

SCHEME & SYLLABUS
M. Sc. Ag. (Agronomy)



Department of Agriculture
UISH
Sant Baba Bhag Singh University

2020

SANT BABA BHAG SINGH UNIVERSITY, KHALA -1430030, JALANDHAR

Institute Name: UISH
Department Name: Agricultural Sciences
Programme Name: M.Sc. Ag. Agronomy
Number of Semesters 4

Vision:

To develop skilled and efficient human resource in the field of Agronomy for imparting education to students, undertaking appropriate research on crop and natural resource management on sustainable basis in the hills and mountains, extend knowledge and skill to the hill farmers.

Mission:

1. To achieve excellence in the curriculum planning pertaining to agronomy by periodically updating it in order to provide the students with sound technical knowledge.
2. To strengthen the research activities in Agronomy by undertaking innovative and application oriented projects for the development of Agricultural and allied sectors.
3. To stimulate and nurture student's interest in agronomy and achieve their professional goals
4. To generate, disseminate, integrate and apply knowledge which is vital to society and to provide leadership and service to the nation.



Details of Programme Educational Objectives, Program Outcomes, Program Specific Outcomes

S. No. Programme Educational Objective (PEO) (The Graduate/Undergraduate will...)

- 1**
- PEO1. Train and develop scholars and promote research by providing students with contemporary concepts in various fields of crop agronomy.
 - PEO2. Generate knowledge through training in cognitive, affective, and psychomotor, which are necessary for productive scholarly research in a selected area of crop agronomy.
 - PEO3. Acquire in-depth knowledge in area(s) of specialization.
 - PEO4. Undertake independent research and present results in a coherent and comprehensive manner and hence enrich area(s) of scholarship.

2 Programme Outcomes (PO) (At the end of Programme/Degree mentioned above , the graduates will be able to)

- PO1. Specific knowledge of various branches specialized to their studies.
- PO2. Detailed knowledge on the subject to improve the farmer's condition by their contributions.
- PO3. Detailed knowledge of cultivation practices, soil, fertilizers, livestock's insect pest, economic associated with farming enterprises.
- PO4. Use appropriate scientific and statistical methods and evaluations for decision making in various sectors of agriculture.

3 Programme Specific Outcomes (PSO)

- PSO1. Demonstrate use of written and oral communication skills.
- PSO2. Understanding the basic concepts and theories and terminology of agronomy.
- PSO3. Undertake teaching, research and offer administrative and consultancy services to organizations.
- PSO4. Apply research and expertise in solving or suggesting solutions to problems in the agricultural industry

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Sr. No.	Subject Code	Subject	Credit	Semester	Page No.
1.	AGR501*	Modern concepts in crop production	3+0	I	6
2.	AGR503*	Principles and practices of soil fertility and nutrient management	2+1	I	7-8
3.	AGR505*	Principles and practices of weed management	2+1	I	9-10
4.	AGR511	Agronomy of fodder and forage crops	2+1	I	11-12
5.	AGR515*	Master's Research	0+4	I	13
6.	MAT529	Experimental designs	2+1	I	14-15
7.	CSE551	Computer fundamentals and programming	2+1	I	16-17
8.	AGR502	Agronomy of oilseed, fibre and sugar crops	2+1	II	19-20
9.	AGR504	Cropping systems	2+0	II	21-22
10.	AGR506	Dryland farming	2+1	II	23-24
11.	AGR510	Agrometeorology and crop weather forecasting	2+1	II	25-26
12.	AGR512	Agronomy of medicinal, aromatic and under-utilized crops	2+1	II	27-28
13.	AGR514	Agrostology and agroforestry	2+1	II	29-30
14.	AGR516	Principles and practices of organic farming	2+1	II	31-32
15.	AGR518	Mechanism of herbicide action	2+1	II	33-34
16.	AGR500*	Master's Research	0+4	II	34
17.	AGR550	Soil erosion and	2+1	II	35-36

		conservation			
18.	AGR552	Soil, water and air pollution	2+1	II	37-38
19.	BOT522	Intellectual property and its management in agriculture	2+0	II	39
20.	AGR607*	Principles and practices of water management	2+1	III	41-42
21.	AGR609	Agronomy of major cereals and pulses	2+1	III	43-44
22.	AGR603*	Master's Seminar	1+0	III	44
23.	AGR605*	Master's Comprehensive	0+2	III	45
24.	AGR601*	Master's Research	0+4	III	45
25.	EVS601	Disaster management	1+0	III	46-47
26.	LIB601	Library and information services	0+1	III	48
27.	AGR600*	Master's Research	0+8	IV	50
28.	AGR602	Technical writing and communications skills	0+1	IV	51
29.	AGR604	Human rights and constitutional duties	1+0	IV	52-53
30.	AGR606	Agriculture research, research, ethics and rural development programme	1+0	IV	54-55

*Compulsory for Master's program

List of Courses Offered

Sr. No.	Subject Code	Subject	Credit	Semester
Major Courses				
1.	AGR501*	Modern concepts in crop production	3+0	I
2.	AGR503*	Principles and practices of soil fertility and nutrient management	2+1	II
3.	AGR505*	Principles and practices of weed management	2+1	I
4.	AGR607*	Principles and practices of water management	2+1	III
5.	AGR609	Agronomy of major cereals and pulses	2+1	III
6.	AGR511	Agronomy of fodder and forage crops	2+1	I
7.	AGR515*	Master's Research	0+4	I
8.	AGR502	Agronomy of oilseed, fibre and sugar crops	2+1	II
9.	AGR504	Cropping systems	2+0	II
10.	AGR506	Dryland farming	2+1	II
11.	AGR510	Agrometeorology and crop weather forecasting	2+1	II
12.	AGR512	Agronomy of medicinal, aromatic and under-utilized crops	2+1	II
13.	AGR514	Agrostology and agroforestry	2+1	II
14.	AGR516	Principles and practices of organic farming	2+1	II
15.	AGR518	Mechanism of herbicide action	2+1	II
16.	AGR500*	Master's Reserch	0+4	II

17.	AGR603*	Master's Seminar	1+0	III
18.	AGR605*	Master's Comprehensive	0+2	III
19.	AGR601*	Master's Research	0+4	III
20.	AGR600*	Master's Research	0+8	IV
Minor Courses				
21.	AGR550	Soil erosion and conservation	2+1	II
22.	AGR552	Soil, water and air pollution	2+1	II
Supporting Courses				
23.	MAT529	Experimental designs	2+1	I
24.	LIB601	Library and information services	0+1	I
25.	CSE551	Computer fundamentals and programming	2+1	I
Interdisciplinary Courses				
26.	EVS601	Disaster management	1+0	III
27.	BOT522	Intellectual property and its management in agriculture	2+0	II
28.	AGR602	Technical writing and communications skills	0+1	IV
29.	AGR604	Human rights and constitutional duties	1+0	IV
30.	AGR606	Agriculture research, research, ethics and rural development programme	1+0	IV
*Compulsory for Master's program				

M. Sc. Ag. (Agronomy) Scheme

SEMESTER-I

Sr. No	Subject Code	Type of Course	Subject Name	Credits (L:T:P)	Contact Hours (L:T:P)	Total Contact Hours	Total Credit Hours
1.	AGR501	CR	Modern concepts in crop production	3:0:0	3:0:0	3	3
2.	AGR503	CR	Principles and practices of soil fertility and nutrient management	2:0:1	2:0:2	4	3
3.	AGR505	CR	Principles and practices of weed management	2:0:1	2:0:2	4	3
4.	AGR515	CR	Master's Research	0:0:4	0:0:8	8	4
5.	MAT529	SC	Experimental designs	2:0:1	2:0:2	4	3
6.	CSE551	SC	Computer fundamentals and programming	2:0:1	2:0:2	4	3

Total Credit Hours: 19
Total Contact Hours: 27

CR-Core Courses

SC- Supporting Courses

SEMESTER-II

Sr. No.	Subject Code	Type of course	Subject Name	Credits (L:T:P)	Contact Hours (L:T:P)	Total Contact Hours	Total Credit Hours
1.	AGR502	DSE	Agronomy of oilseed, fibre and sugar crops	2:0:1	2:0:2	4	3
2.	AGR504	DSE	Cropping systems	2:0:0	2:0:0	2	2
3.	AGR506	DSE	Dryland farming	2:0:1	2:0:2	4	3
4.	AGR500	CR	Master's Research	0:0:4	0:0:8	8	4
5.	AGR550	MC	Soil erosion and conservation	2:0:1	2:0:2	4	3
6.	AGR552	MC	Soil, water and air pollution	2:0:1	2:0:2	4	3
7.	BOT522	IC	Intellectual property and its management in agriculture	2:0:0	2:0:0	2	2

Total Credit Hours: 20**Total Contact hrs: 28****CR-Core Courses****IC- Interdisciplinary Courses****DSE- Discipline Specific Elective****MC- Minor Courses**

SEMESTER-III							
Sr. No.	Subject Code	Type of course	Subject Name	Credits (L:T:P)	Contact Hours (L:T:P)	Total Contact Hours	Total Credit Hours
1.	AGR607	CR	Principles and practices of water management	2:0:1	2:0:2	4	3
2.	AGR609	DSE	Agronomy of major cereals and pulses	2:0:1	2:0:2	4	3
3.	AGR603	CR	Master's Seminar	1:0:0	1:0:0	1	1
4.	AGR605	CR	Master's Comprehensive	0:0:2	0:0:4	4	2
5.	AGR601	CR	Master's Research	0:0:4	0:0:8	8	4
6.	EVS601	IC	Disaster management	1:0:0	1:0:0	1	1
7.	LIB601	SC	Library and information services	0:0:1	0:0:2	2	1

CR-Core Courses

IC- Interdisciplinary Courses

DSE- Discipline Specific Elective

SC- Supporting Courses

Total Credit Hours: 15
Total Contact hours: 24

SEMESTER-IV

Sr. No.	Subject Code	Type of Course	Subject Name	Credits (L:T:P)	Contact Hours (L:T:P)	Total Contact Hours	Total Credit Hours
1.	AGR600	CR	Master's Research	0:0:8	0:0:16	16	8
2.	AGR602	IC	Technical Writing and communications skills	0:0:1	0:0:2	2	1
3.	AGR604	IC	Human rights and constitutional duties	1:0:0	1:0:0	1	1
4.	AGR606	IC	Agriculture research, research, ethics and rural development programme	1:0:0	1:0:0	1	1

CR-Core Courses**IC- Interdisciplinary Courses****Total Credit Hours: 11**
Total Contact hours: 20

CREDIT LOAD FOR MASTER'S PROGRAM		
I	MAJOR CREDITS	24
II	MINOR CREDITS	06
III	SUPPORTING	07
IV	INTERDISCIPLINARY CREDITS	06
V	MASTER'S COMPREHENSIVE	02
VI	MASTER'S RESEARCH	20
TOTAL I to V		45
TOTAL		45 + 20=65





SEMESTER-I

Course Code	AGR501	
Course Title	Modern concepts in crop production	
Type of course	Theory	
L T P	3:0:0	
Credits	3(3+0)	
Course prerequisite	B.Sc. (Agriculture)	
Course objective	To teach the basic concepts of soil management and crop production.	
Course outcomes	CO1	Describe the role of physiological processes controlling plant growth and development.
	CO2	Understand the effect of environment and management on crop growth, rate of development, water and nutrient use efficiency.
	CO3	Describe the impact of latest crop management practices on crop productivity and resource use efficiency.

Syllabus

Theory

UNIT-I

Crop growth analysis in relation to environment, Agroclimatic zones of India. Inverse yield nitrogen law, Mitscherlich's yield equation, its interpretation and applicability, Baule unit.

UNIT-II

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.

UNIT-III

Scientific principles of crop production, seed production techniques in various crops, crop response production functions, concept of soil plant relations, yield and environmental stress.

UNIT-IV

Integrated farming systems, organic farming, resource conservation technology including modern concept of tillage, dry farming, determining the nutrient needs for yield potentiality of crop plants, precision agriculture.

Recommended Books:

S. No	Name	Author(S)	Publisher
1	Principles of crop production	SR Reddy	Kalyani publishers
2	Principles of agronomy	Reddi and Reddy	Kalyani publishers
3	Principles of agronomy	SR Reddy	Kalyani publishers

Course Code	AGR503	
Course Title	Principles and practices of soil fertility and nutrient management	
Type of course	Theory and Practical	
L T P	2:0:2	
Credits	3(2+1)	
Course prerequisite	B.Sc. (Agriculture)	
Course objective	To impart knowledge of soil fertility and plant nutrients and apprise about the integrated approach of plant nutrition and sustainability of soil resources.	
Course outcomes	CO1	Students will learn about the preparation and use of organic manure, management of organic waste and residue management.
	CO2	Students will know how the commercial fertilizers are being prepared, their use and nutrient interaction.
	CO3	Students will be able to understand the different methods of application of the fertilizers.

Syllabus

Theory

UNIT-I

Soil fertility and productivity- factors affecting, features of a good soil management, problems of supply and factors affecting availability of nutrients, relation between nutrient supply and crop growth, organic farming - basic concepts and definitions. Criteria of essentiality of nutrients, essential plant nutrients – their functions and deficiency symptoms, transformation and dynamics of major plant nutrients in soil.

UNIT-II

Preparation and use of farmyard manure, compost, green manures, vermicompost, biofertilizers and other organic concentrates, their composition, availability and crop responses, recycling of organic wastes and residue management.

UNIT-III

Commercial fertilizers, composition, relative fertilizer value and cost, crop response to different nutrients, residual effects and fertilizer use efficiency, fertilizer mixtures and grades, agronomic, chemical and physiological methods of estimating and techniques of increasing fertilizer use efficiency, nutrient interactions.

UNIT-IV

Time and methods of manures and fertilizers application, foliar application and its concept, relative performance of organic and inorganic manures, economics of fertilizer use, concept of balanced nutrition and integrated nutrient management, use of vermi-compost and residue wastes in crops.

Practical

1. Identification of nutrients deficiency symptoms.
2. Determination of soil ph, EC and organic Carbon.
3. Determination of available N, P, K and S in soils.
4. Determination of total N, P, K and S in plants
5. Interpretation of interaction effects and computation of economic and yield optima.

Recommended Books:

S.No.	Name	Author(S)	Publisher
1	Introductory soil science	Dilip Kumar Das	Kalyani publishers
2	Fertilizers-Atextbook	Ranjan Kumar Das	Kalyani publishers
3	Manures and fertilizers	PC Das	Kalyani publishers
4	The nature and properties of soils	Brady NC and Weil RR	Pearson Edu.
5	Soil fertility and fertilizers	Tisdale SL WL and Nelson	Prentice Hall

Course Code	AGR505	
Course Title	Principles and practices of weed management	
Type of course	Theory and Practical	
L T P	2:0:2	
Credits	3(2+1)	
Course prerequisite	B.Sc. (Agriculture)	
Course objective	To familiarize the students about the weeds, herbicides and methods of weed control.	
Course outcomes	CO1	Understand the behaviour of herbicides in the environment.
	CO2	evolution of herbicide resistance in weeds.
	CO3	Management of different types of weeds.

Theory

UNIT-I

Classification and characteristics of weeds, special weed problems including aquatic and parasitic weeds, ecology and physiology of major weeds, ecophysiology of crop-weed competition including allelopathy.

UNIT-II

Principles and methods of weed control, concept of integrated weed management, principles of chemical weed control, weed control through bioherbicides.

UNIT-III

Mode and mechanism of action of herbicides, herbicide selectivity, herbicide combinations, adjuvants and safeners, degradation of herbicides in soils and plants, effect of herbicides in relation to environment, herbicide resistance in weeds and crops.

UNIT-IV

Weed management in major crops and cropping systems, weed shifts in cropping systems, control of weeds in non-cropped situations including grasslands, pastures, tea gardens, orchards and aquatic ecosystem in hills. Cost:benefit analysis of weed management, weed indices.

Practical

1. Identification of important weeds of different crops.

2. Preparation of a weed herbarium, weed survey in crops and cropping systems
3. Crop-weed competition studies, calculation of doses of herbicides and preparation of spray solutions of herbicides for high and low volume sprayers.
4. Use of various types of spray pumps and nozzles, their calibration and related calculations and economics of weed control.

Recommended books:

S.No.	Name	Author(S)	Publisher
1	Weed management principles and practices	OP Gupta	Kalyani publishers
2	Fundamentals of weed science	OP Gupta	Kalyani publishers
3	Weed management	US Walia	Kalyani publishers



Course Code	AGR511
Course Title	Agronomy of fodder and forage crops
Type of course	Theory and Practical
L T P	2:0:2
Credits	3(2+1)
Course prerequisite	B.Sc. (Agriculture)
Course Objectives	To teach the crop husbandry of major fodder and forage crops.

Syllabus

Theory

UNIT-I

Adaptation, distribution, improved varieties, agro-techniques and quality aspects including anti-quality factors of important fodder crops like maize, sorghum, *bajra*, *guar*, cowpea, oats, barley, berseem, *senji*, etc.

UNIT-II

Adaptation, distribution, improved varieties, agro-techniques and quality aspects including anti-quality factors of important forage crops/grasses & legumes like, Napier grass, setaria, *Panicum*, *Lasiurus*, *Cenchrus*, clovers, lucerne, fescue grass, brome grass, etc.

UNIT-III

Year-round fodder production and management, preservation and utilization of forage and pasture crops

UNIT-IV

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 nutritive value, value addition of poor quality fodder. Economics of forage cultivation and seed production techniques

Practical

1. Training on raising fodder crops, canopy measurement
2. Yield and quality estimation *viz.* crude protein, NDF, ADF, lignin, silica, cellulose etc. of various fodder and forage crops
3. Anti-quality components like HCN in sorghum and such factors in other crops

4. Hay and silage making and economics of their preparation

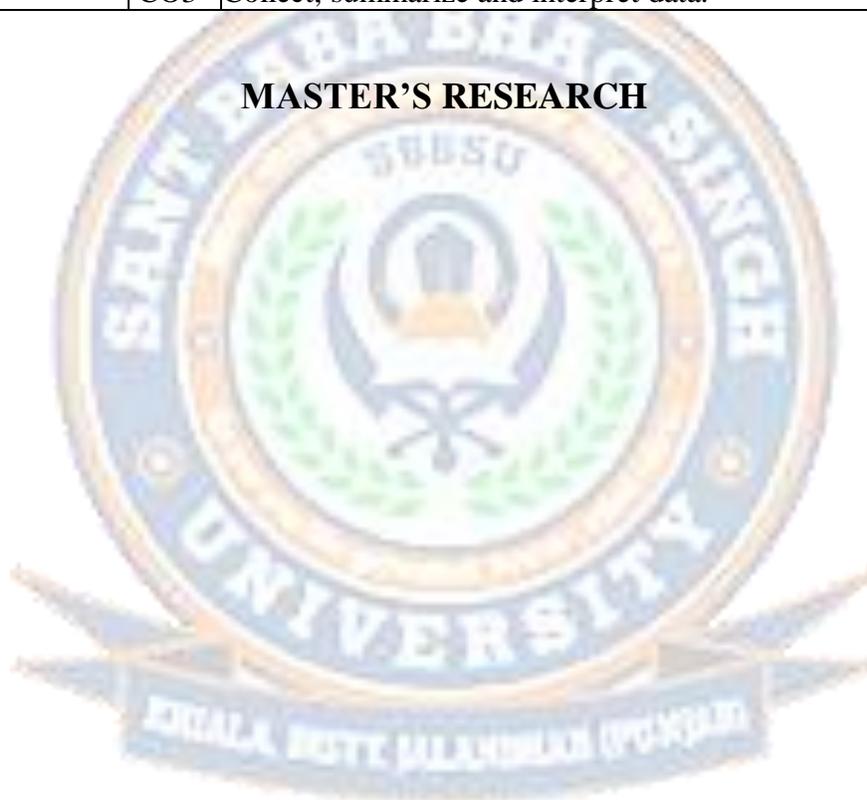
Recommended Books:

S. No	Name	Author(S)	Publisher
1	Principles of crop production	SR Reddy	Kalyani publishers
2	Text Book of Field Crop Production	Rajendra Prasad	ICAR
3	Modern Techniques of Raising Field Crops	Chhidda Singh., Prem Singh and Rajbir Singh	Oxford & IBH Publishing Co., New Delhi



Course Code	AGR515
Course Title	Master's Research
Type of course	Practical
L T P	0:0:4
Credits	4(0+4)
Course prerequisite	B.Sc. (Agriculture)
Course objective	To familiarize the students about the data collection, analyze data and interpretation.
Course outcomes	CO1 This program will provide students the theoretical and research backgrounds necessary to design, implement, and manage different cropping system.
	CO2 Students will conduct field trials.
	CO3 Collect, summarize and interpret data.

MASTER'S RESEARCH



Course Code	MAT529
Course Title	Experimental Designs
Type of course	Theory and Practical
L T P	2:0:2
Credits	3(2+1)
Course prerequisite	B.Sc. (Agriculture)
Course objective	To enable the students to understand the concepts involved in planning, designing their experiments and analysis of experimental data.
Course outcomes	CO1 Valuate the suitability of the models treated in the course, for different experimental situations.
	CO2 Present the planning, implementation and analysis of a conducted experiment, in oral and written form.
	CO3 Analyse experimental data with suitable software.

Syllabus

Theory

UNIT-I

Need for designing of experiments, characteristics of a good design, basic principles of designs - randomization, replication and local control. Uniformity trials, analysis of variance and interpretation of data, transformations, orthogonality and partitioning of degrees of freedom.

UNIT-II

Completely randomized design, randomized block design and Latin square design, repeated Latin square design, analysis of covariance and missing plot techniques in randomized block and Latin square designs.

UNIT-III

Factorial experiments (symmetrical as well as asymmetrical), confounding in symmetrical factorial experiments, factorial experiments with control treatment.

UNIT-IV

Split plot and strip plot designs, crossover designs, balanced incomplete block design, lattice design-concepts, randomization procedure, analysis and interpretation of results, experiments with mixtures.

Practical

1. Analysis of data obtained from CRD, RBD, LSD.
2. Analysis of factorial experiments with and without confounding.
3. Analysis with missing data; balanced incomplete block design; split plot and strip plot designs.
4. Transformation of data.
5. Analysis of lattice design.

Recommended books:

S. No	Name	Author(S)	Publisher
1	Design and Analysis of Experiments.	RA Fisher	Oliver & Boyd.
2	Handbook on Analysis of Agricultural Experiments	AK Nigam & VK Gupta	IASRI Publication



Course Code	CSE551	
Course Title	Computer fundamentals and programming	
Type of course	Theory and Practical	
L T P	2:0:2	
Credits	3(2+1)	
Course prerequisite	B.Sc. (Agriculture)	
Course objective	To impart comprehensive knowledge about the computer fundamentals and programming	
Course outcomes	CO1	Bridge the fundamental concepts of computers with the present level of knowledge of the students.
	CO2	Familiarize operating systems, programming languages, peripheral devices, networking, multimedia and internet.
	CO3	Understand how logic circuits and Boolean algebra forms as the basics of digital computer.

Syllabus

Theory

UNIT-I

Computer fundamentals-number systems, decimal, octal, binary and hexadecimal, representation of integers, fixed and floating point numbers, character representation, ASCII, EBCDIC. Functional units of computer, I/O devices, primary and secondary memories.

UNIT-II

Programming fundamentals with C - algorithm, techniques of problem solving, flowcharting, stepwise refinement, representation of integer, character, real, data types, constants and variables, arithmetic expressions, assignment statement, logical expression.

UNIT-III

Sequencing, alteration and iteration, arrays, string processing.

UNIT-IV

Sub-programs, recursion, pointers and files. Program correctness, debugging and testing of programs.

Practical

1. Conversion of different number types
2. Creation of flow chart
3. Conversion of algorithm/flowchart to program
4. Mathematical operators, operator precedence, sequence, control and iteration
5. Arrays and string processing
6. Pointers and file processing

Recommended books:

S. No	Name	Author(S)	Publisher
1	Digital logic and computer design	MM Mano	Prentice Hall of India
2	Digital computer electronics	AP Malvino & JA Brown	Tata McGraw Hill





SEMESTER-II

Course Code	AGR502	
Course Title	Agromony of oilseed, fibre and sugar crops	
Type of course	Theory and Practical	
L T P	2:0:2	
Credits	3(2+1)	
Course prerequisite	B.Sc. (Agriculture)	
Course objective	To teach the crop husbandry of oilseed, fibre and commercial crops.	
Course outcomes	CO1	Planning, seedbed preparation and layout of field experiments.
	CO2	To understand the different growth stages of crop, Intercultural operation in different crops.
	CO3	Estimation of crop yield on the basis of yield attributes.

Syllabus

Theory

UNIT-I

Origin and history, area and production, classification, improved varieties, adaptability, climate, soil, nutrition, water and cultural requirements, quality components, post-harvest handling and processing of *Kharif* oilseeds - Groundnut, sesame, castor, sunflower, soybean, etc.

UNIT-II

Origin and history, area and production, classification, improved varieties, adaptability, climate, soil, nutrition, water and cultural requirements, quality components, post-harvest handling and processing of *Rabi* oilseeds – Rapeseed and mustard, linseed, safflower , etc.

UNIT-III

Origin and history, area and production, classification, improved varieties, adaptability, climate, soil, nutrition, water and cultural requirements, quality components, post-harvest handling and processing of Fiber crops - Cotton, jute, sunhemp, etc.

UNIT-IV

Origin and history, area and production, classification, improved varieties, adaptability, climate, soil, nutrition, water and cultural requirements, quality components, post-harvest handling and processing of Sugar crops – Sugar-beet and sugarcane.

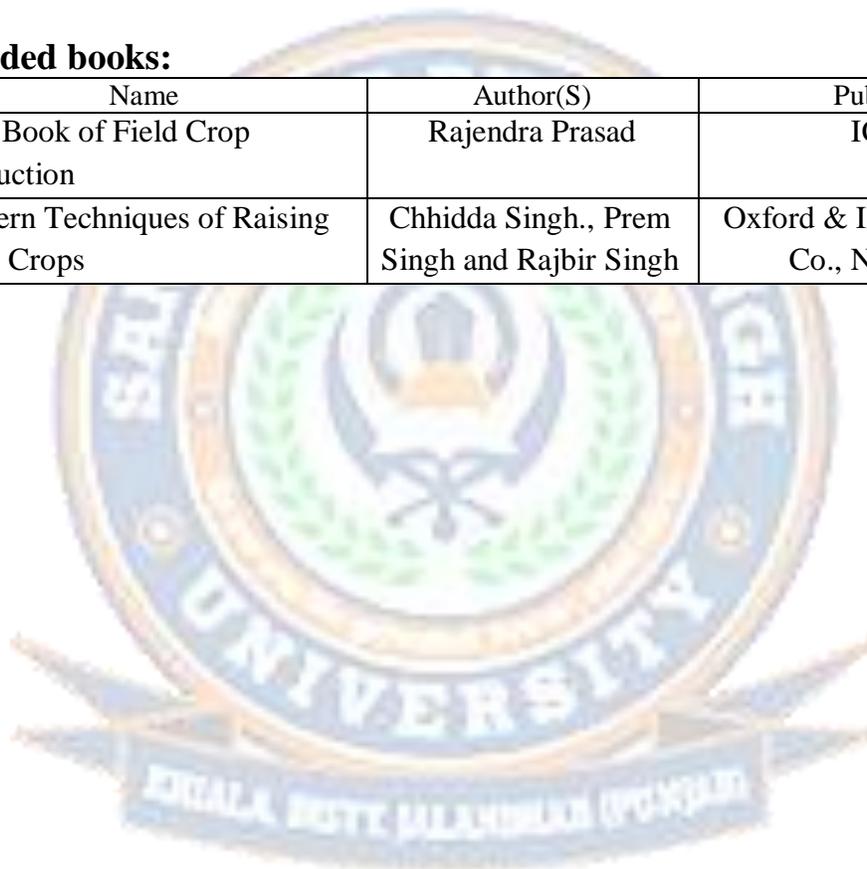
Practical

1. Phenological studies of important crops
2. Familiarization with planting and growing techniques of sugarcane
3. Estimation of crop yield on the basis of yield attributes

4. Formulation of cropping schemes for various farm sizes and calculation of cropping and rotational intensities; computation of growth indices (LER, CGR, RGR, NAR, LAD)
5. Aggressivity; relative crowding coefficient, monetary yield advantage and area-time equivalent ratio (ATER) of prominent intercropping systems
6. Estimation of quality parameters of various crops
7. Planning of field experiments on cultural, fertilizer, weed control and water management aspects
8. Layout of field experiments; intercultural operations in different crops; computation of cost of cultivation of different crops
9. Visit to nearby villages for identification of constraints in crop production

Recommended books:

S. No	Name	Author(S)	Publisher
1	Text Book of Field Crop Production	Rajendra Prasad	ICAR
2	Modern Techniques of Raising Field Crops	Chhidda Singh., Prem Singh and Rajbir Singh	Oxford & IBH Publishing Co., New Delhi



Course Code	AGR504	
Course Title	Cropping systems	
Type of course	Theory	
L T P	2:0:0	
Credits	2(2+0)	
Course prerequisite	B.Sc. (Agriculture)	
Course objective	To acquaint the students about prevailing cropping systems in the country and practices to improve productivity.	
Course outcomes	CO1	Students will be aware about the cropping systems, their types prevailing in India and how natural resources can be utilized for the beneficial cropping system.
	CO2	Students will be aware about the different competition relations, above and below ground interactions and allelopathic effects.
	CO3	Students will understand the role of organic matter, crop residue management and how fertilizer use efficiency can be increased of different fertilizers.

Syllabus

Theory

UNIT-I

Cropping system: definition, indices and its importance, physical resources, soil and water management in cropping systems, assessment of land use.

UNIT-II

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.

UNIT-III

Above and below ground interactions and allelopathic effects, competition relations, multi-storeyed cropping and yield stability in intercropping, role of non-monetary inputs and low cost technologies, research need on sustainable agriculture.

UNIT-IV

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 systems. Plant ideotypes for drylands, plant growth regulators and their role in sustainability.

Recommended books:

S. No	Name	Author(S)	Publisher
1	Principles of agronomy	Reddi and Reddy	Kalyani publishers
2	Principles of agronomy	SR Reddy	Kalyani publishers



Course Code	AGR506	
Course Title	Dryland farming	
Type of course	Theory and Practical	
L T P	2:0:2	
Credits	3(2+1)	
Course prerequisite	B.Sc. (Agriculture)	
Course objective	To teach the basic concepts and practices of dryland farming and soil moisture conservation	
Course outcomes	CO1	Understanding of mid season contingent crop plan for aberrant weather conditions.
	CO2	Study of anti-transpirants and their effect on crops.
	CO3	Study of moisture stress effects and recovery behavior of important crops.

Syllabus

Theory

UNIT-I

Definition, concept and characteristics of dry land farming areas/regions, dry land versus rainfed farming, significance and dimensions of dry land farming in Indian agriculture.

UNIT-II

Soil and climatic parameters with special emphasis on rainfall characteristics, constraints of crop production in dry land areas, types of drought, characterization of environment for water availability, contingent crop planning for erratic and aberrant weather conditions.

UNIT-III

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 season contingent crop plan for aberrant weather conditions.

UNIT-IV

Tillage, tith, frequency and depth of cultivation, compaction with 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), anti-transpirants, soil and crop management techniques, seeding and efficient fertilizer use for increasing water use efficiency. Watershed- concept, resource management, problems, approach and components.

Practical

1. Seed treatment, seed germination and crop establishment in relation to soil moisture contents
2. Moisture stress effects and recovery behaviour of important crops; estimation of moisture index and aridity index
3. Spray of anti-transpirants and their effect on crops
4. Collection and interpretation of data for water balance equations; methods of increasing water use efficiency
5. Preparation of crop plans for different drought conditions
6. Study of field experiments relevant to dryland farming
7. Visit to watershed projects

Recommended books:

S. No	Name	Author(S)	Publisher
1	Principles of agronomy	Reddi and Reddy	Kalyani publishers
2	Principles of agronomy	SR Reddy	Kalyani publishers
3	Dryland Agriculture	SC Panda	Kalyani publishers



Course Code	AGR510	
Course Title	Agrometeorology and crop weather forecasting	
Type of course	Theory and Practical	
L T P	2:0:2	
Credits	3(2+1)	
Course prerequisite	B.Sc. (Agriculture)	
Course objective	To impart knowledge about agro-meteorology and crop weather forecasting to meet the challenges of aberrant weather conditions	
Course outcomes	CO1	Students will get aware about the agro-meteorology and development in relation to crop environment, composition of atmosphere, distribution of atmospheric pressure and wind.
	CO2	Students will be aware about effects of temperature on plant physiological processes, measures of atmospheric temperature, relative humidity.
	CO3	Students will understand weather forecasting, short, medium and long range, aerospace science and weather forecasting, benefits of weather services to agriculture.

Syllabus

Theory

UNIT-I

Agro-meteorology - aim, scope and development in relation to crop environment, composition of atmosphere, distribution of atmospheric pressure and wind. Characteristics of solar radiation, energy balance of atmosphere system, radiation distribution in crop canopies, radiation utilization by field crops, photosynthesis and efficiency of radiation utilization by field crops, energy budget of plant canopies.

UNIT-II

Temperature profile in air, soil, crop canopies, soil and air temperature effects on plant physiological processes, measures of atmospheric temperature, relative humidity, vapour pressure and their relationships, evapo-transpiration and meteorological factors determining evapo-transpiration.

UNIT-III

Modification of plant environment: artificial rain, heat transfer, controlling heat load, heat trapping and shading, protection from cold, sensible and latent heat flux, controlling soil moisture, monsoon- origin, characteristics, onset, progress and withdrawal, weather hazards, drought monitoring and planning for mitigation.

UNIT-IV

Weather forecasting in India – short, medium and long range, aerospace science and weather forecasting, benefits of weather services to agriculture, remote sensing and its present status in India, atmospheric pollution and its effect on crop production, climate change and its impact on agriculture.

Practical

1. Recording of meteorological parameters *viz.* sun-shine duration, wind velocity, wind direction, relative humidity, soil and air temperature, evaporation, precipitation and atmospheric pressure
2. Measurement of solar radiation outside and within crop canopies
3. Measurement/estimation of evapo-transpiration by various methods
4. Measurement/estimation of soil water balance and rainfall variability

Recommended books:

S. No	Name	Author(S)	Publisher
1	Principles and Practices of agronomy	Balasubramaniyna	Agribios
2	Principles of agronomy	SR Reddy	Kalyani publishers
3	Agrometerology principles and applications of climate studies in agriculture	HS Mavi	Taylor Francis New Delhi

Course Code	AGR512
Course Title	Agromony of medicinal, aromatic and under-utilized crops
Type of course	Theory and Practical
L T P	2:0:2
Credits	3(2+1)
Course prerequisite	B.Sc. (Agriculture)
Course objective	To teach the crop husbandry of medicinal, aromatic and under-utilized crops
Course outcomes	CO1 Students will understand about the of medicinal and aromatic plants in human health.
	CO2 Students will be aware about cultural practices, yield and important constituents of medicinal plants.
	CO3 Students will understand Climate and soil requirements of some underutilized crops

Syllabus

Theory

UNIT-I

Importance of medicinal and aromatic plants in human health, national and state economy and industry, classification of medicinal and aromatic plants according to botanical characteristics and uses.

UNIT-II

Climate and soil requirements, cultural practices, yield and important constituents of medicinal plants (Isabgol, Rauwolfia, Poppy, *Aloe vera*, Satavar, Stevia, Safed Musli, Kalmegh, Asafoetida, *Nux vomica*, Roselle, Aconite, Viola, etc).

UNIT-III

Climate and soil requirements, cultural practices, yield and important constituents of aromatic plants (Citronella, Palmarosa, Mentha, Basil, Lemon grass, Rose, Patchouli, Geranium, Lavender, Tagetes, Kuth, etc.).

UNIT-IV

Climate and soil requirements, cultural practices, yield of under-utilized crops (Ricebean, Lathyrus, Sesbania, Clusterbean, French bean, Buckwheat, Chenopodium, Fenugreek, Grain Amaranth, Coffee, Tea and Tobacco, etc.).

Practical

1. Identification of crops based on morphological and seed characteristics
2. Raising of herbarium of medicinal; aromatic and under-utilized plants
3. Quality characters in medicinal and aromatic plants; methods of analysis of essential oils and other chemicals of importance in medicinal and aromatic plants
4. Visit to herbal garden

Recommended books:

S. No	Name	Author(S)	Publisher
1	Medicinal and aromatic crops	Jitendra Singh	Pointer Publisher
2	Cultivation of medicinal and aromatic crops	Farooqi and Sreeramu	Universities Press



Course Code	AGR514	
Course Title	Agrostology and agroforestry	
Type of course	Theory and Practical	
L T P	2:0:2	
Credits	3(2+1)	
Course prerequisite	B.Sc. (Agriculture)	
Course objective	To study about the grassland ecology and agroforestry system	
Course outcomes	CO1	Students will understand about Agrostology, grassland ecology – community, climax, dominant species, succession, biotype, ecological status of grassland.
	CO2	Students will be aware about agroforestry agroforestry systems, agrisilviculture, silvipasture, agrisilvipasture systems.
	CO3	Students will understand production technology in agro-forestry and agrostology system.

Syllabus

Theory

UNIT-I

Agrostology, definition and importance, grassland ecology – community, climax, dominant species, succession, biotype, ecological status of grasslands in India, grass cover of India, problems and management of grasslands.

UNIT-II

Importance, classification (various criteria), scope, status and research needs of pastures, establishment, improvement and renovation of natural and cultivated pastures, common pasture grasses.

UNIT-III

Agroforestry: definition and importance, agroforestry systems, agrisilviculture, silvipasture, agrisilvipasture, agrihorticulture, aquasilviculture, alley cropping and energy plantation.

UNIT-IV

Crop production technology in agro-forestry and agrostology system, silvipastoral system: meaning and importance for wasteland development, selection of species, planting methods and problems of seed germination in agro-forestry systems, irrigation and manuring in agro-forestry systems, associative influence in relation to above ground and underground interferences, lopping and coppicing in agro-forestry systems, social acceptability and economic viability, nutritive value of trees, tender operation, desirable tree characteristics.

Practical

1. Study of different pastures and agro-forestry systems of India through illustrations;
2. Identification of seeds and plants of common grasses, legumes and trees of economic importance with reference to agro-forestry
3. Seed treatment for improved germination
4. Methods of propagation/planting of grasses and trees in silvipastoral system;
5. Estimation of nutritional and anti- nutritional components

Recommended books:

S. No	Name	Author(S)	Publisher
1	An introduction to agroforestry	PKR Nair	Klower Academic Publishers
2	Grassland ecology	CRW Spedding	Oxford university Press



Course Code	AGR516	
Course Title	Principles and practices of organic farming	
Type of course	Theory and Practical	
L T P	2:0:2	
Credits	3(2+1)	
Course prerequisite	B.Sc. (Agriculture)	
Course objective	To study about the concept of organic farming and different organic practices in crop production	
Course outcomes	CO1	Students will understand about the organic farming its various types, biodynamic farming, vedic farming.
	CO2	Students will be aware about soil fertility, nutrient recycling, organic residues, organic manures and composting.
	CO3	Students will understand control of weeds, diseases and insect pest management, biological agents and pheromones, biopesticides.

Syllabus

Theory

UNIT-I

Organic farming - concept and definitions, its relevance to India and global agriculture and future prospects, biodynamic farming, vedic farming, land and water management - land use, minimum tillage, shelter zones, hedges, pasture management, agro-forestry.

UNIT-II

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.

UNIT-III

Crop rotations, multiple and relay cropping systems, intercropping in relation to maintenance of soil productivity.

UNIT-IV

Control of weeds, diseases and insect pest management, biological agents and pheromones, biopesticides. Socio-economic impacts, certification, labeling and accreditation procedures, organic farming and national economy, marketing and export potential.

Practical

1. Preparation of vermicompost and bioformulations, etc.
2. Aerobic and anaerobic methods of making compost; identification and nursery raising of important agro-forestry trees and trees for shelter belts
3. Efficient use of biofertilizers, technique of treating legume seeds with *Rhizobium* cultures, use of *Azotobacter*, *Azospirillum* and PSB cultures in field
4. Quality standards, inspection, certification, labeling and accreditation procedures for farm produce from organic farms
5. Visits to organic experiments/farms

Recommended books:

S. No	Name	Author(S)	Publisher
1	Organic farming concepts, application and advances	Subhash Chand and Sartaj Ahmad Wani	Daya Publishing House
2	Organic farming	T.D.Pandey, RB Tiwari and SA Panday	Kushal Publication and Distributor
3	Principles of Organic Farming	SR Reddy	Kalyani Publisher



Course Code	AGR518	
Course Title	Mechanism of herbicide action	
Type of course	Theory and Practical	
L T P	2:0:2	
Credits	3(2+1)	
Course prerequisite	B.Sc. (Agriculture)	
Course objective	To familiarize the students about the herbicides, methods of weed control and herbicide action	
Course outcomes	CO1	Students will be familiarizing with the herbicides, herbicide usage, classification of herbicides based on their mode of action.
	CO2	Students will get aware about the translocation of herbicides, their effect on growth and development.
	CO3	Students will be aware about the persistence of herbicides, their residual effect and methods of overcoming the residual effect of herbicides.

Syllabus

Theory

UNIT-I

Historical background of herbicides, definitions in herbicide usage, classification of herbicides based on their mode of action.

UNIT-II

Mechanism of absorption and translocation of herbicides, their effect on growth and development.

UNIT-III

Effect of herbicides on photosynthesis, respiration and protein synthesis, factors modifying the response of herbicides in plants, mechanisms of selectivity of herbicides

UNIT-IV

Persistence of herbicides, their residual effect and methods of overcoming the residual effect of herbicides. Mechanism of herbicide resistance, metabolism of herbicides, mechanism of action of adjuvant and herbicides antidotes.

Practical

1. Familiarization with herbicides
2. Application of various herbicides with different types of mechanism of action
3. Study on nature of mortality of weeds
4. Study of symptoms of phytotoxicity of herbicides in crop plants
5. Persistence of herbicides in soil by bioassay technique
6. Study of movement of herbicides in soil
7. Studies on herbicides resistance

Recommended books:

S. No	Name	Author(S)	Publisher
1	Principles of weed science	VS Rao	Oxford and IBH
2	Weed management principles and practices	OP Gupta	Kalyani publishers
3	Fundamentals of weed science	OP Gupta	Kalyani publishers

Course Code	AGR500
Course Title	Master's Research
Type of course	Practical
L T P	0:0:4
Credits	4(0+4)
Course prerequisite	B.Sc. (Agriculture)
Course objective	To familiarize the students about the data collection, analyze data and interpretation.
Course outcomes	CO1 This program will provide students the theoretical and research backgrounds necessary to design, implement, and manage different cropping system.
	CO2 Students will conduct field trials.
	CO3 Collect, summarize and interpret data.

**MASTER'S RESEARCH**

Course Code	AGR550	
Course Title	Soil erosion and conservation	
Type of course	Theory and Practical	
L T P	2:0:2	
Credits	3(2+1)	
Course prerequisite	B.Sc. (Agriculture)	
Course objective	<ol style="list-style-type: none"> 1. To teach the basic concepts of soil erosion and its management. 2. To learn about the soil conservation practices and watershed management. 	
Course outcomes	CO1	Students will be aware about the concept, causes factors affecting erosion and its management strategies.
	CO2	Students will understand Watershed management - concept, objectives and its approach and also Socioeconomic aspects of watershed management.
	CO3	Students will be familiarized about the role of remote sensing in assessment and planning of watersheds.

Syllabus

Theory

UNIT-I

History, distribution, identification and description of soil erosion problems in India. Forms of soil erosion, effects of soil erosion and factors affecting soil erosion, types and mechanisms of water erosion, raindrops and soil erosion, rainfall erosivity - estimation as EI30 index and kinetic energy, factors affecting water erosion, empirical and quantitative estimation of water erosion, methods of measurement and prediction of runoff, soil losses in relation to soil properties and precipitation.

UNIT-II

Wind erosion- types, mechanism and factors affecting wind erosion, extent of problem in the country. Principles of erosion control, erosion control measures – agronomical and engineering, erosion control structures - their design and layout.

UNIT-III

Soil conservation planning, land capability classification, soil conservation in special problem areas such as hilly, arid and semi-arid regions, waterlogged and wet lands.

UNIT-IV

Watershed management - concept, objectives and approach, water harvesting and recycling, flood control in watershed management, socioeconomic aspects of watershed management, case studies in respect to monitoring and evaluation of watersheds, use of remote sensing in assessment and planning of watersheds.

Practical

1. Determination of different soil erodibility indices - suspension percentage, dispersion ratio, erosion ratio, clay ratio, clay/moisture equivalent ratio, percolation ratio and raindrop erodibility index.
2. Computation of kinetic energy of falling rain drop.
3. Computation of rainfall erosivity index using rain gauge data.
4. Visits to a watershed.

Recommended books:

S. No	Name	Author(S)	Publisher
1	Soil erosion and conservation	RPC Morgan	Wiley Blackwell
2	Principles and Practices of agronomy	Balasubramaniyna	Agribios
3	Principles of agronomy	SR Reddy	Kalyani publishers



Course Code	AGR552	
Course Title	Soil, water and air pollution	
Type of course	Theory and Practical	
L T P	2:0:2	
Credits	3(2+1)	
Course prerequisite	B.Sc. (Agriculture)	
Course objective	To teach the basic concepts of pollution problems associated with agriculture.	
Course outcomes	CO1	Students will understand about the concept, causes factors affecting air pollution.
	CO2	Students will understand the procedures to determine the chemical and biochemical oxygen demand, nutrients and heavy metals that are being polluting our environment.
	CO3	Students will learn about the management of pollution.

Syllabus

Theory

UNIT-I

Soil, water and air pollution problems associated with agriculture, nature and extent. Nature and sources of pollutants – agricultural, industrial, urban wastes, fertilizers and pesticides, acid rains, oil spills etc., air, water and soil pollutants - their CPC standards and effect on plants, animals and human beings.

UNIT-II

Sewage and industrial effluents – their composition and effect on soil properties/health, and plant growth and human beings, soil as sink for waste disposal. Pesticides – their classification, behavior in soil and effect on soil microorganisms.

UNIT-III

Toxic elements – their sources, behavior in soils, effect on nutrients availability, effect on plant and human health. Pollution of water resources due to leaching of nutrients and pesticides from soil, emission of greenhouse gases – carbon dioxide, methane and nitrous oxide.

UNIT-IV

Remediation/amelioration of contaminated soil and water, remote sensing applications in monitoring and management of soil and water pollution.

Practical

1. Sampling of sewage waters; sewage sludge, solid/liquid industrial wastes, polluted soils and plants
2. Estimation of dissolved and suspended solids, chemical oxygen demand (COD) and biological oxygen demand (BOD)
3. Estimation of nitrate and ammonical nitrogen and phosphorus
4. Estimation of heavy metal content in effluents
5. Estimation of heavy metals in contaminated soils and plants.

Recommended books:

S. No	Name	Author(S)	Publisher
1	Environmental pollution and control	NH Gopaldutt	Neelkamal
2	Pollution causes and control	RM Harrson	RSC Publishing



Course Code	BOT522
Course Title	Intellectual property and its management in agriculture
Type of course	Theory
L T P	2:0:0
Credits	2(2+0)
Course prerequisite	B.Sc. (Agriculture)
Course objective	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 outcomes	CO1 Students will be aware about of intellectual property right.
	CO2 Students will get aware about the protection of various types of intellectual properties.
	CO3 Students will be aware about international treaty on plant genetic resources for food and agriculture.

Syllabus

Theory

UNIT-I

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.

UNIT-II

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

UNIT-III

Protectable subject matters, protection in biotechnology, protection of other biological materials, ownership and period of protection. National Biodiversity protection initiatives. Convention on Biological Diversity.

UNIT-IV

International Treaty on Plant Genetic Resources for Food and Agriculture. Licensing of technologies, Material transfer agreements, Research collaboration Agreement, License Agreement.

Recommended books:

S. No	Name	Author(S)	Publisher
1	Law related to intellectual property	Dr. B.L. Wadehra	Universal law publishing
2	Law relating to intellectual property rights	V.K. Ahuja	Universal law publishing



SEMESTER-III

Course Code	AGR607	
Course Title	Principles and practices of water management	
Type of course	Theory and Practical	
L T P	2:0:2	
Credits	3(2+1)	
Course prerequisite	B.Sc. (Agriculture)	
Course objective	To teach the principles of water management and practices to enhance the water productivity.	
Course outcomes	CO1	To give students comprehensive knowledge of crop water requirement and its estimations.
	CO2	To introduce students with basic criteria of irrigation project evaluation.
	CO3	Technically understand, design of irrigation structures including for drainage management.

Syllabus

Theory

UNIT-I

Water and its role in plants, water resources of India, major irrigation projects, extent of irrigated area under different crops in India and in different states.

UNIT-II

Concept of water potential, water movement in soils and plants, transpiration, soil-water-plant relationships, water absorption by plants, crop plants response to water stress, crop plant adaptation to moisture stress condition.

UNIT-III

Soil, plant and meteorological factors determining water needs of crops, scheduling of irrigation, depth and methods of irrigation, micro-irrigation systems, fertigation, management of water in controlled environment and polyhouses.

UNIT-IV

Water management in crops and cropping systems, quality of irrigation water and management of saline water for irrigation, water use efficiency and practices to enhance water productivity. Excess of soil water and plant growth, water management in problem

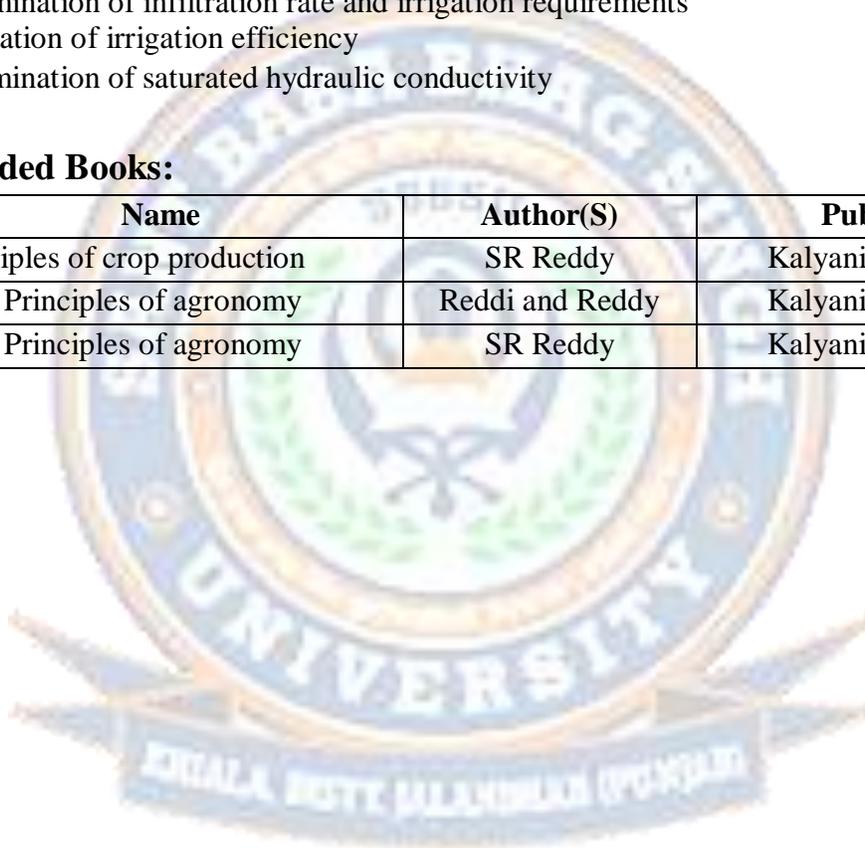
soils, drainage requirement of crops and methods of field drainage, their layout and spacing.

Practical

1. Measurement of soil water potential by using tensiometer, resistance block and pressure plate and membrane apparatus
2. Soil-moisture characteristics curves
3. Determination of FC and PWP
4. Water flow measurements using different devices.
5. Determination of infiltration rate and irrigation requirements
6. Calculation of irrigation efficiency
7. Determination of saturated hydraulic conductivity

Recommended Books:

S. No	Name	Author(S)	Publisher
1	Principles of crop production	SR Reddy	Kalyani publishers
2	Principles of agronomy	Reddi and Reddy	Kalyani publishers
3	Principles of agronomy	SR Reddy	Kalyani publishers



Course Code	AGR609	
Course Title	Agronomy of major cereals and pulses	
Type of course	Theory and Practical	
L T P	2:0:2	
Credits	3(2+1)	
Course prerequisite	B.Sc. (Agriculture)	
Course objective	To teach the crop husbandry of major cereals and pulses.	
Course outcomes	CO1	To study the production technology of cereals and pulses.
	CO2	To identify characteristic of crops, cultivars, and seeds.
	CO3	Understanding the method to calculate the cost of cultivation of different crops.

Syllabus

Theory

UNIT-I

Origin and history, adaptability, area and production, classification, improved varieties, climate, soil, nutrition, water and cultural requirements, quality components, post-harvest handling and processing of *Kharif* cereals- rice, maize, bajra & jowar

UNIT-II

Origin and history, adaptability, area and production, classification, improved varieties, climate, soil, nutrition, water and cultural requirements, quality components, post-harvest handling and processing of *Rabi* cereals- wheat, barley & oats

UNIT-III

Origin and history, adaptability, area and production, classification, improved varieties, climate, soil, nutrition, water and cultural requirements, quality components, post-harvest handling and processing of *Kharif* pulses- soybean, red gram, cowpea, green gram & black gram

UNIT-IV

Origin and history, adaptability, area and production, classification, improved varieties, climate, soil, nutrition, water and cultural requirements, quality components, post-harvest handling and processing of *Rabi* pulses- chickpea, lentil & field pea

Practical

1. Phenological studies of important crops
2. Estimation of crop yield on the basis of yield attributes
3. Formulation of cropping schemes for various farm sizes and calculation of cropping and rotational intensities; computation of growth indices (LER, CGR, RGR, NAR, LAD), aggressivity, relative crowding coefficient, monetary yield advantage and area-time equivalent ratio (ATER) of prominent intercropping systems
4. Estimation of protein content in pulses

5. Planning of field experiments on cultural, fertilizer, weed control and water management aspects
6. Layout of field experiments
7. Intercultural operations in different crops
8. Computation of cost of cultivation of different crops
9. Visit to nearby villages for identification of constraints in crop production

Recommended books:

S. No	Name	Author(S)	Publisher
1	Principles of crop production	SR Reddy	Kalyani publishers
2	Text Book of Field Crop Production	Rajendra Prasad	ICAR
3	Modern Techniques of Raising Field Crops	Chhidda Singh., Prem Singh and Rajbir Singh	Oxford & IBH Publishing Co., New Delhi

Course Code	AGR603	
Course Title	Master's Seminar	
Type of course	Theory	
L T P	1:0:0	
Credits	1(1+0)	
Course prerequisite	B.Sc. (Agriculture)	
Course objective	To familiarize the students about their way of presentation, collection of data for thesis.	
Course outcomes	CO1	Students will demonstrate the ability to collaborate with others as they work on intellectual projects (reading, writing, speaking, researching...).
	CO2	Students will demonstrate the ability to follow discussions, oral arguments, and presentations, noting main points or evidence and tracking threads through different comments.
	CO3	Further, students will be able to challenge and offer substantive replies to others' arguments, comments, and questions, while remaining sensitive to the original speaker and the classroom audience.

MASTER'S SEMINAR

Course Code	AGR605	
Course Title	Master's Comprehensive	
Type of course	Practical	
L T P	0:0:2	
Credits	2(0+2)	
Course prerequisite	B.Sc. (Agriculture)	
Course objective	To understand the basic knowledge of the discipline.	
Course outcomes	CO1	It will improve strong analytical, problem-solving and critical thinking abilities
	CO2	Depth knowledge of the discipline.
	CO3	Ability to communicate knowledge of the discipline

MASTER'S COMPREHENSIVE

Course Code	AGR601	
Course Title	Master's Research	
Type of course	Practical	
L T P	0:0:4	
Credits	4(0+4)	
Course prerequisite	B.Sc. (Agriculture)	
Course objective	To familiarize the students about the data collection, analyze data and interpretation.	
Course outcomes	CO1	This program will provide students the theoretical and research backgrounds necessary to design, implement, and manage different cropping system.
	CO2	Students will conduct field trials.
	CO3	Collect, summarize and interpret data.

MASTER'S RESEARCH

Course Code	EVS601
Course Title	Disaster Management
Type of course	Theory
L T P	1:0:0
Credits	1(1+0)
Course prerequisite	B.Sc. (Agriculture)
Course objective	To study about the natural disaster and their management.
Course outcomes	CO1 Capacity to integrate knowledge and to analyse, evaluate and manage the different public health aspects of disaster events at a local and global levels.
	CO2 Capacity to obtain, analyse, and communicate information on risks, relief needs.
	CO3 Lessons learned from earlier disasters in order to formulate strategies for mitigation in future scenarios with the ability to clearly present and discuss their conclusions and the knowledge and arguments behind them.

Syllabus

Theory

UNIT-I

Natural Disasters- Meaning and nature of natural disasters, their types and effects. Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves, Climatic change: global warming, Sea level rise, ozone depletion.

UNIT-II

Man-made disasters- Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, field fires-burning of straw, stables and residues oil fire, air pollution, water pollution, deforestation, industrial waste water pollution, road accidents, rail accidents, air accidents, sea accidents.

UNIT-III

Disaster Management- Effect to migrate natural disaster at national and global levels. International strategy for disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements;

UNIT-IV

Role of NGOs, community –based organizations and media. Central, state, district and local administration; Armed forces in disaster response; Disaster response; Police and other organizations.

Recommended books:

S. No	Name	Author(S)	Publisher
1	Disaster management future challenges and opportunity	Jagbir Singh	IK International Publishing House Pvt.
2	National hazards and disaster management	RB Singh	UBS



Course Code	LIB601						
Course Title	Library and information services						
Type of course	Practical						
L T P	0:0:2						
Credits	1(0+1)						
Course prerequisite	B.Sc. (Agriculture)						
Course objective	1.Educate and assist students in the identification and effective use of information resources 2. Provide current library materials and databases that support the academic curriculum						
Course outcomes	<table border="1"> <tr> <td>CO1</td> <td>Identify and use search language, controlled vocabulary or search features appropriate to the research tool in order to retrieve relevant results.</td> </tr> <tr> <td>CO2</td> <td>Select appropriate means for recording or saving relevant sources in order to retrieve them when needed.</td> </tr> <tr> <td>CO3</td> <td>Observe and use pointers to additional information (authors, footnotes, bibliographies, controlled vocabulary, etc.) in order to locate additional sources.</td> </tr> </table>	CO1	Identify and use search language, controlled vocabulary or search features appropriate to the research tool in order to retrieve relevant results.	CO2	Select appropriate means for recording or saving relevant sources in order to retrieve them when needed.	CO3	Observe and use pointers to additional information (authors, footnotes, bibliographies, controlled vocabulary, etc.) in order to locate additional sources.
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CO2	Select appropriate means for recording or saving relevant sources in order to retrieve them when needed.						
CO3	Observe and use pointers to additional information (authors, footnotes, bibliographies, controlled vocabulary, etc.) in order to locate additional sources.						

Syllabus

Practical

UNIT-I

Introduction to library services; Role of libraries in University education, research, extension and technology transfer

UNIT-II

Classification systems and organization of Library; Sources of information Primary Sources, Secondary Sources and Tertiary Sources, with emphasis on reference tools and digital resources; Intricacies of abstracting and indexing, CAS, SDI services, (Science Citation Index, Biological Abstracts, Chemical Abstracts, CABI Abstracts etc.)

UNIT-III

Tracing information from reference sources, information explosion and language barrier; Literature survey; Citation techniques/Bibliographic control and Preparation of bibliography

UNIT-IV

Use of CD-ROM Databases, Online Public Access Catalogue and other computerized library services; Use of Internet including search engines and its resources; e-abbreviations like ibid etc

Recommended books:

S. No	Name	Author(S)	Publisher
1.	Manual of Library and Information Services	Bhanu Pratap	STUDERA PRESS



SEMESTER-IV

Course Code	AGR600
Course Title	Master's Research
Type of course	Practical
L T P	0:0:4
Credits	4(0+4)
Course prerequisite	B.Sc. (Agriculture)
Course objective	To familiarize the students about the data collection, analyze data and interpretation.
Course outcomes	CO1 This program will provide students the theoretical and research backgrounds necessary to design, implement, and manage different cropping system.
	CO2 Students will conduct field trials.
	CO3 Collect, summarize and interpret data.

MASTER'S RESEARCH



Course Code	AGR602	
Course Title	Technical Writing and communications skills	
Type of course	Practical	
L T P	0:0:2	
Credits	1(0+1)	
Course prerequisite	B.Sc. (Agriculture)	
Course objective	To equip the students/scholars with skills to write dissertations, research papers, etc. To equip the students/scholars with skills to communicate and articulate in English (verbal as well as writing).	
Course outcomes	CO1	Students will be able to know forms of technical writing thesis, technical papers, reviews, manuals .
	CO2	Students will understand the writing of abstracts, summaries, précis, and citations.
	CO3	Students will be able to know phonetic symbols and transcription, accentual pattern, weak forms in connected speech

Practicals:

1. Various forms of scientific writings- thesis, technical papers, reviews, manuals, etc.
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).
3. Writing of abstracts, summaries, précis, citations etc.
4. Commonly used abbreviations in the theses and research communications.
5. Illustrations, photographs and drawings with suitable captions.
6. Pagination, numbering of tables and illustrations.
7. Writing of numbers and dates in scientific write-ups. Editing and proof-reading.
8. Writing of a review article.
9. Grammar (Tenses, parts of speech, clauses, punctuation marks).
10. Error analysis (Common errors), concord, collocation.
11. Phonetic symbols and transcription, accentual pattern, weak forms in connected speech.
12. Participation in group discussion, facing an interview, presentation of scientific papers.

Recommended books:

S. No	Name	Author(S)	Publisher
1	Technical writing and communication: theory and practices	Deb Dulal Halder, Anjana Neira Dev & Prerna Malhotra	Book age publications

Course Code	AGR604
Course Title	Human rights and constitutional duties
Type of course	Theory
L T P	1:0:0
Credits	1(1+0)
Course prerequisite	B.Sc. (Agriculture)
Course objective	To study the human rights and its actual status
Course outcomes	CO1 Students will be aware about human rights its foundational aspects, nature and classification.
	CO2 Students will be aware about the human rights in India. Constitutional-legal framework, fundamental rights, directive principles of state policy governmental institutions for the protection of human rights.
	CO3 Students will understand the role of status of economic social & cultural rights in India.

Syllabus

Theory

UNIT-I

Introduction to human rights. Foundational Aspects: Meaning, Nature, Classification. Evolution of the Concept: Magna Carta to Universal Declaration of Human Rights; Generations of Human Rights.

UNIT-II

Conceptual Perspective: Meaning, Nature & Characteristics of Human Duties; Classification of Human Duties; Relevance of Human Duties

Human Duties in India: Fundamental Duties in Indian Constitution Part IV A

- (a) To abide by the Constitution and respect its ideals and institutions, the National Flag and the National Anthem;
- (b) To cherish and follow the noble ideals which inspired our national struggle for freedom;
- (c) To uphold and protect the sovereignty, unity and integrity of India;
- (d) To defend the country and render national service when called upon to do so;
- (e) To promote harmony and the spirit of common brotherhood amongst all the people of India transcending religious, linguistic and regional or sectional diversities; to renounce practices derogatory to the dignity of women;
- (f) To value and preserve the rich heritage of our composite culture;
- (g) To protect and improve the natural environment including forests, lakes, rivers and wild life, and to have compassion for living creatures;

- (h) To develop the scientific temper, humanism and the spirit of inquiry and reform;
- (i) To safeguard public property and to abjure violence;
- (j) To strive towards excellence in all spheres of individual and collective activity so that the nation constantly rises to higher levels of endeavour and achievement;
- (k) Who is a parent or guardian to provide opportunities for education to his child or, as the case may be, ward between the age of six and fourteen years.)

UNIT-III

Concept of human rights in India. Constitutional-Legal Framework: Fundamental Rights; Directive Principles of State Policy Governmental Institutions for the Protection of Human Rights: Working of National Human Rights Commission; National Commission for Women.

UNIT-IV

Actual status of human rights in India. Status of Economic Social & Cultural Rights in India: Violence against Women; Violation of Child Rights: An Appraisal. State of Civil & Political Rights in India: A study of Jammu & Kashmir and the North-East.

Recommended books:

S. No	Name	Author(S)	Publisher
1	Introduction to Human Rights and Duties	S.N.Shastry	University of Pune Press, 2011
2	Human duties and limits of human right	Eric R Boot	Springer

Course Code	AGR606	
Course Title	Agriculture research, research, ethics and rural development programme	
Type of course	Theory	
L T P	1:0:0	
Credits	1(1+0)	
Course prerequisite	B.Sc. (Agriculture)	
Course objective	To sensitize the scholars about the basic issues related with agricultural research, ethics in research as well as rural development.	
Course outcomes	CO1	Students will be aware research ethics: research integrity, research safety in laboratories, welfare of animals used in research.
	CO2	Students will be aware about connotations of rural development, rural development policies and strategies. rural development programmes, community development programme
	CO3	Students will understand Panchayati Raj, institutions, co-operatives, voluntary agencies/non-governmental organizations

Syllabus

Theory

UNIT-I

History of agriculture in brief. Global agricultural research system: need, scope, opportunities. Role in promoting food security, reducing poverty and protecting the environment. National Agricultural Research Systems (NARS) and Regional Agricultural Research Institutions. Consultative Group on International Agricultural Research (CGIAR): International Agricultural Research Centres (IARC), 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.

UNIT-II

Research ethics: research integrity, research safety in laboratories, welfare of animals used in research, computer ethics, standards and problems in research ethics.

UNIT-III

Concept and connotations of rural development, rural development policies and strategies. Rural development programmes: Community Development Programme. Intensive Agricultural District Programme, Special group – Area Specific Programme, Integrated Rural Development Programme (IRDP).

UNIT-IV

Panchayati Raj, Institutions, Co-operatives, Voluntary Agencies/Non-Governmental Organisations. Critical evaluation of rural development policies and programmes. Constraints in implementation of rural policies and programmes.

Recommended books:

S. No	Name	Author(S)	Publisher
1.	Rural Development- Principles, Policies and Management.	K Singh	Sage Publ.
2.	Manual on International Research and Research Ethics	M.S. Punia	CCS, Haryana Agricultural University, Hisar.

