

PLANT BREEDING

[15L + 30 P]

[Credits 2]

Course description:

Course Objectives:

Course learning outcomes:

Unit I: Plant Breeding

[5 Hrs.]

Introduction and objectives. Breeding systems: modes of reproduction in crop plants. Important achievements and undesirable consequences of plant breeding. Introduction and objectives. Breeding systems: modes of reproduction in crop plants. Important achievements and undesirable consequences of plant breeding.

Unit II: Methods of crop improvement

[5 Hrs.]

Selection methods: For self-pollinated, cross pollinated and vegetatively propagated plants; Hybridization: For self, cross and vegetatively propagated plants – Procedure, advantages, and limitations. Role of mutations; Polyploidy; Distant hybridization and role of biotechnology in crop improvement.

Unit III: Quantitative Inheritance, Inbreeding depression and Heterosis

[5 Hrs.]

Concept, mechanism, examples of inheritance of Kernel colour in wheat, Skin colour in human beings. Monogenic vs polygenic Inheritance. History, genetic basis of inbreeding depression and heterosis; Applications.

Practical:

[30 Hrs.]

- Study of megasporogenesis and microsporogenesis, Fertilization and life cycle of
- angiospermic plant
- Plant breeder's kit
- Hybridization techniques and procedures
- Study of male sterility and incompatibility in field plots
- Handling of segregating generations
- Problems on Hardy-Weinberg law
- Back cross methods
- Field layout of experiments, field trials and maintenance of records and registers
- Estimation of heterosis and inbreeding depression, Heritability, GCA and SCA
- Estimation of variability parameters

REFERENCE BOOKS:

- Chaudhari, H.K. (1984). Elementary Principles of Plant Breeding. Oxford – IBH. 2nd edition.
- Singh, B.D. (2005). Plant Breeding: Principles and Methods. Kalyani Publishers. 7th edition.

Mode of evaluation:

Continuous Internal Assessment (No end semester examination)

(Poster presentation / Project/ Presentation/ Assignment/ Quiz)

Total Mark: 100

SOIL LESS FARMING

[15L + 30 P]

[Credits 2]

Course description:

Course Objectives:

Course learning outcomes:

Unit I: Modern Farming Technology [5 Hrs.]

Scope, branches and importance of modern farming technology, role in urban and rural economy and employment generation.

Unit II: Hydroponics: Commercial Aspects and Recent Advancements [5 Hrs.]

Hydroponics: Commercial Aspects and Recent Advancements. Advantages and disadvantages of hydroponics, Application of hydroponics in agriculture.

Unit III: Hydroponics: Techniques and Media [5 Hrs.]

Techniques in Hydroponics – Static solution culture, Continuous –flow, Solution culture, NFT, Aeroponics, Passive sub-irrigation, Ebb and flow, Dutch bucket, Deep water culture, Bubbleponics.

Media used for Hydroponics: Clay, Rock wool, cocopeat, Perlite, Pumice, Vermiculite, Sand, Gravel, Hydroton, Polystyrene packing peanuts, wood fiber.

Practicals: [30 Hrs.]

- Study of techniques used in hydroponics (Circulating methods such as Nutrient Film Technique (NFT), Deep Flow Technique (DFT), Dutch bucket; Non circulating methods such as Root dipping, Floating, Capillary action; Aeroponics such as root mist and fog feed techniques).
- Study of various instruments used in hydroponics (Pressure gauge, Filters, PVC Tanks, Venturi/Reciprocating Pump/Mixing tank, EC meter, pH meter, TDS meter, water pump, net cups, air pump, thermometer, lux meter, drip irrigation system).
- Construction of sustainable hydroponic and aeroponic units (including greenhouse facilities)
- Preparation of growth media for Hydroponics
- Estimation of NPK, DO, TDS, pH of growth media.
- Growing a leafy vegetable/fruity vegetable/medicinal herb /aromatic plant in Hydroponics /Aeroponic solution.
- Study of safety measures, certification standards and government policies.
- Visit to Hydroponic/Aquaculture/Aeroponic farm/Institute.

REFERENCE BOOKS:

- Goddek, S., Joyce, A., Kotzen, B., Burnell, G.M. (2019). Aquaponics Food Production Systems. Springer, Cham.
- Hasan, M.; Sabir, N.; Singh, A.K.; Singh, M.C.; Patel, N.; Khanna, M.; Rai, T.; and Pragnya, P. (2018). Hydroponics Technology for Horticultural Crops, Tech. Bull. TBICN 188/2018. Publ. by I.A.R.I., New Delhi.
- Meier Schwarz. (1995). Soilless Culture Management. Advanced Series in Agricultural Sciences, vol 24. Springer, Berlin.
- Misra, R.L., Misra S. (2017). Soilless Crop production. Daya Publishing House, Astral

Mode of evaluation:

Continuous Internal Assessment (No end semester examination)

(Poster presentation / Project/ Presentation/ Assignment/ Quiz)

Total Mark: 100