GENERIC ELECTIVE (GE-02)

Credit distribution, Eligibility and Pre-requisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/ Practice		
Plant Quarantine and Seed Health Technology **ALS BOT GE 02**	**4**	**2**	**0**	**2**	NIL	**NIL**

Objectives:

- To acquaint the students with the Plant Quarantine Information System (PQIS).
- To familiarize the students with knowledge of export and import policies of Germplasm, Transgenic or Genetically Modified Organisms and live organisms.
- To impart knowledge about the importance of seed pathology including mode and mechanism of transmission of pathogens.
- To strengthen student's knowledge in field of quality, conditioning, drying and storage of seeds along with various acts and regulations related to seeds.

Learning Outcomes:

- Plant Quarantine Order and Amendments, and Issuance of Export and Import Permit.
- Procedures of Plant quarantine inspection for clearance.
- The need of quarantine for Germplasm, Transgenic or Genetically Modified Organisms, live insects and microbial cultures, plants, vegetative plants propagating materials and plant products.

- The laws associated with various acts of plant quarantine.
- Core competency in basic understanding about seeds, seed pathology, management and procedure for healthy seed production and seed storage.

Plant Quarantine

Theory:

Unit 1. Introduction: Hours: 02

Plant quarantine: Definition, General principles of Plant Quarantine, Introduction and objectives of Plant Quarantine Information System (PQIS).

Unit 2. Imports: Hours: 05

Plant Quarantine Order and Amendments, Issuance of the Import Permit, import inspection and clearance, Procedures of Post Entry Quarantine (PEQ) inspection, Permits required for import of Germplasm, Transgenic or Genetically Modified Plants, Plant parts and Plant products, Requirements for Import of Wood and Timber, Special conditions for Import of plant species.

Unit 3.Exports: Hours: 04

Export inspection and certification procedure, Post-entry Quarantine, Appeal and Revision, Power of Relaxation, Commodities not requiring Plant Quarantine clearance.

Unit 4. Phytosanitary Measures: Hours: 03

Phytosanitary Agreement, National Standards for Phytosanitary Measures, Accredited Treatment Facilities, Quarantine disinfestation treatment, International Standards on Phytosanitary Measures (ISPMs).

Unit 5. Laws: Hours: 04

The Plant Quarantine Order 2003 - Amendments, International Plant Protection Convention, WTO-SPS Agreement.

Seed Health Technology

Theory:

Unit 6. Importance and concept: Hours: 03

Introduction and economic importance of seed pathology in seed industry, mode and mechanism of transmission of seed-borne pathogens and microorganisms.

Unit 7. Seed Quality and Health: Hours: 04

Classes of seeds and Seed Quality, Seed Cleaning, Seed Treating, Seed Coating and Pelletizing, Seed certification and tolerance limits, Role and Principles of seed Conditioning. Seed moisture, Drying seed and Dehumidified Drying.

Unit 8. Seed Regulations and Management: **Hours: 05**

Role of microorganisms in seed quality deterioration, different methods for seed health testing and detection of microorganisms, Production of toxic metabolites affecting seed quality, Management and procedure for healthy seed production and seed storage, Seed Act and Regulations.

Practical:

1. Detection and identification of pathogens, pests and microorganisms by isolation and growth on different nutrient media.
2. Learning various techniques (Mechanical cleaning, hot water treatment, alcohol wash) for salvaging of infested/ infected/ contaminated germplasm.
3. To perform the Tetrazolium test (TTC) for seed viability.
4. To determine the moisture content of dry seeds by Soaked examination and Incubation test.
5. To inspect dry seeds and perform washing test to assess seeds' health.
6. To learn the technique of surface sterilization of seeds.
7. Evaluation of seed health of different Pulses by Incubation methods.
8. Detection of *Botrytis cinerea* in *Helianthus annuus* (Sunflower) seeds.
9. Detection of *Ustilagotritici*in *Triticum aestivum* by embryo count method.
10. A visit to the Plant quarantine station and preparation of field report.

Essential/recommended readings

1. Muthaiyan, M.C. (2009). *Principles and Practices of Plant Quarantine*.Allied publisher Pvt. Ltd.
2. Ebbels, D.L. (2003). *Principles of Health and Quarantine*, CABI Publishing.
3. Lawrence O. Copeland & Miller B. McDonald (2001). *Principles of Seed Science and Technology* (4th ed.). Springer Science + Business Media, LLC.
4. S.G. Elias, L.O. Copeland, M.B. McDonald & R.Z. Baalbaki (2012). *Seed Testing: Principles and Practices*, Michigan State University Press.

Suggestive readings

1. Khare, D., &Bhale M. S. (2014) *Seed Technology* (2ndEd.). Scientific Publishers.

2. Gregg (B. R.) B. and Billups G. L. (2010) *Seed Conditioning Technology, Advanced-level Information for Managers, Technical Specialists & Professionals* (Volume 2, Part A) Science Publishers.

.**Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.**