, emasculation and hybridization techniques in Rapeseed Mustard and Sunflower.
5. To study the floral biology, emasculation and hybridization techniques in Potato, Berseem, Sugarcane.
6. To study the floral biology, emasculation and hybridization techniques in different crop species namely Tomato, Chilli, Onion.
7. To handle the germplasm and segregating populations by pedigree, bulk and single seed decent methods.
8. To Study of field techniques for seed production and hybrid seeds production in Rabi crops.
9. To estimate the heterosis, inbreeding depression and heritability.
10. To study Layout of field experiments.
11. To study of quality characters, study of donor parents for different characters.
12. To visit to seed production plots.

SUGGESTED READINGS

1. G.S. Chahal and S.S. Gosal (2001). Principles and Procedure of Plant Breeding: Biotechnological and Conventional Approaches. Alpha Science International Ltd.
2. Hari Har Ram (2014). Crop Breeding and Biotechnology. Kalyani Publication, ND.
3. Singh D and Singh N (2014). Breeding crop plants for stress resistance. Kalyani Publishers, ND.
4. Robert W. Allard, Robert Wayne Allard (1999). Principles of Plant Breeding. Wiley Publications.
5. Kumar N (2016). Breeding of horticultural crops. NIPA.

SUGGESTED WEBSITES

Web sites: http://www.agrimoon.com/
http://www.agriinfo.in/ eagri.org
http://www.agriglance.com/
http://agritech.tnau.ac.in/

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6014

MANAGEMENT OF BENEFICIAL INSECTS

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: Extend the knowledge on scope, importance and uses of beneficial insects.

CO2: Learn the management methods in bee keeping, silk worm rearing.

CO3: Learn the skills of bee keeping, silk worm rearing and lac production and Processing.

CO4: Discuss the mass multiplication and field release of bio-agents.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6014

MANAGEMENT OF BENEFICIAL INSECTS

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**

Theory: 25

Practical: 15

C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Importance of beneficial Insects, Beekeeping and pollinators, bee biology, commercial methods of rearing, equipment used, seasonal management, bee enemies and disease. Bee pasturage, bee foraging and communication. Insect pests and diseases of honey bee. Role of pollinators in cross pollinated plants.

Unit – II

Types of silkworm, voltinism and biology of silkworm. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves. Rearing, mounting and harvesting of cocoons. Pest and diseases of silkworm, management, rearing appliances of mulberry silkworm and methods of disinfection.

Unit – III

Species of lac insect, morphology, biology, host plant, lac production – seed lac, button lac, shellac, lac- products. Identification of major parasitoids and predators commonly being used in biological control.

Unit – IV

Insect orders bearing predators and parasitoids used in pest control and their mass multiplication techniques. Important species of pollinator, weed killers and scavengers with their importance.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6014

MANAGEMENT OF BENEFICIAL INSECTS

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: identify and realize the scope, importance and uses of beneficial insects.

CO2: learn the management methods in bee keeping, silk worm rearing.

CO3: learn the skills of bee keeping, silk worm rearing and lac production and Processing.

CO4: learn the skill of mass multiplication and field release of bio-agents.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6014

MANAGEMENT OF BENEFICIAL INSECTS

(PRACTICAL)

Time: 3 Hrs **Marks: 15**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. Honey bee species and castes of bees.
2. Beekeeping appliances and seasonal management.
3. Bee enemies and disease.
4. Bee pasturage, bee foraging and communication.
5. Types of silkworm, voltinism and biology of silkworm.
6. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves.
7. Species of lac insect, host plant identification.
8. Identification of other important pollinators, weed killers and scavengers.
9. Identification and techniques for mass multiplication of natural enemies.
10. Mass multiplication techniques of *Trichogramma* sp. and *Chrysoperla carnea*
11. Visit to research and training institutions devoted to beekeeping, sericulture, lac culture and natural enemies.

SUGGESTED READINGS

1. Abrol D P (2013). Beekeeping. Scientific Publishers.
2. Sathe T V (2014). Fundamentals of beekeeping. Daya Publishing House.
3. Prasad T V (2012). Handbook of entomology. New Vishal Publications.
4. Ganga G and Chetty J S (2017). Introduction to sericulture. Oxford and IBH.
5. Singh Tribhuwan and Saratchan (2017). Principles and techniques of silkworm seed production. Discovery Publishing Pvt. Ltd.

SUGGESTED WEBSITES

Web sites: http://www.agrimoon.com/
http://www.agriinfo.in/ eagri.org
http://www.agriglance.com/
http://agritech.tnau.ac.in/

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6015

RAINFED AGRICULTURE AND WATERSHED MANAGEMENT

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: grasp the fundamentals principles of rainfed agriculture and their application in agriculture.

CO2: learn about watershed management.

CO3: gain in depth knowledge about drought, crop adaptation and contingent crop planning for crops.

CO4: have understanding about soil and climate conditions and soil conservation.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6015

RAINFED AGRICULTURE AND WATERSHED MANAGEMENT

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**
Theory: 25
Practical: 15
C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Rainfed agriculture: Introduction, types, History of rainfed agriculture and watershed in India; Problems and prospects of rainfed agriculture in India; Soil and climatic conditions prevalent in rainfed areas.

Unit – II

Soil and water conservation techniques, Drought: types, effect of water deficit on physio-morphological characteristics of the plants, Crop adaptation and mitigation to drought.

Unit – III

Water harvesting: importance, its techniques, Efficient utilization of water through soil and crop management practices, Management of crops in rainfed areas

Unit – IV

Contingent crop planning for aberrant weather conditions, Concept, objective, principles and components of watershed management, factors affecting watershed management.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6015

RAINFED AGRICULTURE AND WATERSHED MANAGEMENT

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: understand rainfed agriculture and their application in agriculture.

CO2: learn about watershed management and meteorological observations.

CO3: learn the skill of assessing drought and crop adaptation and to develop contingent crop planning.

CO4: have understanding about water harvesting structures and visit various sites.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6015

RAINFED AGRICULTURE AND WATERSHED MANAGEMENT

(PRACTICAL)

Time: 3 Hrs **Marks: 15**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. Studies on climate classification.
2. Studies on rainfall pattern in rainfed areas of the country and pattern of onset and withdrawal of monsoons.
3. Studies on cropping pattern of different rainfed areas in the country and demarcation of rainfed area on map of India.
4. Interpretation of meteorological data and scheduling of supplemental irrigation on the basis of evapo-transpiration demand of crops.
5. Critical analysis of rainfall and possible drought period in the country, effective rainfall and its calculation.
6. Studies on cultural practices for mitigating moisture stress.
7. Characterization and delineation of model watershed.
8. Field demonstration on soil & moisture conservation measures.
9. Field demonstration on construction of water harvesting structures.
10. Visit to rainfed research station/watershed.

SUGGESTED READINGS

1. Das M M and Saika M I (2013). Watershed Management. PHI learning.
2. Tripathi R P and Singh H P (2008). Soil erosion and conservation. New age international.
3. Murthy V V N and Jha M K (2016). Land and water management engineering. Kalyani Publishers, ND.
4. Das Ghanshyam (2016). Hydrology and Soil Conservation Engineering Including Watershed Management. PHI learning.
5. Jayanthi C and Kalpana R (2016). Dryland agriculture. Kalyani Publishers.

SUGGESTED WEBSITES

Web sites: http://www.agrimoon.com/
http://www.agriinfo.in/ eagri.org
http://www.agriglance.com/
http://agritech.tnau.ac.in/

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6016

PROTECTED CULTIVATION AND SECONDARY AGRICULTURE

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: grasp the fundamental knowledge and learn the scope of protected cultivation.

CO2: describe the components of protected structures.

CO3: understand and plan the crop raising under green houses.

CO4: practice raising crops under protected condition.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6016

PROTECTED CULTIVATION AND SECONDARY AGRICULTURE

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**

Theory: 25

Practical: 15

C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Green house technology: Introduction, Types of Green Houses; Plant response to Green house environment, Planning and design of greenhouses, Design criteria of green house for cooling and heating purposes.

Unit – II

Green house equipments, materials of construction for traditional and low cost green houses. Irrigation systems used in greenhouses, typical applications, passive solar green house, hot air green house heating systems, green house drying. Cost estimation and economic analysis.

Unit – III

Important Engineering properties such as physical, thermal and aero & hydrodynamic properties of cereals, pulses and oilseed, their application in PHT equipment design and operation.

Unit – IV

Drying and dehydration; moisture measurement, EMC, drying theory, various drying method, commercial grain dryer (deep bed dryer, flat bed dryer, tray dryer, fluidized bed dryer, recirculatory dryer and solar dryer). Material handling equipment; conveyer and elevators, their principle, working and selection.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6016

PROTECTED CULTIVATION AND SECONDARY AGRICULTURE

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: grasp the fundamental knowledge and learn the scope of protected cultivation.

CO2: describe the components of protected structures.

CO3: understand and plan the crop raising under green houses.

CO4: practice raising crops under protected condition.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6016

PROTECTED CULTIVATION AND SECONDARY AGRICULTURE

(PRACTICAL)

Time: 3 Hrs **Marks: 15**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. Study of different type of green houses based on shape.
2. Determine the rate of air exchange in an active summer winter cooling system.
3. Determination of drying rate of agricultural products inside green house.
4. Study of green house equipments.
5. Visit to various Post Harvest Laboratories.
6. Determination of Moisture content of various grains by oven drying & infrared moisture methods.
7. Determination of engineering properties (shape and size, bulk density and porosity of biomaterials).
8. Determination of Moisture content of various grains by moisture meter.
9. Field visit to seed processing plant.

SUGGESTED READINGS

1. Singh B (2014). Advances in protected cultivation. NIPA.
2. Jag Paul K (2002). Crop production technology for cold arid region. Kalyani Publishers, ND.
3. Prasad S and Kumar U (2016). Greenhouse management for horticulture crops. Agrobios.
4. Tiwari G N (2012). Greenhouse technology for controlled environment. Narosa Publications.
5. Singh C and Singh P (2018). Modern techniques of raising field crops. CBS publishing.
6. Saha, Arun Kumar and Saha Anu (2018). Textbook of soil physics. Kalyani Publishers, ND.

SUGGESTED WEBSITES

Web sites: http://www.agrimoon.com/
http://www.agriinfo.in/ eagri.org
http://www.agriglance.com/
http://agritech.tnau.ac.in/

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6017

DISEASES OF FIELD & HORTICULTURAL CROPS & THEIR MANAGEMENT-II

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: understand in depth about diseases of horticultural and fruit crops in Rabi season and epidemiological favorable factors for disease development.

CO2: understand the life cycle and perpetuation of field crop diseases.

CO3: learn about disease associated with tropical and temperate fruit crops.

CO4: develop basic skill in disease diagnosis and identification.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6017

DISEASES OF FIELD & HORTICULTURAL CROPS & THEIR MANAGEMENT-II

(THEORY)

Time: 3 Hrs. **Max. Marks: 75**

Theory: 40

Practical: 20

C.A: 15

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Symptoms, etiology, disease cycle and management of following diseases: Field Crops: Wheat: rusts, loose smut, karnal bunt, powdery mildew, alternaria blight, and ear cockle; Sugarcane: red rot, smut, wilt, grassy shoot, ratoon stunting and Pokkah Boeng; Sunflower: Sclerotinia stem rot and Alternaria blight.

Unit – II

Mustard: Alternaria blight, white rust, downy mildew and Sclerotinia stem rot; Gram: wilt, grey mould and Ascochyta blight; Lentil: rust and wilt; Cotton: anthracnose, vascular wilt, and black arm; Pea: downy mildew, powdery mildew and rust.

Unit – III

Horticultural Crops: Mango: anthracnose, malformation, bacterial blight and powdery mildew; Citrus: canker and gummosis; Grape vine: downy mildew, Powdery mildew and anthracnose; Apple: scab, powdery mildew, fire blight and crown gall; Peach: leaf curl. Strawberry: leaf spot Potato: early and late blight, black scurf, leaf roll, and mosaic.

Unit – IV

Cucurbits: downy mildew, powdery mildew, wilt; Onion and garlic: purple blotch, and Stemphylium blight; Chillies: anthracnose and fruit rot, wilt and leaf curl; Turmeric: leaf spot Coriander: stem gall Marigold: Botrytis blight; Rose: dieback, powdery mildew and black leaf spot.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6017

DISEASES OF FIELD & HORTICULTURAL CROPS & THEIR MANAGEMENT-II

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: understand in depth about diseases of horticultural and fruit crops in Rabi season and epidemiological favorable factors for disease development.

CO2: understand the life cycle and perpetuation of field crop diseases.

CO3: learn about disease associated with tropical and temperate fruit crops.

CO4: develop basic skill in disease diagnosis and identification.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6017

DISEASES OF FIELD & HORTICULTURAL CROPS & THEIR MANAGEMENT-II

(PRACTICAL)

Time: 3 Hrs **Marks: 20**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. To collect and preserve diseased samples for herbarium.
2. To study symptoms, etiology, disease cycle and management of diseases of wheat.
3. To study symptoms, etiology, disease cycle and management of diseases of sugarcane.
4. To study symptoms, etiology, disease cycle and management of diseases of sunflower.
5. To study symptoms, etiology, disease cycle and management of diseases of mustard.
6. To study symptoms, etiology, disease cycle and management of diseases of gram and Lentil.
7. To study symptoms, etiology, disease cycle and management of diseases of cotton and Coffee.
8. To study symptoms, etiology, disease cycle and management of diseases of apple and Strawberry.
9. To study the symptoms, etiology and management of diseases of potato and cucurbits.
10. To study the symptoms, etiology and management of diseases of onion, garlic and chilli.
11. To study the symptoms, etiology and management of diseases of marigold and rose.

SUGGESTED READINGS

1. Singh S K and Singh D K (2007). Pest and soil management of horticultural crops. ATPA.
2. Sharma R C and Sharma J N (2011). Integrated plant disease management. Scientific Publishers.
3. Biswas S K and Kumar S A (2016). Diseases of pulse crops and their sustainable management. Biotech.
4. Gupta V K and Paul Y S (2017). Diseases of vegetable crops. Kalyani Publishers, ND.
5. Singh, R S (2018) Plant Diseases. Oxford and IBH Co. New Delhi.

SUGGESTED WEBSITES

Web sites: http://www.agrimoon.com/
http://www.agriinfo.in/ eagri.org
http://www.agriglance.com/
http://agritech.tnau.ac.in/

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6018

FARM MANAGEMENT, PRODUCTION AND RESOURCE ECONOMICS

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: understand the basic and advanced farm management practices.

CO2: apply the production function in decision-making for raising crop on a farm.

CO3: prepare of farm records and accounts.

CO4: identify risks and uncertainty in agricultural production.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6018

FARM MANAGEMENT, PRODUCTION AND RESOURCE ECONOMICS

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**

Theory: 25

Practical: 15

C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Meaning and concept of farm management, objectives and relationship with other sciences. Meaning and definition of farms, its types and characteristics, factor determining types and size of farms. Principles of farm management: concept of production function and its type, use of production function in decision-making on a farm, factor-product, factor-factor and product-product relationship, law of equi-marginal/or principles of opportunity cost and law of comparative advantage.

Unit – II

Meaning and concept of cost, types of costs and their interrelationship, importance of cost in managing farm business and estimation of gross farm income, net farm income, family labour income and farm business income. Farm business analysis: meaning and concept of farm income and profitability, technical and economic efficiency measures in crop and livestock enterprises. Importance of farm records and accounts in managing a farm, various types of farm records needed to maintain on farm, farm inventory, balance sheet, profit and loss accounts.

Unit – III

Meaning and importance of farm planning and budgeting, partial and complete budgeting, steps in farm planning and budgeting-linear programming, appraisal of farm resources, selection of crops and livestock's enterprises. Concept of risk and uncertainty occurs in agriculture production, nature and sources of risks and its management strategies, Crop/livestock/machinery insurance – weather based crop insurance, features, determinants of compensation.

Unit – IV

Concepts of resource economics, differences between NRE and agricultural economics, unique properties of natural resources. Positive and negative externalities in agriculture, Inefficiency and welfare loss, solutions, Important issues in economics and management of common property resources of land, water, pasture and forest resources etc.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6018

FARM MANAGEMENT, PRODUCTION AND RESOURCE ECONOMICS

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: understand the basic and advanced farm management practices

CO2: apply the production function in decision-making for raising crop on a farm

CO3: prepare of farm records and accounts

CO4: identify risks and uncertainty in agricultural production

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6018

FARM MANAGEMENT, PRODUCTION AND RESOURCE ECONOMICS

(PRACTICAL)

Time: 3 Hrs **Marks: 15**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. Preparation of farm layout.
2. Determination of cost of fencing of a farm.
3. Computation of depreciation cost of farm assets.
4. Application of equi-marginal returns/opportunity cost principle in allocation of farm resources.
5. Determination of most profitable level of inputs use in a farm production process.
6. Determination of least cost combination of inputs.
7. Selection of most profitable enterprise combination.
8. Application of cost principles including CACP concepts in the estimation of cost of crop and livestock enterprises.
9. Preparation of farm plan and budget, farm records and accounts and profit & loss accounts.
10. Collection and analysis of data on various resources in India.

SUGGESTED READINGS

1. Reddy S and Subba Devi Bhava (2012). Agricultural Economics. Oxford & IBH Publishing Co. Pvt. Ltd.
2. Dhondyal S P (2014). Production economics and farm management Aman Publishing House, New Delhi.
3. Subba Reddy S, Raghu Ram, Neelakanta P, Sastry T V and Bhavani Devi (2011). Agricultural Economics, Oxford and IBH Publishing Co. Private Limited, New Delhi.
4. Heady Earl O and Herald R. Farm Management Economics. Prentice Hall, New Delhi.

SUGGESTED WEBSITES

Web sites: http://www.agrimoon.com/
http://www.agriinfo.in/ eagri.org
http://www.agriglance.com/
http://agritech.tnau.ac.in/

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6019

GEOINFORMATICS, NANO-TECHNOLOGY AND PRECISION FARMING

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: describe the basic concepts of remote sensing and geoinformatics.

CO2: learn about tools and techniques of geoinformatics used in precision farming.

CO3: learn about tools and techniques of nanotechnology in relation to agriculture.

CO4: learn about tools and techniques of image interpretation.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6019

GEOINFORMATICS, NANO-TECHNOLOGY AND PRECISION FARMING

(THEORY)

Time: 3 Hrs. **Max. Marks: 50**

Theory: 25

Practical: 15

C.A: 10

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Precision agriculture: concepts and techniques; their issues and concerns for Indian agriculture; Geo-informatics- definition, concepts, tool and techniques; their use in Precision Agriculture.

Unit – II

Crop discrimination and Yield monitoring, soil mapping; fertilizer recommendation using geospatial technologies; Spatial data and their management in GIS; Remote sensing concepts and application in agriculture; Image processing and interpretation

Unit – III

Global positioning system (GPS), components and its functions; Introduction to crop Simulation Models and their uses for optimization of Agricultural Inputs; STCR approach for precision agriculture

Unit – IV

Nanotechnology, definition, concepts and techniques, brief introduction about nanoscale effects, nano-particles, nano-pesticides, nano-fertilizers, nano-sensors, Use of nanotechnology in seed, water, fertilizer, plant protection for scaling-up farm productivity

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6019

GEOINFORMATICS, NANO-TECHNOLOGY AND PRECISION FARMING

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: describe the basic concepts of remote sensing and geoinformatics.

CO2: learn about tools and techniques of geoinformatics used in precision farming.

CO3: learn about tools and techniques of nanotechnology in relation to agriculture.

CO4: learn about tools and techniques of image interpretation.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6019

GEOINFORMATICS, NANO-TECHNOLOGY AND PRECISION FARMING

(PRACTICAL)

Time: 3 Hrs **Marks: 15**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. Introduction to GIS software.
2. Introduction to spatial data creation and editing.
3. Introduction to image processing software.
4. Visual and digital interpretation of remote sensing images.
5. Supervised and unsupervised classification and acreage estimation.
6. Multispectral remote sensing for soil mapping.
7. Creation of thematic layers of soil fertility based on GIS.
8. Fertilizers recommendations based of VRT and STCR techniques.
9. Crop stress (biotic/abiotic) monitoring using geospatial technology.
10. Formulation, characterization and applications of nanoparticles in agriculture.
11. Projects formulation and execution related to precision farming.

SUGGESTED READINGS

1. Heege Hermann J. (2013). Precision in crop farming. Springer.
2. Sahu D D and Solanki R M (2018). Remote sensing techniqes in agriculture. Agrobios
3. Basudeb Bhatta (2011). Remote sensing and GIS. Oxford University Press.
4. Vyas P R (2015) Remote sensing and geographical information system. Rawat Publications.
5. George Joseph (2015) Fundamentals of remote sensing, Oxford Universities Press.

SUGGESTED WEBSITES

Web sites: http://www.agrimoon.com/
http://www.agriinfo.in/ eagri.org
http://www.agriglance.com/
http://agritech.tnau.ac.in/

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6020 (Opt-I)

WEED MANAGEMENT

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: identify and classify different weeds.

CO2: evaluate the different weed management practices in holistic manner.

CO3: apply different types of herbicides in appropriate manner.

CO4: identify the impact of allelopathy and its role in weed management.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6020 (Opt-I)

WEED MANAGEMENT

(THEORY)

Time: 3 Hrs. **Max. Marks: 75**

Theory: 40

Practical: 20

C.A: 15

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Introduction to weeds: introduction to weeds, characteristics of weeds their harmful and beneficial effects on agricultural ecosystems, classification of weeds

Unit – II

Weed reproduction and dissemination of weeds Introduction to herbicides and mode of action: herbicide classification, Introduction to mode of action of herbicides and selectivity. Herbicide formulation: herbicide formulation and their use, concept of adjuvant, surfactant,

Unit – III

Concept of herbicide mixture and utility in agriculture, different methods of herbicide applications. Principles of weed management: different methods of weed management, allelopathy and its application for weed management, bio-herbicides and their application in agriculture.

Unit – IV

Herbicide compatibility and Resistance: herbicide compatibility with agro-chemicals and their application. Integration of herbicides with non- chemical methods of weed management. Herbicide Resistance and its management

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6020 (Opt-I)

WEED MANAGEMENT

(PRACTICAL)

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B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6020 (Opt-I)

WEED MANAGEMENT

(PRACTICAL)

Time: 3 Hrs **Marks: 20**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. To identify weeds of field crops and uncultivated areas.
2. To collect and preserve weeds for herbarium, biology of different weeds and long-term study of weed flora shifts.
3. To study the reproductive potential of annual and perennial weeds, weed control efficiency and weed index.
4. To study the methods of recording weed intensity in weed control experiments.
5. How to work out weed Index, weed control efficiency in weed control experiments.
6. To study the herbicide formulations.
7. To calculate commercial dose of herbicides for controlling weeds from field crop and in aquatic situations.
8. To study the herbicide requirements for important field crops, study of losses/damage due to crop weeds competition.
9. To study the calibration of knapsack sprayer and to demonstrate the performance of different types of nozzles and Herbicide resistance.
10. To learn identification of herbicides and proper sprayer technology.
11. To study the methods of herbicide applications and resistance in weeds to herbicides.

SUGGESTED READINGS

1. Walia U S (2018). Weed Management. Kalyani Publishers.
2. Walia U S (2017). Weed identification and medicinal use. Scientific Publishers
3. Gupta P (2007). Weed management principles and practices. Agrobios
4. Gupta O P (2018). Weed Management. Agrobios
5. Maalouf Eiohze (2017). Handbook of weed science. Agri-Horti Press

SUGGESTED WEBSITES

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http://www.agriinfo.in/ eagri.org
http://www.agriglance.com/
http://agritech.tnau.ac.in/

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6020 (Opt-II)

FOOD SAFETY AND STANDARDS

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: identify the importance of food safety, hygiene and associated risks.

CO2: evaluate the different food safety management tools in holistic manner.

CO3: apply for food quality management principles and regulation in appropriate manner.

CO4: identify the impact of microbial contaminants for food and water.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6020 (Opt-II)

FOOD SAFETY AND STANDARDS

(THEORY)

Time: 3 Hrs. **Max. Marks: 75**

Theory: 40

Practical: 20

C.A: 15

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Food Safety – Definition, Importance, Scope and Factors affecting; Food Safety. Hazards and Risks; Types of hazards - Biological, Chemical, Physical hazards. Management of hazards - Need. Control parameters -. Temperature control.

Unit – II

Food storage Product design. Hygiene and Sanitation in Food Service Establishments- Introduction. , Sources of contamination and their control. Waste Disposal. Pest and Rodent Control. Personnel Hygiene. Food Safety Measures. Food Safety Management Tools- Basic concepts. PRPs, GHPs, GMPs, SSOPs etc. HACCP. ISO series safety

Unit – III

Total Quality Management (TQM) - concept and need for quality, components of TQM, Kaizen. Risk Analysis. Accreditation and Auditing, Water Analysis, Surface Sanitation and Personal Hygiene to food.

Unit – IV

Food laws and Standards- Indian Food Regulatory Regime, FSSA. Global Scenario CAC. Other laws and standards related. Recent concerns- New and Emerging Pathogens. Packaging, Product labeling and Nutritional labeling. Genetically modified foods\ transgenics. Organic foods. Newer approaches to food safety. Recent Outbreaks. Indian and International Standards for food products.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6020 (Opt-II)

FOOD SAFETY AND STANDARDS

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: identify the importance of food safety, hygiene and associated risks.

CO2: evaluate the different food safety management tools in holistic manner.

CO3: apply for food quality management principles and regulation in appropriate manner.

CO4: identify the impact of microbial contaminants for food and water.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6020 (Opt-II)

FOOD SAFETY AND STANDARDS

(PRACTICAL)

Time: 3 Hrs **Marks: 20**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. To analyze the physico-chemical quality of water.
2. To prepare different types of media.
3. To perform the bacteriological examination of water by total plate count.
4. To perform the coliform count in water.
5. To assess surface sanitation by swab/rinse method.
6. To assess the personal hygiene.
7. To detect the presence of ergot in food grains.
8. To determine the presence of alkaloids in food sample.
9. To visit food unit/kitchen for evaluating pre-requisite programmes.
10. To implement HACCP and evaluation of CCPs and OPRPs from flow diagram of process.
11. To prepare documents for HACCP implementation.
12. To prepare HACCP chart for food unit.

SUGGESTED READINGS

1. Singh S P and Julie Funk (2015). Food Safety, Quality Assurance and Global Trade: Concerns and Strategies, CBS Publishers & Distributors Pvt. Ltd.
2. Ali Inteaz (2012). Food Quality Assurance: Principles and Practices, CRC Press

SUGGESTED WEBSITES

Web sites: http://www.agrimoon.com/
http://www.agriinfo.in/ eagri.org
http://www.agriglance.com/
http://agritech.tnau.ac.in/

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6020 (Opt-III)

HI-TECH HORTICULTURE

(THEORY)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: describe micro-propagation and protected cultivation of horticultural crops.

CO2: understand hi-tech nursery management practices.

CO3: apply the concept of precision farming in horticulture.

CO4: learn and plan hi-tech harvest technology.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6020 (Opt-III)

HI-TECH HORTICULTURE

(THEORY)

Time: 3 Hrs. **Max. Marks: 75**

Theory: 40

Practical: 20

C.A: 15

Instructions for the Paper Setter

Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections (A-D) should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any section.

Unit – I

Introduction & importance; Nursery management and mechanization; micro propagation of horticultural crops; Modern field preparation and planting methods

Unit-II

Protected cultivation: advantages, controlled conditions, method and techniques, Micro irrigation systems and its components; EC, pH based fertilizer scheduling, canopy management, high density orcharding

Unit-III

Components of precision farming: Remote sensing, Geographical Information System (GIS), Differential Geo-positioning System (DGPS)

Unit-IV

Variable Rate applicator (VRA), application of precision farming in horticultural crops (fruits, vegetables and ornamental crops); mechanized harvesting of produce.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6020 (Opt-III)

HI-TECH HORTICULTURE

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: describe micro-propagation and protected cultivation of horticultural crops.

CO2: understand hi-tech nursery management practices.

CO3: apply the concept of precision farming in horticulture.

CO4: learn and plan hi-tech harvest technology.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACM- 6020 (Opt-III)

HI-TECH HORTICULTURE

(PRACTICAL)

Time: 3 Hrs **Marks: 20**

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. To study different types of polyhouses and shade net houses.
2. Nursery management and various potting systems used in nursery.
3. To study EC and pH-based fertilizer scheduling in fruit crops.
4. To study importance and types of micro-irrigation in nursery.
5. To study improved plantation techniques in horticulture.
6. To study intercultural operations in management of fruit nursery.
7. To study different techniques of canopy management in fruit crops.
8. To visit and observe modern technologies used in hi-tech orchard/nursery.
9. To study application of Geographical Information System (GIS) in precision horticulture.
10. To study hi-tech postharvest and marketing technology for horticultural products.

SUGGESTED READINGS

1. Prasad S, Singh D and Bharadwaj R L (2011). Hi-Tech Horticulture. Agrobios (India).

SUGGESTED WEBSITES

Web sites: http://www.agrimoon.com/
http://www.agriinfo.in/ eagri.org
http://www.agriglance.com/
http://agritech.tnau.ac.in/

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACP- 6010

PRACTICAL CROP PRODUCTION-II (*RABI CROPS*)

(PRACTICAL)

COURSE OUTCOMES (CO):

After passing this course student will be able to:

CO1: learn skill of scientific management of different crops.

CO2: practice various intercultural operations for crop raising.

CO3: practice plant protection operations needed for crop raising.

CO4: observe post-harvest operations and work out economic benefits of crop raising.

B.Sc. (Hons.) Agriculture (Semester-VI)

(Session: 2020-21)

Course Code: BACP- 6010

PRACTICAL CROP PRODUCTION-II (*RABI CROPS*)

(PRACTICAL)

Time: 3 Hrs **Total Marks: 50**
Practical: 40
C.A.:10

Instructions for Practical Examiner: Question paper is to be set on the spot jointly by the Internal and External Examiners. Two copies of the same should be submitted for the record to COE Office, Kanya Maha Vidyalya, Jalandhar.

LIST OF EXPERIMENTS

1. Crop planning and field preparation.
2. Raising field crops in multiple cropping systems.
3. Seed treatment methods.
4. Raising nursery and different sowing methods.
5. Nutrient and water management of different *rabi* crops.
6. Weed management of *rabi* crops.
7. Harvesting, threshing, drying, winnowing, storage of farm.
8. Marketing of produce.
9. Major insect-pest of *rabi* crops and their management.
10. Major diseases of *rabi* crops and their management.
11. Preparation of balance sheet.
12. Analysis of cost of cultivation of r*abi* crops.

SUGGESTED READINGS

1. Acquaah George (2011). Principles of crop production: Theory, techniques and technology. PHI Learning.
2. Gururajan B and Balasubramanian (2018). Recent strategies on crop production. Kalyani Publishers.
3. Sharma Jag Paul (2017). Organic crop production Vol – 2. Kalyani Publishers
4. Reddy S R (2017) Agronomy of field crops. Kalyani Publishers
5. Das N R (2013) Introduction to crops of India, Scientific Publishers

SUGGESTED WEBSITES

Web sites: http://www.agrimoon.com/
http://www.agriinfo.in/ eagri.org
http://www.agriglance.com/
http://agritech.tnau.ac.in/