

**Syllabus**  
**B. Sc. (Ag) Hons. Part-II, Semester-I**  
**Agriculture University, Jodhpur**

**Courses & Credits**

<b>Course No.</b>	<b>Course Title</b>	<b>Credits</b>
AGRON-4211	Field crops-I (Kharif)	3(2+1)
AGRON-4212	Weed Management	2(1+1)
NEMAT-4211	Introductory Nematology	2(1+1)
STAT-4211	Statistics	3(2+1)
EXTED-4211	Fundamentals of Rural Sociology and Educational Psychology	2(2+0)
HORT-4211	Production Technology of Fruit and plantation Crops	3(2+1)
AECON-4211	Production Economics and Farm Management	2(1+1)
AENGG-4211	Farm power and machinery	2(1+1)
SCHEM-4211	Manures and Fertilizers	2(1+1)
NSNC-4221	NCC/NSS	-
	<b>Total</b>	<b>21(13+8)</b>



# Syllabus

## **B. Sc. (Ag) Hons. Part-II, Semester-I**

### **Agriculture University, Jodhpur**

**AGRON-4211**

**Field Crops-I (Kharif)**

**3(2+1)**

**Theory:**

Origin, geographic distribution, importance, soil and climatic requirement, varieties; cultural practices *viz.* seed and sowing, inter-cultural operations, fertilizer, water and weed management, plant protection; harvesting and yield of – rice, maize, sorghum, (grain and forage), pearl millet (grain and forage); pigeonpea, groundnut, soybean and cotton; Package of practices of mungbean, urdbean, cowpea, mothbean, clusterbean, sunhemp, castor, sesame, minor millets and napier. Acquaintance about *Panicum*, *Lasiurus* and *Cenchrus*.

**Practical:**

Rice nursery preparation, seed bed preparation and sowing of *kharif* crops; Calculations on seed rate; Sowing of mungbean, pearl millet, and cotton; Effect of seed size on germination and seedling vigour; Identification of weeds in pearl millet and other crops; Fertilizer application and top dressing of nitrogen in pearl millet and study on fertilizer experiments; Study of yield contributing characters, yield calculations, harvesting and yield estimation; Study of crop varieties and important agronomic experiments.

**Suggested Readings:**

1. Singh, Chhidda; Singh P. and Singh, R. 2003. Modern Techniques of Raising Field Crops, Oxford & IBH Publishing Co., New Delhi.
2. Singh, S.S. 1998, Crop Management : Under irrigated and rainfed conditions.
3. Singh, S.S. 1993, Principles and Practices of Agronomy, Kalyani Publishers, New Delhi.
4. Reddy, T.Y. and Reddi, G.H.S. 1993. Principles of Agronomy, Kalyani Publishers, New Delhi.
5. Maiti, S., Hedge, M.R. and Chhattopadhyay, S.B. 1988. Handbook of Annual Oil Seed Crops. Oxford & IBH Publishing Co., New Delhi.
6. Jaiswami, L.H. and Baldeo, B. 1990. Advances in Pulse Production Technology, ICAR, New Delhi.
7. Thakur, C. 1979. Crop Production, Vol. I & II. Metropolitan Book Pvt. Ltd., New Delhi.
8. Ahlawat, I.P.S., Sharma, O.P. & Saini, G.S. 1998 Scientific Crop Production in India. Aman Publishing House, Madhu Market, Budhana gate, Meerut.
9. Rathore, P.S. 1999-2000. Techniques and Management of Field Crop Production. Agrobios (India), Jodhpur.
10. Rathore, P.S. and Sharma, S.K. 2003. Scientific Pulse Production. Yash Publishing House, Bikaner.
11. Sharma, Kalicharan 1990 Bharat ki pramukh fasle. G.B. Pant Agricultural & Technology University, Nainital.
12. Reddy, S.R. 2004. Agronomy of Field Crops. Kalyani Publishers, New- Delhi.

# Syllabus

## **B. Sc. (Ag) Hons. Part-II, Semester-I**

### **Agriculture University, Jodhpur**

**AGRON- 4212**

**Weed Management**

**2(1+1)**

#### **Theory:**

Weeds- introduction, harmful and beneficial effects, classification, propagation and dissemination; Weed biology and ecology, crop weed association, crop weed competition and allelopathy; Concepts of weed prevention, control and eradication; Methods of weed control- physical, cultural, chemical and biological methods; Integrated weed management; Herbicides- advantages and limitation of herbicide usage in India; Herbicide classification, formulations, methods of application; Introduction to Adjuvants and their use in herbicides; Introduction to selectivity of herbicides; Compatibility of herbicides with other agro chemicals; Weed management in major field crops. Aquatic weeds and their management.

#### **Practical:**

Identification of weeds; Preparation of herbarium of weeds; Study of crop weed competition ; Herbicide label information; Computation of herbicide doses; Study of herbicide application equipment and calibration; Demonstration of methods of herbicide application; Preparation of list of commonly available herbicides; Study of phytotoxicity symptoms of herbicides in different crops; Biology of nut sedge, bermuda grass, *Parthenium* and *Celosia*; Economics of weed control practices; visits of problem areas (field).

#### **Suggested Readings:**

- 1 Gupta , O.P. 2005. Weed Management: Principles and Practices (2<sup>nd</sup> Ed) Agribios (India) , Jodhpur.
- 2 Gupta, O.P. 2002 . Modern Weed Management, Agribios (India) Jodhpur.
- 3 Rao, V.S. 2000. Principles of Weed Science (2<sup>nd</sup> Ed) , Oxford & IBH Publishing Co., New-Delhi.
- 4 Saraswat, V.N., Bhan, V.M. and Yaduraju, N.T. 2003. Weed Management, ICAR, New-Delhi.



# Syllabus

## **B. Sc. (Ag) Hons. Part-II, Semester-I**

### **Agriculture University, Jodhpur**

**NEMAT-4211**

**Introductory Nematology**

**2(1+1)**

#### **Theory:**

History and economic importance of plant parasitic nematodes; Characters of Phylum Nematoda and systematic position of plant parasitic nematodes (outline classification upto Generic level); General morphology, ecology and biology; Plant nematode relationship; Kinds of parasitism and symptomology; Nematode interaction with other micro-organisms; Nematode diseases of crop plants of economic importance in State with special reference to *Meloidogyne* spp; *Heterodera avenae*, *Anguina tritici* and *Rotylenchulus reniformis* *Tylenchulus semipenetrans*; Principles of nematode management.

#### **Practical:**

Study of compound microscope alongwith other laboratory necessities, Survey and Collection of soil and plant samples, extraction of nematodes from soil and roots, killing and fixing of nematodes, staining and separation of nematodes in plants tissue, preparation of temporary and semi-permanent mounts of nematodes, identification of important plant parasitic nematodes, collection and preservation of nematode diseased plant samples; Nematicides and their uses.

#### **Suggested Readings:**

1. Reddy, P.P. (1993). A treatise on phyto nematology, Agricol. Publ. Academy, N. Delhi.
2. Walia, R.K. and Bajaj, H.K. (2003). Introduction plant Nematology, ICAR Publication, Krishi Bhawan, New Delhi.
3. Laboratory Manual of Elementary Nematology (Correspondence course No. NEMAT-411) by Dr. R.L. Midha and Dr. G.L. Sharma (2007).
4. डा. गोपाल स्वरूप (1982) पादप कृषि विज्ञान, राजस्थान साहित्य अकादमी, जयपुर।
5. डा. सुशील कुमार एवं डा. बी. पी. सिंह पादप सूत्रकृमि विज्ञान (2003), रामा पब्लिशिंग हाउस, मेरठ।



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STAT-4211

Statistics

3(2+1)

**Theory:**

Introduction: Definition of statistics by seligman and Horac Secrist. Aims, Scope and limitation of statistics. Classification: Definition and its type (According to attributes and class intervals). Measures of central tendency: A.M., G.M., H.M. median, mode, Properties of A.M. Merits, demerits and uses of above measures. Dispersion: range, M.D. Q.D., S.D., variance and c.v., Merits and demerits of above measures. Correlation and regression: scatter diagram, Karl pearson's correlation coefficient, Simple linear regression; regression lines and their fitting, properties of correlation and regression coefficients. Probability and simple problems based on probability. Test of significance: Null and alternative hypothesis, two types of errors, level of significance, critical region, d.f. standard normal deviate test and students. t-test for single mean and difference between two means, paired t-test. Test of significance of correlation and regression coefficients. Chisquare test for Goodness of fit and for testing independence of attributes, Yates correction (No mathematical derivatives).

**Practical:**

Preparation of frequency table of quantitative data. Computation of A.M. for raw data and frequency distribution by direct method and short cut method. Computation of G.M. and H.M. for raw data and frequency distribution. Computation of median and mode for raw data and frequency distribution. Computation of M.D.; Q.D. for raw data and frequency distribution. Computation of S.D. and C.V. for raw data and frequency distribution. Computation of correlation coefficient. Estimation of regression lines, t & S.N.D. test for single mean and difference between two means, paired t-test. Test of significance of correlation and regression coefficients. Chisquare test for Goodness of fit & test of independence in 2x2 contingency table and m x n contingency table.

**Suggested Readings:**

1. Chandel S.R.S. 1998. Handbook of Agril. Statistics. Achal Prakashan Mandir, Kanpur.
2. Gupta S.P. 2002. Statistical Methods. Sultan Chand & Sons, New Delhi.
3. Agarwal B.L. 1991. Basic Statistics Wiley Eastern, New Delhi.

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# Syllabus

## **B. Sc. (Ag) Hons. Part-II, Semester-I**

### **Agriculture University, Jodhpur**

**EXTED-4211      Fundamentals of Rural Sociology and Educational Psychology      2(2+0)**

**Theory:**

Sociology and Rural Sociology-Meaning, Definition, Scope, Importance of rural sociology in Agricultural Extension and Interrelationship between Rural Sociology and Agricultural Extension. Indian Rural Society, Important characteristics, differences & Relationship between Rural and Urban societies. Social Groups: Meaning, Definition, Classification, Factors considered in formation and organization of groups. Social Stratification – Meaning, Definition, Functions, Forms of Social stratification. Cultural concepts - Culture, Customs, Folkways, Mores, Taboos, Rituals and Traditions - Meaning, Definition and their role in Agricultural Extension. Social Values and Attitude - Meaning, Definition, Types and Role of social values and Attitudes in Agricultural Extension. Social Institutions - Meaning, Definition, Major institutions in Rural society, Functions. Social Control - Meaning, Definition, Need and Means of Social control. Social change - Meaning, Definition, Nature of Social change and factors of social change. Leadership- Meaning, Definition, Classification, Roles of Leader, Methods of selection of leaders. Psychology and Educational psychology- Meaning, Definition, Scope and Importance of Educational Psychology in Agricultural Extension. Intelligence - Meaning, Definition, Types, Factors affecting intelligence. Personality- Meaning, Definition, Types, Factors influencing the Personality and Role of Personality in Agricultural Extension. Teaching- Learning process- Meaning and Definition of Teaching, Learning, Learning experience and Learning situation, Elements of learning situation and its characteristics.

**Suggested Readings:**

1. Bhatia, H.R. 1965. A Text Book of Educational Psychology, Asia Publishing House, New Delhi.
2. Chitamber, J.B., 1990. Introductory Rural Sociology: Willey Easter Ltd. New Delhi.
3. Dahama, O.P. & Bhatnagar, O.P.,1985. Education & Communication for Development,Oxford and IBH Publishing Company, New Delhi,
4. Desai, A.R. 1953. Rural Sociology in India, Vora & Co. Publisher Pvt. Ltd., Bombay.
5. Pujari, D. 2002 Educational Psychology in Agriculture, Agrotech Publishing Academy, Udaipur (Raj.) –313001.



**Syllabus**  
**B. Sc. (Ag) Hons. Part-II, Semester-I**  
**Agriculture University, Jodhpur**

**HORT--4211      Production Technology of Fruit and Plantation Crops**

**3(2+1)**

**Theory:**

Importance, introduction and scope of horticulture. Classification of fruits according to climate. Selection of site, planning, establishment and layout of orchard. Propagation methods of fruit crops. Methods of training and pruning in fruit crops. Use of growth regulators in fruit production. Package of practices for the cultivation of major fruits with the emphasis on botanical name, family, origin, distribution, climate, soil, varieties, propagation, planting, manures and fertilizers, irrigation, training and pruning, intercultural operation, harvesting, yield and plant protection measures including physiological disorders – mango, banana, citrus, grape, guava, sapota, apple, papaya, pineapple, pomegranate, ber, jack, aonla, bael, date palm; plantation crops -coconut, areca nut, cashew, oil palm and tea

**Practical:**

Identification of fruit and plantation crops. Study of horticultural tools and implements and their uses; Plant propagation methods, by seeds, cuttings (soft wood, hard wood and semi-hardwood), budding and grafting, layering (simple layering, Air layering.); Layout and planting systems, Methods of pruning and training of important fruit crops. Irrigation methods in fruit crops including drip – Micro irrigation methods for establishment of orchard; Methods of fertilizer application in fruit crops. Visit to local commercial orchards with in state; Preparation of growth regulator solutions for propagation; Application of growth regulators for improving fruit set, fruit size and quality.

**Suggested Readings:**

1. Bose.T.K., Kabir.J., Das.P. and Joy.P.P.(2000)Tropical Horticulture. Naya Prokash.Calcutta
2. Singh.Amar (1986)Fruit Physiology And Production. Kalyani Publishers,New Delhi
3. Singh. S.P. (1997) Commercial Fruits.Kalyani Publishers,New Delhi
4. Mitra.S.K., Bose. T.K. andRathore.D.S.(1991) Temperate Fruits. Horticulture & Allied Publishers,Calcutta
5. Parthasvathy. V. A. Chattopadhyay. P.K. and Bose. T.K. (2006). Plantation Crpos.Naya Prokash, Kolkatta
6. Bal. J.S. (1997) Fruit Growing. Kalyani Publisher, New Delhi
7. Chandra, Atul and Chandra, Anju Production and Post harvest technology of Fruits. NBS Publisher & Distributers, Bikaner

# Syllabus

## **B. Sc. (Ag) Hons. Part-II, Semester-I**

### **Agriculture University, Jodhpur**

**AECON- 4211**

**Production Economics and Farm Management**

**2 (1+1)**

#### **Theory:**

Production Economics: Meaning, Definition, Nature and Scope of Agricultural Production Economics. Basic concepts and terms. Concepts of Production. Production Functions: Meaning, Definition, Types. Laws of returns: Increasing, Constant and decreasing. Factor Product Relationship. Determination of optimum input and output. Factor relationship. Product relationship. Types of enterprise relationships. Returns to scale: Meaning, Definition, Importance. Farm Management. Economic principles applied to the Organisations of farm business. Types and systems of farming. Farm planning and budgeting. Risk and uncertainty. Farm budgeting. Linear programming: Assumptions, Advantages and Limitations of Linear programming.

#### **Practical:**

Computation of cost concepts; Methods of computation of depreciation; Analysis of Net worth statement; Farm inventory analysis; Preparation of farm plans and budgets; Types of farm records and accounts; Preparation of profit and loss account; Break, Even analysis; Economics analysis of different crop and livestock enterprises; Application of Farm Management Principles.

#### **Suggested Readings:**

1. Mittal, S.K. and Sethi, C.P. "Linear Programming."
2. Tandan R.K. and Dhondiyal, S.P. "Principles and Methods of Farm Management".
3. Heady, E.O. and Candler, W. "Linear Programming Methods".
4. Johl, S.S. and Kapoor, T.R. "Fundamental of Farm Business Management, Kalyani Publishers, Ludhiana and New Delhi.
5. Sankhayan, P.L. "Introduction to the Economics of Agricultural Production".
6. Singh, I.J. "Elements of Farm Management".
7. Dorfman, R. and Samuelson and Solow, R. "Linear Programming and Economic Analysis".
8. Heady, E.O. and Dillors, J.L. "Agricultural Production Function".
9. Karam, A.S. and Karan Singh "Economics of Farm Management in India".



# Syllabus

## **B. Sc. (Ag) Hons. Part-II, Semester-I**

### **Agriculture University, Jodhpur**

**AENGG -4211**

**Farm Power and Machinery**

**2(1+1)**

**Theory :**

Sources of farm power; Scope and development of farm mechanization; Elementary knowledge of principle, operation, types and components of I.C. engines; I.C. engine terminology and related numericals. Different systems of I.C. engines- Air supply and exhaust system; Fuel supply system; Lubricating system; Cooling system; Transmission system; Daily and periodic maintenance of tractors; Tractor driving and its safety; Hitching of implements; Numericals on field capacity and draw bar horse power requirements of implements; Primary tillage implements- tractor drawn mould board plough and disk plough; Secondary tillage implements- cultivators, harrows and hoes; Ferti-seed drill- parts and calibration (including numericals).

**Practical :**

Identification of engine parts; Study of air and fuel supply system; Study of lubricating and cooling system; Study of transmission system; Tractor driving and its safety; Hitching of implements; Daily and periodic maintenance of tractor; Study of tractor drawn mould board plough and disk plough; Study of different cultivators, harrows and hoes; Study and calibration of ferti-seed drill; Estimation of tractor operational cost; Numerical problems on field capacity, field efficiency and power requirement of implements; and numericals on engine terminology.

**Suggested Readings:**

1. Principles of Agricultural Engineering. Vol. I. 1987. Michael, A.M. and T.P. Ojha. Jain Brothers, Jodhpur.
2. Farm Tractors, Maintenance and Repair. 1989. Rai and Jain. Tata Mc Graw Hill Publ. New Delhi.
3. Elements of Farm Machinery. 1989. Srivastava, A.C. Oxford IBH Publ. Company, New Delhi.
4. Elements of Agricultural Engineering, Vol. I & III. 1989. Singhal, O.P. Suraj Prakashan, Allahabad.
5. Element of Agricultural Engineering. 1990. Sahay, Jagdishwar. Agro. Book Agency, New Chitragupta Nagar, Patna.

# Syllabus

## **B. Sc. (Ag) Hons. Part-II, Semester-I**

### **Agriculture University, Jodhpur**

**SCHEM-4211**

**Manures and Fertilizers**

**2(1+1)**

**Theory:**

Soil organic matter, Composition, Decomposability, C: N ratio. Soil biology, Biomass, Soil organisms and their beneficial and harmful roles. Raw materials – Manures – Bulky and concentrated – FYM, Composts – Different methods, Mechanical compost plants, Vermicomosting, Green manures, Oil cakes, Sewage and sludge – Biogas plant slurry, Plant and animal refuges. Fertilizers – classifications, Chemistry of manufacturing and properties of major nitrogenous (ammonium sulphate, urea, calcium ammonium nitrate, ammonium nitrate, ammonium sulphate nitrate) phosphatic (single super phosphate, enriched super phosphate, diammonium phosphate, ammonium poly phosphate), potassic and complex fertilizers, their fate and reactions in the soil, Secondary and micronutrients fertilizers, amendments, Fertilizer Control Order, Fertilizer storage; Important Biofertilizers and their advantage.

**Practical:**

Determination of organic carbon and microbial biomass C, N and P. Total nitrogen and phosphorus in manures / composts – Ammoniacal and nitrate nitrogen – Water soluble  $P_2O_5$ , potassium, calcium, sulphur and zinc contents of fertilizers, Adulteration in fertilizer.

**Suggested Readings:**

1. Yawalkar, K.S. and Agarwal. J.P. (1992). Manure and fertilizers. Agriculture- Horticulture Publishing House, Nagpur.
  2. Tisdale, S.L. and Nelson, W.L. (1990). Soil Fertility and fertilizers, McMillan Pub. Co. N.Y. pp.754.
  3. Sanchalli, V.K. (1960). Chemistry and Technology of Fertilizers. Reinhebl publishing corporation, New York,USA.
  4. Chopra, S.L. and Kanwar, J.S. (1991). Analytical Agriculture, Chemistry, Kalyani Publishers, New Delhi.
  5. Tandon, H.L.S. (1989). Soil water and fertilizers analysis, Fertilizer Development and Consultant organization, New Delhi
  6. FAI. (1999). Fertilizer (Control) Order, 1985 and the essential commodities Act, 1995. FAI, New Delhi, pp. 203.
  7. Kanwar, J.S. (1976). Soil Fertility: theory and practice. (ed) ICAR, New Delhi pp. 583.
  8. McVicker, M.H. (1952). Using commercial fertilizers, Interstate Danvil, US.
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**Syllabus**  
**B. Sc. (Ag) Hons. Part-II, Semester-II**  
**Agriculture University, Jodhpur**

**Courses & Credits**

<b>Course No.</b>	<b>Course Title</b>	<b>Credits</b>
AGRON-4221	Field crops-II (Rabi )	3(2+1)
AGRON-4222	Water management	2(1+1)
SCHEM-4221	Soil survey, land use planning and remote sensing	2(1+1)
ENTO-4221	Insect Ecology & Integrated pest management	3(2+1)
HORT-4221	Production Technology of Vegetables & Flowers	4(3+1)
AECON-4221	Agricultural Finance and Co-operation	2(1+1)
PPHYS-4221	Crop Physiology	3(2+1)
EXTED-4221	Entrepreneurship Development and Communication Skills	2(1+1)
NSNC-4221	NSS / NCC*	1(0+1)
	<b>Total</b>	<b>22(13+9)</b>

\*Shall be offered from first to fourth semester and evaluation reported at the end of fourth semester.





# Syllabus

## **B. Sc. (Ag) Hons. Part-II, Semester-II**

### **Agriculture University, Jodhpur**

**AGRON-4221**

**Field Crops- II (*Rabi*)**

**3(2+1)**

**Theory:**

Origin, geographical distribution, importance, production in Rajasthan and India, soil and climatic requirements, varieties, cultural practices *viz.* seed and sowing, intercultural operations, fertilizer, water and weed management, plant protection measures; harvesting and yield of wheat, barley; chickpea; rapeseed and mustard, potato, sugarcane and lucerne; Package of practices of tobacco, sunflower, safflower, linseed, sugarbeet, isabgol, lentil, berseem, oats, opium poppy, frenchbean, taramira and peas.

**Practical:**

Identification of seeds of *rabi* crops, Seed bed preparation and sowing of wheat and sugarcane; Calculations on seed rate; Top dressing of nitrogen in wheat and study of fertilizer experiments on *rabi* crops; Identification of weeds in wheat and other *rabi* crops; Application of herbicides and study of weed control experiments; Morphological characteristics of wheat, barley, oats, rapeseed and mustard; Yield contributing characters of crops, Judging sugarcane maturity and quality tests.

**Suggested Readings:**

1. Singh, Chhidda; Singh P. and Singh, R. 2003. Modern Techniques of Raising Field Crops, Oxford & IBH Publishing Co., New Delhi.
2. Singh, S.S. 1998, Crop Management : Under irrigated and rainfed conditions.
3. Singh, S.S. 1993, Principles and Practices of Agronomy, Kalyani Publishers, New Delhi.
4. Reddy, T.Y. and Reddi, G.H.S. 1993. Principles of Agronomy, Kalyani Publishers, New Delhi.
5. Maiti, S., Hedge, M.R. and Chhattopadhyay, S.B. 1988. Handbook of Annual Oil Seed Crops. Oxford & IBH Publishing Co., New Delhi.
6. Jaiswami, L.H. and Baldeo, B. 1990. Advances in Pulse Production Technology, ICAR, New Delhi.
7. Thakur, C. 1979. Crop Production, Vol. I & II. Metropolitan Book Pvt. Ltd., New Delhi.
8. Ahlawat, I.P.S., Sharma, O.P. & Saini, G.S. 1998 Scientific Crop Production in India. Aman Publishing House, Madhu Market, Budhana gate, Meerut.
9. Rathore, P.S. 1999-2000. Techniques and Management of Field Crop Production. Agrobios (India), Jodhpur.
10. Rathore, P.S. and Sharma, S.K. 2003. Scientific Pulse Production. Yash Publishing House, Bikaner.
11. Sharma, Kalicharan 1990 Bharat ki promokh faslea. G.B. Pant Agricultural & Technology University, Nanital.
12. Reddy, S.R. 2004. Agronomy of Field Crops. Kalyani Publishers, New-Delhi.

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**AGRON- 4222**

**Water Management**

**2(1+1)**

**Theory:**

Irrigation: definition and objectives; Water resources and irrigation development in India and Rajasthan; Soil moisture constants and theories of soil water availability; Methods of soil moisture estimation; Evapotranspiration and crop water requirement; Scheduling of irrigation; Methods of irrigation: surface, sprinkler and drip irrigation; Irrigation efficiency and water use efficiency, Irrigation water quality and its management including conjunctive use of water; Water management of different crops (rice, wheat, maize, groundnut, sugarcane, pearl millet, chickpea, mustard); Agricultural drainage

**Practical:**

Determination of bulk density by field method; Determination of soil moisture content by gravimetric, tensiometer, electrical resistance blocks and neutron moisture meter methods; Determination of field capacity by field method; Determination of permanent wilting point; Measurement of irrigation water using different devices; Calculations on irrigation water requirement and irrigation efficiencies (problems); Determination of infiltration rate; Demonstration of border method of irrigation; Demonstration of furrow method of irrigation; Demonstration of check basin and basin method of irrigation; Acquaintance and upkeep of sprinkler and drip irrigation systems; Determination of EC, pH, carbonates bicarbonates and Ca+ Mg in irrigation water (quality parameters).

**Suggested Readings:**

1. Michael, A.M. 1987. Irrigation - Theory and Practice, Vikas Publishing House Pvt. Ltd., New-Delhi.
2. Parihar, S.S. and Sandhu, B.S. 1978. Irrigation of Field Crops- Principles and Practices, ICAR, New-Delhi.
3. Lenka, D. 1999. Irrigation and Drainage. Kalyani Publishers, New-Delhi.
4. Sankara Reddy, G.H. and Yellamanda Reddi, T. 1995. Efficient use of Irrigation Water. Kalyani Publishers, New-Delhi.
5. Reddy, S.R. 2000. Principles of Crop Production, Kalyani Publishers, New-Delhi.
6. Majumdar, D.K. 2004. Irrigation Water Management- Principles and Practice. Prentice Hall of India, New-Delhi.
7. Mishra, R.D. and Ahmed, M. 1987. Manual on Irrigation Agronomy, Oxford & IBH Publishing Co. Pvt. Ltd., New-Delhi.

# Syllabus

## **B. Sc. (Ag) Hons. Part-II, Semester-II**

### **Agriculture University, Jodhpur**

**SCHEM- 4221     Soil Survey, Land Use Planning and Remote Sensing**

**2(1+1)**

**Theory:**

Soil profile development, soil survey: Significance and purpose of soil survey, methods of soil survey and mapping. Types of soil surveys: Detailed, Reconnaissance, and Detailed—reconnaissance soil survey. Land use planning: Land capability classification, Soil mapping units. Soil survey interpretations and soil survey report. Major soil groups of India with special reference to Rajasthan. Soil taxonomy – a comprehensive US system of soil classification. Remote sensing: concept of remote sensing. Aerial photography, Aerial and satellite sensor imagery, image processing and interpretations.

**Practical:**

Examinations and description of typical soil profile. Interpretation of topographic map and delineation of physiographic boundaries based on important characters, typifying pedon excavation, examination and classification, interpretation of the identified soil characteristics and their evaluation for land use planning. Preparation of the soil survey report, interpretation of remote sensing information.

**Suggested Readings:**

1. Brady, N.C. (1996) The nature and properties of soil Mac Millan, Publishing company New York.
2. Buol, S.W., Hole, H.D. and Mc Crackoh, R.J. ( 1980 ) Soil genesis and classification, Oxford and IBH publishing Co. New Delhi.
3. Cursau Paul, J. (1985) Principal of remote sensing, Loymen, New York.
4. lilles, T.m. and Kiefer, R.W. (1979 ) Remote sensing and image interpretation John willey and sons, New York.
5. Patel, A.N. and Singh Surendra (1999) Principal of remote sensing, Scientific publishers (India) Jodhpur.
6. Sehgal, J. (2000) Pedology: Concepts and applications, Kalyani publisher, Ludhiana
7. ISSS (2002) Fundamental of Soil Science Div. of Soil Science, IARI, New Delhi



# Syllabus

## **B. Sc. (Ag) Hons. Part-II, Semester-II**

### **Agriculture University, Jodhpur**

**ENTO-- 4221 Insect Ecology and Integrated Pest Management Including Beneficial Insects**

**3 (2+1)**

**Theory:**

**Insect Ecology:** Definition, scope and concept. Environment and its components. Agroecosystem. Effect of abiotic factors- temperature, moisture, humidity, rainfall, light, atmospheric pressure and air currents. Effect of biotic factors – positive and negative interactions. Causes of pest outbreak. Pest surveillance and forecasting. Categories of pests.

**IPM:** Introduction, importance, scope, concepts and limitations. Tools of IPM- Host plant resistance, cultural, mechanical and physical, legislative and biological control (parasites, predators and pathogens such as bacteria, fungi and viruses). Chemical control- Classification, toxicity and formulations of insecticides. Study of important insecticides- Botanicals, chlorinated hydrocarbons, organophosphates, carbamates, synthetic pyrethroids and novel insecticides, chitin synthesis inhibitors, rodenticides, acaricides and fumigants. Hormones and pheromones, repellents, antifeedants, attractants, gamma radiation and genetic control. Insecticides Act 1968- Important provisions. Application techniques of insecticides. Symptoms of insecticide poisoning, first aid and antidotes.

**Beneficial insects:** Honeybee- Important species, rearing techniques, diseases and natural enemies. Silkworm- Important species, rearing techniques, diseases and natural enemies. Lac insect- rearing techniques, diseases and natural enemies.

**Practical:**

Visit to meteorological observatory and IPM laboratory. Pest surveillance through light traps, pheromone traps and field incidence. Study of sampling techniques for the estimation of insect population. Practicable IPM practices-Mechanical, physical and cultural methods Identification and application of parasites and predators. Botanical insecticides- Neem based products Chemical control- Insecticides and their formulations. Handling of plant protection equipments. Calibration of spray equipments. Calculation of doses/concentrations of insecticides. Calculation of doses/concentrations of insecticides. IPM case studies of one important field crop. Poison bait preparation for rodent control and its application. Safe handling of pesticides. Rearing technique for honeybees. Rearing technique for silkworm. Rearing technique for lac insect.

**Suggested Readings:**

- 1 Metcalf, R.L and Luckman W.H. 1982. Introduction to Insect Pest Management. Wiley Inter Science publishing, New York.
- 2 G.S.Dhaliwal and Ramesh Arora 2001. Integrated Pest Management. Concepts and Approaches. Kalyani publishers, New Delhi.
- 3 Larry P.Pedigo. 1991. Entomology and Pest Management. Mc Millan publishing company, New York.
- 4 Yazdani G.S. and Agarwal M.L. 1979. Elements of Insect Ecology. Naroji publishing house, New Delhi.
- 5 David, B.V. 2003. Elements of Economic Entomology, Popular Book Depot, Chennai.

# Syllabus

## **B. Sc. (Ag) Hons. Part-II, Semester-II**

### **Agriculture University, Jodhpur**

**HORT-4221 Production Technology of Vegetables and Flowers**

**4(3+1)**

#### **Theory:**

Importance and scope of Olericulture. Types of vegetable gardening. Classification of vegetables. Package of practices with reference to botanical name, family, origin, distribution, climate, soil, varieties, sowing, manure and fertilizers, irrigation, intercultural operations, harvesting, yield and plant protection measures including physiological disorders for fruit vegetables – tomato, brinjal, chilies, and okra; Cucurbitaceous vegetables-cucumber, ridge gourd, bottle gourd, bitter gourd, melons – water melon, musk melon and round melon, Cole crops – cabbage, cauliflower and knol-khol. Bulb crops – onion and garlic. Beans and peas – French bean, cluster bean, dolichos bean, peas and cowpea. Tuber crops – potato, sweet potato, colocasia, ; Root crops – carrot, radish, turnip and beet root; Leafy vegetables – amaranths and palak. Introduction to protected cultivation of important vegetables viz .cucumber, capsicum and tomato. Importance and scope of floriculture. Principles of landscape gardening. Types and styles of ornamental gardening. Planting, care and management of lawn, ornamental trees, shrubs, climbers, palms, indoor- plants and seasonal flowers in the gardens. Package of practices for rose, jasmine, chrysanthemum, marigold and gladiolus. Introduction to protected cultivation of important flower crops viz. rose and gerbera.

#### **Practical:**

Planning and layout of kitchen garden; Identification of important vegetable and ornamental plants; trees (shrubs, climbers, house plants, palms etc..) Raising of vegetable nurseries. Transplanting of vegetable seedlings in main field; Layout of lawns and maintenance; Potting, repotting and maintenance of house plants; Visit to commercial vegetable farms ;Training and pruning of rose (standards, hybrid 'T' roses scented roses) and chrysanthemum (pinching and disbudding); Planning and layout of gardens and garden designs for public and private areas; Harvesting indices of different vegetable crops; Grading and packing of vegetables; Prolonging the shelf life of cut flowers. Visit to different styles and types of gardens.

#### **Suggested Readings:**

1. Thompson, H. C. and Kelly, W. C. Vegetables Crops. Tata McGraw Hill
2. Chauhan, D.V.S. Vegetable Production in India. Ram Prasad & sons, Agra
3. Bosse, T.K. Vegetables. Naya Prokash, Calcutta
4. Singh, S. P. Production Technology of Vegetables Crops. Agril. Res. Communication centre, Karnal
5. Choudhary, B. Vegetables. NBT, New Delhi
6. Gopalaswamiengar, K. S. The Complete Gardening in India. The Hosali Press, Bangalore
7. Arora, J.S. Introductory Ornamental Horticulture. Kalyani Publisher, Ludhiana



# Syllabus

## **B. Sc. (Ag) Hons. Part-II, Semester-II**

### **Agriculture University, Jodhpur**

**AGECO -4221**

**Agricultural Finance and Co-Operation**

**2(1+1)**

**Theory:**

Agricultural finance: nature and scope. Time value of money, Compounding and Discounting. Agricultural credit: meaning, definition, need, classification. Credit analysis: 4R's 5C's and 7 P's of credit, repayment plans. History of financing agriculture in India. Commercial banks, nationalization of commercial banks. Lead bank scheme, regional rural banks, scale of finance. Higher financing agencies, RBI, NABARD, AFC, Asian Development Bank, World Bank, Insurance and Credit Guarantee Corporation of India. Assessment of crop losses, determination of compensation. Crop insurance, advantages and limitations in application, estimation of crop yields. Agricultural cooperation: philosophy and principles. History of Indian cooperative Movement, pre-independence and post independence periods, cooperation in different plan periods, cooperative credit structure: PACS, FSCS. Reorganisation of cooperative credit structure in Andhra Pradesh and single window system. Successful cooperative systems in Gujarat, Maharashtra. Punjab etc.

**Practical:**

Factors governing use of Capital and identification of credit needs; Time value of money, Compounding and discounting; Tools of financial management, Balance sheet, Income statement and cash flow analysis; Estimations of credit needs and determining unit costs; Preparations and analysis of loan proposals; Types of repayment loans; Study of financial institutions: PACS, DCCB, Apex Banks, RRBs, CBs, NABARD.

**Suggested Readings:**

1. Reddy, S. and Raghu Ram, P. "Agricultural Finance and Management" Oxford and IBH, New Delhi.
2. Singh, J.P. 1990. "Agricultural Finance – Theory and Practice" Ashish Publishing House, New Delhi
3. Pandey, U.K. "An Introduction to Agricultural Finance" Kalyani Publishes, New Delhi
4. Pandey, Mukesh and Tewari, Deepali "Rural and Agriculture Marketing"
5. Mamoria, C.B. "Agricultural Problems of India"
6. Krishnaswami, O.R. "Fundamental of Cooperation"
7. Nelson, A.G. and Murray, W.G. 1988 "Agricultural Finance" IOWA State University Press, Amies, IOWA, USA

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# Syllabus

## **B. Sc. (Ag) Hons. Part-II, Semester-II**

### **Agriculture University, Jodhpur**

**PPHY- 4221**

**Crop Physiology**

**3(2+1)**

**Theory:**

Introduction, Definition of Crop Physiology, Importance in Agriculture and Horticulture. Crop Water Relations, Physiological importance of water to plants, Water potential and its components, measurement of water status in plants. Crop water relations (contd.) Transpiration, Definition, significance, Transpiration in relation to Crop productivity, Water Use Efficiency, WUE in C<sub>3</sub>, C<sub>4</sub> and CAM plants, Factors affecting WUE. Photosynthesis, Energy synthesis, Significance of C<sub>3</sub>, C<sub>4</sub> and CAM pathway, Relationship of Photosynthesis and crop productivity, Translocation of assimilates, Phloem loading, apoplastic and symplastic transport of assimilates, Source and sink concept, Factors affecting Photosynthesis for productivity, Methods of measuring photosynthesis, Photosynthetic efficiency, Dry matter partitioning, Harvesting index of crops. Photorespiration and crop productivity. Respiration and its significance, Importance of glycolysis, TCA cycle. Pentose Phosphate Pathway, Growth respiration and maintenance respiration, Alternate respiration, Salt respiration, wound respiration, measurement of respiration. Nutriophysiology, Definition, Mengel's classification of plant nutrients, Physiology of nutrient uptake, Functions of Plant nutrients, Deficiency and toxicity symptoms of plant nutrients, Foliar nutrition, Hydroponics, solution and sand culture. Physiology of flowering, Photoperiodism and Vernalisation in relation to crop productivity, Classification of plants, Commercial application of photoperiodism. Growth and Development, Definition, Types of growth, Determinate and Indeterminate growth, Monocarpic and Polycarpic species with examples, Measurement of growth, Growth analysis Growth characteristics, Definitions and mathematical formulae. Plant Growth Regulators, Occurrence, Biosynthesis, Mode of action of Auxins, Gibberellins, Cytokinins, ABA, Ethylene. Novel plant growth regulators, Commercial application of plant growth regulator in agriculture and horticulture. Senescence and abscission, Definition, Classification, Theories of mechanism and control of senescence, Physiological and biochemical changes and their significance. Abscission and its relationship with senescence. Seed Physiology, Seed dormancy, Definition, types of seed dormancy, Advantages and disadvantages of seed dormancy, Causes and remedial measures for breaking seed dormancy with examples, Optimum conditions of seed storage, Factors influencing seed storage (ISTA standards). Post Harvest Physiology, Fruit ripening, Metamorphic changes, Climacteric and non-climacteric fruits, Hormonal regulation of fruit ripening (with ethrel, CCC, Polaris, paclobuterozole), Use of hormones in increasing vase life of flowers.

**Practical:**

Preparation of solutions. Growth analysis: Calculation of growth parameters. Methods of measuring water status in roots, stems and leaves. Estimation of water potential by Chardakov's method. Measurement of absorption spectrum of chloroplastic pigments and fluorescence. Measurement of leaf area by various methods. Stomatal frequency and index. Leaf anatomy of C<sub>3</sub> and C<sub>4</sub> plants (Demonstration by already prepared slides). Respirometer – measurement of respiration. Measurement of transpiration by different methods. Measurement of respiratory quotient (RQ). Optimum conditions for seed germination. Breaking seed dormancy (a.) Chemical method (b.) Mechanical method. Yield analysis. Seed viability and vigour tests. Effect of ethylene on regulation of stomata.

**Suggested Readings:**

1. N.K. Gupta & Sunita Gupta, 2004. Plant Physiology. Oxford & IBH Publication, New Delhi
2. R.L. Agarwal, 1995. Seed Technology, Oxford & IBH Publication, New Delhi
3. G.R. Noggle and G.J. Fritz, 1986. Plant Physiology, Prentic Hall of India Pvt. Ltd.
4. J.B. Salisbury and C.W. Ross (1992). Plant Physiology, Wadswar Publishing Company, Belmont, California
5. S.N. Pandey & B.K. Sinha (1995). Vikas Publishing House Pvt. Ltd., New Delhi

# Syllabus

## **B. Sc. (Ag) Hons. Part-II, Semester-II**

### **Agriculture University, Jodhpur**

**EXTED-4221 Entrepreneurship Development and Communication Skills 2(1+1)**

#### **Theory:**

Communication Skills: Meaning and Process of communication, verbal and non-verbal communication; listening and note taking, writing skills, oral presentation skills. Public speaking. Entrepreneurship Development: Concept & Meaning. Overview of Indian social, political and economic systems and their implications for decision making by individual entrepreneurs. Globalization and the emerging business / entrepreneurial environment. Entrepreneurial and managerial characteristics; managing an enterprise; motivational drives; entrepreneurial ethics; Entrepreneurship development Programmes- SWOT analysis, generation, incubation and commercialization of ideas and innovations. Government schemes and incentives for promotion of entrepreneurship. Government Policy on Small and Medium Enterprises (SMEs)/ SSIs. Export and Import Policies. Contract farming and joint ventures, public- private partnerships.

#### **Practical:**

Listening and note taking, writing skills, oral presentation skills; field diary and lab record; indexing, footnote and bibliographic procedures. Summarizing, abstracting; individual and group presentation. Practice on SWOT Analysis, visit to SMEs / SSIs

#### **Suggested Readings:**

1. Akhouri, M.M.P., Mishra, S.P. and Sen Gupta, R. 1989. Trainers Manual on Developing Entrepreneurial Motivation, NIESBUD, New Delhi.
  2. Bidgoli, H. 1989. Decision Support Systems: Principles and Practices, St. Paul, West Publishing Co., USA.
  3. Goyal, D.P. 1994. Management Information System: Concept and Application, Deep & Deep Publisher, New Delhi.
  4. Mancuso, J. 1974. The Entrepreneurs Handbook (Vol. 192), Artech House, Inc., USA.
  5. Patel, V.G. 1987. Entrepreneurship Development Programme in India and Its Relevance to Developing Countries, Entrepreneurship Development Institute of India, Ahmedabad.
  6. Rao, T.V. 1974. Development of an Entrepreneur, Indian Institute of Management, Ahmedabad.
  7. Dipak De & M.S. Rao. Entrepreneurial behaviour of farmers : An axiomatic theory. ISBN 81-85694-36-2, Ganga Kaveri Publishing House, D.35/77, Jangamawadimath, Varanasi-221001 (India), Ph.- 0542-2451936.
  8. Dipak De & Basavaprabhu Jirli. Entrepreneurship : Theory and practice in agriculture. ISBN 81-85694-57-5, Ganga Kaveri Publishing House, D.35/77, Jangamawadimath, Varanasi-221001 (India), Ph.- 0542-2451936
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