

# **SYLLABUS**

**FOR**

## **AGRICULTURAL SCIENCES AND TECHNOLOGY**

**[M.Sc. Agronomy]  
(Third Semester)**



**PRAYAGRAJ**

**FACULTY OF  
AGRICULTURAL SCIENCES  
AND TECHNOLOGY**

## Syllabus for M.Sc. Agronomy

Course Title: **AGRONOMY OF FODDER & FORAGE CROPS**

Course Code: **AGPCMG301T**

Semester: **III**

### Objective:

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The major objectives of this course are to make the student to learn the following

- What are the agronomical practices to cultivate the cereal fodders, grass fodders, legume fodders and tree fodders?
- How to preserve those fodders in the form of silage and hay making?
- What are the methods of irrigation and drainage for fodder production?
- What is intercropping and what are the methods of intercropping fodder crops?
- How to recycle the livestock wastes for profitable utilization as manure and for energy?

### Course Syllabus (Theory)

Adaptation, distribution, varietal improvement, agro-techniques and quality aspects including anti-quality factors of important fodder crops like maize, bajra, guar, cowpea, oats, barley, berseem, senji, lucerne etc. Adaptation, distribution, varietal improvement, agro-techniques and quality aspects including anti-quality factors of important forage crops/grasseslime, napier grass, Panicum, Lasiuras, Cenchrusetc. Year-round fodder production and management, preservation and utilization of forage and pasture crops. Principles and methods of hay and silage making; chemical and biochemical changes, nutrient losses and factors affecting quality of hay and silage; use of physical and chemical enrichments and biological methods for improving nutrition; value addition of poor quality fodder. Economics of forage cultivation uses and seed production techniques.

### Syllabus organised in Unit (Theory)

Unit	Content	Hours
1	<b>Fodder crops</b> Adaptation, distribution, varietal improvement, agro-techniques and quality aspects including anti-quality factors of important fodder crops like Maize, Bajra, Guar, Cowpea, Oats, Barley, Berseem, Senji, Lucerne etc.	8
2	<b>Forage crops</b> Adaptation, distribution, varietal improvement, agro-techniques and quality aspects including anti-quality factors of important forage crops like Grasseslime, Napier Grass, Panicum, Lasiuras, Cenchrus etc.	8
3	<b>Management and utilization of forage crops</b> Year-round fodder production and management, preservation and utilization of forage and pasture crops.	4
4	<b>Hay and silage</b> Principles and methods of hay and silage making; chemical and biochemical changes, nutrient losses and factors affecting quality of hay and silage; use of physical and chemical enrichments and biological methods for improving nutrition; value addition of poor quality fodder.	8
5	<b>Seed production techniques</b> Economics of forage cultivation uses and seed production techniques.	4

### Course Outcomes

- To know the Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of fodder and forage crops.
- To know about the adaptation, distribution, agro techniques, anti-quality factors of improvement of fodder crops.
- To know about the preservation and utilization of forage and pasture crops.
- To understand the economics of forage cultivation, grassland of India and their improvement.
- To understand the principles of grassland ecology, economic aspect of grassland, problems and their management.

### **Recommended Text Books/ Reference Books**

- Agronomy of fodder and forage crops- SC Panda. 2014. Kalyani Publishers.
- Forages and Fodder: Indian Perspective Hardcover- Anil Kr. Singh, M.A. Khan, Natraja Subash & Krishna Murari Singh. 2013. Daya Publishing House.
- Fodder production and grassland management- Kapa Sarjan Rao. 2019. OXFORD & IBH PUBLISHING CO. PVT. LTD. New Delhi.
- Fodder Production and Grassland Management- Reddy D V. 2005. Academa Publishers.
- Forage Crops of the World, Volume I: Major Forage Crops- Md. Hedayetullah & Parveen Zaman. 2021. Apple Academic Press

## Syllabus for M.Sc. Agronomy

**Course Title: AGRONOMY OF FODDER & FORAGE CROPS LAB**

**Course Code: AGPCMG301P**

**Semester: III**

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### Objective:

- The prime aim of this lab is to explore the knowledge of fodder & forage crop identification, formulation and better way of management to enhance the yield of crops.
- The course will consist of lecture (both theory and practical) in the lab.
- Illustrate the mainly practical oriented topics.
- Evaluation will be done not on the theory but on the basis of field practical & assignment.
- Aim of study to practically skilled the student on the scale of learning by doing

### Course Syllabus (Practical)

Practical raining of farm operations in raising fodder crops. Canopy measurement, yield and quality estimation, viz. crude protein, NDF, ADF, lignin, silica, cellulose etc. of various fodder and forage crops. Anti-quality components like HCN in sorghum and such factors in other crops. Hay and silage making and economics of their preparation.

### Syllabus organised in Unit (Practical)

Topics	Description with Practical Applications	Hours
Practical raining of farm operations in raising fodder crops.	Cropping scheme Importance, improved varieties, climate, soil, water and cultural requirements, nutrition, quality components, maximum production of fodder crops.	8
Canopy measurement, yield and quality estimation, viz. crude protein, NDF, ADF, lignin, silica, cellulose etc. of various fodder and forage crops	Practical training of farm operations in raising fodder crops, canopy measurement. Yield and quality estimation, viz. crude protein, NDF, ADF, lignin, silica, cellulose etc. of various fodder and forage crops.	8
Anti-quality components like HCN in sorghum and such factors in other crops.	Nitrate toxicity, Cyanogenic glycosides/prussic acid (HCN), Saponins, Oxalate, Tannins and Phyto-estrogens.	8
Hay and silage making and economics of their preparation.	To prepare best quality silage, cereal green fodder like Green fodder maize, Fodder sorghum, Bajara, Hybrid Napier, Sugar cane tops, Oat, Marwel etc are required. Avoid bad weather at the time of harvest, Assess the quantity of crop to be harvested, Check the condition of silo, Check growth stage of the crop, Addition of molasses, salt, etc., Proper filling of silo and Covering and sealing of silo.	8

### Course Outcomes

- Skilled on identification of important fodder and forage crops.
- Skilled on farm operations, canopy measurement. Yield and quality estimation, viz. crude protein, NDF, ADF, lignin, silica.
- Student will be know about the adaptation, distribution, agro techniques, anti-quality factors of improvement of fodder crops.
- Student will be able to understand the nutrition from hay is vital to keep the animal healthy, and to protect its digestive health.

## Syllabus for M.Sc. Agronomy

**Course Title: CROPPING SYSTEMS & SUSTAINABLE AGRICULTURE**

**Course Code: AGPCMG302T**

**Semester: III**

**L T P C**  
**2 0 0 2**

### Objective:

- To ensure optional utilization and conservation of available resources and effective recycling of farm residues within system.
- Help to sustain agricultural production by having healthy rural communities, conserving natural resources, and remaining economically competitive.
- Identify methods of reducing off-farm input expenses, particularly irrigation, herbicides, and nitrogen fertilizer.
- Develop cropping systems that implement integrated pest management (IPM) practices for prolonging the useful life of selective herbicides, and reducing the amount and expense of pesticide applications.
- Designing crop rotations that maximize precipitation (PUE) and fallow (FUE) use efficiency.

### Course Syllabus (Theory)

Cropping systems: definition, indices and its importance; physical resources, soil and water management in cropping systems; assessment of land use. Concept of sustainability in cropping systems and farming systems, scope and objectives; production potential under monoculture cropping, multiple cropping, alley cropping, sequential cropping and intercropping, mechanism of yield advantage in intercropping systems. Above and below ground interactions and allelopathic effects; competition relations; multistoried cropping and yield stability in intercropping, role of non-monetary inputs and low cost technologies; research need on sustainable agriculture. Crop diversification for sustainability; role of organic matter in maintenance of soil fertility; crop residue management; fertilizer use efficiency and concept of fertilizer use in intensive cropping system. Plant ideotypes for drylands; plant growth regulators and their role in sustainability.

### Syllabus organized in Unit (Theory)

Unit	Content	Hours
1	<b>Cropping systems</b> Cropping systems: definition, indices and its importance; physical resources, soil and water management in cropping systems; assessment of land use.	4
2	<b>Concept &amp; types Cropping systems</b> Concept of sustainability in cropping systems and farming systems, scope and objectives; production potential under monoculture cropping, multiple cropping, alley cropping, sequential cropping and intercropping, mechanism of yield advantage in intercropping systems.	8
3	<b>Allelopathic effects</b> Above and below ground interactions and allelopathic effects; competition relations; multistoried cropping and yield stability in intercropping, role of non-monetary inputs and low cost technologies; research need on sustainable agriculture.	8
4	<b>Crop diversification for sustainability</b> Crop diversification for sustainability; role of organic matter in maintenance of soil fertility; crop residue management; fertilizer use efficiency and concept of fertilizer use in intensive cropping system.	8
5	<b>Plant ideotype</b> Plant ideotypes for drylands; plant growth regulators and their role in sustainability.	4

### Course Outcomes

- Students will be know about the different cropping and farming system like integrated farming system (IFS).
- To get knowledge on sustainable agricultural practices such as organic farming.

**Recommended Text Books / Reference Books.**

- Cropping and Farming Systems- Panda SC. 2003. Agrobios.
- Principles of Agronomy- T. Yellamanda Reddy & G.H. Sankara Reddy. 1992. Kalyani.
- Principles of Agronomy- Sankaran S & Mudaliar TVS. 1997. The Bangalore Printing & Publ. Co.

## Syllabus for M.Sc. Agronomy

**Course Title: CROPPING SYSTEMS & SUSTAINABLE AGRICULTURE LAB**

**Course Code: AGPCMG302P**

**Semester: III**

**L T P C**  
**0 0 2 1**

### Objective:

- To formulate cropping and farming system model involving main and allied enterprises for different farming situations.
- Taking full advantage of local knowledge and practices, including innovative approaches not yet fully understood by scientists although widely adopted by farmers.

### Course Syllabus (Practical)

Preparation of cropping scheme for irrigated/dry-land situations. Study of existing farming systems in nearby villages; Preparation of integrated farming system model for wetlands; Preparation of integrated farming system model for drylands; Preparation of enriched Farm Yard Manure; Preparation of Vermicompost; Visit to urban waste recycling unit; Study of profitable utilization of agricultural wastes; Visit to poultry and dairy units to study resource allocation, utilization and economics; Visit to an organic farm to study various components and utilization; Study of degraded lands; Economics of Bee keeping and Mushrooms.

### Syllabus organized in Unit (Practical)

Topics	Description with Practical Applications	Hours
Preparation of cropping scheme for irrigated/ dry- land situations.	Objective, pre-requisite, cropping scheme, principles of cropping and layout. Indices to evaluate cropping systems {Cropping index (cropping intensity), Multiple cropping index (MCI), Cultivated land utilization index (CLUI) Rotational intensity}.	4
Study of existing farming systems in nearby villages.	Objective, primary data collection, proforma for identification of predominant farming systems (Name of state/Zone/ District/Block /Village/Name of Households/Farms size (ha) - table form).	4
Preparation of integrated farming system model for wetlands/ dry lands.	Farming system, Criteria for enterprise selection, Integrated Farming System, Interactions and linkages, Evaluation of FSR/IFS, IFS for different agro-climatic zones (India). IFS Model for wetland/irrigated lands & IFS Model for dry lands.	4
Preparation of enriched Farm Yard Manure	Objectives, Principles of composting, farm yard manure (Cattle manure), Constituents of FYM- Dung, Urine, Litter. Quality and composition of FYM, Improved methods of handling farm yard manure, losses of nutrients from FYM during collection and storage, Ways to minimize these losses from FYM during handling.	4
Preparation of Vermi-compost	Objectives, vermi-compost, vermin-culture, very-technology, Types of earthworms in vermicomposting, Mechanism of vermicomposting, Vermiculture industry or vermicompost preparation, Harvesting of the vermicompost from the pit, Precautions, natural enemies and their control, Transportation of live worms, Nutrient composition of vermicompost, Advantage of vermicompost.	4
Visit to urban waste recycling unit	Objective, Waste Water Treatment, Types of Waste Water Treatment Plants, Waste water Treatment Methods, stages of Sewage Treatment.	2
Study of profitable utilization of agricultural wastes	Objective, agricultural wastes, utilization of agricultural wastes- farm yard manure, Compost from Farm and Town Refuse, Nutrient composition of FYM and composts. Vermi-compost, Night Soil, Sewage & Sludge, Green leaf manuring, Concentrated organic manures, Wood ashes.	2
Visit to poultry units to study resource allocation, utilization and economics	Objective, Farm size/Capacity, Farm rent, Equipment expenditure of farm, Expenditures rearing, Labour charges, marketing cost, Total expenditures, productivity ratio, Cost benefit ratio.	2
Visit to dairy units to study resource allocation, utilization and economics	Animal health, milking hygiene, nutrition (feed and water), animal welfare, environment and socio-economic management.	2

<p>Visit to an organic farm to study various components and utilization</p>	<p>Objective, Complete land use pattern: Crops and cropping systems; Area under cattle sheds/ buildings; Roads/paths/stage structures etc Biodiversity: Other than crops, dairy cattle, poultry, bee keeping, mushroom etc, Resource/inputs generation/use; Vermicomposting, composting and other organic preparations Outputs: Their sales and recycling.</p>	<p>4</p>
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### Course Outcomes

- Skilled on preparation of cropping scheme, integrated farming system and preparation of enriched Farm Yard Manure model along with better understanding of farming systems in nearby villages.
- Skilled on preparation of Vermi-compost, utilization of agricultural wastes with exposure visit of poultry, dairy and organic farm unit.
- IFS provides an opportunity to increase economic yield per unit area per unit time by virtue of intensification of crop and allied enterprises.



## Syllabus for M.Sc. Agronomy

**Course Title: DRYLAND FARMING & WATERSHED MANAGEMENT**

**Course Code: AGPCMG303T**

**Semester: III**

**L T P C**  
**2 0 0 2**

### Objective:

- To explore the knowledge of students on fertilizers and manures as sources of plant nutrients in addition of integrated approach of crop nutrition with soil fertility evaluation and sustainability of soil fertility.

### Course Syllabus (Theory)

Definition, concept and characteristics of dry land farming; dry land versus rainfed farming; significance and dimensions of dry land farming in Indian agriculture. Soil and climatic parameters with special emphasis on rainfall characteristics; constraints limiting crop production in dry land areas; types of drought, characterization of environment for water availability; crop planning for erratic and aberrant weather conditions. Stress physiology and resistance to drought, adaptation of crop plants to drought, drought management strategies; preparation of appropriate crop plans for dry land areas; mid contingent plan for aberrant weather conditions. Tillage, tith, frequency and depth of cultivation, compaction in soil tillage; concept of conservation tillage; tillage in relation to weed control and moisture conservation; techniques and practices of soil moisture conservation (use of mulches, kinds, effectiveness and economics); antitranspirants; soil and crop management techniques, seeding and efficient fertilizer use. Concept of watershed resource management, problems, approach and components.

### Syllabus organised in Unit (Theory)

Unit	Content	Hours
1	<b>Dry land farming</b> Definition, concept and characteristics of dry land farming; dry land versus rainfed farming; significance and dimensions of dry land farming in Indian agriculture.	4
2	<b>Soil and climatic parameters</b> Soil and climatic parameters with special emphasis on rainfall characteristics; constraints limiting crop production in dry land areas; types of drought, characterization of environment for water availability; crop planning for erratic and aberrant weather conditions.	8
3	<b>Drought</b> Stress physiology and resistance to drought, adaptation of crop plants to drought, drought management strategies; preparation of appropriate crop plans for dry land areas; mid contingent plan for aberrant weather conditions.	8
4	<b>Tillage</b> Tillage, tith, frequency and depth of cultivation, compaction in soil tillage; concept of conservation tillage; tillage in relation to weed control and moisture conservation; techniques and practices of soil moisture conservation (use of mulches, kinds, effectiveness and economics); antitranspirants; soil and crop management techniques, seeding and efficient fertilizer use.	8
5	<b>Watershed management</b> Concept of watershed resource management, problems, approach and components.	4

### Course Outcomes

- Student will be understand the concept of fertility and productivity of soil and crop growth with their factors affecting along with concept of organic farming.
- Study the essential crop nutrient and able to understand their function in growth of plants with preparation of organic manure and their composition.
- Student will be able to understand the concept of recycling of organic waste, commercial fertilizers and crop response along with fertilizer use efficiency.

### Recommended Text Books / Reference Books

- Tillage and Crop Production- Das NR. 2007 Scientific Publishers.
- Principles of Agronomy- T. Yellamanda Reddy & G.H. Sankara Reddy. 1992. Kalyani..
- Technologies for Food Security and Sustainable Agriculture- Singh P & Maliwal PL. 2005. Agrotech Publishing Company.

- Research for Rainfed Farming- Katyal JC & Farrington J. 1995. CRIDA.
- Challenges and Strategies of Dryland Agriculture- Rao SC & Ryan J. 2007. Scientific Publishers.

## Syllabus for M.Sc. Agronomy

**Course Title: DRYLAND FARMING & WATERSHED  
MANAGEMENT LAB**

**Course Code: AGPCMG303P**

**Semester: III**

**L T P C**  
**0 0 2 1**

### Objective:

- The prominent aim of this lab is to teach the student various organic fertility sources and best use practices, along with soil management practices for soil health and fertility in sustainable manner/ form.
- The course will consists of lecture (both theory and practical) in the lab.
- Highlights the mainly practical oriented topics.
- Evaluation will be done not on the theory but on the basis of assigned practical.
- Aim of study to practically expertize the student on eager to learn scale.
- To teach the basic concepts and practices of dry land farming and soil moisture conservation.

### Course Syllabus (Practical)

Seed treatment, seed germination and crop establishment in relation to soil moisture contents. Moisture stress effects and recovery behaviour of important crops. Estimation of moisture index and aridity index. Estimation of moisture index and aridity index. Spray of anti-transpirants and their effect on crops. Spray of anti-transpirants and their effect on crops. Collection and interpretation of data for water balance equations. Water use efficiency. Preparation of crop plans for different drought conditions. Study of field experiments relevant to dryland farming. Visit to dryland research stations and watershed projects.

### Syllabus organised in Unit (Practical)

Topics	Description with Practical Applications	Hours
Seed treatment, seed germination and crop establishment in relation to soil moisture contents.	Seed treatments are the biological, physical and chemical agents and techniques applied to seed to provide protection and improve the establishment of healthy crops. Most common tests are the cold germination test, accelerated aging test, the tetrazolium test and warm germination test. Each test is designed to evaluate various qualities of the seed.	4
Moisture stress effects and recovery behaviour of important crops.	Germination of seeds, leaf area, leaf expansion and root development of plant.	4
Estimation of moisture index and aridity index	$I_m = 100 \times (S - D)/PE$ , where $I_m$ is the moisture index, $S$ is the water surplus in months when precipitation exceeds evapotranspiration, $D$ is the water deficit in months when evapotranspiration exceeds precipitation, and $PE$ is the potential. It is calculated as the ratio of $P/PET$ , where $P$ is the average annual precipitation and $PET$ is the potential evapotranspiration.	4
Spray of anti-transpirants and their effect on crops.	Antitranspirant types- stomata closing type, film-forming, reflecting type, growth retardants. It reducing the absorption of solar energy and thereby reducing leaf temperatures and transpiration rates.	4
Collection and interpretation of data for water balance equations.	Water balance equation $\rightarrow P = R + ET + \Delta S$ . where: $P$ = Precipitation. $R$ = Runoff. $ET$ = Evapotranspiration.	4
Water use efficiency.	Reflects how the carbon and water cycles are coupled and is an effective integral trait for assessing the responses of vegetated ecosystems to climate change.	2
Preparation of crop plans for different drought conditions.	Plant native and /or drought-tolerant grasses, ground covers, shrubs and trees. Install irrigation devices that are the most water efficient for each use, such as micro and drip irrigation, and soaker hoses.	2
Study of field experiments relevant to dryland farming	Dryland techniques to reduce evaporation and transpiration loss. Soil moisture is the most limiting factor in dryland agriculture. Types of mulches (Stubble mulch, straw mulch, plastic mulch).	4
Visit to dryland research stations and watershed projects.	Focusing on weather based crop planning and plant protection strategies for rainfed crops. Transfer of technologies from Farm to Field to Fork and reaching the un-reached	4

	farmers. Developing wastelands or degraded lands, drought-prone and desert areas on watershed basis, keeping in view the capability of land, site conditions and local needs.	
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### Course Outcomes

- Student will be able to understand the characteristics of rainfed /dry land farming
- Evaluate the extent of rainfed/dry farming areas in the country and State of U.P.
- Illustrates the moisture conservation practice and use of anti-transpirants in Dryland farming
- Student will be able to understand the concept of watershed management, principles and its practices.
- Identify the suitable crops, crop rotations and other agriculture techniques for various categories of rainfed areas.

## Syllabus for M.Sc. Agronomy

**Course Title: PRINCIPLES & PRACTICES OF ORGANIC FARMING**

**Course Code: AGPCMG304T**

**Semester: III**

**L T P C**  
**2 0 0 2**

### Objective:

- Knowledge and concept of organic farming
- Basics of soil fertility, nutrient cycle manures and soil biota
- Knowledge of weeds and their control in agricultural crops
- Basic concepts of marketing and export potential, certification and labelling
- Study of Cropping and farming systems for sustainable agriculture

### Course Syllabus (Theory)

Organic farming - concept and definition, its relevance to India and global agriculture and future prospects; land and water management - land use, minimum tillage; shelter zones, hedges, pasture management, agro-forestry. Organic farming and water use efficiency; soil fertility, nutrient recycling, organic residues, organic manures, composting, soil biota and decomposition of organic residues, earthworms and vermicompost, green manures and biofertilizers. Farming systems, crop rotations, multiple and relay cropping systems, intercropping in relation to maintenance of soil productivity. Control of weeds, diseases and insect pest management, biological agents and pheromones, biopesticides Socio-economic impacts; marketing and export potential: inspection, certification, labeling and accreditation procedures; organic farming and national economy.

### Syllabus organised in Unit (Theory)

Unit	Content	Hours
1	<b>Organic farming and water management</b> Organic farming - concept and definition, its relevance to India and global agriculture and future prospects; land and water management - land use, minimum tillage; shelter zones, hedges, pasture management, agro-forestry.	8
2	<b>Organic manures and bio-fertilizers</b> Organic farming and water use efficiency; soil fertility, nutrient recycling, organic residues, organic manures, composting, soil biota and decomposition of organic residues, earthworms and vermi-compost, green manures and bio-fertilizers.	8
3	<b>Farming systems</b> Farming systems, crop rotations, multiple and relay cropping systems, intercropping in relation to maintenance of soil productivity.	8
4	<b>Plant protection</b> Control of weeds, diseases and insect pest management, biological agent and pheromones, bio-pesticides.	4
5	<b>Socio-economic impacts</b> Socio-economic impacts; marketing and export potential: inspection, certification, labelling and accreditation procedures; organic farming and national economy.	4

### Course Outcomes

- Students will develop a deep understanding of the principles and practices and how each relates to various organic farming systems and enterprises and be able to answer.
- Skilled on weed vermi-compost, weed compost along with a single dose of biofertilizer.
- Understand the plant protection is the act of overseeing climate, weeds, pests and diseases that harm or repress the development of natural product, agronomical and other crops.
- Student understand the socio-economic impacts such as marketing and better incomes for small-scale farmers and increased food security, environmental benefits such as improved soil and water quality and biodiversity preservation, and improved animal welfare.

### **Recommended Text Books/ Reference Books**

- Principles of Agronomy- T. Yellamanda Reddy & G.H. Sankara Reddy. 1992. Kalyani.
- Organic Farming – Theory and Practice- Palaniappan SP & Anandurai K. 1999. Scientific Publ.
- Hand Book of Organic Farming- Sharma A. 2002. Agrobios.
- Organic Farming in India, Problems and Prospects - Thapa, U. and Tripathi, P.

## Syllabus for M.Sc. Agronomy

**Course Title: PRINCIPLES & PRACTICES OF ORGANIC FARMING LAB**

**Course Code: AGPCMG304P**

**Semester: III**

**L T P C**  
**0 0 2 1**

### Objective:

- The course will consist of lecture (both theory and practical) in the lab.
- Highlight the mainly practical oriented topics.
- Evaluation will be done not on the theory but on the basis of lab experiments.
- Aim of study to practically skilled the student on the scale of learning by doing.

### Course Syllabus (Practical)

Aerobic and anaerobic methods of making compost. Making of vermi-compost. Identification and nursery raising of important agro-forestry trees and trees for shelter belts. Efficient use of bio-fertilizers, technique of treating legume seeds with Rhizobium cultures, use of Azotobacter, Azospirillum, and PSB cultures in field. Visit to an organic farm. Quality standards, inspection, certification and labelling and accreditation procedures for farm produce from organic farms.

### Syllabus organised in Unit (Practical)

Topics	Description with Practical Applications	Hours
Aerobic and anaerobic methods of making compost	Compost, nutrient content of compost, benefit of compost, parameters in composting. Mechanism in composting, phase of composting, microorganism involved in composting, materials required in composting and methods of preparation of compost-Indore, Bangalore, NADEP, Coimbatore method.	4
Making of vermicompost	Vermicompost, Nutrient content of Vermicompost, Materials for preparation of Vermicompost, Efficient Species, Vermiwash and Method of preparation.	2
Identification and nursery raising of important agro-forestry trees and trees for shelter belts	Nursery, Selection of the nursery site (Location, Topography of land, drainage, transportation, Labour, protection from animals, market needs and size). Material required (Seedbed, spade, seeds, rotten farmyard manure, khurpi, watering can, mulching material (dried leaves). Precautions to be taken during the preparation of nursery bed.	8
Efficient use of biofertilizers, technique of treating legume seeds with Rhizobium cultures, use of Azotobacter, Azospirillum, and PSB cultures in field	Different types of Biofertilizers and their applications, liquid fertilizer application (seed treatment & soil application), how to apply or use biofertilizers, precautions before biofertilizer application, tips to get good response to biofertilizer application.	8
Visit to an organic farm	Introduction, Objectives, Study Guide, Procedure- Principle, Requirements Steps. Observation and Result, Precautions.	2
Quality standards, inspection, certification and labelling and accreditation procedures for farm produce from organic farms.	Develop an organic system plan, Implement the organic system plan. General Requirement for Certification, Application for Certification, Review of Application, Scheduling of Inspection, Verification during Inspection, Group Certification Standards, Continuation of Certification	8

### Course Outcomes

- Student will be able to study the various components and their utilization at organic farm.
- Student understand the basic function of Biocontrol Laboratory and Biofertilizer and vermicompost Unit.
- Study of preparation of Biodynamic compost and cow pat pit.
- Study of quality analysis of compost and vermicompost.

## Syllabus for M.Sc. Agronomy

**Course Title: AGROSTOLOGY AND AGROFORESTRY**

**Course Code: AGPCMG305T**

**Semester: III**

**Objective:**

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<b>2</b>	<b>0</b>	<b>0</b>	<b>1</b>

The aim of the study is to explore the knowledge to get the maximum seed production, mechanization, resource conservation and integrated nutrient, insect-pest and disease management with soil management and crop production.

**Course Syllabus (Theory)**

Crop growth analysis in relation to environment; agro-ecological zones of India. Quantitative agro-biological principles and inverse yield nitrogen law; Mitscherlich yield equation, its interpretation and applicability; Baule unit. Effect of lodging in cereals; physiology of grain yield in cereals; optimization of plant population and planting geometry in relation to different resources, concept of ideal plant type and crop modeling for desired crop yield. Scientific principles of crop production; crop response production functions; concept of soil plant relations; yield and environmental stress. Integrated farming systems, organic farming and resource conservation technology including modern concept of tillage; dry farming; determining the nutrient needs for yield potentiality of crop plants, concept of balance nutrition and integrated nutrient management; precision agriculture.

**Syllabus organised in Unit (Theory)**

Unit	Content	Hours
1	<b>Crop growth analysis</b> Crop growth analysis in relation to environment; agro-ecological zones of India. Quantitative agro-biological principles and inverse yield nitrogen law; Mitscherlich yield equation, its interpretation and applicability; Baule unit.	8
2	<b>Plant population and Planting Geometry</b> Effect of lodging in cereals; physiology of grain yield in cereals; optimization of plant population and planting geometry in relation to different resources, concept of ideal plant type and crop modeling for desired crop yield. Scientific principles of crop production; crop response production functions; concept of soil plant relations; yield and environmental stress.	10
3	<b>Organic Farming and Nutrient Management</b> Integrated farming systems, organic farming and resource conservation technology including modern concept of tillage; dry farming; determining the nutrient needs for yield potentiality of crop plants, concept of balance nutrition and integrated nutrient management; precision agriculture.	14

**Course Outcomes**

- Able to understand the basic principle of agronomy, field management and fertilizers.
- Student will be able to understand the crop growth analysis along with yield equation and its interpretation.
- Student will be able to understand the effect of lodging, effective uses of plant geometry along with crop modeling and soil plant relations.
- Student will be able to understand the concept of integrated farming, organic farming and integrated nutrient management.

**Recommended Text Books/ Reference Books**

- Modern Concepts And Advances Principles In Crop Production- SC Panda, Agrobios (India).
- Principles of Crop Production- SR. Reddy. 2000. Kalyani Publishers.
- Principles of Agronomy- S. Sankaran & TVS. Mudaliar. 1997. The Bangalore Printing & Publ.
- Principles and Practices of Agronomy- SS. Singh. 2006, Kalyani Publishers.
- Principles and Practices of Agronomy- P Balasubramaniyan & SP Palaniappan. 2001. Agrobios.
- Maximizing Crop Yields- NK. Fageria. 1992. Marcel Dekker.
- Soil Fertility and Fertilizers- JL Havlin, JD Beaton, SL Tisdale & WL Nelson. 2006. 7th Ed. Prentice Hall.
- Principles of Genetics- Phundan Singh, Kalyani Publishers.



## Syllabus for M.Sc. Agronomy

**Course Title: AGROSTOLOGY AND AGROFORESTRY  
LAB**  
**Semester: III**

**Course Code: AGPCMG305P**

**L T P C**  
**0 0 2 1**

### Objective:

- To manage land efficiently so that its productivity is increased and restored.
- To generate employment opportunities for rural peoples.
- To provide raw material for small cottage industries in rural areas.
- To raise the supply of fuel in the rural areas at convenient distance for consumer.

### Course Syllabus (Practical)

Identification of grasses under agro-forestry systems. Crop growth analysis through vegetative growth attribute's. Study different agro-ecological zones of India. Study of ideal plant type and different crop modelling for desired crop yield. To study about the Integrated farming systems models in eastern Uttar Pradesh.

### Syllabus organised in Unit (Practical)

Topics	Description with Practical Applications	Hours
Identification of grasses under agro-forestry systems	Agroforestry models i.e. Agri-horticulture, agri-silviculture, agri- silvi-pastoral, pastoral-silviculture and pastoral-horticulture were prevalent in the area.	8
Crop growth analysis through vegetative growth attribute's	Concept of growth and development. Principles and concept of growth analysis, like CGR, LAI, RGR, NER etc.	8
Study different agro-ecological zones of India	The National Bureau of Soil Survey & Land Use Planning (NBSS&LUP) came up with twenty agro-ecological zones based on the growing period as an integrated criteria of effective rainfall, soil groups, delineated boundaries adjusted to district boundaries with a minimal number of regions	8
Study of ideal plant type and different crop modelling for desired crop yield.	Assist in pre-season and in-season management decisions on cultural practices, fertilization, irrigation, and pesticide use. crop growth models are -(a) regression models, describing the growth course with some empirical function (e.g. Richards function, polynomials), and (b) mechanistic models	4
To study about the Integrated farming systems models in eastern Uttar Pradesh	Different enterprises of Integrated farming systems like crop production, horticulture, livestock, poultry, piggery, bee-keeping, sericulture, and pastoral-silviculture etc.	4

### Course Outcomes

- Skilled on identification of important grasses under various agroforestry systems.
- Student will be know about the different Agroforestry models.
- Understand the different enterprises of Integrated farming systems.
- Student will be know about the basic concept of ideal plant type and different crop modelling for desired crop yield.

## Syllabus for M.Sc. Agronomy

**Course Title: INTELLECTUAL PROPERTY AND ITS MANAGEMENT IN AGRICULTURE**

**Course Code: AGPCMG306T**

**Semester: III**

**L T P C**  
**1 0 0 1**

### Objective:

- Knowledge, concept and introduction of Intellectual Property Right regime; TRIPs and various provisions in TRIPS Agreement
- Basics of Legislations for the protection of various types of Intellectual Properties
- Fundamentals of patents, copyrights, geographical indications, designs and layout
- Basic concepts of Protection of plant varieties and farmers' rights and bio-diversity protection, Convention on Biological Diversity; International Treaty on Plant Genetic Resources for Food and Agriculture
- Study of Licensing of technologies, Material transfer agreements, Research collaboration Agreement, License Agreement
- The main objective of this course is to equip students and stakeholders with knowledge of intellectual property rights (IPR) related protection systems, their significance and use of IPR as a tool for wealth and value creation in a knowledge based economy.

### Course Syllabus (Theory)

Historical perspectives and need for the introduction of Intellectual Property Right regime; TRIPs and various provisions in TRIPS Agreement; Intellectual Property and Intellectual Property rights (IPR), benefits of securing IPRs; Indian Legislations for the protection of various types of Intellectual Properties; Fundamentals of patents, copyrights, geographical indications, designs and layout, trade secrets and traditional knowledge, trademarks, protection of plant varieties and farmers' rights and biodiversity protection; Protectable subject matters, protection in biotechnology, protection of other biological materials, ownership and period of protection; National Biodiversity protection initiatives; Convention on Biological Diversity; International Treaty on Plant Genetic Resources for Food and Agriculture; Licensing of technologies, Material transfer agreements, Research collaboration Agreement, License Agreement.

### Syllabus organised in Unit (Theory)

Unit	Content	Hours
1	Historical perspectives and need for the introduction of Intellectual Property Right regime; TRIPs and various provisions in TRIPS Agreement;	3
2	Intellectual Property and Intellectual Property Rights (IPR), benefits of securing IPRs; Indian Legislations for the protection of various types of Intellectual Properties;	3
3	Fundamentals of patents, copyrights, geographical indications, designs and layout, trade secrets and traditional knowledge, trademarks, protection of plant varieties and farmers' rights and biodiversity protection	3
4	Protectable subject matters, protection in biotechnology, protection of other biological materials, ownership and period of protection; National Biodiversity protection initiatives;	3
5	Convention on Biological Diversity; International Treaty on Plant Genetic Resources for Food and Agriculture; Licensing of technologies, Material transfer agreements, Research collaboration Agreement, License Agreement.	4

### Course Outcomes

- Understand the concept of Intellectual Property Right regime; TRIPs and various provisions in TRIPS Agreement.
- Knowledge of Legislations for the protection of various types of Intellectual Properties.
- Student will be able to understand the protection of plant varieties and farmers' rights and bio-diversity protection along with CBD (Convention on Biological Diversity); International Treaty on Plant Genetic Resources for Food and Agriculture.
- Knowledge of Convention on Biological Diversity; International Treaty on Plant Genetic Resources for Food and Agriculture
- Knowledge of Socio-economic impact, Research collaboration Agreement, License Agreement

### **Recommended Text Books/ Reference Books**

- Erbisch FH & Maredia K.1998. Intellectual Property Rights in Agricultural Biotechnology. CABI. Ganguli P. 2001.
- Intellectual Property Rights: Unleashing Knowledge Economy. McGraw-Hill. Intellectual Property Rights: Key to New Wealth Generation. 2001.
- NRDC & Aesthetic Technologies. Ministry of Agriculture, Government of India. 2004.
- State of Indian Farmer. Vol. V. Technology Generation and IPR Issues. Academic Foundation. Rothschild M & Scott N. (Ed.). 2003.
- Intellectual Property Rights in Animal Breeding and Genetics. CABI. Saha R. (Ed.). 2006.
- Intellectual Property Rights in NAM and Other Developing Countries: A Compendium on Law and Policies.
- Daya Publ. House. The Indian Acts - Patents Act, 1970 and amendments; Design Act, 2000; Trademarks Act, 1999; The Copyright Act, 1957 and amendments; Layout Design Act, 2000; PPV and FR Act 2001, and Rules 2003; National Biological Diversity Act, 2003.

## Syllabus for M.Sc. Agronomy

**Course Title: AGRICULTURAL RESEARCH, RESEARCH ETHICS AND RURAL DEVELOPMENT PROGRAMS**

**Course Code: AGPCMG307T**

**Semester: III**

**L T P C**  
**1 0 0 1**

### Objective:

The course intends to sensitize the scholars about the basic issues related with agricultural research, ethics in research as well as rural development. The scholars will be also educated about principles and philosophy of rural development and motivated towards practicing and promoting ethics in research and developmental endeavors.

### Course Syllabus (Theory)

History of agriculture in brief; Ancient agriculture, Historical stages of development of agriculture. Development of scientific agriculture in world and India. Green revolution in India. Revolutions related to agriculture and allied activities. National Agricultural Research Systems (NARS): ICAR- mandate, research institutions their mandate. Regional Agricultural Research institutions of ICAR. State Agricultural Universities. Consultative Group on international Agricultural Research (CGIAR). International Agricultural Research Centers (IARC) their mandate and achievements. Global agricultural research system: need, scope, opportunities. Role promoting food security, reducing poverty and protecting the environment; Partnership with NARS, role as a partner in the global agricultural research system, strengthening capacities at national and regional levels; International fellowships for scientific mobility. NAAS rating journals. Research ethics: research integrity, research safety in laboratories, welfare of animals used in research, computer ethics and standards land problems in research ethics. Definition, Meaning and Connotations of Rural Development. Rural Development Policies and Strategies. Rural Development Programmes -CDP and IADP. Drought Prone Area Programme and Swarnajayanti Gram Swa rojagar Yojana. Sampoorna Grameena Rojagar Yojana and National Rural Employment Guaranty Act. Panchayat Raj Institutions in implementation of Rural Development Programmes. Evaluation of Rural Development Policies and Programmes.

### Syllabus organised in Unit (Theory)

Unit	Content	Hours
1	History of agriculture in brief; Ancient agriculture, Historical stages of development of agriculture. Development of scientific agriculture in world and India. Green revolution in India. Revolutions related to agriculture and allied activities. National Agricultural Research Systems (NARS): ICAR- mandate, research institutions their mandate. Regional Agricultural Research institutions of ICAR. State Agricultural Universities. Consultative Group on international Agricultural Research (CGIAR). International Agricultural Research Centers (IARC) their mandate and achievements. Global agricultural research system: need, scope, opportunities. Role promoting food security, reducing poverty and protecting the environment; Partnership with NARS, role as a partner in the global agricultural research system, strengthening capacities at national and regional levels; International fellowships for scientific mobility. NAAS rating journals.	6
2	Research ethics: research integrity, research safety in laboratories, welfare of animals used in research, computer ethics and standards land problems in research ethics.	4
3	Definition, Meaning and Connotations of Rural Development. Rural Development Policies and Strategies Rural Development Programmes -CDP and IADP. Drought Prone Area Programme and Swarnajayanti Gram Swa rojagar Yojana. Sampoorna Grameena Rojagar Yojana and National Rural Employment Guaranty Act. Panchayat Raj Institutions in implementation of Rural Development Programmes. NGOs/Voluntary Organizations in Rural Development. Evaluation of Rural Development Policies and Programmes. Constraints in implementation of Rural Development Programmes.	6

### Course Outcomes

- Students will be able to recognize and examine the relationships between inputs and outputs in their agricultural field to make effective and profitable.
- Demonstrate ethical awareness, the ability to do ethical reflection, and the ability to apply ethical principles in decision-making.
- Improving the living standards of rural people by utilizing the easily available natural and human resources.

### **Recommended Text Books/ Reference Books**

- Ableman, M. 2005. Fields of plenty: A farmer's journey in search of real food and the people who produce it. San Francisco: Chronicle Books.
- Agarwal, A. 2005. Environmentalism: Technologies of government and the making of subjects. Durham, NC: Duke University Press. 5
- Gadgil, M. and Guha, R. 1995. Ecology and equity. The use and abuse of nature in contemporary India. New Delhi: Penguin Books.
- Jain, L.C., Krishnamurthy, B.V. and Tripathi, P.M. 1986. Grass without roots under Government Auspices. Sage Publications, New Delhi.
- Punia M. S. Manual on international Research and Research ethics. CCS, Hayana Agricultural University, Hisar.
- RAO, B.S.V., 2007, Rural Development strategies and Role of Institutions-Issues, Innovations and Initiatives Mittal Publishers, New Delhi.
- Rivera, Roberto and David Borasky 2009. Research Ethics Training Curriculum, Family Health International. P.O. Box 13950 Research Triangle Park, NC27709. USA.
- Singh, K., 1998, rural Development Principles, Policies and Management Sage Publications, New Delhi.
- Singh, Kartar 2001. Rural Development – Principles, Policies and Management. Sage Publications, New Delhi.
- Thompson, P. 1997. The spirit of the soil: Agriculture and environmental ethics. New York: Routledge Press.

## Syllabus for M.Sc. Agronomy

**Course Title: MASTERS SEMINAR- II**

**Course Code: AGPCMG308T**

**Semester: III**

L	T	P	C
1	0	0	1

### Objective:

The aim of this seminar to explore the knowledge of students through the presentation on selected topic from field crops, crop nutrition, manure and fertilizers, Irrigation water management, weed & herbicidal management with crop rotation.

### Course Syllabus (Presentation)

Soil, Tillage and Soil and water conservation, Rainfed Agriculture, watershed management, Irrigation water management, Weed management, Farming System and sustainable agriculture, Organic farming, Soil fertility, manures and fertilizers, Geoinformatics, Nanotechnology for precision farming.

## Syllabus for M.Sc. Agronomy

**Course Title: PROFESSIONAL PROFICIENCY (M.Sc. Ag.)- III      Course Code: PTSPMMG30T**  
**Semester: III**

**Objective:**

**L    T    P    C**  
**4    0    0    4**

Students should be able to read and write correct English, attain reasonable fluency in the Language and should also be exposed to introductory lessons of Aptitude Building.

**Course Syllabus (Theory)**

Hard skill includes Basic Grammar, Close Test, Conjunction, Preposition, Construction of Sentences and Reading Comprehension etc. Efforts should be made to overcome the initial hesitation of speaking English of students and hence improve their fluency in English. Suggested methods include: In addition to the testing of candidates' understanding of the English Language, its vocabulary, grammar, sentence structure, synonyms, antonyms and its correct usage, etc. his/her writing ability, would also be tested. Class should be interactive and students should always be engaged in some kind of conversation. Each student should speak 10 minutes, 2-5 times in 2<sup>nd</sup> semester on topics of his choice selected from Social, Environmental, Sports, Business and Economics, Medicines and Health Care, Science and Technology, Politics, World Affairs and Religion etc. In the above process students should be regulated towards better Vocabulary and Pronunciation. Aptitude Building Quantitative Aptitude: Ratio and proportion, Partnership. Profit and loss. Logical Reasoning: Inequalities, Direction Test, Blood Relation

**Syllabus organised in Unit (Theory)**

Unit	Content	Hours
1	<p><b>Hard Skills</b> Hard skill includes Basic Grammar, Close Test, Conjunction, Preposition, Construction of Sentences and Reading Comprehension etc.</p>	<b>20</b>
2	<p><b>Communication Skill</b> Efforts should be made to overcome the initial hesitation of speaking English of students and hence improve their fluency in English. Suggested methods include:</p> <ul style="list-style-type: none"> <li>• In addition to the testing of candidates' understanding of the English Language, its vocabulary, grammar, sentence structure, synonyms, antonyms and its correct usage, etc. his/her writing ability, would also be tested.</li> <li>• Class should be interactive and students should always be engaged in some kind of conversation.</li> <li>• Each student should speak 10 minutes, 2-5 times in 2<sup>nd</sup> semester on topics of his choice selected from Social, Environmental, Sports, Business and Economics, Medicines and Health Care, Science and Technology, Politics, World Affairs and Religion etc.</li> </ul> <p>In the above process students should be regulated towards better Vocabulary and Pronunciation.</p>	<b>18</b>
3	<p><b>Aptitude Building</b> <b>Quantitative Aptitude</b></p> <ul style="list-style-type: none"> <li>• Ratio and proportion.</li> <li>• Partnership.</li> <li>• Profit and loss.</li> </ul> <p><b>Logical Reasoning</b></p> <ul style="list-style-type: none"> <li>• Inequalities.</li> <li>• Direction Test.</li> <li>• Blood Relation</li> </ul>	<b>10</b>

**Course Outcomes**

- Better representation of himself/ herself in terms of communication skills, overall personality development and aptitude building required for Government & Non-government jobs.
- This program will help students employable and ready for Seed Company, Fertilizer Company, Agro-Industries/ Dairy & Poultry based Industries /Corporate/ CSR project and other Public and Private Sector, Non-Governmental Organizations (NGOs) jobs.

## Syllabus for M.Sc. Agronomy

**Course Title: MASTER'S RESEARCH  
(DISSERTATION WORK)**

**Course Code: AGPCMG309P**

**Semester: III**

**L T P C**  
**0 0 5 5**

### Objective:

The prominent aim of the course to equipped the students with skills to write dissertations, article and research papers etc. from the agricultural research field and able to communicate and articulate in English language.

- The course will consist of lecture (both theory and practical) in the lab.
- Highlight the mainly practical oriented topics.
- Evaluation will be done only on the basis of lab.
- Aim of study to practically skilled the student on the scale of learning by doing.

### Course Syllabus (Practical)

Technical Writing– Various forms of scientific writings– thesis, technical papers, reviews, manuals, etc., Various parts of thesis and research communications (title page, authorship contents page, preface, introduction, review of literature, material and methods, experimental results and discussion); Writing of abstracts, summaries, précis, citations etc.; commonly used abbreviations in the theses and research communications; illustrations, photographs and drawings with suitable captions; pagination, numbering of tables and illustrations; writing of numbers and dates in scientific write-ups; Editing and Proof-reading; Writing of a review article. Communication Skills– Grammar (Tenses, parts of speech, clauses, punctuation marks); Error analysis (Common errors); Concord; Collocation; Phonetic symbols and transcription; Accentual pattern; Weak forms in connected speech; Participation in group discussion; Facing an interview; presentation of scientific papers.

### Syllabus organised in Unit (Practical)

Topics	Description with Practical Applications	Hours
Various forms of scientific writings– theses, technical papers, reviews, manuals, etc.	Cover Letter, Review Article, Plagiarism, Structure of Review Article, What makes review articles good, Conclusion.	2
Various parts of thesis and research communications (title page, authorship contents page, preface, introduction, review of literature, material and methods, experimental results and discussion)	First part, Cover page, Description page, Table of contents, List of figures, List of tables. Research reports; Introduction of the topic, Theoretical basis, Implementation of the project, Research results and discussion, Development project reports, List of references, Appendices.	2
Writing of abstracts, summaries, précis, citations etc.	Structured Abstract, Additional Thoughts of Abstract, Titles, Keywords, Conclusions.	2
Commonly used abbreviations in the theses and research communications; illustrations, photographs	ANOVA: Analysis of Variance, CF: Community Forest, DDC: District Development Committee, DoA: Department of Agriculture, FAO: Food and Agricultural Organization, GDP: Gross Domestic Product, GOs: Government Organizations.	2
Drawings with suitable captions; pagination, numbering of tables and illustrations	Table 1, Table 2, Figure 1, Figure 2, Table 3, etc., Descriptive caption, Simple Consecutive Numbering, Section-based Numbering.	2
Writing of numbers and dates in scientific write-ups	Times of Day, Use figures, Spell out in words, Indicate continuing time, Dates; Use figures throughout, Spell out month in words, Continuing date, Sequence of the year.	2
Editing and Proof-reading	Concentration is Key, Paper Printout, Watch Out for Homonyms, Watch Out for Contractions and Apostrophes, Check the Punctuation, Read it Backwards, Get Someone Else to Proof read It.	2
Writing of a review article	Purpose of review papers, Domain-based review papers, Theory-based review papers, Method-based review papers, Process and structure for review papers,	2



	Systematic literature review process, Structure of systematic review papers, Conclusion.	
Communication Skills– Grammar (Tenses, parts of speech, clauses, punctuation marks)	Verbal, Written, Present tense, Past tense, Future tense, Verb, Noun, Adjective, Adverb, Pronoun, Preposition, Conjunction, Interjection, Commas, Full-stop, Question marks, Exclamation marks, Colons, Semicolons.	4
Error analysis (Common errors); Concord; Collocation; Phonetic symbols and transcription; Accentual pattern; Weak forms in connected speech	Error Analysis, Error Taxonomy, Intralingual, Interlingual, Linguistic Component.	4
Participation in group discussion	Topical Group Discussions, Case-studies, Abstract Group Discussions, Evaluation criteria; Content, Analytical skills, Reasoning skills, Organisation skills, Communication skills, Creativity, Listening skill, Leadership quality, Body language, Group behavior.	4
Facing an interview; presentation of scientific papers	Research, Practice, Dress Well, Be Punctual and Prepared, Wait Actively, First Impression, Don't Stress, Introduce Yourself Professionally. Podium Presentation, Appropriate Conference, Make a Plan, Prepare the Abstract, Content for Slides and Speech, Practice and Time your Speech, Familiarize with the Hall and the Audio-Visual System, Delivering the Presentation.	4

### Course Outcomes

- Skilled on writing of theses, research paper and manuals along with the core findings of a study derived from the methods applied to gather and analyze information as a parts of thesis and research communications.
- Student will be skilled on scientific writing of abstract and summary of the research study along with abbreviations which is used in the theses and research communications with photograph.
- Understand the importance of editing and proof reading and skilled on pagination, numbering of tables along with date on scientific write-ups and review articles.
- Skilled on communication with grammatical importance and actively participation in a group discussion, interview along with presentation of scientific research paper.

### Recommended Text Books/ Reference Books

- MLA Handbook for writers of Research Papers- Joseph G. 2000. 5th Ed. Affiliated East- West Press.
- Comp. Oxford Advanced Learner's Dictionary of Current English- Hornby AS. 2000. 6<sup>th</sup> Ed. Oxford University Press.
- Technical Writing- Gordon HM & Walter JA. 1970. 3<sup>rd</sup> Ed. Holt, Rinehart & Winston.
- Handbook for Technical Writing- James HS. 1994. NTC Business Books.
- Speaking English Effectively- Mohan K. 2005. MacMillan India.
- Course in Phonetics and Spoken English- Abhishek. Sethi J & Dhamija PV. 2004. 2<sup>nd</sup> Ed. Prentice Hall of India.
- Technical Writing- Richard WS. 1969. Barnes & Noble.
- High School English Grammar and Composition- Wren PC & Martin H. 2006. S. Chand & Co.
- Spoken English; Flourish Your Language- Robert C. (Ed.). 2005.

## Syllabus for M.Sc. Agronomy

**Course Title: LIBRARY AND INFORMATION SERVICES  
LAB**

**Course Code: AGPCMG310P**

**Semester: III**

**L T P C**  
**0 0 2 1**

### Objective:

To equip the library users with skills to trace information from libraries efficiently, to appraise them of information and knowledge resources, to carry out literature survey, to formulate information search strategies and to use modern tools (Internet, OPAC, search engines etc.) of information search.

### Course Syllabus (Practical)

Introduction to library and its services; Role of libraries in education, research and technology transfer; Classification systems and organization of library; Sources of information – Primary Sources, Secondary Sources and Tertiary Sources; Intricacies of abstracting and indexing services (Science Citation Index, Biological Abstracts, Chemical Abstracts, CABI Abstracts, etc.); Tracing information from reference sources; Literature survey; Citation techniques/ Preparation of bibliography; Use of CD-ROM Databases, Online Public Access Catalogue and other computerized library services; Use of Internet including search engines and its resources; e-resources access methods.

### Syllabus organised in Unit (Practical)

Topics	Description with Practical Applications	Hours
Introduction to library and its services	Exploring the background of a topic; Developing a topic or research question; Finding sources; Evaluating sources; Using and citing sources.	4
Role of libraries in education, research and technology transfer	Role of Libraries in Education, Research and Transfer of Technology · Outlines of the lecture/presentation · Generally, literacy is considered to be the ability	4
Classification systems and organization of library	Its consists of two steps. Firstly, the subject or topic of the material is ascertained. Next, a call number (essentially a book's address) based on the classification system in use at the particular library will be assigned to the work using the notation of the system.	4
Sources of information	Primary Sources, Secondary Sources and Tertiary Sources	2
Intricacies of abstracting and indexing services	Science Citation Index, Biological Abstracts, Chemical Abstracts, CABI Abstracts, etc.	4
Tracing information from reference sources	Reference and information access sources are encyclopaedias, dictionaries, biographical sources, geographical sources, fact finding sources, etc.	2
Literature survey; Citation techniques/ Preparation of bibliography	5 Steps to Writing a Hassle-Free Literature Review Step 1—Narrow your topic. ... Step 2—Gather your sources and pick the right ones to use. ... Step 3—Find connections, patterns, disagreements, pivotal changes and gaps. . Step 4—determine how you will organize your literature review. ... Step 5—Write your literature review.	4
Use of CD-ROM Databases, Online Public Access Catalogue and other computerized library services	CD-ROMs are used as databases to store large quantity of data, in the form of bibliographical, full text, numerical, graphical, and even sound.	4
Use of Internet including search engines and its resources; e-resources access methods	E-resources with an app or mobile optimized page Ebsco e-journals and e-books, Ellibs e-books, Knovel e-books, Pro Quest E-book Central, Pub Med database. social media, blogs, personal experiences, books, journal and magazine articles, expert opinions, newspapers, and websites	4

### **Course Outcomes**

- Understand the importance of the resources and services they offer create opportunities for learning, support literacy and education, and help shape the new ideas and perspectives that are central to a creative and innovative society.
- Student will be able to facilitate subject access by allowing the user to find out what works or documents the library has on a certain subject.
- Understand the indexes provide entries which enable you to locate information, while abstracts summarize content while making sure that all the essential details are included.
- Understand the Reference sources are authoritative works that help you locate information about people, facts, and ideas. These sources can help you find the date of an important event, major achievements of an individual or organization, or a definition of a term or concept.
- Skilled on E-resources are available on the Internet, databases and CDs / VCDs at a library, knowledge resource centers etc.

### **Recommended Text Books/ Reference Books**

- Bhatt r. K. History and development of libraries in india. 1995. Mittal publications, new delhi.
- Chapman e. A. And lynden f. C. Advances in librarianship. 2000. Academic press, san diego.
- Prasher r. G. Information and its communication. 1991. Medallion press, new delhi.
- Singh, s. P. Special libraries in the electronic environment. 2005. Bookwell, new delhi.
- Venkappaiah v. And madhusudhan m. Public library legislation in the new millennium. 2006. Bookwell, new delhi.