

M.Sc. (Ag.)
Semester-III
Course Title: Soil Water Plant Relationship
Course Code: AS506
w.e.f. Session 2020-21

3(2+1)

Unit I

Soil plant-atmosphere continuum-pathways of water movement, variations in water potentials and fluxes.

Unit II

Solute transport in soils, Root growth in relation to soil physical environment. Modelling water uptake by plants at macro and micro levels.

Unit III

Evapotranspiration and growth relations, Models for water use, plant growth and yield in terms of water availability.

Practical

Evapotranspiration losses under different situations. Salt and water profile changes during infiltration. Measurement of canopy temperature, leaf diffusion resistance, xylem water potential. Determination of components of water balance in a cropped field.

Suggested Readings:

- M.B. Kirkham. 2014. Principles of Soil and Plant Water Relations, 2nd Edition, Academic Press.
- Rathinasamy A. 2014. Fundamentals of Soil Science, Scientific Publishers-Jodhpur.
- Jeffrey, D.W. (Ed.). 1987. Soil-Plant Relationships: An Ecological Approach. Springer Netherlands.

M.Sc. (Ag.) Agronomy
Semester-III
Course Title: Agronomy of Major Field Crops (Kharif)
Course Code: AA505
w.e.f. Session 2020-21

3 (3+0)

Theory

Unit I

Origin, history, distribution, adaptation, classification, morphology, phenology, varietal improvement and production technology of Rice Maize, Sorghum, Pearl-millet

Unit II

Origin, history, distribution, adaptation, classification, morphology, phenology, varietal improvement and production technology of Smaller-millet, Pigeon pea, Mung bean, Urd bean, Cowpea, Moth bean, Groundnut, Sunflower, Sesame, Niger, Caster, Soybean, Cotton, Jute, Mesta & Sugarcane.

Unit III

Quality components and industrial uses of the main and by-products and their post harvest handling for marketing

Suggested Readings:

- Das NR. 2007. Introduction to Crops of India. Scientific Publ.
- Kumar Ranjeet & Singh NP. 2003. Maize Production in India: Golden Grain in Transition. IARI, New Delhi
- Khare D & Bhale MS. 2000. Seed Technology. Scientific Publ.
- Hunsigi G & Krishna KR. 1998. Science of Field Crop Production. Oxford & IBH.
- Pal M, Deka J & Rai RK. 1996. Fundamentals of Cereal Crop Production. Tata McGraw Hill.

M.Sc. (Ag.)
Semester-III
Course Title: Toxicology of Insecticides
Course Code: AG506
w.e.f. Session 2019-20

3(2+1)

Theory

Unit I

Definition and scope of insecticide toxicology; history of chemical control; pesticide use and pesticide industry in India.

Unit II

Classification of insecticides and acaricides based on mode of entry, mode of action and chemical nature. Structure and mode of action of organochlorines, organophosphates, carbamates, pyrethroids, tertiary amines, neonicotinoids, oxadiazines, phenyl pyrozoles, insect growth regulators, microbials, botanicals, new promising compounds, etc.

Unit III

Principles of toxicology; evaluation of insecticide toxicity; joint action of insecticides- synergism, potentiation and antagonism; factors affecting toxicity of insecticides; insecticide compatibility, selectivity and phytotoxicity.

Unit IV

Insecticide metabolism; pest resistance to insecticides; mechanisms and types of resistance; insecticide resistance management and pest resurgence.

Unit V

Insecticide residues, their significance and environmental implications. Insecticide Act, registration and quality control of insecticides; safe use of insecticides; diagnosis and treatment of insecticide poisoning.

Practical

Insecticide formulations and mixtures; quality control of pesticide formulations; laboratory and field evaluation of bioefficacy of insecticides; bioassay techniques; probit analysis; evaluation of insecticide toxicity and joint action. Toxicity to beneficial insects. Pesticide appliances. Working out doses and concentrations of pesticides; visit to toxicology laboratories. Good laboratory practices.

Suggested Readings:

- Chattopadhyay SB. 1985. Principles and Procedures of Plant Protection. Oxford & IBH, New Delhi.
- Gupta HCL. 1999. Insecticides: Toxicology and Uses. Agrotech Publ., Udaipur.
- Ishaaya I & Degheele (Eds.). 1998. Insecticides with Novel Modes of Action. Narosa Publ. House, New Delhi.
- Perry AS, Yamamoto I, Ishaaya I & Perry R. 1998. Insecticides in Agriculture and Environment. Narosa Publ. House, New Delhi.
- Prakash A & Rao J. 1997. Botanical Pesticides in Agriculture. Lewis Publ., New York.

M.Sc. (Ag.)
Semester-III
Course Title: Hormonal Regulation of Plant Growth and Development
Course Code: AG507
w.e.f. Session 2019-20

3(2+1)

Theory

Unit I

Definition and classification of plant growth regulators- Hormones, endogenous growth substances and synthetic chemicals, Endogenous growth regulating substances other than hormones. triconanol, Phenols – polyamines, jasmonates, concept of death hormone.

Unit II

Site of synthesis, biosynthetic pathways and metabolism and the influence on plant growth development of individual group of hormones- Auxins, Gibberellins, cytokinins, Abscisic acid and Ethylene Brassinosteroids.

Unit III

Hormone mutants and transgenic plants in understanding role of hormones.

Unit IV

Signal perception.transduction, and effect at functional gene level of different hormones- Auxins- cell elongation, Gibberellins - germination of dormant seeds, cytokinins- cell division. Retardation of senescence of plant parts, Abscisic acid-Stomatal closure and induction of drought resistance, Ethylene- fruit ripening.

Unit V

Interaction of hormones in regulation of plant growth and development processes. Rooting of cuttings- Flowering. Apical dominance, molecular aspects of control of reproductive growth and development.

Unit VI

Synthetic growth regulators- Classification, their effect on plant growth and development. Practical utility in agriculture and horticulture.

Practical

Quantification of Hormones- Principles of bioassays, physico chemical techniques and immunoassay, Extraction of hormones from plant tissue. Auxins- bioassays- auxins effect onrooting of cuttings, abscission, apical dominance, Gibberellins- bioassays-GA effect on germination of dormant seeds, cytokinin- bioassays- estimation using immunoassay technique cytokinin effect on apical dormance and senescence, ABA bioassays estimation using immunoassay technique. ABA effect on somatal movement, Ethylene bioassays, estimation using physico chemical techniques- effect on breaking dormancy in sunflower and groundnut.

Suggested Readings:

- Hopkins WG & Huner NPA. 2004. Introduction to Plant Physiology. John Wiley & Sons.
- Salisbury FB & Ross C. 1992. Plant Physiology. 4th Ed. Wadsworth Publ.
- Taiz L & Zeiger E. 2006. Plant Physiology. 4th Ed. Sinauer Associates.

M.Sc. (Ag.)
Semester-III
Course Title: Diseases of Field Crops
Course Code: AG508
w.e.f. Session 2019-20

3(2+1)

Theory

Unit-I

History, economic importance, symptoms; disease cycle, epidemiology and diseases management of Cereal crops- wheat, barley, rice, pearl millet, sorghum and maize.

Unit-II

History, economic importance, symptoms; disease cycle, epidemiology and diseases management of Pulse crops- gram, urdbean, mungbean, lentil, pigeonpea, soybean.

Unit-III

History, economic importance, symptoms; disease cycle, epidemiology and diseases management of Oilseed crops- rapeseed and mustard, sesame, linseed, sunflower, groundnut, castor.

Unit-IV

History, economic importance, symptoms; disease cycle, epidemiology and diseases management of Cash crops- cotton, sugarcane.

Practical

Detailed study of symptoms and host parasite relationship of important diseases of above mentioned crops. Collection and dry preservation of diseased specimens of important crops.

Suggested Readings:

- Joshi LM, Singh DV & Srivastava KD. 1984. Problems and Progress of Wheat Pathology in South Asia. Malhotra Publ. House, New Delhi.
- Rangaswami G. 1999. Diseases of Crop Plants in India. 4th Ed.. Prentice Hall of India, New Delhi.
- Ricanel C, Egan BT, Gillaspie Jr AG & Hughes CG. 1989. Diseases of Sugarcane, Major Diseases. Academic Press, New York.
- Singh RS. 1998. Plant Diseases. 7th Ed. Oxford & IBH, New Delhi.
- Singh US, Mukhopadhyay AN, Kumar J & Chaube HS. 1992. Plant Diseases of International Importance. Vol. I. Diseases of Cereals and Pulses. Prentice Hall, Englewood Cliffs, New Jersey.

M.Sc. (Ag.)
Semester-III
Course Title: Management of Problematic Soils and Waters
Course Code: AS511
w.e.f. Session 2021-22

3(2+1)

Theory

Unit I

Area and distribution of problem soils – acidic, saline, sodic and physically degraded soils; origin and basic concept of problematic soils, and factors responsible.

Unit II

Morphological features of saline, sodic and saline-sodic soils; characterization of salt-affected soils - soluble salts, ESP, pH; physical, chemical and microbiological properties.

Unit III

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

Unit IV

Acid soils - nature of soil acidity, sources of soil acidity; effect on plant growth, lime requirement of acid soils; management of acid soils; biological sickness of soils and its management.

Unit V

Quality of irrigation water; management of brackish water for irrigation; salt balance under irrigation; characterization of brackish waters, area and extent; relationship in water use and quality.

Unit VI

Agronomic practices in relation to problematic soils; cropping pattern for utilizing poor quality ground waters.

Practical

Characterization of acid, acid sulfate, salt-affected and calcareous soils, Determination of cations (Na^+ , K^+ , Ca^{++} and Mg^{++}) in ground water and soil samples, Determination of anions (Cl^- , SO_4^- , CO_3^- and HCO_3^-) in ground waters and soil samples, Lime and gypsum requirements of acid and sodic soils.

Suggested Readings:

- Chemistry of the Soil- Bear FE. 1964, Oxford & IBH.
- Salt-affected Soils- Jurinak JJ. 1978, Department of Soil Science & Biometeorology. Utah State Univ.
- Diagnosis and improvement of Saline and Alkali Soils- USDA Handbook No. 60. 1954, Oxford & IBH.
- Fundamentals of Soil Science- Indian Society of Soil Science (ISSS) 2012, 2nd edition.

M.Sc. (Ag.)/MBA Agribusiness Management
Semester-III
Course Title: Library and Information Services
Course Code: PGS501
w.e.f. Session 2019-20

1 (0+1)

Practical

Introduction to library and its services; Role of libraries in education, research and technology transfer; Classification systems and organization of library; Sources of information- Primary Sources, Secondary Sources and Tertiary Sources; Intricacies of abstracting and indexing services (Science Citation Index, Biological Abstracts, Chemical Abstracts, CABI Abstracts, etc.); Tracing information from reference sources; Literature survey; Citation techniques/Preparation of bibliography; Use of CD-ROM Databases, Online Public Access Catalogue and other computerized library services; Use of Internet including search engines and its resources; e-resources access methods.

Suggested Readings:

- Singh G. Information Sources, Services and Systems, 2013 Edition. Prentice Hall India Learning Private Limited
- Library Science, 2018 Edition. Ramesh Publishing House
- Subhankar Biswas, Durga Sankar Rath. Cataloguing in the New Era: Gazing through the Bodleian Catalogues to RDA, 2017 Edition. Ess Ess Publications