CROP PRODUCTION TECHNOLOGY

ENAE 201

Lecture : 2 **Year : II**
Tutorial : 1 **Part : I**
Practical : 1.5

Course Objectives:
The objective of this course is to develop knowledge and skills on crop management and cultivation practices for efficient, productive and sustainable agricultural and horticultural systems with controlled crop disease by paste management.

Part I: Agronomy

1. Introduction **(2 hours)**

1.1 Definition and concept of agronomy
1.2 Scope and importance in relation to production and sustainability

2. Crop Physiological Processes **(2 hours)**

2.1 Growth and development of crops
2.2 Nutrient and water uptake and their transportation
2.3 Photosynthesis
2.4 Respiration
2.5 Transpiration
2.6 Photoperiodism
2.7 Flowering and fruiting
2.8 Senescence and aging

3. Seeds and Seed Quality **(2 hours)**

3.1 Definition of seed
3.2 Seed quality and its importance
3.3 Seed viability
3.4 Seed germination
3.5 Seed dormancy
3.6 Production of quality seed
3.7 Seed processing

4. Soil Fertility and Plant Nutrition (3 hours)

4.1 Basic concept of soil fertility and plant nutrition
4.2 Essential plant nutrients: Classification, functions and deficiency/toxicity symptoms in plants
4.3 Inorganic fertilizers: Composition and their behavior in soil
4.4 Green manures and bio-fertilizers
4.5 Management of saline, alkaline and acidic soils
4.6 Integrated plant nutrient management system (IPNMS)

5. Cropping Systems (3 hours)

5.1 Crop rotation
5.1.1 Importance of crop rotation in agriculture system
5.1.2 Selection of crops in crop rotation
5.2 Mixed cropping
5.3 Intercropping
5.4 Relay cropping
5.5 Cropping intensity
5.6 Cropping index
5.7 Harvest index

6. Climate and Weather Elements on Crop Production (4 hours)

6.1 Solar radiation
6.2 Temperature
6.3 Humidity
6.4 Wind
6.5 Precipitation
6.6 Agro-climatic requirements of major food crops
6.7 Climatic hazards and their management

7. Weed Management (2 hours)

7.1 Definition and concept of weeds
7.2 Classification of weeds
7.3 Losses caused by weeds
7.4 Weed management
7.5 Prevention
7.6 Control
7.7 Eradication

8. Cultivation Practices of Major Crops (2 hours)

8.1 Cereal crops (Rice, Wheat, Maize)
8.2 Grain legumes (Lentil, green gram)
8.3 Oil seeds (Mustard, Sunflower, Soybean)
8.4 Industrial crops (Sugarcane, Jute, Rubber plant)
8.5 Tuber crops (Potato)

Part II: Horticulture

9. Introduction (2 hours)

9.1 Meaning, branches and importance of horticulture
9.2 Scope and feasibility of horticultural development in Nepal
9.3 Classification of horticultural crops

10. Physiology of Horticultural Crops (2 hours)

10.1 Seed and bud dormancy
10.2 Factors affecting germination
10.3 Juvenility-characteristics and modifications
10.4 Physiology of seedlings
10.5 Flowering, fruit-setting, fruit growth, maturity of horticultural crops
10.6 Ripening and fruit drop
10.7 Tuber and bulb formation

11. Production of Vegetables and Spice Crops (2 hours)

11.1 Classification of vegetable and spice crops
11.2 Cultivation practices of major vegetable crops
  11.2.1 Cole crops (Cauliflower, cabbage)
  11.2.2 Bulb crops (Onion)
  11.2.3 Solanaceous vegetables (Tomato, chilly)
  11.2.4 Tuber crop (Potato)
11.3 Cultivation practices of major spice crops: Zinger, turmeric, cardamom

12. Production of Fruits and Plantation Crops (2 hours)

12.1 Importance and scope of fruits and plantation crops
12.2 Orchard establishment-site selection, layout, selection of crops and spices
12.3 Nursery management and factors affecting seedlings growth
12.4 Principles of sexual, asexual and micro-propagation
12.5 Cultivation practices of major fruit crops
  12.5.1 Tropical fruits (Mango, Banana, Litchi)
  12.5.2 Sub-tropical fruits (Grapes, Guava, Pineapple)
  12.5.3 Temperate fruits (Apple, Pear, Kiwi)
  12.5.4 Plantation crops (Tea, Coffee)

Part III: Insect/Pest and Disease Management

13. Insect/Pest Management (1 hour)

13.1 Insects of major agronomical and horticultural crops
13.2 Principles and methods of pest control

14. Disease Management (1 hour)

14.1 Important diseases of field, vegetable and plantation crops
14.2 Causes of plant diseases (Biotic and Abiotic)

Tutorial (15 hours)

1. Branches of agronomy and classification of agronomical crops
2. Seed testing and certification system in Nepal
3. Dominant cropping/farming system in different domains of Nepal
4. Cultural practices to improve and maintain soil fertility (Mulching, liming, composting, intercropping, contour farming, alley cropping, terrace farming, agro-forestry)
5. Distribution of major vegetables and spice crops in different domains of Nepal
6. Soil and climate factors in the production of vegetables and spice crops
7. Importance and constraints of resource conservation farming systems in Nepal
8. Control measures of major insects of major cereals (Rice, wheat and maize)
9. Control measures of major diseases of major cereals (Rice, wheat and maize)

Practical (22.5 hours)

1. Identification of crops and their seeds.
2. Identification of mineral fertilizers and their methods of application in different crops
3. Calculation of mineral and organic fertilizers for specific area of land
4. Preparation of calendar of operation for mixed cropping, intercropping and relay cropping
5. Calculation of seed rate for different crops and planting materials
6. Germination, viability and purity test of seeds
7. Collection and identification of weeds of major agronomical crops
8. Study of commercially available pre and post emergence herbicides with their formulations
9. Calculation of rates of insecticides, pesticides and fungicides
10. Identification of fruits and plantation crops
11. Identification of plants and seeds of vegetables and spices
12. Practice on crop cultural operation in field, vegetable, fruits and plantation crops

Final Exam

The questions will cover all the chapters in the syllabus. The evaluation scheme will be as indicated in the table below:

Chapters	Hours	Marks distribution
Part I : Agronomy		
1, 2 and 3	6	4
4	3	4
5 and 6	7	6
7 and 8	4	4
Part II: Horticulture		
9 and 10	4	4
11 and 12	4	4
Part III: Insect/pest and Disease Management		
13	1	2
14	1	2
Total	**30**	**30**

* There may be minor deviation in marks distribution.

References

1. Sharma, K. P., Dahal, K. R., & Neupane, K. R. (1991). An introduction to agronomy. Tribhuvan University, Institute of Agriculture and Animal Science.
2. Singh, C. (1983). Modern techniques of raising field crops. Oxford and IBH Publishing Co.
3. Shrestha, R. K., Khatri, K., & Adhikari, K. R. (2024). Fundamentals of soil science. Heritage Publishers and Distributors Pvt. Ltd.
4. Singh, S. S. (2011). Crop management. Kalyani Publishers.
5. Acquaah, G. (2002). Horticulture: Principles and practices. Prentice Hall.
6. Agrios, G. N. (2005). Plant pathology (5th ed.). Academic Press.
7. Devkota, L. P., & Thapa, M. B. (2005). Entomology in Nepal. Entomological Society of Nepal.