AGRICULTURE AND ENVIRONMENTAL POLLUTION

Bot.Sp-14 **Credit Hours: 3(2+1)**

THEORY

Introduction to the course:

This course provides the knowledge about different environmental pollution problems and their effects on agriculture soil and crop plants. It is generally aimed to familiarize students with agricultural pollution, its causes and effects.

Course Objectives:

The course is designed:

1. To provide an adequate knowledge about basic concepts of agricultural environmental pollution and types of agricultural environmental pollutants
2. To give an insight about behavior of environmental pollutants in the environment and their effects on crop plants.

Course Outline:

1. **Agriculture as a Global Polluter:**
   - 1.1. Polluting Gases (Methane, Nitrous Oxides and Ammonia), their Sources and Trends in the Atmosphere, the Products of Burning of Vegetation, Local and Global Impacts of Agricultural Pollution
2. **Air Pollution and Agriculture:**
   - 2.1. Introduction; Sources and causes of air pollution Methods of Assessing Air Pollution and its impact on Agriculture
   - 2.2. Ozone; Particulate matter; Mixtures of Pollutants and their effects on plants
3. **Acid Rain**:
   - 3.1. Introduction to acid rain; Trends of emission and pattern of acid deposition; Effects of acid rain on soil and agriculture.
4. **Pesticides**:
   - 4.1. Introduction; Use and Impacts on agriculture.
5. **Heavy Metals:**
   - 5.1. General and Specific Heavy Metals (Lead, Copper, Zinc and Cadmium),
   - 5.2. Sources; Distribution and Damage to Plants
6. **Water Pollution:**
   - 6.1. Introduction; Sources and causes of water pollution
   - 6.2. Impact of water pollution on Agriculture
7. **Sewage Pollution:**
   - 7.1. Introduction to sewage effluents and waste water; Sewage sludge; Constituents of sludge and their Effects on Plants

Practicals:

1. Sampling of agricultural soil.
2. Analysis of soil affected by water pollution for important Physical and Chemical Characteristics.
3. Study of various sources of air pollution
4. Study the symptoms of various Air Pollutants on Plants.
5. Study of Impact of Polluted Water on Germination and Seedling Growth.
6. Field Work: Visit to sites of Water Pollution and sewage effluents treatment plant.

Teaching-learning Strategies

1. Lectures
2. Group Discussion

3. Laboratory work
4. Seminar/ Workshop

Learning Outcome:

Students will be able to

1. Define agricultural environmental pollution.
2. Explain the types of agricultural environmental pollutants.
3. Explain the behavior of environmental pollutants in the environment.
4. Explain the modern agricultural practices
5. Evaluate and use the new knowledge in the field of agricultural pollution with a systematic approach.

Assessment Strategies:

1. Lecture Based Examination (Objective and Subjective)
2. Assignments
3. Class discussion
4. Quiz
5. Tests

Recommended Readings:

1. Agricultural Nonpoint Source Pollution: Watershed Management and Hydrology edited by William F. Ritter, Adel Shirmohammadi
2. Agricultural Pollution: Environmental Problems and Practical Solutions By Graham Merrington, Dr Linton Winder Nfa, R. Parkinson, Mark Redman, L. Winder
3. Assessment of Crop Loss From Air Pollutants Editors: Walter W. Heck, O. Clifton Taylor, David T. Tingey ISBN: 978-94-010-7109-3 (Print) 978-94-009-1367-7 (Online)
4. Biomass Burning and Global Change: Remote sensing, modeling and ..., Volume 1, edited by Joel S. Levine
5. Conway, G.R. and Pretty, J.N (2009). Unwelcome Harvest: Agriculture and Pollution. Earthscan Publications Ltd. London.
6. Dassler, H.G. and Bortitz, S. (2002). Air Pollution and its influence on vegetation. Dr. W. Junk Publishers, The Netherlands.
7. Nebel, B.R. and Edward, E.J. (2002). Environmental Science. Prentice-Hall. Inc. New Jersey.
8. Stiling, P.D. (1996). Ecology: Theories and Applications. (2nd Ed.), Prentice-Hall, Inc. London.
6. Unsworth, M.H. and Ormrod, D.P. (2006). Effects of Gaseous Air Pollution in Agriculture and Horticulture. Butterworth Scientific. London, Sydney, Toronto.
7. Treshow, M. (2003). Air Pollution and Plant Life. John Wiley and Sons. New York, Toronto. Brisbane.

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