SCHEME & SYLLABUS
Agrochemical & Pesticide Management
(10+2 Any Stream)

Department of Agriculture

UISH

Sant Baba Bhag Singh University

2020

SANT BABA BHAG SINGH UNIVERSITY, KHIALA -1430030, JALANDHAR

Institute Name: **University Institute of Sciences and Humanities**
Department Name: **Agricultural Sciences**
Programme Name: **Agrochemical & Pesticide Management**
Number of Semesters **2**

Vision:

To impart the experiential learning through promoting skills, knowledge in the field of plant protection, production, reduction in toxicity, environmental safety and sustainability of agro ecosystem.

Mission:

1. To provide relevant education to the students in soil science, its formation and soil fertility
2. Building expertise through well planned on-field implementation
3. To make the students well aware about the different agrochemicals and their management.
4. To disseminate the knowledge through hands on trainings to improve the skills in managing the diseases.
5. To encourage the young ones by imparting the knowledge in the crop pests and their management.
6. To persuade the youths on entrepreneurship and rural development through adopting different ventures.

Details of Programme Educational Objectives, Program Outcomes, Program Specific Outcomes

S. No.		Programme Educational Objective (PEO) (The students will….)
1	PEO1	Imparting detailed knowledge of soil science, its formation and soil fertility.
	PEO2	Knowledge dissemination regarding different chemicals and their management.
	PEO3	Providing detailed knowledge of plant diseases and their management.
	PEO4	Facilitating detailed study of various pests of different crops and their management.
	PEO5	To provide a quality education as a venture in the field of economic entomology.
2	Programme Outcomes (PO) (At the end of diploma above, the students will be able to understand ……)	
	PO1.	Fundamental and core knowledge & understanding of different agrochemicals and their management in relation to natural ecosystem.
	PO2.	Transfer relevant knowledge, skills and technology concepts of plant production as well as protection.
3	Programme Specific Outcomes (PSO)	
	PSO1.	Provide scientific knowledge in environmental safety and sustainability to the students.
	PSO2.	Identify and evaluate appropriate techniques in the crop protection and production to enhance efficiency of production
	PSO3	Identify and solve technological problems encountered in current crop production systems
	PSO4	Evaluate the various entrepreneurship opportunities in the field of economic entomology and uplift the socioeconomic status of the community.

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Scheme for Agrochemical & Pesticide Management (10+2 Any Stream)

SEMESTER-I							
S No.	**Sub Code**	**Sub Type**	**Subject Name**	**Contact Hours (L:T:P)**	**Credits (L:T:P)**	**Total Contact Hours**	**Total Credit Hours**
Theory Subjects							
1	CAPM101-19	C	INTRODUCTION TO SOIL SCIENCE	6:0:0	6:0:0	6	6
2	CAPM105-19	C	CHEMICAL FERTILIZER AND THEIR MANAGEMENT	6:0:0	6:0:0	6	6
3	CAPM109-19	C	PESTS OF CROP PLANTS AND THEIR CONTROL- I	6:0:0	6:0:0	6	6
4	CAPM111-19	C	INTRODUCTORY AND INDUSTIRIAL ENTOMOLOGY	6:0:0	6:0:0	6	6
Practical Subjects							
5	CAPM103-19	C	INTRODUCTION TO SOIL SCIENCE LAB	0:0:6	0:0:3	6	3
6	CAPM107-19	C	CHEMICAL FERTILIZER AND THEIR MANAGEMENT LAB	0:0:6	0:0:3	6	3
Total						36	30

C –Core; I-Interdisciplinary; E- Elective

Total Contact hrs: 36
Total Credit Hours: 30

SEMESTER-II							
S No.	**Sub Code**	**Sub Type**	**Subject Name**	**Contact Hours (L:T:P)**	**Credits (L:T:P)**	**Total Contact Hours**	**Total Credit Hours**
Theory Subjects							
1	CAPM102-19	C	ECONOMIC ENTOMOLOGY	8:0:0	4:0:0	4	4
2	CAPM104-19	C	PESTICIDE RESIDUES AND TOXICOLOGY	8:0:0	4:0:0	4	4
3	CAPM106-19	C	PESTS OF CROP PLANTS AND THEIR CONTROL – II	8:0:0	4:0:0	4	4
4	CAPM108-19	C	DISEASES OF CROP PLANTAND THEIR CONTROL	8:0:0	4:0:0	4	4
5	CAPM110-19	C	ENVIRONMENTAL STUDIES AND DISASTER MANAGEMENT	3:0:0	3	3	3
6	CAPM112-19	C	WEED MANAGEMENT	2:0:0	2	2	2
7	CAPM114-19	C	PRACTICAL ECONOMIC ENTOMOLOGY	0:0:6	3	5	3
8	CAPM116-19	C	PRACTICAL PESTS OF CROP PLANTS AND THEIR CONTROL	0:0:6	3	5	3
9	CAPM118-19	C	PRACTICAL DISEASES OF CROP PLANTS AND THEIR CONTROL	0:0:6	3	5	3
					Total	36	30

C –Core; I-Interdisciplinary; E- Elective

Total Contact hrs: 33
Total Credit Hours: 30

SEMESTER-I

Course Code	CAPM101-19	
Course Title	Introduction to Soil Science	
Type of course	Theory	
L T P	6 0 0	
Credits	6 0 0	
Course prerequisite	10+2 or Any Stream	
Course Objectives	The objective of this subject is to introduce the students about the properties of soil and its impact on crops.	
Course outcomes	CO1	Students will be aware about soil forming processes and physical properties of the soil
	CO2	Students will be aware about the soil fertility and soil productivity,
	CO3	Students will understand the concept of problematic soils and their management.

INTRODUCTION TO SOIL SCIENCE

Section- I

Soil as a medium for plant growth, Factors of soil formations, Composition of Soils, Soil profile, Soil texture and its importance, Organic matter in soil, Essential plant nutrients, Effects of modern agro –technology and pesticides on soil,

Section-II

Soil fertility and soil productivity, Factors effecting soil productivity, Soil reaction and its importance, Water retention characteristics/Gravitational water, Field Capacity, water holding capacity, plant available water and wilting coefficient

Section-III

Problematic soils- Sandy soils, water logged soils, saline soil, Saline sodic soils, sodic soils and their Reclamation and management, Brackish irrigation water and their efficient use

Reference Books:

Bear : Chemistry of the soil (ACS Remhold)
M. B. Green, G. S. Hartley and T. F. West: Chemicals for crop improvement and pest management (Pergamon).
A. M. Deshmukh: Biofertilizers and Biopesticides: Technoscience Publications

Course Code	CAPM105-19	
Course Title	CHEMICAL FERTILIZER AND THEIR MANAGEMENT	
Type of course	Theory	
L T P	6 0 0	
Credits	6 0 0	
Course prerequisite	10+2 or Any Stream	
Course Objectives	To impart the knowledge amongst the students about the different straight fertilizers their formation and application.	
Course outcomes	CO1	Students will be able to discuss the classification of nitrogenous fertilizers their classification.
	CO2	Students will learn about various phosphatic fertilizers its different types.
	CO3	Students will learn about methods and time of fertilizer application

CHEMICAL FERTILIZER AND THEIR MANAGEMENT

Section I

Classification and types of fertilizers, Nitrogenous fertilizers: Ammonium nitrate, Urea, Calcium Cyanamide, Calcium Ammonium Nitrate, Sodium Nitrate, Ammonium Chloride: Introduction, Raw materials, Action of as a fertilizers.

Section II

Phosphate fertilizers: Normal super phosphate, Triple Super Phosphate, Ammonium Phosphate. Potassic fertilizers, Factors effecting optimum fertilizer dose.

Section III

Methods and time of fertilizer applications, tips to get best efficiency of Applied fertilizers, Integrated nutrient management, fertilizers and its relations to plant nutrients

Reference Books:

Gopal Rao: Outlines in Chemical Technology.
Shukla and Pandey: Introduction to Chemical Technology.

Course Code	CAPM109-19	
Course Title	PESTS OF CROP PLANTS AND THEIR CONTROL- I	
Type of course	Theory	
L T P	6 0 0	
Credits	6 0 0	
Course prerequisite	10+2 or Any Stream	
Course Objectives	To provide the knowledge amongst the students about the different pests of various crops	
Course outcomes	CO1	Students will be able to understand the pests of cereals.
	CO2	Students will learn about various pests of pulses and cash crops
	CO3	Students will learn about control the pests of different crops.

PESTS OF CROP PLANTS AND THEIR CONTROL- I

Section-I: Pests of Cereal Crops
(Classification, Biology, Nature of damage and Control Measures)
A) Pests of Cereals:
a) **Rice:** I) Major – Brown plant hopper, Yellow stem borer, Swarming Caterpillar.
II) Minor – Rice ear head bug, Armyworm, Pink borer, Rice hispa.
b) **Sorghum:** I) Major – Midge fly, Aphids, Shoot fly.
II) Minor – Leaf roller.
c) **Maize:** I) Major- Bug (Deliphacid), Ear head bug, Stem borer, Pink borer.
II) Minor- Pyrilla, Aphid.
d) **Pearlmillet:** I) Major- Blister beetle.
II) Minor- Surface grasshopper, Armyworm
e) **Wheat:** I) Major- Jassid, Termite, Stem borer.
II) Minor- Aphid, Nematode.

Section-II:Pests of Pulses & Sugarcane
a) Pulses: Chickpea, Pigeon pea, Cowpea, Peas, Green gram, Black gram, Kidney bean, Cluster bean, etc.
I) Major- Gram pod borer, Tur pod bug, Pigeon pea pod fly, Pea aphid, *Spodoptera.*
II) Minor- Bean fly, Aphid, Tur plum moth, Thrip, Mite.
b) Pest of Sugarcane:
I) Major: Early shoot borer, White grub, White fly.
II) Minor: Stalk borer, Armyworm, Mite, Pyrilla, Sugarcane Woolly Aphid, Termite, Plassy borer.

Section III

Integrated Pest Management(IPM): need; its tools and limitations. Natural Control, plant resistance. Physical, Mechanical and Cultural Control. Study of important insecticides

Reference Books

1. Text of applied Entomology Vol I & II -K.P.Srivastava.
2. Introduction to insect Pest Management.
3. Textbook of insets toxicology.
4. Introduction to biological control.-R.Bosch, D.S.Messenger&A.D.Gutierrez.
5. Principles of insect Pest Management. –G.S.Dhaliwal and R.Arora.
6. Entomology and Pest Management –Larry P.Pedigo.

Course Code	CAPM111-19	
Course Title	INTRODUCTORY AND INDUSTIRIAL ENTOMOLOGY	
Type of course	Theory	
L T P	6 0 0	
Credits	6 0 0	
Course prerequisite	10+2 or Any Stream	
Course Objectives	To acquaint the students about the different entrepreneurship in beekeeping and sericulture.	
Course outcomes	CO1	Students will learn about Insect pest of stored grain and their control
	CO2	Students will learn about pests and their general characters
	CO3	Students will learn about the beekeeping and sericulture.

INTRODUCTORY AND INDUSTIRIAL ENTOMOLOGY

Section-I

Introduction of insects:

Pests, General characters, Habitats, Damage, Economic Threshold Level, Natural enemies, Parasitoids and Predators.

Section-II

Insect pest of stored grain and their control Classification of pests: Based on damage and Feeding habitat

Section-III

Insects of Industrial Importance:

Sericulture: Mulberry cultivation and Rearing of Silkworms; Pest and Disease management of Mulberry and Silkworm.

Apiculture: Types of honey bees, Bee keeping equipments, Honey quality, Pest and disease management Agriculture

Reference Books:

1. Agriculture pest of India and South East Asia by A. S. Atwal.
2. A textbook of applied entomology by K. P. Srivastava.
3. Entomology and pest management-Larry P. Pedigo.
4. Sericulture and pest management-DPH-Delhi by Sathe & Jadhav.
5. Agricultural Entomology by S. Pradhan.
6. Crop pests and How to fight them- Govt. Maharashtra.

Course Code	CAPM103-19	
Course Title	Introductory to Soil Sciences (LAB)	
Type of course	Practical	
L T P	0 0 6	
Credits	0 0 3	
Course prerequisite	10+2 or Any Stream	
Course Objectives	To acquaint the students about the different lab techniques to analyze the different parameters of soil.	
Course outcomes	CO1	Students will learn about the determination of soil densities
	CO2	They will learn how to collect the soil samples and their analysis.
	CO3	They will learn about the various procedures of soil texture and structure.

INTRODUCTION TO SOIL SCIENCE (LAB)

1. To Determine Soil Colour With Use Of A Munsell Colour Chart.
2. To Determine Soil Bulk Density.
3. To Determine Particle Density Of Soil And Calculate Soil Porosity.
4. Study of soil profile
5. Study of soil structure
6. Collection and preparation of soil sample

Course Code	CAPM107-19	
Course Title	CHEMICAL FERTILIZER AND THEIR MANAGEMENT (LAB)	
Type of course	Practical	
L T P	0 0 6	
Credits	0 0 3	
Course prerequisite	10+2 or Equivalent	
Course Objectives	To acquaint the students about the different lab techniques to analyze the different parameters of chemical fertilizers.	
Course outcomes	CO1	Students will learn about the methods of application of fertilizers
	CO2	They will learn how to calculate the fertilizer dose.
	CO3	They will learn about the fertigation, soil health cards and its parameters

CHEMICAL FERTILIZER AND THEIR MANAGEMENT (LAB)

1) Identification of chemical fertilizers-Nitrogenous, phosphatic and potassium
2) Calculating fertilizer dose for different crops
3) Soil health cards and its parameters
4) Methods of fertilizer applications
5) Fertigation
6) Soil amendments and soil conditions
7) Preparations of soil sample for analysis
8) Determination of gypsum requirement

SEMESTER-II

Course Code	CAPM102-19	
Course Title	ECONOMIC ENTOMOLOGY	
Type of course	Theory	
L T P	8 0 0	
Credits	8 0 0	
Course prerequisite	10+2 or Any Stream	
Course Objectives	To familiarize the students about the insect ecology, chemical control of the pests and compatibility of pesticides.	
Course outcomes	CO1	Students will learn about insect ecology-environment and its components.
	CO2	Students will learn about pests of polyhouse and greenhouse plants and their control.
	CO3	Students will learn about identification of common insect-pests and their management.

ECONOMIC ENTOMOLOGY

UNIT-I

Insect Ecology-environment and its components, factors Biotic potential, environmental resistance and causes of pest outbreaks in agro-ecosystem. Categories of pests. Insects, Pests and Crop Losses; Present agriculture and pest problems. Beneficial insects.

UNIT-II

Chemical Control: importance, hazards and limitations. Biological Control: parasitoids, predators and microbes. **Pests of Polyhouse and Greenhouse plants:** Major: *Helicoverpa* borer, Mite, Mealy bug, Aphid, White fly, Minor: Cutworm, Leaf minor and Armyworm.

UNIT-III

Compatibility of pesticides. Identification of common insect-pests, phytophagous mites, rodent, bird pests and their damage, other beneficial insect-pollinators. Pest surveillance through light and pheromone traps.

REFERENCE BOOK

Principles of Insect Pest Management- G. S. Dhaliwal and Ramesh Arora
Introduction to Entomology by M. S. Mani

Course Code	CAPM104-19	
Course Title	PESTICIDE RESIDUES AND TOXICOLOGY	
Type of course	Theory	
L T P	8 0 0	
Credits	8 0 0	
Course prerequisite	10+2 or Any Stream	
Course Objectives	To familiarize the students about pesticides residue in water, soil and atmosphere and its harmful impact on human life.	
Course outcomes	CO1	Students will be aware pesticides into the atmosphere and their fate.
	CO2	Students will learn about nature and origin of pollution of aquatic systems.
	CO3	Students will learn about the harmful impact of pesticide residue on human life.

PESTICIDE RESIDUES AND TOXICOLOGY

Unit-I: Residues of Agrochemicals:

a) Pesticides Residues in the Atmosphere:
Pesticides into the atmosphere and their fate, Transport of vapours, Precipitation, effect of residues on human life,

b) Pesticides residues in Water system:

Nature and origin of pollution of aquatic systems, Point and Non-Point pollution. Dynamics of pesticides in aquatic environment.

UNIT-II

Pesticides residues in the Soil:
Absorption, Retention, Transport and Degradation of pesticides in the soil, Effect on micro-organisms and Consequent effect on the soil condition, Fertility, Interaction in the soil,

Unit-III

Effect of pesticide residues on the quality of human life.
Model ecosystem, In general and consequent effect on human life. The Cases of & affected societies and starving populations facing problems of health and nutrition, Traditional wisdom and Food security.

Reference Books

Progress in pesticides biochemistry and Toxicology V. I, II, III by D. H. Hutson and T. R. Robert.

Evaluation of pesticides in ground water by W. Y. Garnett, R. C. Honeycatt and others

Course Code	CAPM106-19	
Course Title	PESTS OF CROP PLANTS AND THEIR CONTROL – II	
Type of course	Theory	
L T P	8 0 0	
Credits	8 0 0	
Course prerequisite	10+2 or Any Stream	
Course Objectives	To familiarize the students about pests of vegetables, horticultural and different crops.	
Course outcomes	CO1	Students will be aware about the different pests of vegetables and their control.
	CO2	Students will learn about different pests of horticultural crops and their control.
	CO3	Students will learn about the different pests of trees and their control.

PESTS OF CROP PLANTS AND THEIR CONTROL – II

Unit-I

Pests of vegetables

a) Cabbage, Cauliflower, Knol-Khol, Radish & other cruciferous Vegetable:

I) Major: Diamond back month, Cabbage Semi looper, mustard aphid.
II) Minor: Leaf Webber & Cabbage borer.

b) Brinjal: I) Major: Shoot & Fruit borer, Jassid, Aphid.
II) Minor: Stem borer, Tingid bug, Melon fruit fly.

c) Tomato: I) Major: Fruit borer, Aphid, Cotton white fly.
II) Minor: Thrip, Leaf hopper, Mealy bug.

d) Potato: I) Major: Tuber moth, Golden cyst nematode.
II) Minor: Aphid, Thirip.

Unit-II

a) Lady's finger: I) Major: Spotted bollworm, Aphid, Cotton Jassid.
II) Minor: Leaf roller.

b) Cucurbits: I) Major: Red Pumpkin beetle, Fruit fly.
II) Minor: Blister beetle, Red vegetable mite, Aphid.

c) Sweet potato: I) Major: Weevil.

d) Sugar beet: I) Major: Army worm, Leaf Webber, Rodent.
II) Minor: Painted bug, Cutworm, Aphid, Thrip.

e) Leafy vegetables: (Coriander, Spinach, Fenugreek, Lettuce, Amaranthus, etc)
I) Major: Aphid, Flea beetle, Stem weevil, Leaf miner.
II) Minor: Grass hopper, Leaf hopper.

Unit III

Pests of Fruits & Fruit Trees

a) Mango:

I) Major: Mango hopper, Stem borer, Giant mealy bug, Stone Weevil, Fruit fly

II) Minor: Leaf and shoot gall insect, Red ant, Termite.

b) Grape vine: I) Major: Thirp, Flea beetle, Mealy bug.

II) Minor: Leafhopper, Two spotted spider mite

e) Citrus: I) Major: Black fly, Psylla, Mite, Cottony cushion scale.

II) Minor: Fruit sucking moth, Lance nematode, Aphid.

g) Guava: I) Major: Guava fruit fly, Mealy bug, Spiraling whitefly.

II) Minor: Scale insect.

h) Papaya: I) Major: Aphid, Cotton white fly.

II) Minor: Red spider mite.

k) Ber: I) Major: Fruit fly, Fruit borer, Jassid.

II) Minor: Ber beetle

m) Jackfruit: I) Major: White tailed mealy bug, Bark borer.

II) Minor: Pink waxy scale.

Reference Book

Hand book of pest management in agriculture Wi.II by D. pimento

Insect sex pheromones by M.Jacobson (AP).

Course Code	CAPM108-19	
Course Title	DISEASES OF CROP PLANTAND THEIR CONTROL	
Type of course	Theory	
L T P	8 0 0	
Credits	8 0 0	
Course prerequisite	10+2 or Any Stream	
Course Objectives	To acquaint the students about diseases of vegetables, horticultural and different crops.	
Course outcomes	CO1	Students will be aware about the different diseases of vegetables and their control.
	CO2	Students will learn about different diseases of horticultural crops and their control.
	CO3	Students will learn about the different diseases of trees and their control.

DISEASES OF CROP PLANTAND THEIR CONTROL

Unit-I
Fungal Diseases of Cereals and Pulses:

Cereals:- Rice, Wheat, Maize, Bajara, Sorghum
Pules: (Chickpea, Pigeon pea, Cow- Pea, green gram, Black gram, beans etc.)

Unit-II
Diseases of Vegetables

Fungal diseases of vegetable crops, their symptoms, control measures:
Tomato, Potatoes, Bhendi , Chillies, Brinjal, Onion, Pea and beans, Leafy vegetables, Crucifies

Unit III
Fruit trees & their diseases

Fungal diseases of Fruit crops, their symptoms, control measures:
Mango, Guava, Papaya, Citrus, Lemon and orange, Ber

Reference Book

Pathological problems of economics crop plants & their management by Paul Khurana, S.M., 1998.
Plant Diseases by Singh, R.S. 1963.
Diseases of Crop Plants in India 4th Edition by Rangaswami, G. & Mahadevan, A.2008.

Course Code	CAPM110-19	
Course Title	Environmental Studies and Disaster Management	
Type of course	Theory & Practical	
L T P	2 0 1	
Credits	3 0 0	
Course prerequisite	10+2 (Non Medical or Medical) or Equivalent	
Course Objectives	Main objective of this subject is to familiarize the students about environmental studies and disaster management.	
Course outcomes	CO1	Students will learn about environmental studies
	CO2	Students will learn about natural disasters and their management
	CO3	Students will learn about biodiversity and its conservation

Environmental Studies and Disaster Management

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) 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. Treats 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. 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.

UNIT-III

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 free, coal free, forest free, oil free, 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.

Practical

1. Pollution case studies. Case Studies- Field work:

2. Visit to a local area to document environmental assets river/ forest/ grassland/ hill/ mountain,
3. Visit to a local polluted site-Urban/Rural/Industrial/Agricultural,
4. Study of common plants, insects, birds and study of simple ecosystems-pond, river,hill slopes, etc.

Recommended Books:

S. No	Name	Author(S)	Publisher
1	Environment Education and Disaster Management	V D Harma	CBS Publisher and Distributors, New Delhi
2	Environment Engineering and Disaster Management	Sanjay K Sharma	Laxmi Publisher

Course Code	CAPM110-19	
Course Title	Environmental Studies and Disaster Management	
Type of course	Theory & Practical	
L T P	2 0 1	
Credits	3 0 0	
Course prerequisite	10+2 (Non Medical or Medical) or Equivalent	
Course Objectives	Main objective of this subject is to let learn the student about the management of weeds with different technique	
Course outcomes	CO1	Students will able to understand the cycle of weeds and crop weed competition, different methods of weed control
	CO2	Students will understand integrated weed management, classifications and formulations of herbicides
	CO3	Students will identify aquatic and problematic weed and their control

Weed Management

UNIT-I

Introduction to weeds, characteristics of weeds their harmful and beneficial effects on ecosystem. Classification, reproduction and dissemination of weeds.

UNIT-II

Herbicide classification, concept of adjuvant, surfactant, herbicide formulation and their use. Introduction to mode of action of herbicides and selectivity.

UNIT-III

Allelopathy and its application for weed management. Bio-herbicides and their application in agriculture. Concept of herbicide mixture and utility in agriculture. Herbicide compatibility with agro-chemicals and their application.

UNIT-IV

Integration of herbicides with non chemical methods of weed management. Herbicide Resistance and its management.

Recommended Books:

S.No.	Name	Author(S)	Publisher
1	A Text Book of Weed Management	B L Jana	Pointer
2	Weed Management	R K Pawar	ABD Publisher

Course Code	CAPM114-19	
Course Title	Practical Economic Entomology	
Type of course	Theory & Practical	
L T P	0 0 6	
Credits	3 00	
Course prerequisite	10+2 (Non Medical or Medical) or Equivalent	
Course Objectives	Main objective of this subject is to let learn the student about the insect morphology, body parts and characters of different orders.	
Course outcomes	CO1	Students will learn about insect morphology
	CO2	Students will learn about external features of grasshopper, methods of preservation.
	CO3	Students will learn about types of insect larvae and pupae, mouth parts, antennae and pars of legs.

Practical Economic Entomology (Lab)

Practicals

1. Methods of collection and preservation of insects including immature stages.

2. External features of Grasshopper/Blister beetle;

3. Types of insect antennae, mouthparts and legs; Wing venation, types of wings and wing coupling apparatus.

4. Types of insect larvae and pupae; Dissection of digestive system in insects (Grasshopper); Dissection of male and female reproductive systems in insects (Grasshopper);

5. Study of characters of orders Orthoptera, Dictyoptera, Odonata, Isoptera, Tysanoptera, Hemiptera, Lepidoptera, Neuroptera, Coleoptera, Hymenoptera, Diptera and their families of agricultural importance. 6. Insecticides and their formulations. Pesticide appliances and their maintenance.

7. Sampling techniques for estimation of insect population and damage.

Recommended Books:

S. No	Name	Author(S)	Publisher
1	Agricultural Pests of South Asia and Their Management.	A. S. Atwal and G.S Dhaliwal	Kalyani Publishers, Ludhiana
2	Principles of Insect Pest Management	G. S. Dhaliwal and Ramesh Arora	National Agricultural Technology Information Centre, Ludhiana

Course Code	CAPM116-19	
Course Title	Practical pests of crop plants and their control	
Type of course	Theory & Practical	
L T P	0 0 6	
Credits	3 00	
Course prerequisite	10+2 (Non Medical or Medical) or Equivalent	
Course Objectives	Main objective of this subject is to let learn the student about the pests of field, vegetable and fruit crops, body parts and characters of different orders.	
Course outcomes	CO1	Students will learn about pests of different crops.
	CO2	Students will learn about different methods of infestation of pests.
	CO3	Students will learn calculations on the doses of insecticides application technique.

Practical pests of crop plants and their control (Lab)

Practicals

1. Identification of different types of damages.
2. Identification and study of life cycle and seasonal history of various insect pests attacking crops and their produce: (a) Field Crops; (b) Vegetable Crops(c) Fruit Crops; (d) Plantation, gardens, Narcotics, spices & condiments.
3. Identification of insect pests and Mites associated with stored grain.
4. Determination of insect infestation by different methods. Assessment of losses due to insects.
5. Calculations on the doses of insecticides application technique.

Recommended Books:

S.No.	Name	Author(S)	Publisher
1	Insects and Mites of Crops in India	M.R.G.K. Nayar	ICAR, New Delhi
2	A Text Book of Entomology Vol.I & II	K.P. Shrivastava	Kalyani Publishers, New Delhi

Course Code	CAPM118-19	
Course Title	Practical diseases of crop plants and their control	
Type of course	Theory & Practical	
L T P	0 0 6	
Credits	3 00	
Course prerequisite	10+2 (Non Medical or Medical) or Equivalent	
Course Objectives	Main objective of this subject is to let learn the student about the diseases identification and management.	
Course outcomes	CO1	Students will learn about collection and preservation of plant diseased specimens for herbarium.
	CO2	Students will learn about different diseased samples in the field
	CO3	Students will learn about the major diseases of field crops.

Practical diseases of crop plants and their control (lab)

Practicals

1. Identification and histopathological studies of selected diseases of field and horticultural crops covered in theory.
2. Field visit for the diagnosis of field problems.
3. Collection and preservation of plant diseased specimens for herbarium.
4. Detailed study of Red rot of sugarcane.
5. Detailed study of diseases of major crops cultivated in punjab (Rice, wheat, Maize, Potato etc.)

Recommended Books:

S.No.	Name	Author(S)	Publisher
1	Crop diseases and their management	Y S Ahlawat and S Nagarajan	Kalyani
2	Diseases of Field crops	V K Gupta & Y S Paul	Indus Publishing Co. New Delhi
3	Diseases of Fruit Crops	R S Singh 2012	Oxford and IBH Publishing Co.Pvt.Ltd. New Delhi
4	Diseases of Vegetable Crops 3rd ed.	R S Singh 1998	Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi