Syllabus for Semester –I
for B. Sc, (Agri.) Degree

1. AGRONOMY

1. AGRO-111 (New) Principles of Agronomy 2 (1+1)

Meaning and scope of Agronomy, Relationship with other sciences, Role of Agronomist

National and international agricultural research institutes and SAU's in India, agricultural research stations/centres in Maharashtra.

Agroclimatic zones of India and Maharashtra. Soil – Definition, classification, properties, factors affecting soil properties, soil fertility and productivity.

Tillage and tilth – Definition, objectives, types of tillage, implements used, modern concepts of tillage, tilth and characteristics of ideal tilth.

Classification of crops

Seeds and sowing – quality of seed, seed testing, seed multiplication, seed treatment, sowing methods, crop stand establishment, planting geometry and its effect on growth and yield – sole, paired and skipped row planting.

Manures and fertilizers – Plant nutrients and their role in crop production, classification of manures and fertilizers and green manuring.

Weed – Definition, characteristics, merits and demerits

Cropping systems – Definition, types, advantages and disadvantages, precision, farming

Harvesting – Signs of maturity, methods of harvesting..

Practical: Study of tillage implements; Practice of ploughing; Practice of puddling; Study of seeding equipments and introduction of remote sensing. Different methods of sowing; Study of manures, fertilizers and green manure crops / seeds (including calculations); Study of intercultivation implements and practice; Practice of methods of fertilizer applications; Participation in ongoing field operations.

Theory: Teaching Schedule

1. AGRO-111 (New) Principles of Agronomy 2 (1+1)

Lecture No.	Topic to be covered	Weightage
1	Agronomy, its definition, scope and relationship with other sciences, Role of Agronomist.	6
2	National and International Agricultural Research Institutes, State Agricultural universities in India, Research stations and centres in Maharashtra.	4
3	Agro-climatic Zones of India and Maharashtra,	6
4 and 5	Soil, its definition, classification, soil properties, factors affecting soil fertility and productivity.	10
6	Tillage, its definition, objectives and types of tillage.	4
7	Factors affecting tillage, Tillage implements and tools, Effect of tillage on soil and crop growth	10
8	Tilth : its definition and characteristics, ideal tilth, Modern concepts of tillage.	6
9	Classification of crops	6
-	Mid term examination	
10	Crops stand establishment (sowing methods), seed quality, seed testing, Multiplication stages of seed	10
11	Seed treatment and its objectives.	4
12	Planting geometry: solid, paired and skipped row planting and its effect on growth and yield of crop	6
13	Importance of manures and fertilizers in crop production, Plant nutrients, their role in crop production, Classification of manures, fertilizers, and green manuring.	6
14	Methods and time of application of manures and fertilizers.	6
15	Weed – Definition, characteristics, merits and demerits.	4
16	Cropping systems, its definition, types, advantages and disadvantages.	6
17	Harvesting, signs of maturity of different crops and methods of harvesting.	6

Reference books

1. Crop production and field experimentation by V.G. Vaidya, K.R. Sahastrabudhe and V.S. Khuspe. Continental Prakashan, Vijaynagar, Pune.
2. Hand book of Agriculture, ICAR Publication.
3. Modern techniques of raising field corps by Chidda Singh. Oxford and IBH Publishing Co. Ltd., Bangalore.
4. Principles of Agronomy by Sankaran S. and V.T. Subbiah Mudliyar, 1991. The Bangalore Printing and Publishing Co. Ltd., Bangalore.
5. Agronomy by S.C. Panda, 2006. Agribios Publication, New Delhi.
6. Crop Production and Management by Y.B. Moranchan. Oxford and IBH Publishing Co. Ltd., Bangalore.
7. Principles of Agronomy by S.R. Reddy, Kalyani Publishers, Ludhiana, India.
8. Principles of Crop Production by Martin J.H. and Leonard W.H. the Mac Million Company, New York – 1962.
9. Scientific Crop Production (Vol. I and II). Thakur C. Metropolitan Books Co. Pvt. Ltd., New Delhi.
10. Fundamentals of Agronomy. Gopal Chandra De. 1980. Oxford and IBH Publishing Co. Ltd., Bangalore.
11. Cropping Systems in the tropics – Principles and Practices by S.P. Palaniappan, Willey Eastern Ltd., New Delhi.

Practical

1. AGRO-111 (New) Principles of Agronomy 2 (1+1)

Ex. No.	Name of the exercise
1	Introduction to Agronomy and acquaintance with College Agronomy Farm
2	Identification of seeds and crop plants at different growth stages.
3	Study of Primary Tillage implements and practice of ploughing
4	Importance of puddling in low land paddy cultivation, study of puddling implements and practice of puddling
5 and 6	Study of secondary tillage implements and working with them
7	Determination of purity and germination percentage of seed
8	Study of viability, dormancy and practice of seed treatments in different field crops
9	Study of different methods of sowing, seeding implements and working with them.
10	Calculation of Plant Population, Seed rate and fertilizer doses for different field crops
11	Identification and classification of different types of manures and fertilizers
12	Study of different methods of manures and fertilizer application and their application practice in important field crops
13	Study of different Intercultural Implements and working with them
14	Preparation of FYM and compost
15	Preparation of vermicompost, green manuring
16	Identification of different weeds
17	Participation in ongoing field operations and actual working in the field for raising field crops

2. AGRO-112(New) Agricultural Meteorology 2 (1+1)

Agricultural meteorology, its importance in Agriculture

Weather and climate, weather elements and factors affecting them.

Earth's atmosphere, composition and structure of atmosphere.

Solar radiation – nature, properties, depletion, factors affecting solar radiation, solar constant and energy balance.

Atmospheric temperature – factors affecting temperature, importance of air temperature, horizontal and vertical distribution and variations in temperature and global warming.

Soil temperature – importance of soil temperature, variation of soil temperature.

Air pressure – Variations, isobars and pressure gradients.

Wind – Types, classification, importance of wind in Agriculture, forces acting to produce wind, cyclones, anticyclones and general circulation system of earth.

Atmospheric humidity – saturated and actual vapour pressure, specific and relative humidity, diurnal variation of humidity.

Process of condensation, formation of dew, fog, frost, mist, snow, rain and hail.

Cloud – types, formation and classification.

Precipitation – hydrologic cycle, types of rain – thunder and hail storms, types of monsoon, agricultural seasons.

Drought – its classification, strategy to mitigate drought.

Microclimate

Weather forecasting – Basics, types and importance of weather forecasting.

Remote sensing and introduction to crop modeling.

Practical : Site selection for Agromet observatory; Measurement of temperature; Measurement of rainfall; Measurement of evaporation (atmospheric/soil); Measurement of atmospheric pressure; Measurement of sunshine duration and solar radiation; Measurement of wind direction and speed and relative humidity; Study of weather forecasting and synoptic charts, measurement of dew.

Theory : Teaching Schedule

2. AGRO-112(New) Agricultural Meteorology 2 (1+1)

Lecture No.	Topic to be covered	Weightage (%)
1	Definition of Meteorology, Agricultural Meteorology, its importance, scope in general and agriculture in particular.	4
2 and 3	Concept of weather and climate, difference between weather and climate, weather elements and factors affecting them.	10
4	Earth's atmosphere, composition and structure of atmosphere.	6
5 and 6	Solar radiation, nature (direct, diffuse) its significance, factors affecting solar radiation, solar constant and energy balance	10
7 and 8	Atmospheric temperature, factors affecting temperature, importance of air temperature, horizontal and vertical temperature distribution, temperature variation, DALR, SALR, temperature inversion, stability and instability of air, heating of atmosphere, global warming	10
9	Soil temperature, importance of soil temperature, variation of soil temperature	6
	Mid Term Examination	
10	Air pressure, variation with height, isobars and pressure gradients	4
11	Wind-scale, importance of wind in agriculture, its classification, forces acting to produce wind, cyclone and anticyclones, general circulation system of earth	10
12	Atmospheric humidity, saturated and actual vapour pressure, specific and relative humidity, diurnal variation of humidity	10
13	Process of condensation, formation of fog, dew, frost, mist, snow, rain and hail.	6
14	Cloud, its types, classification. Precipitation, its process and forms. Hydrological cycle.	6
15	Types of rains, thunder and hail storms, introduction to monsoon, its types. Agricultural seasons.	4
16	Drought its classification, strategy to mitigate drought. Microclimate	4
17	Basics of weather forecasting, types, importance of weather forecasting, remote sensing and introduction to crop modeling.	10

Reference Books

1. Atmosphere, weather and climate – Barry R.G. and Charley R.J. The English Language Book Society and Mathuen and Co. Ltd., Sultolk.
2. Contemporary climatology – Handarson Sellers A. and Robinson P.J. Longman Scientific and Technical, England.
3. Introduction to Agrometeorology – H.S. Mavi, Oxford and IBH Publishing Co., New Delhi.
4. Meteorology – S.R. Ghadekar
5. Agricultural Climatology – J.R. Kakade
6. Our atmosphere by – Smita Bhutani
7. Climate, weather and crops in India – D. Lenka

Practical

Ex. No.	Name of the exercise
1	Study of Agro-meteorological observatory, its types, selection of site and plan of layout and visit to Agro-meteorological observatory.
2 and 3	Study of meteorological instruments and methods of recording observations.
4	Measurement of Air temperature.
5	Measurement of soil temperature.
6 and 7	Measurement of rainfall with the help of different rainguages.
8	Measurement of wind velocity with the help of cup anemometer and study of wind vane.
9	Measurement of evaporation by USWB Class A open pan evaporimeter.
10	Measurement of evapotranspiration by Lysimeter.
11	Measurement of Bright Sunshine hours by Campbell stokes sunshine recorder
12	Measurement of solar radiation
13	Measurement of atmospheric pressure..
14	Measurement of relative humidity with the help of Assmans Psychrometer
15	Measurement of dew.
16	Preparation of synoptic charts.
17	Study of automatic weather station.

3. AGRO – 113 (New) Introductory Agriculture (Ancient Heritage, Agriculture Scenario and Gender Equity in Agriculture) 1(1+0)

Art, Science and business of crop production, Basic elements of crop production; Factors affecting crop production; History of Agricultural Development; Ancient India Agriculture in Civilization Era, Chronological Agricultural Technology development in India. Indian Agriculture, balance sheet, liabilities; Assets and Contrasting trends (DATA), Agril. growth, contrasting food chains, Diversity in physiography, Soil groups, marine, livestock and water; Liabilities: Soil factors, weather factors, Economic ecology, dry and irrigated agriculture, Farming Systems approach, value addition, requirements in new technology; Women in Agriculture: multifaceted roles and tasks, work stress factors, Nutritional and rural life standards, role in house hold design making, drudgery reduction for farm women, women friendly agricultural technology; Empowerment of women; Group dynamics for farm women, rural women; The nucleus of Agricultural Extension and Training.

Theory : Teaching Schedule

Lecture No	Topic to be covered	Weightage (%)
1 and 2	Agriculture Definition, Art, science and business of crop production. Scope of agriculture in India and Maharashtra.	8
3 and 4	Basic elements of crop production and factors affecting it.	6
5 and 6	History of Agricultural Development, Ancient India, Agriculture in civilization Era, Chronological Agricultural Technology development in India.	8
7	Indian Agriculture, balance sheet, liabilities, Assets and contrasting trends (DATA) Agricultural growth, Contrasting food chains.	8
8 and 9	Diversity in physiography : Soil groups, marine, livestock and water, liabilities soil factors, weather factors and Economic Ecology.	12
	Mid term examination	
10	Dry and irrigated Agriculture, Farming System Approach	6
11	Value addition in field crops, requirements in new technology	10
12	Women in Agriculture: multifaceted roles and tasks, work stress factors, nutritional and rural life standards.	10
13 and 14	Role of women in household design making, drudgery reduction for farm women, women friendly agricultural technology.	12
15	Empowerment of women, group dynamics for farm women, rural women.	12
16 and 17	The nucleus of Agricultural Extension and Training.	8

Reference Books :

1) Principles of Agronomy : S. R. Reddy, Kalyani Publishers, Ludhiana, New Delhi, India.
2) Crop production and management : Y.B. Morachan
3) Agricultural development today and tomorrow Vol. I : Arun Kumar.
4) Agriculture Finance : Subba Reddy and Raghu Ram.
5) Women in Agriculture : Ranjit Kumar Samanta
6) Principles of Agronomy : Sankaran S. and V. T. Subbiah Mudliyar.
7) Hand Book of Agriculture ICAR, Publication, 2006.

BOT – 111 : Principles of Genetics *2+1 = 3*

Introduction : Definition of genetics, history and role of genetics in Agriculture, Mendel's laws of inheritance : law of segregation, exceptions to the laws, Types of gene action, Multiple alleles, pleiotropism, penetrance and expressivity, Quantitative traits – multiple factor hypothesis, Differences between qualitative and quantitative traits, Cytoplasmic inheritance, Difference between cytoplasmic and chromosomal inheritance, Mutation and its characteristics, Methods of inducing mutations and CIB techniques, Gene expression and differential gene activation, Lac operon and fine structure of gene, Ultra structure of cell and cell organelles and their functions, Study of chromosome structure, morphology, types and number in following crops Cereals- Rice, Wheat, Triticale, Sorghum, Bajra, Maize, Nagali, Prosomillets, Foxtail millet, Kodomillet. Pulses : Pigeonpea, Green gram, Black gram, Cowpea, Chickpea, Horsegram, Lentil, Lantharus, Rajama bean, Dolichous, Lablabean, Oilseed : Groundnut, Sunflower, Safflower, Linseed, Castor, Sesame, Soybean. Fibre : Cotton, Jute. Fruit & Plantation crop: Mango, Coconut, Cashew, Guava, Pomogranet, Sapota, Nutmeg, Grape, Citrus. Vegetable : Tomato, Brinjal, Chilli, Okra. Cash crop : Sugarcane and Tobacco, karyotype and idiogram, Mitosis, Meiosis their significance and difference, DNA and its structure, function, types, modes of replication and repairs, RNA and its structure, function and types, Transcription, Translation, Genetic code and outline of protein synthesis, Crossing over and factors affecting it, Mechanism of crossing over, Cytological proof of crossing over, Linkage, types of linkage and estimation of linkage, sex determination and sex linked inheritance, Numerical chromosomal aberrations (polyploids), Structural chromosomal aberrations, Evolution of different crops Cotton, Wheat, Tobacco, Triticale, Brassica.

Practical : Microscopy. Preparations and use of fixatives and stains for light microscopy. Preparation of microslides – Identification of various stages of mitosis. Identification of various stages of meiosis. Preparation of various stages of meiosis. Monohybrid ratio and its modifications. Dihybrid ratio and its modifications. Tribybrid ratio. Chi-square analysis. Interaction of factors. Epistatic factors – supplementary, duplicate. complementary, additive, inhibitory. Linkage – two point test cross. Linkage – three point test cross. Induction of polyploidy using colchicines. Induction of chromosomal aberrations using chemicals.

Books Recommended :

1. Sunderaj D.D., Thulsidas G and Dorairaj M.S. (1997). Introduction to cytogenetics and plant breeding, Popular Book Depot, Chennai.
2. Singh B.D. (1990). Fundamentals of Genetics, Kalyani Publisher, Ludhiana.
3. Gupta P.K. (1997). Genetics, Rastogi Publications, Meerut.
4. Gardner, E.J. (1981). Principles of Genetics, Johan Wiley and Sons, U.S.A.
5. Griffiths, A.J.F., Miller, J.H. Suzuki, D.T., Lewantin, R.C. and W.M. Gelbart (1996). An Introduction to Genetic Analysis (6th edition). W.H. Freeman, New York.
6. Stickberger M.W. (1996). Genetics (3rd edition) Mac Millan Publishing Co. New Delhi.

Course Title : Introduction to Soil Science (B. Sc. (Agri.))

Course No. : SSAC-111 **Credit : 3 (2+1)**

Teaching Schedule

Lecture No.	Topic	Weightage
1 & 2	Soil pedological and edapholgical concept. Origin of the earth Earth's crust composition	3
3& 4	Study of soil forming rocks and minerals	3
5 & 6	Weathering of rocks and minerals	6
7 & 8	Soil forming factors and processes, Components of soils	6
9	Study of soil profile.	4
10 & 11	Soil physical properties: Soil texture, textural classes, particle size analysis	5
12 to 14	Soil structure Classification, soil aggregates, significance of soil consistency, Soil crusting. Bulk density and Particle density. Soil porosity, their significance and manipulation. Soil compaction and soil colour.	6
15, 16 & 17	Soil water: Retention and potentials, soil moisture constants, movement of soil water, infiltration, percolation permeability, Drainage: Methods of determination of soil moisture	6
18	Thermal properties of soils, Soil temperature	3
19	MID TERM	
20 & 21	Soil air: Gaseous exchange. Influence of soil temperature, air on plant growth	5
22 & 23	Soil colloids: Properties, nature, types and significance	5
24 & 25	Layer silicates clays: Genesis and sources of charges	5
26 & 27	Adsorption of ions. Ion exchange. CEC and AEC. Factors influencing ion exchange and its significance	6
28, 29 & 30	Soil organic matter: composition, Determination of organic. Humus. fractionation of organic matter, carbon cycle C:N ratio	6
31 to 33	Soil biology: Definition soil Biomass, soil organisms and their beneficial and harmful roles	4
34 & 35	Soil survey and USDA Soil classification. Land Capability classification Soils of India. Soils of Maharashtra.	4
36	Soil erosion. Types, universal soil loss equation & control measures.	3

TEXT BOOKS

1. Text book of Soil Science by J. A. Daji.
2. Physical properties of soil by C. C. Shah and NK. Narayana (1966)
3. Fundamentals of Soil Science (8th edition) 1990 by Henry. D. Fothk.
4. Text book of Soil Science (Second edition) 1994 by Biswas and Mukharjiee
5. Nature and properties of soils (Tenth edition) by N. C. Brady, prentice Hall of India Pvt. Ltd. New Delhi.
6. Fundamentals of Soil Science – A Text Book by V.D. Patil & C.V. Mali
7. Fundamentals of Soil Science by ISSS, New Delhi.

PRACTICALS

Pract. No.	*Name of practical*
1	Study of soil forming minerals and their identification
2	Study of soil farming rocks and their identification
3	Collection of soil sample and processing of soil for physico-chemical analysis.
4	Study of soil profile in field
5	Determination of Bulk density and particle density of soil
6	Determination of hydraulic conducting of soil
7	Determination soil strength and Determination of moisture content of soil
8	Determination moisture constants.
9	Determination of infiltration rate of soil
10	Determination of soil texture and particle size analysis by hydrometer method
11	Determination of aggregate size analysis
12	Determination of soil temperature
13	Study of basic analytical concepts techniques and calculations
14	Determination of organic carbon content of soil
15	Determination pH and EC of soil
16-17	Determination of CEC of soil.

Plant Pathology and Agril. Microbiology

1) Course No : PATH- 111 Credits: 1+1=2
Title : Introductory Plant Pathology

Theory:

Introduction, History of Plant Pathology: History and development of Plant Pathology in ancient, dark, premodern, modem and present eras, Contribution made by different scientists, Definitions and objectives of Plant Pathology: Concepts of disease, Disease triangle, Important plant pathogenic organisms: Different groups like fungi, bacteria, fastidious vesicular bacteria and phytoplasma with examples of diseases caused by them, Morphology and reproduction: of spiroplasmas, viruses, viroids, algae, protozoa and phanerogamic parasites with examples of diseases caused by them, Prokayotes - classification of prokaryotes according to Bergey's manual of Systematic bacteriology, General characters of fungi: mycelium (septate and non-septate), nutrition of fungi - saprophytes, parasites and symbiosis), definition of fungus, somatic structures, types of fungal thalli, fungus tissues, modification of thallus, reproduction in fungi (asexual and sexual) - spores (asexual and sexual), spore fruits (asexual and sexual), Asexual reproduction: fission, budding, and fragmentation; Sexual reproduction: plasmogamy, karyogamy and meiosis, Method of reproduction: planogametic copulation, gametangial contact, gametangial copulation, spermatization, dikaryotization; Nomenclature: binomial system of nomenclature, rules of nomenclature; Classification of fungi-upto genus

Practical:

Morphology of fungi (Vegetative), Reproductive structures and spore fruits in fungi, Symptoms produced by plant pathogens like fungi, bacteria, viruses and phytoplasmas, Acquaintance to Plant Pathology laboratory and equipments, Preparation of culture media for fungi and bacteria, Isolation techniques, Demonstration of Koch's postulates, Collection of disease specimen and preparation of mounts, Preservation of disease samples, Study of important genera of plant pathogenic fungi like *Pythium, Phytophthora, Albugo Sclerospora, Perenosclerospora, Pseudoperenospora, Perenospora, Plasmopara,* and *Bremia* (Oomycota); *Mucor* and *Rhizopus* (Zygomycota); *Oidium, Oidiopsis, Ovulariopsis, Erysiphe, Phyllactinia, Uncinula* and *Podosphaera* (Ascomycota); *Puccinia* (Different stages), *Uromyces, Hemiliea, Sphacelotheca* (*Soroporium*), *Ustilago, Tolyposporium Agaricus, Pleurotus and Ganoderma* (Basidiomycota); *Septoria, Colletotrichum, Pestalotiopsis, Pyricularia, Drechslera, Alternaria, Stemphyllium, Cercospora, Phaeoisariopsis, Rhizoctonia* and *Sclerotium* (Asexual Ascomycetes - Deuteromycota)

Text books Recommended

1. Introduction to principles of plant pathology by R. S. Singh, Oxford and IBH Publ. Co., New Delhi (1996)
2. Essentials of plant pathology by V. N. Pathak, Prakash Publ., Jaipur (l972)
3. Plant pathology by G. N. Agrios 4th edition, Academ. Press, New york (1997)
4. Introductory Plant Pathology by M. N. Kamat, Prakash Publ, Jaipur (l967)
5. Plant diseases by R. S. Singh
6. Introductory Mycology by Alexopoulos, Mims and Blackwel (2004)
7. Introductory Plant Pathology by H.C. Dube

B) Teaching schedule

Course No - PATH- 111

Lecture No.	Topics to be covered
1	Introduction
2	History, Definition and objectives of Plant Pathology
3	Concepts of disease, disease triangle
4	Definition of Plant Pathology
5	Important plant pathogenic organisms, different groups, Fungi, Bacteria, Fastidious and Vesicular bacteria and Phytoplasma with examples of diseases caused by them.
6	Spiroplasmas, Viruses, Viroids, Algae, Protozoa, and phanerogamic parasites with examples of diseases caused by them.
7,8	Prokaryotes, classification of prokaryotes according to Bergey's manual of Systematic bacteriology.
9	General characters of Fungi
10	Definition of Fungus, somatic structures, types of fungal thalli, fungus tissues, modification of thallus
11	Reproduction in Fungi (Asexual)
12	Reproduction in Fungi (Sexual)
13	Nomenclature, Binomial system of nomenclature
14	Rules of nomenclature
15	Classification of Fungi-up to genus

C) Lesson Plan

Course No - PATH- 111

Lesson No.	Topics to be covered
1	Introduction
2	History, Definitions and objectives of Plant Pathology History of Plant Pathology- History and development of Plant Pathology in ancient, dark, premodern, modem and present eras. Contribution made by - Surpal, Theophrastus, Pliny, Iwanowski, Robert Hook, Anton van Leeuwenhoek, Needham, Linnaeus, Tillet, Prevost Robert Koch, Marshal Ward, Millardet, Jenson, Meyar, Burril, E.F. Smith, Erikson, Biffen, Iwanwasky, Stakman, Cragie, Luthra, Stanley, Bowden & Pierie, Doi & Asuyama, Butler, Mehta, Mundkur, Dastur, Kulkarni, Bhide, Uppal, Tirumalachar, Patel and Rangaswamy.
3	Concepts of disease, disease triangle
4	Definition of Plant Pathology
5	Important plant pathogenic organisms, different groups: Fungi, Bacteria, Fastidious Vesicular bacteria and Phytoplasma with examples of diseases caused by them.
6	Important plant pathogenic organisms, different groups: Morphology and reproduction -Spiroplasmas, Viruses, Viroids, algae, Protozoa, and phanerogamic parasites with examples of diseases caused by them.
7,8	Prokaryotes, classification of prokaryotes according to Bergey's manual of Systematic Bacteriology.
9	General characters of Fungi - mycelium (septate and non-septate), Nutrition of fungi, saprophytes, parasites and symbiosis)
10	Definition of Fungus, somatic structures, types of fungal thalli, fungus tissues, modification of thallus
11	Reproduction in Fungi (asexual and sexual): Spores (asexual and sexual), spore fruits (asexual and sexual)
12	Reproduction in Fungi (Asexual and sexual): Asexual reproduction - Fission, budding, and fragmentation Sexual reproduction - Plasmogamy, karyogamy and meiosis Method of reproduction – Planogametic copulation, Gametangial

	contact, Gametangial copulation, spermatization, dikaryotization
13	Nomenclature, Binomial system of nomenclature
14	Rules of nomenclature
15	Classification of Fungi-upto genus

D) Weightages

Course No - PATH- 111

Sr. No.	Name of Topic	Weigh-tages
1	Introduction	6-7
2	Important plant pathogenic organisms, different groups, Fungi, Bacteria, Fastidious vesicular bacteria and Phytoplasma, Spiroplasma, Viruses, Viroids, algae, Protozoa, and phanerogamic parasites with examples of diseases cased by them	6-8
3	Prokaryotes, classification of prokaryotes according to Bergy's manual of systematic bacteriology.	6-7
4	General characters of Fungi	4-5
5	Definition of Fungus, somatic structures, types of fungal thalli, fungus tissues, modification of thallus	6-8
6	Reproduction in Fungi (Asexual and sexual)	4-5
7	Nomenclature, Binomial system of nomenclature	4-5
8	Classification of Fungi – up to genus.	4-5
	Total	40-50

E) Exercise schedule (practical)

Course No - PATH- 111

Exercise No.	Topics to be covered
1	Morphology of fungi (Vegetative)
2	Reproductive structures and spore fruits in fungi
3	Symptoms produced by fungal plant pathogens
4	Symptoms produced by bacterial plant pathogens
5	Symptoms produced by viruses and phytoplasma
6	Acquaintance to Plant Pathology laboratory and equipments
7	Preparation of culture media for fungi and bacteria
8	Isolation techniques, demonstration of Koch's postulates, collection of disease specimen and preparation of mounts
9	Preservation of disease samples
10	Study of Pythium, Phytophthora and Albugo
11	Study of Sclerospora, Perenosclerospora, Pseudoperenospora, Perenospora, Plasmopara, and Bremia
12	Study of genera Mucor and Rhizopus
13	Study of Oidium, Oidiopsis, Ovulariopsis, Erysiphe, Phyllactinia, Uncinula and Podosphaera
14	Study of Puccinia (Different stages), Uromyces, Hemiliea
15	Study of Sphacelotheca, Ustilago and Tolyposporium
16	Study of Agaricus, Pleurotus and Ganoderma
17	Study of Septoria, Colletotrichum, and Pestalotiopsis
18	Study of Pyricularia, Helminthosporium, Drechslera, Alternaria, Stemphyllium, Cercospora, Phaeoisariopsis, Rhizoctonia and Sclerotium

Department of Horticulture
Course No. HORT-111
Title: Production technology of fruit crops Credits: (2+1)

Theory: "A" (Fundamentals)

Definition of Horticulture, fruit science: scope, importance, area and production of fruit crops in Maharashtra and India, Export import scenario of fruit crops in India, Classification of fruit crops on Horticultural basis, Climate and soil, Selection of site, fencing, wind break and shelter belts, Planning, layout and planting systems, High density, planting and meadow orcharding, Methods of propagation in fruit crops, Use of rootstocks in fruit crops, Training and pruning of fruit crops, Use of bio - regulators in propagation and fruit production, Nutritional management of fruit crops, Irrigation management of fruit crops, Special horticultural practices: Bahar treatments, notching, ringing, bending, girdling etc.

"B" Fruit production technology

Origin, B. N. family, area and production, soil and climate, commercial varieties, Propagation and planting, after cares (irrigation, weed management, nutritional requirement, use of PBR, physiological disorders, plant protection measures and special horticultural practices), Harvesting and yield of following crops, Mango, Banana, Citrus (Sweet orange, Mandarin, Acid Lime), Guava and sapota, Grape, Pineapple, Papaya, Pomegranate, Anonacious fruits, Ber and fig, Aonla and Jackfruit, Apple, Brief cultivation in tabular form on following crops, Strawberry, Cherry, Pear, Plum, Peach, Almond, Karonda, Phalsa and Bael, Recommendations of Joint Agresco (last five years)

Practical:

Study of garden tools and implements, Study of propagation media, containers, potting mixtures, potting, depotting, repotting and transplanting, Study of fruit crops and their varieties, Study of fruit crops and their varieties, Plant propagation by seed (scarification, stratification), Plant propagation by cutting and layering, Plant propagation by budding and grafting, Propagation through specialized vegetative structures and micro propagation, Layout and planting of fruit crops, Training and pruning of fruit crops, Preparation and application of bio regulators in horticultural crops, Methods of irrigation, Methods of manuring and fertilizer application and fertigation, Methods of harvesting: Mannual, Mechanical and Chemical, Visit to commercial nursery, Visit to commercial orchard.

Books Recommended:

1. Bose T. K. 1990 Fruits of India Tropical and Subtropical, Naya Prakash, Culcutta.
2. Hard Block of Horticulture – ICAR
3. Arid fruit culture – B. A. Chundawat
4. Fruit culture in India – Sham Singh and others
5. Principles of Horticulture and fruit growing – Kunte and Yawalkar
6. Pomology – Kumar
7. Production Technology of fruit crops – Shammugvelk k. G.
8. Fruits – Ranjit Singh.

Course No. HORT-111
Title: Production technology of fruit crops Credits: (2+1)
Lesson plan "A"(Fundamentals)

Lesson No.	Topic	*Marks*
1.	Definition of Horticulture, fruit science: scope, importance, area and production of fruit crops in Maharashtra and India.	10
2.	Export import scenario of fruit crops in India.	5
3.	Classification of fruit crops on Horticultural basis	10
4.	Climate and soil	10
5.	Selection of site, fencing, wind break and shelter belts	10
6.	Planning, layout and planting systems	10
7.	High density, planting and meadow orcharding	5
8.	Methods of propagation in fruit crops	10
9.	Use of rootstocks in fruit crops	5
10.	Training and pruning of fruit crops	10
11.	Use of bio - regulators in propagation and fruit production	10
12.	Nutritional management of fruit crops	5
13.	Irrigation management of fruit crops	5
14.	Special horticultural practices: Bahar treatments, notching, ringing, bending, girdling etc.	10

Lesson plan "B"Fruit production technology

	Origin, B. N. family, area and production, soil and climate, commercial varieties, Propagation and planting, after cares (irrigation, weed management, nutritional requirement, use of PBR, physiological disorders, plant protection measures and special horticultural practices), Harvesting and yield of following crops.	
15, 16	Mango	10
17, 18	Banana	10
19, 20	Citrus (Sweet orange, Mandarin, Acid Lime)	10
21	Guava and sapota	5
22, 23	Grape	10
24	Pineapple	5
25	Papaya	5
26	Pomegranate	5
27	Anonacious fruits	5
28	Ber and fig	5
29	Aonla and Jackfruit	5
30	Apple	5
31	Brief cultivation in tabular form on following crops Strawberry, Cherry, Pear, Plum, Peach, Almond, Karonda, Phalsa and Bael.	5
32	Recommendations of Joint Agresco (last five years)	

Practicals:

1. Study of garden tools and implements
2. Study of propagation media, containers, potting mixtures, potting, depotting, repotting and transplanting
3. Study of fruit crops and their varieties.
4. Study of fruit crops and their varieties.
5. Plant propagation by seed (scarification, stratification)
6. Plant propagation by cutting and layering
7. Plant propagation by budding and grafting.
8. Propagation through specialized vegetative structures and micro propagation.
9. Layout and planting of fruit crops.
10. Training and pruning of fruit crops.
11. Preparation and application of bio regulators in horticultural crops.
12. Methods of irrigation.
13. Methods of manuring and fertilizer application and fertigation.
14. Methods of harvesting: Mannual, Mechanical and Chemical.
15. Visit to commercial nursery.
16. Visit to commercial orchard.

Books Recommended

1. Bose T. K. 1990 Fruits of India Tropical and Subtropical, Naya Prakash, Culcutta.
2. Hard Block of Horticulture – ICAR
3. Arid fruit culture – B. A. Chundawat
4. Fruit culture in India – Sham Singh and others
5. Principles of Horticulture and fruit growing – Kunte and Yawalkar
6. Pomology – Kumar
7. Production Technology of fruit crops – Shammugvelk k. G.
8. Fruits – Ranjit Singh.

Extension Education

B. Sc. (Agriculture)

EXTN-111 Fundamentals of Rural Sociology and Educational Psychology

Credits: 2(2+0)

THEORY:

- Sociology - Meaning, definition.
- Rural sociology - Meaning, definition, Scope, Importance of Rural Sociology in agricultural extension and Interrelationship between Rural sociology & Agricultural Extension.
- Indian Rural Society - Important characteristics, Differences and Relationship between Rural and Urban societies.
- Social Groups - Meaning, definition, Classification, Factors considered in formation and organization of groups, Motivation in group formation and Role of social groups in Agricultural Extension.
- Social Stratification - Meaning, Definition, Functions, basis for stratification, Forms of social Stratification Characteristics and – Differences between Class & Caste System.
- Cultural concepts - Culture, Customs, Folkways, Mores, taboos, Rituals and traditions – Meaning, Definition and their Role in Agricultural Extension.
- Social Values and Attitudes - Meaning, Definition, Types and role of Social Values and attitudes in agricultural Extension.
- Social Institutions - Meaning, definition, Major institutions in Rural society : marriage, family and religion, Functions and their Role in Agricultural Extension.
- Social Organizations - Meaning, Definition, types of organizations and role of social organizations in Agricultural Extension.
- Social control – Meaning, Definition, Need of social control and Means of social control.
- Social change - Meaning, Definition, Nature of Social change, Dimensions of social change and factors of social change.
- Leader - Meaning, Definition, types and their role in Agricultural Extension.
- 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.
- Teaching - Learning process – Meaning and definition of Teaching, Learning, Learning experience and Learning situation, Elements of learning situation and its characteristics. Principles of learning and their implication for teaching
- Perception and motivation.

Syllabus for English Courses

LANG-111 Comprehension and Communication Skills in English

2 (1+1) (NC) Semester - I

THEORY:

Descriptive writing, reading comprehension-short answer questions, choice of best alternative, vocabulary exercises – word groups, word forms, synonyms and antonyms, words and phrases, derivation of adjectives from verbs, derivation of verbs from nouns, derivation of nouns from verbs, comprehension tests, true of false, compound words, often confused words, homonyms and homophones, auxiliaries – modal auxiliaries.

PRACTICAL:

Applied Grammar: Articles, prepositions, verbs, tenses, voice, direct indirect speech, agreement of verb with subject, relative pronouns and relative adverbs, simple, compound and complex sentences, infinitives, clauses, word order, gerunds. Use of for and since, sentence patterns.

Listening comprehension: Listening to lectures, speeches, talks.
Spoken English: Importance of stress and intonation.
Assignments on written skills, letter writing, précis writing, paragraph writing, brief essay writing

Text: Current English for language skills by M. L. Tickoo and A. E. Subramanian, Publisher Macmillan India Limited

1. The Book of Nature: Jawaharlal Nehru
2. A Days Wait : Earnest Hemingway,
3. I Was Gandhi's Jailer : Patrick Quinn,
4. Too Dear : Leo Tolstoy,
5. My Greatest Olympic Prize: Jesse Owens,
6 & 7 Fighting the Invisible - I & II: Navin Sullivan
8. My Struggle for an Education : Brooker T. Washington
9. Hari: Nayantara Sahgal
10. My Lost Dollar: Stephen Leacock

Animal Science and Dairy Science

Livestock Breeding and Nutrition (1+1=2)

Syllabus

Theory

History and concept of Animal Breeding. Cell and cell division. Gene: Functions and role in Animal Genetics, Gene actions, Gene and Genotypic frequencies Gene expression and mutation. Mendelian principles and Hardy Weinberg law. Chromosomes and its abnormatlities. Laws of probabilities and Animal breeding. Variations in economic traits of farm animals. Methods of selection. Genetic parameters: Heritability, repeatability, genotypic, phenotypic and environmental correlation and regression. Sterility, fertility.Quantitantive and qualitative traits. Composition of plant and animal body. Classification of feeds and fodders. Important food ingredients and their functions in animal body. Digestive system, digestion and absorption of different nutrients in ruminants and non-ruminants. Important macro and micro nutrients in ruminants and non-ruminants. Feed supplements and feed additives, method of measuring food values. Feeding standard. Feed formulation and feeding pattern for different classes of livestock. Processing of low grade feeds and fodders viz; Use of by-pass nutrients technique: Preparation of complete feed block.

PRACTICAL

Cell structure. Estimation of gene and genotypic frequency. Estimation of heritability. Estimation of repeatability. Correlation studies. Estimation of breeding value of cow. Construction of selection index. Estimation of Regression coefficient. Sire indices. Estimation of genetic gain. Estimation of heterosis. Identification of feeds and fodders. Nutritive value of various feeds and fodders. Characteristics of good ration. Study of nutritive values: Nutritive ratio (NR), Starch equivalent (SE), DCP, TDN and GE. Nutrients requirement of different classes of animals. Feeding standards, their principles, thumb rule, computation of ration for different livestock. Silage and hay making. Chaffing of fodders. Improving low quality roughages for efficient utilization urea, molasses and salt treatment.

Teaching Schedule

Theory

1. History and concept of animal breeding
2. Cell and cell division
3. Gene: Functions and role in Animal Genetics
4. Gene actions, Gene and Genotypic frequencies
5. Gene expression and mutation
6. Mendelian principles and Hardy Weignberg law
7. Chromosomes and its abnormalities
8. Laws of probabilities
9. Variations in quantitative and qualitative traits in farm animals
10. System of breeding
11. Methods of selection
12. Composition of plant and animal body
13. Classification of feeds and fodders
14. Important nutrients and their functions in animal body
15. Digestive system and digestion of different nutrients in ruminants and non-ruminants
16. Feed supplements and feed additives, methods of measuring food values
17. Feeding standards
18. Concept and preparation of complete feed blocks

Practicals

Estimation of gene and genotypic frequency
Estimation of breeding value of cow
Estimation of regression coefficient
Preparation of breeding plan
Identification of feeds and fodders
Nutritive value of various feeds and fodders
Ration, there types and desirable characteristics of good ration
Nutritive ratio (NR), DCP and TDN
&10 Preparation of concentrate mixture and computation of ration for different classes of livestock
11. Chaffing of fodders.
12. Preparation of Silage
Preparation of Hay
14. Improving low quality roughages
15. Feeding standards
16. Concept and preparation of complete
Feed blocks