

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

Courses & Credits

Course No.	Course Title	Credits
AGRON-4121	Agricultural Meteorology	2(1+1)
PBG-4121	Principles of Plant Breeding	3(2+1)
PPATH-4121	Plant Pathogens and Principles of Plant Pathology	4(3+1)
ENTO-4121	Insect Morphology and Systematics	3(2+1)
AECON-4121	Principles of Agril. Economics	2(2+0)
AENGG-4121	Fundamentals of Soil, Water and Conservation Engineering	2(1+1)
BIOCH-4121	Biochemistry	3(2+1)
SCHEM-4121	Soil Chemistry, Soil Fertility and Nutrient Management	2(1+1)
NSNC-4221	NCC/NSS	-
	Total	21(14+7)

Syllabus

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

Agriculture University, Jodhpur

AGRON- 4121

Agricultural Meteorology

2(1+1)

Theory:

Atmosphere- its composition, extent and structure; Atmospheric weather variables; Atmospheric pressure, its variation with height; Daily and seasonal variation of wind speed and direction, cyclones, anticyclones and air masses; Nature and properties of solar radiation, solar constant, depletion of solar radiation, short wave and thermal radiation, net radiation, albedo; Atmospheric temperature, daily and seasonal variations of temperature, heat balance of earth and global warming; Atmospheric humidity, concept of saturation, vapor pressure, process of condensation, formation of dew, fog, mist, frost, snow, rain and hail; Precipitation, cloud formation and movement; Agriculture and weather relations; Introduction to monsoon; Use of weather data for irrigation scheduling, pesticide sprays, fertilizer application; Climatic normals for crop production, Basics of weather forecasting.

Practical:

Agro-meteorological observatory – its site selection, installation and exposure of instruments, weather data recording; Measurement of total solar radiation, short wave and long wave radiation, albedo and sunshine duration; Maximum and minimum air temperature, soil temperature, dew point temperature; Determination of vapor pressure, relative humidity, atmospheric pressure, wind speed and wind direction; Measurement of rain, open pan evaporation and evapo-transpiration; Processing, tabulation and presentation of weather data.

Suggested Readings:

- 1 Sacheti, A.K. 1985. Agricultural Meteorological Instructional Cum Practical Manual (E.d.) NCERT Publication, New Delhi.
- 2 Mavi, H.S. 1994, Introduction to Agrometeorology, Oxford & IBH Publishing Co., New Delhi.
- 3 Lal, D.S. 2005 Climatology, Sharda Pustak Bhawan, Allahabad..
- 4 Barry, R.G. and Chorley, R.C. 1985. Atmosphere Weather and Climate. English Language Book Soc. Publication.
- 5 Varshneya, M.C. and Balakrishna, Pillai, 2003. Text book of Agricultural Meteorology. ICAR, New-Delhi
- 6 Sahu, D.D., 2003. Agrometeorology and Remote sensing: Principles and Practices, Agrobios (India), Jodhpur.

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

PBG 4121

Principles of Pant Breeding

3(2+1)

Theory:

Introduction to ecological and taxonomical classification of plants. Historical development, nature and role of plant breeding. Modes of reproduction (sexual, asexual and vegetative) and their relation with plant breeding. Fertility regulatory mechanisms (incompatibility, male sterility and apomixis), their classification and importance in plant breeding. Inheritance of qualitative and quantitative characters and heritability. Pure line theory and genetic basis of selection. Hardy-Weinberg law, heterosis and theories of heterosis and inbreeding depression. Germplasm resources and center of diversity. Domestication, introduction and acclimatization in relation to plant improvement. Improved genotypes of different crop plants- variety, inbred line, different hybrids, synthetic, composite, multiline, clone etc. Different breeding methods of their development. Polyploidy in relation to plant breeding. Mutation breeding-types, role and method of mutation breeding. Use of biotechnology in plant breeding. Procedure for

Practical:

Identification of plants of different ecological groups. Floral biology of different crop plants. T.S. of ovary. Mounting of different types of ovules. Study of microsporogenesis and megasporogenesis. Study of pollen viability. Study of pollen size. Emasculation and hybridization techniques in important self and cross pollinated crops. Study of male sterility in sorghum/ bajra. Calculation of mean, range, variance and standard deviation.

Suggested Readings:

- 1 Alard, R.W. 2000. Principles of Plant Breeding. John Willey & Sons, New York.
- 2 Chahel, G.S. and S.S. Gosal. 2002. Principles and Procedures of Plant Breeding, Biotechnological and Conventional Approaches. Narosa Publishing House, New Delhi.
- 3 Singh, B.D. 2005. Plant Breeding. Kalyani Publishers, New Delhi.
- 4 Singh, P. 2001. Essentials of Plant Breeding - Principles and Methods. Kalyani Publishers, New Delhi.
- 5 Jain, H.K. and M.C.Kharackwal. 2004. Plant breeding- Mendelian to Molecular approach. Narosa Publishers, New Delhi.

Syllabus

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

Agriculture University, Jodhpur

P. PATH. 4121

Plant Pathogens and Principles of Plant Pathology

4 (3+1)

Theory:

Introduction, Important plant pathogenic organisms, different groups, fungi, bacteria, fastidious vesicular bacteria, phytoplasmas, spiroplasmas, viruses, virioids, algae, protozoa and phanerogamic parasites with examples of diseases caused by them. Prokaryotes: classification of prokaryotes according to Bergey's Manual of Systematic Bacteriology. General Characters of fungi, Definition of fungus, somatic structures, types of fungal thalli, fungal tissues, modifications of thallus, reproduction in fungi (asexual and sexual). Nomenclature, Binomial system of nomenclature, rules of nomenclature, classification of fungi. Key to kingdoms and phylum, Introduction: Definition and objectives of Plant Pathology. History of Plant Pathology. Terms and concepts in Plant Pathology. Phenomenon of infection - pre-penetration, penetration and post penetration. Pathogenesis – Role of enzymes, toxins, growth regulators and polysaccharides. Defense mechanism in plants – structural and biochemical. Plant disease epidemiology. Plant Disease Forecasting - Remote sensing - General principles of plant diseases management - Importance, general Principles - Avoidance, exclusion, protection - Plant Quarantine and Inspection - Quarantine Rules and Regulations. Cultural methods - Rouging, eradication of alternate and collateral hosts, crop rotation, manure and fertilizer management, mixed cropping, sanitation, hot weather ploughing, soil amendments, time of sowing, seed rate and plant density, irrigation and drainage. Role and mechanisms of biological control and PGPR classification of fungicides and their uses. Host plant resistance – Application of biotechnology in plant disease management -Development of disease resistant transgenic plants through gene cloning. Integrated plant disease management (IDM) - Concept, advantages and importance.

Practical:

Acquaintance to plant pathology laboratory and equipments; Preparation of culture media for *fungi* and *bacteria*; Isolation techniques, preservation of disease samples; Study of *Pythium*, *Phytophthora* and *Albugo*; Study of *Sclerospora*, *Peronosclerospora*, *Pseudoperonospora*, *Peronospora*, *Plasmopara* and *Bremia*; Study of genera *Mucor* and *Rhizopus*. Study of *Oidium*, *Oidiopsis*, *Ovulariopsis*, *Erysiphe*, *Phyllactinia*, *Uncinula* and *Podospaera*; Study of *Puccinia* (different stages), *Uromyces*, *Hemilia*; Study of *Sphacelotheca*, *Ustilago* and *Tolyposporium*; Study of *Agaricus*, *Pleurotus* and *Ganoderma*; Study of *Septoria*, *Colletotrichum*, *Pestalotiopsis* and *Pyricularia*; Study of *Aspergillus*, *Penicillium*, *Trichoderma*, and *Fusarium*; Study of *Helminthosporium*, *Drechslera*, *Alternaria*, *Stemphyllium*, *Cercospora*, *Phaeoisariopsis*, *Rhizoctonia* and *Sclerotium*; Demonstration of Koch's postulates. Preparation of fungicides – Bordeaux mixture, Bordeaux paste. Chestnut compounds; Methods of application of fungicides – seed, soil and foliar. Visit of quarantine station and remote sensing laboratory.

Suggested Readings:

- 1 Agrios, G.N. 1996. Plant Pathology, Academic Press, New Delhi
- 2 Alexopolus, C.J., Mims, C.W. and Blackwell, M. 1996. Introductory Mycology, John Wiley Eastern Private Limited, New York
- 3 Mehrotra, R.S. and Aggarawal, A. 2007. Plant Pathology. Tata McGraw Hill Publishing Co. Ltd., New Delhi
- 4 Singh, R.S. 1996. An Introduction to Principles of Plant Pathology. Oxford & IBH, New Delhi.
- 5 Nene Y.L. and Thapliyal, P.N. 1993. Fungicides in Plant Diseases Control. 3rd Edn. Oxford & IBH published Co. Pvt. Ltd., New Delhi.

Syllabus

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

Agriculture University, Jodhpur

ENTO-4121

Insect Morphology and Systematics

3 (2+1)

Theory:

History of Entomology in India. Factors for insect dominance. Classification of phylum Arthropoda upto classes.

Morphology: Structure and functions of insect cuticle and moulting. Body segmentation; structure of head, thorax and abdomen of grasshopper. Structure and modifications of insect antennae, mouth parts and legs. Wing venation, modifications and wing coupling apparatus. Sensory organs. Metamorphosis in insects. Types of larvae and pupae. Structure and functions of digestive, circulatory, excretory, respiratory, nervous, secretory (endocrine) and reproductive systems in grasshopper. Types of reproduction in insects.

Systematics: Taxonomy -importance, history and binomial nomenclature. Definitions of species, sub-species sibling species and biotype, Classification of class Insecta up to families:

Orthoptera- Acrididae, Isoptera- Termitidae, Thysanoptera- Thripidae-Hemiptera- Pentatomidae, Coreidae, Pyrrhocoridae, Lygaeidae, Cicadellidae, Delphacidae, Aphididae, Coccidae, Aleurodidae, Pseudococcidae, Lepidoptera- Octuidae, Spingidae, Pyralidae, Gelechiidae, Arctiidae, Coleoptera- Coccinellidae, Galerucidae, Cerambycidae, Curculionidae, Bruchidae, Melonithidae, Hymenoptera- Tenthredinidae, Apidae, Trichogrammatidae, Ichneumonidae, Braconidae, Diptera- Cecidomyiidae, Trypetidae, Tachinidae, Agromyzidae. Dictyoptera- Mantidae, Blattidae

Practical:

Methods of collection and preservation of insects including immature stages; External features of Grasshopper/Cockroach; Types of insect antennae, mouthparts and legs; Wing venation, types of wings and wing coupling apparatus; Dissection of digestive and nervous system in insects; Study of characters of orders Orthoptera, Dictyoptera, Isoptera, Thysanoptera, Hemiptera, Lepidoptera, Coleoptera, Hymenoptera, Diptera and their families of agricultural importance.

Suggested Readings:

- 1 Nayar. K.K, Ananthkrishnan.T.N. and David. B.V. 1976. General and Applied Entomology. Mc graw Hill publishing Co. Ltd. New Delhi
- 2 Richards O.W. and Davies R.G. 1977. Imm's General Text Book of Entomology Vol. I&II. Chapman and Hall, London
- 3 Pant. N.C. and Ghai. S, 1981. Insect Physiology and Anatomy, ICAR, New Delhi . 4.
- 4 Chapman .R.F.1974. Insect Structure and Function, ELBS Publishers New Delhi.
- 5 Snodgrass.R.E .2001. Principles of Insect Morphology.
- 6 Mathur and Upadhyay, 2000. A Text Book of Entomology, Aman Publishing House, Meerut.

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

AGECON-4121

Principles of Agricultural Economics

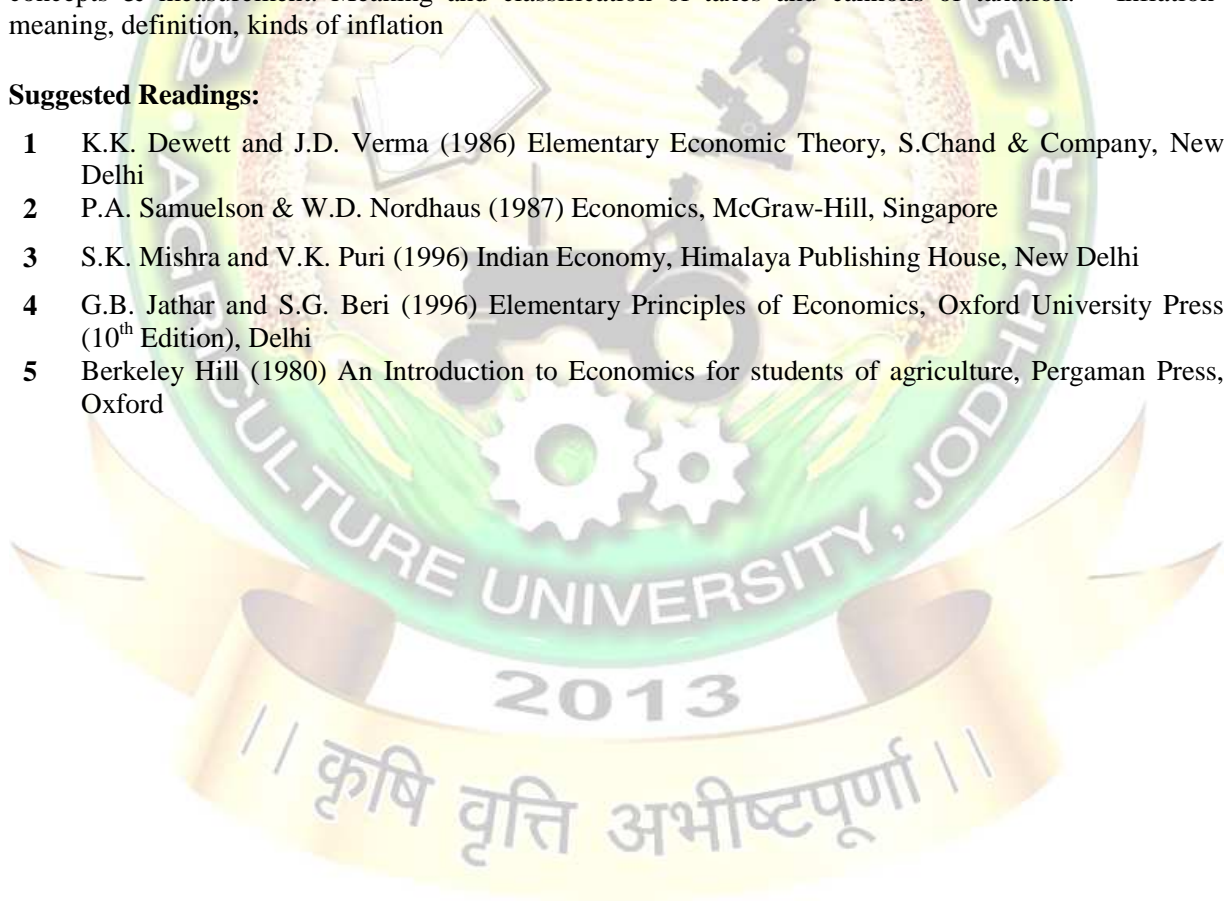
2(2+0)

Theory:

Meaning, definition, subject matter, Division and Importance of economics. Meaning, definition of Agricultural Economics. Basic concepts of goods, service, utility, value, price, wealth & welfare economics. Meaning, characteristics, importance and classification of wants. Theory of consumption. Law of diminishing marginal utility – meaning & importance. Demand - meaning, definition and kinds of demands, Demand schedule and demand curve. Law of demand - extension and contraction Vs increase and decrease in demand. Elasticity of demand – meaning and definition, types of elasticity of demand, degree of price elasticity of demand, Method of measuring elasticity – factors influencing elasticity of demand and importance of elasticity of demand. Laws of supply – meaning & definition, supply schedule, supply curve, elasticity of supply and factor influencing in elasticity of supply. National income – concepts & measurement. Meaning and classification of taxes and cannons of taxation. Inflation- meaning, definition, kinds of inflation

Suggested Readings:

- 1 K.K. Dewett and J.D. Verma (1986) Elementary Economic Theory, S.Chand & Company, New Delhi
- 2 P.A. Samuelson & W.D. Nordhaus (1987) Economics, McGraw-Hill, Singapore
- 3 S.K. Mishra and V.K. Puri (1996) Indian Economy, Himalaya Publishing House, New Delhi
- 4 G.B. Jathar and S.G. Beri (1996) Elementary Principles of Economics, Oxford University Press (10th Edition), Delhi
- 5 Berkeley Hill (1980) An Introduction to Economics for students of agriculture, Pergaman Press, Oxford



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

AGENGG -4121 Fundamentals of Soil and Water Conservation Engineering 2(1+1)

Theory:

Classification of irrigation projects and components of canal system; Ground water sources- types of aquifers; Centrifugal pumps; Measurement of irrigation water; Water conveyance system; Pressurized irrigation methods- sprinkler and drip; Soil erosion- types and factors affecting soil erosion; Brief description about erosion control structures for agricultural lands; for non-agricultural, denuded and wastelands; Temporary and permanent gully control structures.

Practical:

Power calculation for pumps; Field measurement of irrigation water; Design of open channels; Determination of fertilizers doses, uniformity coefficient and capacity of a sprinkler irrigation system; Visit to farmers adopting sprinkler and drip irrigation systems; Visit to watershed areas.

Suggested Readings:

1. Murthy V.V.N. 1982 Land and Water Management Engineering. Kalyani Publishers, New Delhi.
2. Michael A.M. 1989. Irrigation: Theory and Practices. Vikas Publishing House Pvt. Ltd., New Delhi.
3. Michael A.M. and T.P. Ojha. 1993. Principles of Agricultural. Engineering. Vol. II. Jain Brothers, New Delhi.



Syllabus

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

Agriculture University, Jodhpur

BIOCH -4121

Biochemistry

3(2+1)

Theory:

Biochemistry – introduction and importance. Plant cell, cell wall and its role in livestock, food and paper industries. Structure, properties & applications of biomolecules: amino acids, peptides and proteins. Plant proteins and their quality. Enzymes – classification, factors affecting the activity, immobilization and other industrial applications. Lipids – classification, properties and their industrial application in soaps, paints, lubricants, plastics including biodegradable plastics, bio-diesel etc. Carbohydrates – classification, structure and functions. Nucleotides and nucleic acids. Metabolism – basic concepts, glycolysis, citric acid cycle, pentose phosphate pathway, oxidative phosphorylation and fatty acid oxidation. General reactions of amino acids. Biosynthesis – carbohydrates, lipids, proteins and nucleic acids. Metabolic regulation. Secondary metabolites - terpenoids, alkaloids, phenolics and their applications in food and pharmaceutical industries.

Practical:

Preparation of standard solutions and buffers. Determination of pH. Qualitative tests for carbohydrates, lipid, amino acids and proteins. Identification of plant pigments by paper chromatography. Thin layer chromatography of lipids. Assay of enzyme and effect of pH. Demonstration of column chromatography. Extraction of oil from oil seeds. Quantitative determination of carbohydrates (sugars), proteins and phenols. Extraction of nucleic acids.

Suggested Readings:

1. Conn EE, Stumpf PK, Bruining G and Doi RH (2007). Outlines of Biochemistry. JohnWiley and Sons, New York.
2. Lehninger AL (2004). Principles of Biochemistry, Freeman and Company, USA
3. Nelson DL and Cox MM (2000). Lehninger Principles of Biochemistry 3rd edn, Printed in India by Replica Press Pvt. Ltd., New Delhi for Worth Publishers, New York.
4. Goodwin, TW. and Mercer EI (1998). Introduction to Plant Biochemistry, Progamon Press Inc. Deffered UK
5. De Robertis EDP and De Robertis EMF (2006). Cell and Molecular Biology, B I Publications Pvt Ltd, New Delhi
6. Sahney SK and Singh RR (2002). Introductory Practical Biochemistry, Narosa Publishing House, New Delhi
7. Yadav VK and Yadav N (2007). Biochemistry and Biotechnology-A Laboratory Manual, Pointer Publishers, Jaipur

Syllabus

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

Agriculture University, Jodhpur

SCHEM-4121 Soil Chemistry, Soil Fertility and Nutrient Management 2(1+1)

Theory:

Essential and beneficial elements, criteria of essentiality, forms of nutrients in soil, mechanisms of nutrient transport to plants, factors affecting nutrient availability to plants. Measures to overcome deficiencies and toxicities, nutrient availability to plants in Acid, salt affected and calcareous soils: Concept of soil fertility, different approaches/methods for soil fertility evaluation -- Biological method. Plant analysis method: DRIS methods, critical levels in plants. Rapid tissue tests. Indicator plants. Soil analysis methods: critical levels of different nutrients in soil. Soil test based fertilizer recommendations to crops. Factors influencing nutrient use efficiency (NUE) in respect of N,P,K,S, Fe and Zn fertilizers. Integrated nutrient management

Practical:

Analytical chemistry – Basic concepts, techniques and calculations, Principles of analytical instruments and their calibration and applications, Estimation of available N, P, K, S, Zn and Fe in soil, Estimation of N, P and K in plants.

Suggested Readings:

1. Biswas, T.D. and Mukherjee, S.K. (2006) Text book of soil science. Tata McGraw Hill publishing Co. Ltd, New Delhi
2. Das, D.K. (2002) Introductory Soil Science, Kalyani publisher, New Delhi
3. Rai, M.M. (2002) Principal of Soil Science, Mac Millan India Ltd, New Delhi
4. Mehra R.K. (2004) Text book of Soil Science, ICAR New Delhi
5. ISSS (2002) Fundamental of Soil Science Div. of Soil Science, IARI, New Delhi
6. Jackson, M.L. (1973) Soil chemical analysis, Prentice Hall of India, Pvt. Ltd New Delhi
7. Piper, C.S. (1950) Soil and Plant analysis, .Hans publications, Bombay
8. Singh Dhyani, Chhonkar, P.K. and Dwivedi V.S. (2005) Manul on Soil Plant and water analysis. Westville Publishing House, New Delhi
9. Tisdale, S.L. Nelson, W.L. Beaton, J.D. and Havlin, J.L. (1991) Soil fertility and fertilizers (5th ed.). Prentice Hall of India, Pvt. Ltd, New Delhi.
10. Singh Vinay (1996) (Hindi) Soil Science, fertilizer & Manures , V.K. Prakashan, Barot, Merrut (U.P)

2013
|| कृषि वृत्ति अभीष्टपूर्णा ||