

Programme Educational Objectives (PEOs) of M.Sc. Ag. (Plant Pathology)

- PEO1:** To understand the pathogens and their vectors and increase crop yield, proper storage and preservation of agro products for suitable consumption and marketing.
- PEO2:** To develop a good teaching-learning environment for higher studies and help in selection of professional careers in government and private organization, agro industries, educational/ research/extension, etc.
- PEO3:** To develop the skills for leadership, ethical integrity, and professional engagement in agriculture/Plant Pathology and its applied sectors.
- PEO4:** To provide adequate information about natural and other resources through a course curriculum for the betterment of life.
- PEO5:** To encourage the moral and social values to adapt plant pathology in local and global prospect

PO/PSO of M.Sc.Ag. (Plant Pathology)

- P.O. 1. Imparting detailed knowledge of Agriculture and its related branches.
- P.O. 2. Providing detailed knowledge of various factors affecting agricultural produce in India and role of agricultural enterprises for generating income of farmers.
- P.O. 3. Develop understanding of techniques of crop farming.
- P.O. 4. Develop understanding of climatic factors and weather conditions can regulate plant diseases.
- P.O. 5. Acquaint the students with method of experimental design, analysis of data and presentation.
- P.S.O. 1. Acquaint the students with principles of plant pathology and their role in agriculture.
- P.S.O. 2. Studying various biological as well as abiotic entities responsible for causing diseases in plants.
- P.S.O. 3. Studying various management strategies designed to reduce the loss caused by diseases in plants.
- P.S.O. 4. Studying various components emphasizing on organic farming like biological control, developing diseases resistant varieties, cultural practices, integrated pest management, etc. to minimize the use of chemicals/ pesticides in the crop fields.
- P.S.O. 5. Integrating all the available management practices to reduce the loss of the agricultural produce.

Course outcomes (M.Sc. Ag.)

Year 1st Semester-I

MSAGP-501: Mycology 3(2+1)

- MSAGP-501. CO.1: Educate different terms, concepts, relationship, nomenclature and classifications of fungi are studied.
- MSAGP-501. CO. 2: Develop understanding about morphological and reproductive characters of fungi in the laboratory.
- MSAGP-501. CO. 3: Develop ability to analyze the disease development by fungal pathogen in cereals, Horticultural and medicinal crops and other field crops.
- MSAGP-501. CO.4: Able to collect, identify, preserve and managing fungal pathogen.

MSAGP-502: Plant Bacteriology 3(2+1)

- MSAGP 502.CO.1: Acquaint with structure, nutritional requirements, survival and dissemination and other characteristics of plant pathogenic prokaryotes.
- MSAGP 502.CO.2: Develop the understanding of important diseases caused by phyto-pathogenic bacteria.
- MSAGP 502.CO.3: Develop the skills in methods of isolation, purification, identification and growth of phyto-pathogenic bacteria.
- MSAGP 502.CO.4: Develop the ability to evaluate common antibacterial chemicals/antibiotics against phyto-pathogenic bacteria in the laboratory.

MSAGP-503: Principles of Plant Pathology 3(2+1)

- MSAGP 503.CO.1: Acquaint with different terms and concepts of plant pathology.
- MSAGP 503.CO.2: Understand about biotic-abiotic diseases, growth and survival of plant pathogens.
- MSAGP 503.CO.3: Develop ability to examine the role of metabolites in host for disease development.

- MSAGP 503.CO.4: Develop ability to analyse, defense strategies of crops against plant pathogens.

MSAGP-504: Principles of Plant Disease Management 3(2+1)

- MSAGP 504 .CO.1: Acquaint with basic principles of plant disease management.
- MSAGP 504 .CO.2: Understand the disease resistance in plants.
- MSAGP 504 .CO.3: Develop ability to select suitable chemicals and apply in disease management in plants.
- MSAGP 504 .CO.4: Develop ability to analyze mode of action of antifungal, antibacterial and antiviral chemicals.

ASS-111: Fundamentals of Soil Science (L-T-P: 2-0-2) Credit: 3(2+1)

- ASS-111 Co.1 Familiarize students with different concepts of soil, classification and soil of India.
- ASS-111 Co. 2 Understand the soil organism, organic matter and soil pollution.
- ASS-111 Co. 3 Develop the skills for soil sampling techniques and sampling tools.
- ASS-111 Co.4 Develop ability to optimize soil density, moisture content, texture, porosity, EC, cation exchange capacity and organic matter content of soil on field.

AGA-111: Fundamentals of Agronomy (L-T-P: 3-0-2) Credit: 4(3+1)

- AGA-111 CO 1. Discuss about the agronomy, fertilizer, organic manures, agricultural tools, horticultural crops use of iron and steel in agriculture.
- AGA-111 CO 2. Develop ability to identify the different agricultural tools, fertilizers, seeds, and weeds.
- AGA-111 CO 3. Operates the agricultural tools in the field.
- AGA-111 CO 4. Develop ability to differentiate between fertilizer, manure and bio-fertilizer.

APP-312: Diseases of Field and Horticultural Crops and their Management -I (L-T-P: 2-0-2): 3(2+1)

- APP-312 CO 1. After completion of this course students will study symptoms; include pathogens, disease cycle, and best possible management practices and provide solution for yield reduction in crops.
- APP-312 CO 2. Develop ability for isolation of culture, techniques, identification and biology of pathogens in the laboratory.
- APP-312 CO 3. Demonstrate crop fields and suggest best possible management practices available and solved causing reducing yield in crops.
- APP-312 CO 4. Apply different fungicides and antibiotics (mode of action and formulations) on the basis of Nature of pathogen, manage crops disease corresponding to involved pathogen and examine loss in quality and yield.
- APP-312 CO 5. After completing this course students will be able for detection and diagnosis of plant diseases and application of pesticides.

Semester-II

MSAGP-505: Detection and Diagnosis of Plant Diseases 2(1+1)

- MSAGP-505 .CO.1: Acquaint with basic techniques and methods of detection and diagnosis of plant diseases.
- MSAGP-505.CO.2: Develop the understanding of Koch's postulates to establish the relation between pathogen and host plant.
- MSAGP-505.CO.3: Develop the skills in microscopy, chromatography, serological and molecular techniques of diagnosis of plant disease and detecting plant pathogens.
- MSAGP-505.CO.4: Develop the ability to select proper fungicides, bactericides, etc. for disease management.

MSAGE-506: Classification of Insects 3(2+1)

- MSAGE-506.CO.1: Educate about the Insect Taxonomy.

- MSAGE-506.CO.2: Develop the understanding of the evolutionary history of Insects, distinguishing characters, general biology, habits, and habitats of Insect.
- MSAGE-506.CO.3: Develop skills for identification, characterization, and classification of insects in a hierarchical manner.
- MSAGE-506.CO.4: Develop skills to Differentiate among various orders of the same class.

MSAGE-507: Pests of Field Crops 2(1+1)

- MSAGE-507.CO.1: Familiarize the concept of entomology, nature of damage and seasonal incidence of insect pests that cause loss.
- MSAGE-507.CO.1: Develop the for understanding of distinguishing features, life cycle, damage to crops and human health by insects.
- MSAGE-507.CO.1: Able to analyse the population of pests, infestation and losses of yield.
- MSAGE-507.CO.1: Create awareness about adverse effects of insecticides and pesticides on the environment and create IPM module in crop wise.

MSAGM-508: Statistical Methods 2(1+1)

- MSAGM-508.CO.1: Educate the basics terms used in collection, classification, presentation and analysis of data, descriptive statistics, parametric and non-parametric tests, etc.
- MSAGM-508.CO.2: Understand to use of various formulas, principles and methods of statistical calculations used in agriculture.
- MSAGM-508.CO.3: Develop the skills in methods of collection of any type of data, classification of data, presentation of data, analysis of data, descriptive statistics, parametric and non-parametric tests, etc.
- MSAGM-508.CO.4: Develop ability to analyse results of statistical calculations and their validation.

APP-321: Diseases of Field and Horticultural Crops and their Management-II (L-T-P: 2-0-2)

- APP-312 CO-1: Educate basic knowledge of the causal organisms and systematic positions involved in causing pathogens in crops are studied
- APP-312 CO-2: Develop the understanding about isolation of culture, techniques, identification and biology of pathogens in the laboratory.
- APP-312 CO-3: Demonstration of field, horticultural, medicinal crops and cash crops studied symptoms, involved pathogen, disease cycle, best possible management practices and provide solution for yield reduction in crops.
- APP-312 CO-4: Apply fungicides and antibiotics (mode of action and formulations) on the basis of nature of pathogen, manage crops disease corresponding to involved pathogen and examine loss in quality and yield.
- APP-312 CO-5: Development skills about detection and diagnosis of plant diseases and application of pesticides.

Semester –III

MSAGP-509: Plant Virology 3(2+1)

- MSAGP 509.CO. 1: Educate basic terms, concepts, relationship, nomenclature and classification of viruses are studied.
- MSAGP 509.CO.2: Develop the skill for understanding about morphological characters, isolation and virus-vector relationships in laboratory and field labels.
- MSAGP 509.CO.3: Demonstrate different crop fields for study involved virus pathogens and vectors role of disease development.
- MSAGP 509.CO.4: Develop the skills for identification of virus, vectors and operate molecular equipment.

MSAGP-510: Biological Control of Plant Diseases 3(2+1)

- MSAGP 510.CO.1: Educate definition of different terms, concepts, history and relationship of biological agents.
- MSAGP 510.CO.2: Develop ability to classify the biological agents on the basis of plant pathogenic agents.

- MSAGP 510.CO.3: Apply principles and methods biological control for controlling plant diseases.
- MSAGP 510.CO.4: Motivate for entrepreneurship of development of bio-fertilizer and marketing of bio-pesticides.

MSAGE-511: Biological Control of Crop Pests and Weeds 2(1+1)

- MSAGE 511.CO.1: Familiarize with history, principles, and scope of biological control of crop pests and weeds.
- MSAGE 511.CO.2: Develop ability to understand of lifecycle, adaptation quality, host-seeking behavior of predatory and parasitic groups of insects.
- MSAGE 511.CO.3: Develop ability to interpret mass production of quality biocontrol agents including standard techniques, formulations, economics, field release/application and evaluation.
- MSAGE 511.CO.4: Develop ability to differentiate importation of natural enemies of pest and analyzing the quarantine regulations.

MSAGE-512: Principles of Integrated Pest Management 2(1+1)

- MSAGE 512.CO.1: Educate concepts, tools and principles of Integrated Pest and Disease Management.
- MSAGE 512.CO.2: Develop the understanding of the role of IPM in sustainable agriculture as the future of modern plant protection in pest and disease control strategy.
- MSAGE 512.CO.3: Develop the skills about methods of detection and diagnosis of insect pest and diseases and application of different pest and disease control techniques.
- MSAGE 512.CO.4: Develop the skills for analyzing the agricultural ecosystem, level of pest damage, Pest risk and timing of different pest control tactics to manage the pest population effectively.
- MSAGE 512.CO.5: Evaluate the economic injury level and economic threshold level for timely application of control measures for pest management.

MSAGP-513: Mushroom Production Technology 3(2+1)

- MSAGE 513 .CO.1: Educate the basic concepts, terms, objectives and history of mushroom production.
- MSAGE 513 .CO.2: Develop the understanding of mushroom identification, preparation of media, isolation, different cultivation techniques and different tools used in mushroom cultivation.
- MSAGE 513 .CO.3: Demonstrate the different places and forest for identification and collection of mushrooms.
- MSAGE 513 .CO.4: Develop the skills for different cultivation techniques and substrates for good production of mushrooms.
- MSAGE 513 .CO.5: Motivating for develop entrepreneurship of spawn, sporophores and product production.

MSAGM-514: Experimental Design 3(1+1)

- MSAGM 514 .CO.1: Acquaint with basic characteristics of a good experimental design, randomization, replication and local control, uniformity trails, size and shape of plots/blocks, etc.
- MSAGM 514 .CO.2: Develop understanding of analysis of variance, completely randomized design, randomized block design and Latin square design and other designs.
- MSAGM 514 .CO.3: Develop ability to apply principles and procedure for data analysis and interpretation of results.
- MSAGM 514 .CO. 4: Develop ability to create correct hypothesis, select correct experimental design and present best results after analysis of data.

MSAGP-591: Seminar 1(0+1)

- MSAGP 591.CO.1: Acquaint with scientific terms, concepts and content preparation, etc.
- MSAGP 591.CO.2: Develop ability to make power point and presentation.
- MSAGP 591.CO.3: Develop ideas for using photographs and sketches in power point to give valuable information.

- MSAGP 591.CO.4: Develop skills preparation of research proposal or synopsis, report, manuscripts/article and publications and use of computer programs.

Semester-IV

MSAGP-599: Synopsis, Research Work & Thesis 20(0+20)

- MSAGP-599.CO.1: Acquaint with scientific terms of research designing, citation and bibliography, intellectual property right (IPR) and its uses in academic life, theoretical arguments, content preparation, etc.
- MSAGP-599.CO.2: Able to make ethical dimensions of research work and knowledge to obtain appropriate approval.
- MSAGP-599.CO.3: Study the systematic discovery, scientific measurements, statistical calculations and analysis of data, critical review, novelty of work, etc.
- MSAGP-599.CO.4: Develop skills in research works, formulation of hypotheses, collection, classification, presentation and analysis primary/secondary data, assessment of resources, time management, fund utilization, critical analysis, preparation of research proposal or synopsis, report, manuscripts/article and publications and use of computer programs.
- MSAGP-599.CO.5: Develop ability to create links between theory and practical during lab and field experiments.
- MSAGP-599.CO.6: Develop a sense of responsibility for making conclusions and recommendations by scientific pursuits and influence the new opportunities for entrepreneurship and employability.

Non Gradiual Compulsory courses

NCLIB -501: Library and Information Services 1(0+1)

- NCLIB -501. CO.1: Acquaint with basic terms of library services.
- NCLIB -501. CO.2: Understand methods of tracing information from different sources.
- NCLIB -501. CO.3: Develop ability to relate one information with another information of interest.
- NCLIB -501. CO.4: Develop ability to compose abstract, citation, bibliography, review of literatures, scientific manuscript, etc.

NCHU-501: Technical Writing and Communications Skills 1(0+1)

- NCHU-501 CO.1: Educate about various forms of writing frequently required in a predation of documents, reports, manuscripts, manual, etc.
- NCHU-501 CO.2: Develop the understanding of principles and method of effective and professional communication and speech.
- NCHU-501 CO.3: Develop ability to differentiate among and to use facts, inferences and judgments and editing and proof-reading and organizing information for research communication, report, thesis and other publication.
- NCHU-501 CO.4: Develop the skill in composing abstract, content, notation, citation, captions, pagination, bibliography, review of literatures, scientific manuscript, research article, review article, etc.

NCPH-501: Disaster Management 1(1+0)

- NCPH-501. CO1. Educate for identifying the natural and manmade disasters/hazards and their causes.
- NCPH-501. CO2. Develop understanding of standard methods of mitigation process of disaster.
- NCPH-501. CO3. Motivate for individual and social support for national disaster management framework by government and non government efforts.
- NCPH-501. CO4. Motivate for the efforts for conservation of environment.

NCIT-501: Intellectual Property and Its Management in Agriculture

- NCIT-501. CO.1: Acquaint the meaning of intellectual property and differentiate it from tangible property.
- NCIT-501. CO.2: Understand the process of IPR, their eligibility and various treaty and conventions.
- NCIT-501. CO.3: Develop ability to analyze TRIPs and various provisions in TRIPs Agreement, GI, ITR, protection of plant varieties, researcher's right and farmer's right.
- NCIT-501. CO.4: Enable to evaluate ethical and professional issues that arise in the intellectual property law.

NCBT-501: Basic Concepts in Laboratory Techniques 1(0+1)

- NCBT-501. CO. 1: Educate about basic rules and regulations of laboratory.
- NCBT-501. CO. 2: Develop the understanding of principles and methods of handling chemicals and equipments, preparation of solution, testing samples, etc. in the laboratory.
- NCBT-501. CO. 3: Develop the skills to operate laboratory equipments efficiently and safely.
- NCBT-501. CO. 4: Develop the ability to design appropriate procedure of scientific works in the laboratory in such a way that accuracy of results remains higher.

NCRM-501: Agricultural Research, Research Ethics and Rural Development Programmes 1(1+0)

- NCRM-501. CO.1: Impart about basics of Agricultural Research, Research Ethics and Rural Development Programmes in India.
- NCRM-501. CO.2: Develop understanding research ethics including research integrity, research safety in laboratories, welfare of animals used in research, computer ethics, standards and problems in research ethics.
- NCRM-501. CO.3: Develop the understanding of rural developmental programs, policies and strategies at different levels.

- NCRM-501. CO.4: Develop ability to analyze the major constraints in implementation of rural policies and programmes.