Program and Course Structure

School of Basic Sciences and Research
Department of Agricultural Sciences

B.Sc. (Hons) Agriculture
Programme Code: SBR0501
Batch: 2018- 22

1.1 Vision, Mission and Core Values of the University

Vision of the University

To serve the society by being a global University of higher learning in pursuit of academic excellence, innovation and nurturing entrepreneurship

Mission of the University

1. Transformative educational experience
2. Enrichment by educational initiatives that encourage global outlook
3. Develop research, support disruptive innovations and accelerate entrepreneurship
4. Seeking beyond boundaries

Core Values

- Integrity
- Leadership
- Diversity
- Community

1.2 Vision and Mission of the School

School of Basic Sciences and Research

Vision of the School

Achieving excellence in the realm of basic and applied sciences to address the global challenges of evolving society

Mission of the School

1. To equip the students with knowledge and skills in basic and applied sciences
2. Capacity building through advanced training and academic flexibility.
3. To establish center of excellence for ecologically and socially innovative research.
4. To strengthen inter-institutional and industrial collaboration for skill development and global employability.

1.3 Vision and Mission of Agricultural Science Department

Vision of Department

To harness science to adapt and evolve economically viable, environmentally safer and sustainable agricultural and horticultural farming systems

Mission of Department

1. To produce high quality practically trained manpower in agricultural and horticultural sciences.
2. To adopt, improve and promote agricultural and horticultural technologies for sustenance and income-oriented farming systems.
3. To generate trained manpower for peri-urban and protected cultivation systems.
4. To develop and demonstrate technology for income and employment generation in farming.

1.3.1 Program Educational Objectives (PEO)

PEO1: To foster a strong foundation in agricultural and horticultural principles and practices to make students globally competitive.

PEO2: To develop strong interest in agricultural and horticultural technologies by enhancing the problem-solving skills in students so that they are motivated to pursue research and entrepreneurship development.

PEO3: To emphasize on the peri-urban agriculture and protected cultivation to address the needs of the growing population and changing environment.

PEO4: To train the students to develop and demonstrate technology for income and employment generation.

PEO5: To create a sense of responsibility among students towards the use of scientific knowledge in agriculture for the benefit of farmers.

1.3.2 Program Outcomes (PO's)

PO1: Students will have the ability to apply science for the benefit of industry by conducting relevant investigative and trial work.

PO2: Students will have the ability to develop good agricultural practice, evaluate new techniques, instigate change and be able to contribute effectively to the development of the industry

PO3: Students will have the capability of analysis and evaluation of relevant scientific and technical information of global agriculture and its consequences

PO4: Student will have enhanced personal and employability skills so they can work effectively in a professional environment

PO5: Students shall have a clear understanding of various agricultural practices for food security in current climate scenario

PO6: Students will be determined individuals who question practice and apply the skills they have learnt to propose effective solutions to real-world agricultural problems in a professional manner

Program Structure Template
School of Basic Sciences & Research
B. Sc. (H) Agriculture
Batch: 2018-2022

Term - 1

S No.	SUBJECT CODE	Title of Paper	HOURS				CREDITS	Core/Elec /Pre- / Co Requisite	Type of Course
	THEORY		**L**	**T**	**P**	**TOTAL**			
1	BAG 100	Agricultural Heritage	1	-	-	1	1	Core	CC
2	BAG 101	Fundamentals of Soil Science and Management of problematic soils	4	-	-	4	4	Core	CC
3	BAG 102	Forestry and environmental studies	4	-	-	4	4	Core	CC
4	BAG 103	Fundamentals of Agronomy	4	-	-	4	4	Core	CC
5	BAG 107	Fundamentals of Horticulture	1			1	1	Core	CC
6	BAG 109	Fundamentals of Rural Sociology, Educational Psychology	2			2	2	Core	CC
7	FEN 101/ FEN 103	Functional basic English-1 / Functional intermediate English-1	1	-	-	1	1	Core	SEC
9	MSM 101/ BGB 101	Foundation course in Mathematics / Introduction to Life Sciences	4	-	-	4	4	Core	CC
	PRACTICALS							Core	CC
9	BAP 101	Soil Science Lab	-	-	2	2	1	Core	CC
10	BAP 102	Forestry Lab	-	-	2	2	1	Core	CC
11	BAP 103	Fundamentals of Agronomy Lab	-	-	2	2	1	Core	CC
12	BAP 107	Fundamentals of Horticulture Lab	-	-	2	2	1	Core	CC
13	ENP 102	Functional basic English-1/ Functional intermediate English-1			2	2	1	Core	SEC
		TOTAL	21		10	31	26		

[1] CC: Core Course, AECC: Ability Enhancement Compulsory Courses, SEC: Skill Enhancement Courses, DSE: Discipline Specific Courses

Term - 2

S No.	SUBJECT CODE	Title of Paper	HOURS				CREDITS	Core/Elec/ Pre- /Co Requisite	Type of Course
	THEORY		**L**	**T**	**P**	**TOTAL**			
1	BAG 125	Fundamentals of Plant Pathology	3	-	-	3	3	Core	CC
2	BAG 105	Fundamentals of Agricultural Microbiology	2	-	-	2	2	Core	CC
3	BAG 106	Fundamentals of Genetics	2	-	-	2	2	Core	CC
4	BAG 126	Fundamentals of Crop Physiology	1	-	-	1	1	Core	CC
5	BAG 110	Introductory Soil & Water Conservation Engineering	2	-	-	2	2	Core	CC
6	BAG 111	Fundamentals of Agricultural Economics	2	-	-	2	2	Core	CC
7	BAG 127	Fundamentals of Entomology & Nematology	3	-	-	3	3	Core	CC
8	BAG 128	Fundamentals of Agricultural Extension Education	2	-	-	2	2	Core	CC
9	BAG 129	Fundamentals of Plant biochemistry & biotechnology	2	-	-	2	2	Core	CC
10	BAP 125	Plant Pathology Lab						Core	CC
11	BAP 105	Microbiology Lab	-	-	2	2	1	Core	CC
12	BAP 106	Genetics Lab	-	-	2	2	1	Core	CC
13	BAP 126	Crop Physiology Lab	-	-	2	2	1	Core	CC
14	BAP 110	Soil & Water Conservation Engineering Lab	-	-	2	2	1	Core	CC
15	BAP 127	Entomology Lab			2	2	1	Core	CC
16	BAP 128	Agricultural Extension Education Lab	-	-	2	2	1	Core	CC
17	BAP 129	Plant biochemistry & biotechnology Lab	-	-	2	2	1	Core	CC
		TOTAL	19		16	35	27		

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Term 3:

S No.	SUBJECT CODE	Title of Paper	HOURS				CREDITS	Core/Elec/ Pre- /Co Requisite	Type of Course
	THEORY		**L**	**T**	**P**	**TOTAL**			
1	BAG 114	Crop production technology-I (*Kharif* crops)	1	-	-	1	1	Core	CC
2	BAG 115	Fundamentals of Plant Breeding	2	-	-	2	2	Core	CC
3	BAG 116	Agricultural Finance and Cooperation	2	-	-	2	2	Core	CC
4	BAG 117	Agri- Informatics	1	-	-	1	1	Core	CC
5	BAG 118	Farm Machinery and Power	1	-	-	1	1	Core	CC
6	BAG 119	Production Technology for Vegetables and Spices	1	-	-	1	1	Core	CC
7	BAG 120	Environmental Studies and Disaster Management	2	-	-	2	2	Core	CC
8	BAG 121	Livestock and Poultry Management	3	-	-	3	3	Core	CC
9	BAG 122	Statistical Methods	1	-	-	1	1	Core	CC
10	BAP 114	Crop production technology-I (*Kharif* crops) Lab	-	-	2	2	1	Core	CC
11	BAP 115	Fundamentals of Plant Breeding Lab	-	-	2	2	1	Core	CC
12	BAP 116	Agricultural Finance and Cooperation Lab	-	-	2	2	1	Core	CC
13	BAP 117	Agri- Informatics Lab	-	-	2	2	1	Core	CC
14	BAP 118	Farm Machinery and Power Lab	-	-	2	2	1	Core	CC
15	BAP 119	Production Technology for Vegetables and Spices Lab	-	-	2	2	1	Core	CC
16	BAP 120	Environmental Studies and Disaster Management Lab	-	-	2	2	1	Core	CC
17	BAP 121	Livestock and Poultry Management Lab	-	-	2	2	1	Core	CC
18	BAP 122	Statistical Methods Lab	-	-	2	2	1	Core	CC
19	CCU 401	Community connect	-	-	2	2	2		
		TOTAL	**14**		**20**	**34**	**25**		

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Term 4:

S No.	SUBJECT CODE	Course Title	HOURS				CREDITS	Core/Elec/ Pre- /Co Requisite	Type of Course
	THEORY		L	T	P	TOTAL			
1	BAG 229	Crop Production Technology-II (*Rabi* crops)	1	-	-	1	1	Core	CC
2	BAG 230	Production Technology for Ornamental Crops, MAP and Landscaping	1	-	-	1	1	Core	CC
3	BAG 231	Renewable Energy and Green Technology	1	-	-	1	1	Core	CC
4	BAG 232	Problematic Soils and their Management	2	-	-	2	2	Core	CC
5	BAG 233	Production Technology for Fruit and Plantation Crops	1	-	-	1	1	Core	CC
6	BAG 234	Principles of Seed Technology	1	-	-	1	1	Core	CC
7	BAG 235	Farming System & Sustainable Agriculture	1	-	-	1	1	Core	CC
8	BAG 236	Agricultural Marketing Trade & Prices	2	-	-	2	2	Core	CC
9	BAG 237	Introductory Agro-meteorology & Climate Change	1	-	-	1	1	Core	CC
10	BAX 107	Protected cultivation(El. course)	2	-	-	2	2	Elective	SEC
11	BAP 229	Crop Production Technology-II Lab	-	-	2	2	1	Core	CC
12	BAP 230	Production Technology for Ornamental Crops, MAP and Landscaping Lab	-	-	2	2	1	Core	CC
13	BAP 231	Renewable Energy and Green Technology Lab	-	-	2	2	1	Core	CC
14	BAP 233	Production Technology for Fruit and Plantation Crops Lab	-	-	2	2	1	Core	CC
15	BAP 234	Principles of Seed Technology Lab	-	-	4	4	2	Core	CC
16	BAP 236	Agricultural Marketing Trade & Prices Lab	-	-	2	2	1	Core	CC
17	BAP 237	Introductory Agro-meteorology & Climate Change Lab	-	-	2	2	1	Core	CC
18	BAY 107	Protected cultivation Lab	-	-	2	2	1	Elective	CC
		TOTAL	**14**		**16**	**30**	**22**		

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Term 5:

S No.	SUBJECT CODE	Course Title	HOURS				CREDITS	Core/Elec/ Pre- /Co Requisite	Type of Course
	THEORY		**L**	**T**	**P**	**TOTAL**			
1	BAG 338	Principles of Integrated Pest & Disease Management	2	-	-	2	2	Core	CC
2	BAG 339	Manures, Fertilizers and Soil Fertility Management	2	-	-	2	2	Core	CC
3	BAG 340	Pests of Crops and Stored Grain and their Management	2	-	-	2	2	Core	CC
4	BAG 341	Diseases of Field and Horticultural Crops and their Management -I	2	-	-	2	2	Core	CC
5	BAG 342	Crop Improvement-I *(Kharif Crops)*	1	-	-	1	1	Core	CC
6	BAG 343	Entrepreneurship Development and Business Communication	1	-	-	1	1	Core	CC
7	BAG 344	Geoinformatics and Nano-technology and Precision Farming	1	-	-	1	1	Core	CC
8	BAG 345	Practical Crop Production – I (*Kharif* crops)	-	-	-	-	-	Core	CC
9		ELECTIVE COURSE	3			3	3	Elective	SEC
10	BAP 338	Principles of Integrated Pest and Disease Management Lab	-	-	2	2	1	Core	CC
11	BAP 339	Manures, Fertilizers and Soil Fertility Management Lab	-	-	2	2	1	Core	CC
12	BAP 340	Pests of Crops and Stored Grain and their Management Lab	-	-	2	2	1	Core	CC
13	BAP 341	Diseases of Field and Horticultural Crops and their Management -I Lab	-	-	2	2	1	Core	CC
14	BAP 342	Crop Improvement-I *(Kharif Crops)* Lab	-	-	2	2	1	Core	CC
15	BAP 343	Entrepreneurship Development and Business Communication Lab	-	-	2	2	1	Core	CC
16	BAP 344	Geoinformatics and Nano-technology and Precision Farming Lab	-	-	2	2	1	Core	CC
17	BAP 345	Practical Crop Production – I (*Kharif* crops) Lab			4	4	2	Core	CC
		TOTAL	**14**		**18**	**32**	**23**		

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Term 6:

S No.	SUBJECT CODE	Course Title	HOURS				CREDITS	Core/Elec/ Pre- /Co Requisite	Type of Course
	THEORY		**L**	**T**	**P**	**TOTAL**			
1	BAG 346	Rainfed Agriculture & Watershed Management	1	-	-	1	1	Core	CC
2	BAG 347	Protected Cultivation and Secondary Agriculture	1	-	-	1	1	Core	CC
3	BAG 348	Diseases of Field and Horticultural Crops and their Management-II	2	-	-	2	2	Core	CC
4	BAG 349	Post-harvest Management and Value Addition of Fruits and Vegetables	1	-	-	1	1	Core	CC
5	BAG 350	Management of Beneficial Insect	1	-	-	1	1	Core	CC
6	BAG 351	Crop Improvement-II *(Rabi crops)*	1	-	-	1	1	Core	CC
7	BAG 352	Practical Crop Production –II (*Rabi* crops)	-	-	-	-	-	Core	CC
8	BAG 353	Principles of Organic Farming	1	-	-	1	1	Core	CC
9	BAG 354	Farm Management, Production & Resource Economics	1	-	-	1	1	Core	CC
10	BAG 355	Principles of Food Science and Nutrition	2	-	-	2	2	Core	CC
11		ELECTIVE COURSE	3	-	1	3	4	Elective	SEC
12	BAP 346	Rainfed Agriculture & Watershed Management Lab	-	-	2	2	1	Core	CC
13	BAP 347	Protected Cultivation and Secondary Agriculture Lab	-	-	2	2	1	Core	CC
14	BAP 348	Diseases of Field and Horticultural Crops and their Management-II Lab	-	-	2	2	1	Core	CC
15	BAP 349	Post-harvest Management and Value Addition of Fruits and Vegetables Lab	-	-	2	2	1	Core	CC
16	BAP 350	Management of Beneficial Insect Lab	-	-	2	2	1	Core	CC
17	BAP 351	Crop Improvement-II *(Rabi crops)* Lab	-	-	2	2	1	Core	CC
18	BAP 352	Practical Crop Production –II (*Rabi* crops) Lab	-	-	2	2	1	Core	CC
19	BAP 353	Principles of Organic Farming Lab	-	-	2	2	1	Core	CC
20	BAP 354	Farm Management, Production & Resource Economics Lab	-	-	2	2	1	Core	CC
	BAP 360	Dissertation-I	-	-	2	2	2		
		TOTAL	**14**		**21**	**36**	**26**		

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Term 7:

S No.	SUBJECT CODE	Course Title	WEEKS	CREDITS	Core/Elec/ Pre- /Co Requisite	Type of Course
	Practical		**TOTAL**			
		Activities				
1	BAP 400	General orientation & On campus training by different faculties	1	14		
		Village attachment	8			
		Unit attachment in Univ./ College. KVK/ Research Station Attachment	5		Core	SEC
2	BAP 401	Plant clinic	2	02	Core	SEC
3	BAP 402	Agro-Industrial Attachment	3	04	Core	SEC
		Project report preparation, Presentation and Evaluation	1		Core	SEC
		Total weeks for RAWE & AIA	20	20	Core	SEC
4	OPE 131	OPE		2	Core	SEC

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Term 8:

Only 20 credits to be choosen as Dissertation-I and Dissertation-II (BAP 403, BAP 404)

S No.	SUBJECT CODE	Course Title	HOURS				CREDITS	Core/Elec/ Pre- /Co Requisite	Type of Course
	Practical		**L**	**T**	**P**	**TOTAL**			
1	BAS 401	Production Technology for Bioagents and Biofertilizer	-	-	10	10	10	Elective	SEC
2	BAS 402	Seed Production and Technology	-	-	10	10	10	Elective	SEC
3	BAS 403	Mushroom Cultivation Technology		-	10	10	10	Elective	SEC
4	BAS 404	Soil, Plant, Water and Seed Testing		-	10	10	10	Elective	SEC
5	BAS 405	Commercial Beekeeping		-	10	10	10	Elective	SEC
6	BAS 406	Commercial Horticulture		-	10	10	10	Elective	SEC
7	BAS 407	Organic Production Technology		-	10	10	10	Elective	SEC

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School: SBSR		**Batch: 2018-2022**		
Program: B.Sc.		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: I**		
1	Course Code	BAG 100		
2	Course Title	Agricultural Heritage		
3	Credits	1		
4	Contact Hours (L-T-P)	1-0-0		
	Course Status	Compulsory		
5	Course Objective	The main objective of the course is to acquaint the present day agriculture students about our ancient and traditional agricultural systems and practices. This will enable us to build the future research strategy also.		
6	Course Outcomes	After the completion of this course, the student will be able to CO1: have the knowledge of Indian Agricultural Heritage CO2: know the development of agricultural practices in India CO3: have the knowledge of indigenous knowledge of plant production and protection. CO4: understand the current scenario of Indian agriculture CO5: understand the scope and resources available for farming in India		
7	Outline syllabus			
	Unit 1			
	A	Introduction of Indian agricultural heritage; Ancient agricultural practices		
	B	Relevance of heritage to present day agriculture		
	C	Past and present status of agriculture and farmers in society		
	Unit 2			
	A	Journey of Indian agriculture		
	B	Journey of Indian agriculture in the past		
	C	Journey of Indian agriculture in the modern era		
	Unit 3			
	A	Plant production		
	B	Plant Protection		
	C	Use of indigenous knowledge for production and protection		
	Unit 4			
	A	Crop voyage in India and world		
	B	Current scenario of Indian agriculture		
	C	Indian agricultural concerns and future prospects.		
	Unit 5			
	A	Agriculture scope; Importance of agriculture and agricultural resources available in India		
	B	Crop significance and classifications		
	C	National agriculture setup in India		
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Textbook on Indian Agricultural Heritage (KK publications)		

School: SBSR		**Batch: 2018-2022**		
Program: B.Sc.		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: I**		
1	Course Code	BAG 101		
2	Course Title	Soil Science and management of problematic soils		
3	Credits	4		
4	Contact Hours (L-T-P)	4-0-0		
	Course Status	Compulsory		
5	Course Objective	The objective of the course is to make students aware of the soil and its types as it is the basis of plant growth.		
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** differentiate between various kinds of soil, their formation and characteristics. **CO2:** have the understanding of soil profile and components **CO3:** have the knowledge of soil classification and composition. **CO4:** understand the current scenario of temperature, pH in context of soil **CO5:** understand the soil colloids and pollution in soil		
7	Outline syllabus			
	Unit 1			
	A	Soil as a natural body, pedagogical and edaphological concepts of soil		
	B	Soil Genesis: soil forming, rock and minerals		
	C	Weathering, processes and factors of soil formation		
	Unit 2			
	A	Soil profile, components of soil.		
	B	Soil physical properties		
	C	Soil consistence and plasticity		
	Unit 3			
	A	Soil taxonomy classification and soils of India		
	B	Soil water retention and availability		
	C	Gaseous exchange, problems and plant growth		
	Unit 4			
	A	Soil temperature and flow of heat in the soil		
	B	Soil reaction to pH, soil acidity and alkalinity		
	C	Nutrient availability in the soil		
	Unit 5			
	A	Soil colloids; constitution and properties		
	B	Humic substances and their properties		
	C	Soil pollution and mitigation		
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Textbook of Soil Sciences by S.K. Mukherjee 2. Textbook of Soil Science by N.K. Prasad		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: I**
1	Course Code	BAG 102
2	Course Title	Forestry and environmental studies
3	Credits	4
4	Contact Hours (L-T-P)	4-0-0
	Course Status	Compulsory
5	Course Objective	The course will equip graduates with the analytical skills to determine the correlations between forests and other domains, such as natural sciences, technical production, economy and social policy.
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** have the knowledge of Forestry and classification of Forests. **CO2:** have the understanding of forest regeneration and artificial regeneration **CO3:** have the knowledge of crown classification and trending operations in forestry **CO4:** understand the forest mensuration **CO5:** understand agro-forestry and cultivation practices
7	Outline syllabus	
	Unit 1	
	A	Introduction – definitions of basic terms related to forestry
	B	objectives of silviculture, forest classification
	C	Salient features of Indian Forest Policies
	Unit 2	
	A	Forest regeneration, Natural regeneration - natural regeneration from seed and vegetative parts, coppicing, pollarding, root suckers
	B	Artificial regeneration – objectives, choice between natural and artificial regeneration
	C	essential preliminary considerations for regeneration
	Unit 3	
	A	Crown classification
	B	Tending operations – weeding, cleaning, thinning
	C	Mechanical, ordinary, crown and advance thinning.
	Unit 4	
	A	Forest mensuration – objectives, diameter measurement, instruments used in diameter measurement; Non instrumental methods of height measurement - shadow and single pole method
	B	Instrumental methods of height measurement - geometric and trigonometric principles, instruments used in height measurement; tree stem form, form factor, form quotient
	C	measurement of volume of felled and standing trees, age determination of trees
	Unit 5	

	A	Agroforestry – definitions, importance, criteria of selection of trees in agroforestry, different agroforestry systems prevalent in the country		
	B	shifting cultivation, taungya, alley cropping, wind breaks and shelter belts, home gardens		
	C	Cultivation practices of two important fast growing tree species of the region		
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Introduction to Forestry and Natural Resources (Academic Press)		

School: SBSR		**Batch: 2018-2022**		
Program: B.Sc.		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: I**		
1	Course Code	BAG 103		
2	Course Title	Fundamentals of Agronomy		
3	Credits	3		
4	Contact Hours (L-T-P)	3-0-0		
	Course Status	Compulsory		
5	Course Objective	The students in this course will undertake research on scientific cultivation of crops taking into account the effects of factors like soil, climate and variety of crops and adjusts production techniques suitably depending on the situation.		
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** have the knowledge of agronomy and its scope **CO2:** have the understanding of crop nutrition and efficiency **CO3:** have the knowledge of water resources and irrigation **CO4:** have the awareness of weeds, their importance and management **CO5:** understand growth and development of crop and their management technologies		
7	Outline syllabus			
	Unit 1			
	A	Agronomy and its scope		
	B	Seeds and sowing, tillage and tilth		
	C	Crop density and geometry		
	Unit 2			
	A	Crop nutrition		
	B	Manures and fertilizers		
	C	Nutrient use efficiency		
	Unit 3			
	A	Water resources, soil-plant-water relationship, crop water requirement		
	B	Water use efficiency, irrigation- scheduling criteria and methods		
	C	Quality of irrigation water, logging.		
	Unit 4			
	A	Weeds- importance, classification, crop weed competition		
	B	Concepts of weed management principles and methods		
	C	Herbicides- classification, selectivity and resistance, allelopathy		
	Unit 5			
	A	Growth and development of crops, factors affecting growth and development		
	B	Plant ideotypes, crop rotation and its principles, adaptation and distribution of crops		
	C	Crop management technologies in problematic areas, harvesting and threshing of crops.		
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Principles of Agronomy by Reddy and Reddy		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: I**
1	Course Code	BAG 107
2	Course Title	Fundamentals of Horticulture
3	Credits	1
4	Contact Hours (L-T-P)	1-0-0
	Course Status	Compulsory
5	Course Objective	This course will help improve how we use plants, for food and other human purposes, as well as repairing the environment and personal aesthetics.
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** have the knowledge of horticulture and its importance **CO2:** have the understanding of botanical classification and type of soil use for horticulture **CO3:** have the knowledge of plant propagation and seed management **CO4:** have the awareness of technologies associated with training and pruning **CO5:** understand growth and development of medicinal and aromatic plants
7	Outline syllabus	
	Unit 1	
	A	Horticulture - Its definition and branches
	B	Horticulture - Branches
	C	Importance and scope
	Unit 2	
	A	Horticultural classification
	B	Botanical classification
	C	Climate and soil for horticultural crops
	Unit 3	
	A	Plant propagation-methods and propagating structures
	B	Seed dormancy, Seed germination
	C	Principles of orchard establishment.
	Unit 4	
	A	Principles and methods of training and pruning, juvenility and flower bud differentiation; unfruitfulness
	B	Pollination, pollinizers and pollinators
	C	Fertilization and parthenocarpy
	Unit 5	
	A	Medicinal and aromatic plants; importance of plant bio-regulators in horticulture.
	B	Irrigation – methods
	C	Fertilizer application in horticultural crops.

	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Fundamentals of Horticulture, Edmond, J.B., Sen., T.L., Andrews, F.S and Halfacre R.G, 1963. Tata McGraw Hill Publishing Co., New Delhi. 2. 2 Introduction to Horticulture, Kumar, N. 1990. Rajyalakshmi Publications, Nagarcoil, Tamilnadu.		

School: SBSR		**Batch: 2018-2022**		
Program: B.Sc.		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: I**		
1	Course Code	BAG 109		
2	Course Title	Fundamentals of Rural Sociology and Educational Psychology		
3	Credits	2		
4	Contact Hours (L-T-P)	2-0-0		
	Course Status	Compulsory		
5	Course Objective	This course is important for the students in order to understand the rural life and rural set up as agriculture is the basis of life there.		
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** be aware of scope and significance of sociology and agricultural extension. **CO2:** have the understanding of ecology of the society. **CO3:** have the educational psychology awareness for farmers. **CO4:** have the awareness of behaviour amongst farming community. **CO5:** understand growth and development of personalities and intelligence		
7	Outline syllabus			
	Unit 1			
	A	Sociology and Rural sociology: Definition		
	B	Sociology and Rural sociology: Scope		
	C	Significance in agriculture extension		
	Unit 2			
	A	Social Ecology, Rural society, Social Groups		
	B	Social Stratification, Culture concept, Social Institution		
	C	Social Change & Development		
	Unit 3			
	A	Educational psychology		
	B	Meaning & its importance in agriculture extension		
	C	Significance		
	Unit 4			
	A	Behavior: Cognitive		
	B	Psychomotor domain.		
	C	Affective domain.		
	Unit 5			
	A	Personality, Learning.		
	B	Motivation, Theories of Motivation		
	C	Intelligence		
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Dahama, O. P. and Bhatnagar, O.P., 1998, Education and Communication for Development, Oxford and IBH publishing Co. Pvt. Ltd., New Delhi		

School: SBSR		**Batch : 2018-2022**
Program: B.Sc. (H)		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: I**
1	Course Code	MSM 101
2	Course Title	FOUNDATION COUSE IN MATHEMATICS
3	Credits	4
4	Contact Hours (L-T-P)	4-0
	Course Status	Compulsory
5	Course Objective	• To familiarise the students with basic concepts of matrices, determinants and solving the system of linear equations. • To understand the basic concept of sets theory, co-ordinate geometry, complex number and vector algebra.
6	Course Outcomes	CO1: Explain the concept of matrices and solve systems of linear equations and determinants. (K2,K3, K4) CO2: Explain the concept of complex numbers and calculate the nth roots of complex numbers and illustrate the solutions of simple Polynomial equations. (K2, K3, K4) CO3: Memorize the basic of Cartesian coordinate system and use algebraic techniques to explain intercepts and explore equations of lines on the number plane. (K1, K3, K4) CO4: Describe and differentiate the symmetries from graphs of conic sections. (K1, K2) CO5: Describe and use the concepts of set theory, relation and functions. (K1,K2,K3) CO6: Explain the basic concepts of vector algebra and use to find area of parallelogram and quadrilateral, Vector triple product .(K2,K 3,K4)
7	**Outline syllabus**	**Foundation course in Mathematics**
	Unit 1	**Matrices**
	A	Evaluation of determinants, Properties of determinants,
	B	Matrices: types of matrices, addition, subtraction and multiplication of matrices, symmetric and skew symmetric matrix. Inverse of matrix.
	C	Rank of a matrix, Consistency of system of equations, Characteristic equation, Cayley -Hamilton theorem.
	Unit 2	**Complex Numbers**
	A	Representation of complex number in Argand plane, Modulus and argument of complex number
	B	Algebraic operations, De- Moivre's theorem
	C	Nth root of complex number, Euler's formula
	Unit 3	**Co-ordinate geometry**
	A	Cartesian coordinate system, Distance between two points Equations of line in various forms
	B	Equation of circle in various forms, Equation of tangent and normal to the circle.

	C	Equation of ellipse, parabola and hyperbola		
	Unit 4	**Sets Theory**		
	A	Definition of set, types of sets, Union and intersection of sets, Venn diagram, De-Morgan's law.		
	B	Relation and functions.		
	C	Composite function and inverse function.		
	Unit 5	**Vector Algebra**		
	A	Addition and subtraction of vectors and their geometric application.		
	B	Scalar and vector product, their physical application, Projection of vector on another vector, area of triangle.		
	C	Area of parallelogram and quadrilateral, Vector triple product.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Kreyszig, E., "Advanced Engineering Mathematics", John Wiley & Sons Inc. 2. Jain, M.K., and Iyengar, S.R.K., "Advanced Engineering Mathematics", Narosa Publications		
	Other References	1. Thomas, B.G., and Finny R.L., "Calculus and Analytical geometry", Pearson Education Asia, Adison Wisley. 2. Simmons, G.F., "Differential Equations with applications with applications", Tata McGraw-Hill.		

School: SBSR		**Batch : 2018-2022**
Program: B.Sc. (H)		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: II**
1	Course Code	BAG 125
2	Course Title	Fundamentals of Plant pathology
3	Credits	3
4	Contact Hours (L-T-P)	3-0
	Course Status	Compulsory
5	Course Objective	The students after studying this course will be well acquainted with the pathogen causing disease in plants.
6	Course Outcomes	After successful completion of the course, the student will be able to CO1: be aware of the importance and history of plant diseases CO2: get acquainted with the disease development and various pathogens CO3: to identify fungi as pathogen and its importance CO4: to identify bacteria as pathogen and its importance CO5: to get aware of the growth and reproduction of plant pathogens.
7	**Outline syllabus**	
	Unit 1	
	A	Introduction: Importance of plant diseases, scope and objectives of Plant Pathology.
	B	History of Plant Pathology with special reference to Indian work.
	C	Terms and concepts in Plant Pathology.
	Unit 2	
	A	Pathogenesis. Causes / factors affecting disease development: disease triangle and tetrahedron and classification of plant diseases.
	B	Important plant pathogenic organisms, different groups**:** fungi, bacteria, fastidious vesicular bacteria, phytoplasmas, spiroplasmas, viruses, viroids, algae, protozoa, phanerogamic parasites and nematodes with examples of diseases caused by them.
	C	Diseases and symptoms due to abiotic causes.
	Unit 3	
	A	***Fungi*****:** general characters, definition of fungus, somatic structures, types of fungal thalli, fungal tissues, modifications of thallus, reproduction (asexual and sexual).
	B	Nomenclature, Binomial system of nomenclature, rules of nomenclature, classification of fungi.
	C	Key to divisions, sub-divisions, orders and classes.
	Unit 4	
	A	*Bacteria and mollicutes*: general morphological characters. Basic methods of classification and reproduction.
	B	*Viruses*: nature, structure, replication and transmission. Study of phanerogamic plant parasites.

	C	*Nematodes:* General morphology and reproduction, classification, symptoms and nature of damage caused by plant nematodes (*Heterodera, Meloidogyne*, *Anguina, Radopholus* etc.)		
	Unit 5			
	A	Growth and reproduction of plant pathogens. Liberation / dispersal and survival of plant pathogens. Types of parasitism and variability in plant pathogens.		
	B	Pathogenesis. Role of enzymes, toxins and growth regulators in disease development. Defense mechanism in plants**.** Epidemiology: Factors affecting disease development.		
	C	Principles and methods of plant disease management. Nature, chemical combination, classification, mode of action and formulations of fungicides and antibiotics.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Introduction to Plant Pathology by R. S. SIngh		

School: SBSR		**Batch : 2018-2022**		
Program: B.Sc. (H)		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: II**		
1	Course Code	BAG 105		
2	Course Title	Fundamentals of Agricultural Microbiology		
3	Credits	2		
4	Contact Hours (L-T-P)	2-0-0		
	Course Status	Compulsory		
5	Course Objective	This course will help students get aware of the various microorganisms causing diseases in plants and their disease mechanisms.		
6	Course Outcomes	After completion of the course, the students will be able to CO1: be aware of the microbial world. CO2: be acquainted with the bacteria cell structure and reproduction CO3: be aware of the role of microbes in crop production CO4: identify the nitrogen fixing bacteria and fixation CO5: be aware of microbes in human welfare.		
7	**Outline syllabus**			
	Unit 1			
	A	Introduction, Microbial world		
	B	Prokaryotic microbes		
	C	Eukaryotic microbes		
	Unit 2			
	A	Bacteria: cell structure, chemoautotrophy, photo autotrophy, growth.		
	B	Bacterial genetics: Genetic recombination transformation, conjugation and transduction,		
	C	plasmids, transposon		
	Unit 3			
	A	Role of microbes in soil fertility and crop production:		
	B	Carbon, Nitrogen cycles.		
	C	Phosphorus and Sulphur cycles		
	Unit 4			
	A	Biological nitrogen fixation- symbiotic, associative and asymbiotic.		
	B	Azolla, blue green algae and mycorrhiza.		
	C	Rhizosphere and phyllosphere.		
	Unit 5			
	A	Microbes in human welfare		
	B	Silage production, biofertilizers, biopesticides		
	C	Biofuel production and biodegradation of agro-waste.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Textbook of Microbiology by D.R.Arora and B.B. Arora		

School: SBSR		**Batch : 2018-2022**
Program: B.Sc. (H)		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: II**
1	Course Code	BAG 106
2	Course Title	Fundamentals of Genetics
3	Credits	2
4	Contact Hours (L-T-P)	2-0-0
	Course Status	Compulsory
5	Course Objective	The students will learn the application of *genetics in agriculture* which is the main cause of sustainable and adaptable farming today in the form of new and well adapted crop species or varieties which perform better and stands well in crucial environment and soil factors.
6	Course Outcomes	After completion of the course, the students will be able to CO1: acquaint themselves with genetics and heredity CO2: be aware of chromosomal theory of inheritance CO3: be aware of sex and blood group genetics CO4: have the knowledge of mutation and genetic disorders CO5: have the understanding of the nature and structure of genetic material
7	**Outline syllabus**	
	Unit 1	
	A	Pre and Post Mendelian concepts of heredity, Mendelian principles of heredity.
	B	Architecture of chromosome; chromonemata, chromosome matrix, chromomeres, centromere, secondary constriction and telomere
	C	special types of chromosomes
	Unit 2	
	A	Chromosomal theory of inheritance- cell cycle and cell division- mitosis and meiosis.
	B	Probability and Chi-square. Dominance relationships, Epistatic interactions with example.
	C	Multiple alleles, pleiotropism and pseudoalleles.
	Unit 3	
	A	Sex determination and sex linkage, sex limited and sex influenced traits, Blood group genetics, Linkage and its estimation, crossing over mechanisms, chromosome mapping.
	B	Structural and numerical variations in chromosome and their implications
	C	Use of haploids, dihaploids and doubled haploids in Genetics.
	Unit 4	

	A	Mutation, classification, Methods of inducing mutations & CIB technique, mutagenic agents and induction of mutation.		
	B	Qualitative & Quantitative traits, Polygenes and continuous variations, multiple factor hypothesis		
	C	Cytoplasmic inheritance. Genetic disorders.		
	Unit 5			
	A	Nature, structure & replication of genetic material.		
	B	Protein synthesis, Transcription and translational mechanism of genetic material		
	C	Gene concept: Gene structure, function and regulation, Lac and Trp operons.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. B. D. Singh. 2014, fundamentals of genetics, kalyani publication. 2. P. K. Gupta, 2007, Genetics: classical to modern. Meerut, India : Rastogi Publications.		

School: SBSR		**Batch : 2018-2022**		
Program: B.Sc. (H)		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: II**		
1	Course Code	BAG 126		
2	Course Title	Fundamentals of Crop Physiology		
3	Credits	1		
4	Contact Hours (L-T-P)	1-0-0		
	Course Status	Compulsory		
5	Course Objective	The course will help students to have knowledge of both the genetic potentia1ities and the environment which will help operate to produce the quantity and quality of growth or phenotype		
6	Course Outcomes	After completion of the course, the students will be able to CO1: have the knowledge of physiology of plants CO2: acquaint with plant cell and its functions CO3: understand about the nutrition in plants CO4: have the knowledge of photosynthesis and metabolism in plants CO5: understand about the plant growth regulators		
7	**Outline syllabus**			
	Unit 1			
	A	Introduction to crop physiology		
	B	Its importance in Agriculture		
	C	Scope of physiology		
	Unit 2			
	A	Plant cell: an Overview		
	B	Diffusion and osmosis		
	C	Absorption of water, transpiration and Stomatal Physiology		
	Unit 3			
	A	Mineral nutrition of Plants		
	B	Functions and deficiency symptoms of nutrients		
	C	nutrient uptake mechanisms		
	Unit 4			
	A	Photosynthesis: Light and Dark reactions, C3, C4 and CAM plants		
	B	Respiration: Glycolysis, TCA cycle and electron transport chain		
	C	Fat Metabolism: Fatty acid synthesis and Breakdown		
	Unit 5			
	A	Plant growth regulators: Physiological roles and agricultural uses		
	B	Physiological aspects of growth and development of major crops		
	C	Growth analysis, Role of Physiological growth parameters in crop productivity		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Robert M. Devlin Francis M. Witham. 1986. Plant Physiology. Published by CBS Publishers and Distributers, New Delhi		

School: SBSR		**Batch : 2018-2022**		
Program: B.Sc. (H)		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: II**		
1	Course Code	BAG 110		
2	Course Title	Introductory soil and water conservation Engineering		
3	Credits	2		
4	Contact Hours (L-T-P)	2-0-0		
	Course Status	Compulsory		
5	Course Objective	The student will get aware of the Soil and water which are two important natural resources and the basic needs for agricultural production.		
6	Course Outcomes	After completion of the course, the students will be able to CO1: have the knowledge of the soil and water conservation CO2: understand the gully classification and soil loss measure. CO3: have the knowledge of erosion and its control CO4: acquaint with harvesting of water CO5: have the knowledge of wind erosion and its control		
7	**Outline syllabus**			
	Unit 1			
	A	Introduction to Soil and Water Conservation, causes of soil erosion.		
	B	Definition and agents of soil erosion, water erosion		
	C	Forms of water erosion		
	Unit 2			
	A	Gully classification and control measures		
	B	Soil loss estimation by universal Loss Soil Equation		
	C	Soil loss measurement techniques.		
	Unit 3			
	A	Principles of erosion control		
	B	Introduction to contouring, strip cropping. Contour bund		
	C	Graded bund and bench terracing.		
	Unit 4			
	A	Grassed water ways and their design		
	B	Water harvesting		
	C	Water harvesting design		
	Unit 5			
	A	Wind erosion: mechanics of wind erosion, types of soil movement		
	B	Principles of wind erosion control		
	C	Control measures.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. T.P. Ojha and A.M. Michael. (2005) Principles of Agricultural Engineering (Volume-1), Jain Brothers		

School: SBSR		**Batch : 2018-2022**
Program: B.Sc. (H)		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: II**
1	Course Code	BAG 111
2	Course Title	Fundamentals of Agricultural Economics
3	Credits	2
4	Contact Hours (L-T-P)	2-0-0
	Course Status	Compulsory
5	Course Objective	The course agricultural economics is an applied discipline with a broadly based application to development theory. The students will be able to relate and design the economy based on agriculture
6	Course Outcomes	After completion of the course, the students will be able to CO1: have the knowledge of scope and concept in economics CO2: understand the planning and development in the country CO3: have the understanding of the production costs and control CO4: have the knowledge of the distribution theory and wage concept CO5: have the knowledge of the credit creation policy and taxation
7	**Outline syllabus**	
	Unit 1	
	A	Economics: Meaning, scope and subject matter, activities, approaches to economic analysis; micro- and macro-economics
	B	Economic laws as generalization of human behavior.
	C	Basic concepts: Goods and services, desire, want, demand, utility, cost and price, wealth, capital, income and welfare.
	Unit 2	
	A	Agricultural economics: meaning, definition, characteristics of agriculture, importance and its role in economic development. Agricultural planning and development in the country.
	B	Demand: meaning, law of demand, schedule and demand curve, determinants, utility theory; law of diminishing marginal utility, equi-marginal utility principle.
	C	Consumer's equilibrium and concept of consumer surplus. Elasticity of demand: concept and measurement of price elasticity, income elasticity and cross elasticity.
	Unit 3	
	A	Production: process, factors of production, input output relationship. Laws of returns: Law of variable proportions and law of returns to scale.
	B	Cost: concepts, short run and long run cost curves. Supply: Stock v/s supply, law of supply, schedule, supply curve, determinants of supply, elasticity of supply.

	C	Market structure: meaning and types of market, Price determination under perfect competition.		
	Unit 4			
	A	Distribution theory: meaning, factor market and pricing of factors of production. Concepts of rent, wage, interest and profit.		
	B	National income: Meaning and importance, circular flow, concepts of national income		
	C	Accounting and approaches to measurement, difficulties in measurement		
	Unit 5			
	A	Money: Barter system of exchange and its problems, evolution, meaning and functions of money, classification of money, supply, general price index, inflation and deflation.		
	B	Banking: Role in modern economy, types of banks, functions of commercial and central bank, credit creation policy. Agricultural and public finance: meaning, micro v/s macro finance, need for agricultural finance, public revenue and public expenditure.		
	C	Tax: meaning, direct and indirect taxes, agricultural taxation, VAT.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Acharya S S and Agarwal N L. 2005. Agricultural Marketing in India. Oxford and IBH Publishing Co. Pvt. Ltd		

School: SBSR		**Batch : 2018-2022**
Program: B.Sc. (H)		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: II**
1	Course Code	BAG 127
2	Course Title	Fundamentals of Entomology
3	Credits	3
4	Contact Hours (L-T-P)	3-0-0
	Course Status	Compulsory
5	Course Objective	1.Students after this course can detect the role of insects in the spread of disease and discovering ways of protecting food and fiber crops, and livestock from being damaged. 2.They will study the way beneficial insects contribute to the wellbeing of humans, animals, and plants.
6	Course Outcomes	After completion of the course, the students will be able to CO1: have the knowledge of Entomology, morphology and relationship of insects with other arthropods CO2: have the understanding of the physiological processes of insect CO3: acquaint themselves with insect ecology and environmental resistance CO4: have the knowledge of the pests and Integrated Pest Management. CO5: understand the systematics and binomial nomenclature of insecta
7	**Outline syllabus**	
	Unit 1	
	A	History of Entomology in India. Major points related to dominance of Insecta in Animal kingdom. Classification of phylum Arthropoda upto classes
	B	Relationship of class Insecta with other classes of Arthropoda. Morphology: Structure and functions of insect cuticle and molting. Body segmentation. Structure of Head, thorax and abdomen.
	C	Structure and modifications of insect antennae, mouth parts, legs, Wing venation, modifications and wing coupling apparatus. Structure of male and female genital organ. Metamorphosis and diapause in insects. Types of larvae and pupae
	Unit 2	
	A	Structure and functions of digestive, circulatory, excretory, respiratory, nervous, secretary (Endocrine) and reproductive system
	B	Types of reproduction in insects.
	C	Major sensory organs like simple and compound eyes, chemoreceptor.
	Unit 3	
	A	Insect Ecology: Introduction, Environment and its components.
	B	Effect of abiotic factors– temperature, moisture, humidity, rainfall, light, atmospheric pressure and air currents.
	C	Effect of biotic factors – food competition, natural and environmental resistance.
	Unit 4	
	A	Categories of pests. Concept of IPM, Practices, scope and limitations of IPM. Classification of insecticides, toxicity of insecticides and formulations of insecticides.

	B	Chemical control importance,hazards and limitations. Recent methods of pest control, repellents, anti feed ants, hormones, attractants, gamma radiation.		
	C	Insecticides Act 1968- Important provisions. Application techniques of spray fluids. Symptoms of poisoning, first aid and antidotes.		
	Unit 5			
	A	Systematics: Taxonomy –importance, history and development and binomial nomenclature. Definitions of Biotype, Sub-species, Species, Genus, Family and Order.		
	B	Classification of class Insecta upto Orders, basic groups of present day insects with special emphasis to orders and families of Agricultural importance like Orthoptera: Acrididae, Tettigonidae, Gryllidae, Gryllotalpidae; Dictyoptera: Mantidae, Blattidae; Odonata; Isoptera: Termitidae; Thysanoptera: Thripidae		
	C	Hemiptera: Pentatomidae, Coreidae, Cimicidae, Pyrrhocoridae, Lygaeidae, Cicadellidae, Delphacidae, Aphididae, Coccidae, Lophophidae, Aleurodidae, Pseudococcidae; Neuroptera: Chrysopidae; Lepidoptera: Pieridae, Papiloinidae, Noctuidae, Sphingidae, Pyralidae, Gelechiidae, Arctiidae, Saturnidae, Bombycidae; Coleoptera: Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Bruchidae, Scarabaeidae; Hymenoptera: Tenthridinidae, Apidae. Trichogrammatidae, lchneumonidae, Braconidae, Chalcididae; Diptera: Cecidomyiidae, Tachinidae, Agromyziidae, Culicidae,Muscidae, Tephritidae		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Insecta: An Introduction by Ragumoorthi and Balasubramani		

School: SBSR		**Batch : 2018-2022**
Program: B.Sc. (H)		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: II**
1	Course Code	BAG 128
2	Course Title	Fundamentals of Agriculture Extension Education
3	Credits	2
4	Contact Hours (L-T-P)	2-0-0
	Course Status	Compulsory
5	Course Objective	This course will help the students in understanding the planning and implementation of plans at village level for increasing agricultural production.
6	Course Outcomes	After completion of the course, the students will be able to CO1: understand the meaning, scope and types of education CO2: have the knowledge of various extension development programmes CO3: have the knowledge of rural development CO4: have the knowledge of monitoring and evaluation processes CO5: understand ICT applications in agriculture
7	**Outline syllabus**	
	Unit 1	
	A	**Education**: Meaning, definition & Types; Extension Education- meaning, definition, scope and process; objectives and principles of Extension Education Extension Programme planning- Meaning, Process, Principles and Steps in Programme Development.
	B	Extension systems in India: extension efforts in pre-independence era (Sriniketan, Marthandam, Firka Development Scheme, Gurgaon Experiment, etc.)
	C	Post-independence era (Etawah Pilot Project, Nilokheri Experiment, etc.)
	Unit 2	
	A	Various extension/ agriculture development programmes launched by ICAR/ Govt. of India (IADP, IAAP, HYVP, KVK, IVLP, ORP, ND,NATP, NAIP, etc.).
	B	New trends in agriculture extension: privatization extension, cyber extension/ e-extension
	C	Market-led extension, farmer-led extension, expert systems, etc.
	Unit 3	
	A	Rural Development: concept, meaning, definition; various rural development programmes launched by Govt. of India.
	B	Community Dev.-meaning, definition, concept & principles, Philosophy of C.D.
	C	Rural Leadership: concept and definition, types of leaders in rural context; extension administration: meaning and concept, principles and functions.
	Unit 4	
	A	Monitoring and evaluation: concept and definition, monitoring and evaluation of extension programmes
	B	transfer of technology: concept and models, capacity building of extension personnel

	C	Extension teaching methods: meaning, classification, individual, group and mass contact methods.		
	Unit 5			
	A	ICT Applications in TOT (New and Social Media), media mix strategies; communication: meaning and definition		
	B	Principles and Functions of Communication, models and barriers to communication		
	C	Agriculture journalism; diffusion and adoption of innovation: concept and meaning, process and stages of adoption, adopter categories		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*			

School: SBSR		**Batch : 2018-2022**
Program: B.Sc. (H)		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: II**
1	Course Code	BAG 129
2	Course Title	Fundamentals of Plant Biochemistry and Biotechnology
3	Credits	2
4	Contact Hours (L-T-P)	2-0-0
	Course Status	Compulsory
5	Course Objective	
6	Course Outcomes	After completion of the course, the students will be able to CO1: have the knowledge of various biochemical processes of the plant CO2: understand the enzymes and their classification CO3: have the knowledge of plant biotechnology and its significance CO4: understand the embryo rescue and its significance CO5: understand transgenics and its importance
7	**Outline syllabus**	
	Unit 1	
	A	Importance of Biochemistry. Properties of Water, pH and Buffer. Carbohydrate: Importance and classification. Structures of Monosaccharides, Reducing and oxidizing properties of Monosaccharides, Mutarotation; Structure of Disaccharides and Poly saccharides.
	B	Lipid: Importance and classification; Structures and properties of fatty acids; storage lipids and membrane lipids.
	C	Proteins: Importance of proteins and classification; Structures, titration and zwitterions nature of amino acids; Structural organization of proteins.
	Unit 2	
	A	Enzymes: General properties; Classification; Mechanism of action; Michaelis & Menten and Line Weaver Burk equation & plots; Introduction to allosteric enzymes.
	B	Nucleic acids: Importance and classification; Structure of Nucleotides, A, B & Z DNA; RNA: Types and Secondary & Tertiary structure.
	C	Metabolism of carbohydrates: Glycolysis, TCA cycle, Glyoxylate cycle, Electron transport chain. Metabolism of lipids: Beta oxidation, Biosynthesis of fatty acids.
	Unit 3	
	A	Concepts and applications of plant biotechnology: Scope, organ culture, embryo culture, cell suspension culture, callus culture, anther culture, pollen culture and ovule culture and their applications
	B	Micro-propagation methods; organogenesis and embryogenesis
	C	Synthetic seeds and their significance
	Unit 4	

	A	Embryo rescue and its significance; somatic hybridization and cybrids; Somaclonal variation and its use in crop improvement; cryo-preservation		
	B	Introduction to recombinant DNA methods: physical (Gene gun method), chemical (PEG mediated)		
	C	Agrobacterium mediated gene transfer methods		
	Unit 5			
	A	Transgenics and its importance in crop improvement		
	B	PCR techniques and its applications; RFLP, RAPD, SSR		
	C	Marker Assisted Breeding in crop improvement; Biotechnology regulations		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. A textbook of plant physiology, biochemistry and biotechnology by S.K. Verma		

School: SBSR		**Batch: 2018-2022**		
Program: B.Sc.		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: III**		
1	Course Code	BAG 114		
2	Course Title	Crop production technology-I (*Kharif* crops)		
3	Credits	1		
4	Contact Hours (L-T-P)	1-0-0		
	Course Status	Compulsory		
5	Course Objective	1. To make the students familiar with kharif season crops. 2. To know the production technology of crops. 3. To increase the production by improving technologies.		
6	Course Outcomes	After the completion of this course, the student will be able to CO1: Familiariase with kharif season crops CO2: understand the production technology of cereals. CO3: understand the production technology of pulses CO4: understand the production technology of oil seeds CO5: understand the production technology of forage crops		
7	Course Description	This course is designed to make students familiar with the kharif crops sowing season and their production technologies.		
8	Outline syllabus			
	Unit 1	**Origin and distribution of kharif crops**		
	A	Origin and geographical distribution		
	B	Economic importance, soil and climatic requirements		
	C	Varieties, cultural practices and yield of *Kharif* crops.		
	Unit 2	**Production technology of cereals**		
	A	Production technology of rice and maize		
	B	Production technology of sorghum and mung bean.		
	C	Production technology of pearl and finger millet.		
	Unit 3	**Production technology of pulses**		
	A	Production technology of pigeonpea		
	B	Production technology of mung bean		
	C	Production technology of urd bean		
	Unit 4	**Production technology of oilseed and fiber crops**		
	A	Production technology of groundnut		
	B	Production technology of soyabean		
	C	Production technology of cotton and jute		
	Unit 5	**Production technology of forage crops.**		
	A	Production technology of sorghum		
	B	Production technology of cowpea		
	C	Production technology of cluster bean and napier		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Textbook of field crops by Joshi and Mukund		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: III**
1	Course Code	BAG 115
2	Course Title	Fundamentals of Plant Breeding
3	Credits	2
4	Contact Hours (L-T-P)	2-0-0
	Course Status	Compulsory
5	Course Objective	1. To know about the history, concept and nature of breeding 2. To get familiar with breeding methods. 3. Application of breeding in crop development. 4. To understand the importance of biotechnological tools for increase production.
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** To know about basic terms related to breeding. **CO2:** To know about breeding methods for crop improvement. **CO3:** understand improved technologies in breeding. **CO4:** Use hybridization, polyploidy and heterosis for crop improvement. **CO5:** design biotechnology and markers in agriculture.
7	Course Description	This course is designed to make students proficient by genetic improvement techniques. They also learn about certain breeding technologies and their application in agriculture.
8	Outline syllabus	
	Unit 1	**Basics of genetics**
	A	Historical development, concept, nature and role of plant breeding.
	B	Major achievements and future prospects; Genetics in relation to plant breeding, modes of reproduction and apomixes.
	C	Incompatibility and male sterility- genetic consequences, cultivar options.
	Unit 2	**Breeding methods**
	A	Domestication, Acclimatization and Introduction; Centres of origin/ diversity, components of Genetic variation; Heritability and genetic advance;
	B	Genetic basis and breeding methods in self- pollinated crops - mass and pure line selection.
	C	Hybridization techniques and handling of segregating population; Multiline concept.
	Unit 3	**Breeding laws**
	A	Concepts of population genetics and Hardy-Weinberg Law, Genetic basis and methods of breeding cross pollinated crops, modes of selection.
	B	Population improvement Schemes- Ear to row method
	C	Modified Ear to Row, recurrent selection schemes.
	Unit 4	**Use of breeding techniques in crop improvement**
	A	Heterosis and inbreeding depression, development of inbred lines and hybrids, composite and synthetic varieties; Breeding methods in asexually propagated crops

	B	Clonal selection and hybridization; Maintenance of breeding records and data collection;		
	C	Wide hybridization and prebreeding; Polyploidy in relation to plant breeding, mutation breeding-methods and uses; Breeding for important biotic and abiotic stresses. and disease.		
	Unit 5	**Role of biotechnology in genetics**		
	A	Biotechnological tools-DNA markers and marker assisted selection		
	B	Participatory plant breeding; Intellectual Property Rights,		
	C	Patenting, Plant Breeders and & Farmer's Rights.		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Plant breeding by B.D. Singh		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: III**
1	Course Code	BAG 116
2	Course Title	Agricultural Finance and Cooperation
3	Credits	2
4	Contact Hours (L-T-P)	2-0-0
	Course Status	Compulsory
5	Course Objective	1. To get familiar with agricultural financing. 2. Source and role of agricultural finance. 3. To know about the institutions involved in providing the finance for agriculture 4. To learn about agricultural cooperation and it's status in India
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** Understand the concept of agricultural finance **CO2:** understand the source of agricultural financing **CO3:** get familiar with Institutions involved in agricultural financing. **CO4:** know about agricultural cooperation. **CO5:** know the status of agricultural cooperation.
7	Course Description	This course is designed to make students familiar with the institution for financing the technologies and loan facilities for agriculture.
8	Outline syllabus	
	Unit 1	**Agricultural finance**
	A	**Agricultural** Finance- meaning, scope and significance
	B	Credit needs and its role in Indian agriculture. Agricultural credit: meaning, definition, need, classification
	C	Credit analysis: 4 R's, and 3C's of credits.
	Unit 2	**Sources of agricultural finance**
	A	Institutional and non-institutional sources, commercial banks, social control and nationalization of commercial banks
	B	Micro financing including KCC. Lead bank scheme
	C	RRBs, Scale of finance and unit cost.
	Unit 3	**Higher financing institutions and analysis of financial statements**
	A	An introduction to higher financing institutions – RBI, NABARD, ADB, IMF, world bank, Insurance and Credit Guarantee Corporation of India.
	B	Cost of credit. Recent development in agricultural credit. Preparation and analysis of financial statements
	C	Balance Sheet and Income Statement. Basic guidelines for preparation of project reports- Bank norms – SWOT analysis.
	Unit 4	Agricultural Cooperation
	A	Meaning, brief history of cooperative development in India
	B	Objectives, principles of cooperation,.
	C	Significance of cooperatives in Indian agriculture.
	Unit 5	**Status of agricultural cooperation in India**

	A	Agricultural Cooperation in India- credit, marketing, consumer and multi-purpose cooperatives		
	B	farmers' service cooperative societies, processing cooperatives,		
	C	Farming cooperatives, cooperative warehousing; role of ICA, NCUI, NCDC, NAFED.		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Agriculture finance and management by Reddy and Ram		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: III**
1	Course Code	BAG 117
2	Course Title	Agri- Informatics
3	Credits	1
4	Contact Hours (L-T-P)	1-0-0
	Course Status	Compulsory
5	Course Objective	1. To provide basic knowledge about computer application 2. To understand the use of informatics for the data collection. 3. To aware about the role of agri-informatics to understand the plant processes 4. To understand the preparation of contingent crop-planning using IT tools.
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand and learn about the basics of computer. **CO2:** apply of MS- Office and excel for data collection and analysis **CO3:** have knowledge of application of computer languages **CO4:** Use technologies in agricultural marketing. **CO5:** to get familiar with preparation of contingent crop-planning using IT tools.
7	Course Description	This course is designed to make students proficient in agricultural informatics and its application in data collection, analysis and agricultural marketing.
8	Outline syllabus	
	Unit 1	**Computer application**
	A	Introduction to Computers
	B	Operating Systems,
	C	Definition and types.
	Unit 2	**Use of computer programmes in data collection**
	A	Applications of MS-Office for document creation & Editing.
	B	Data presentation, interpretation and graph creation, statistical analysis, mathematical expressions, Database,
	C	Concepts and types, uses of DBMS in Agriculture, World Wide Web (WWW): Concepts and components.
	Unit 3	**Application of computer programming languages in agriculture**
	A	Introduction to computer programming languages
	B	Concepts and standard input/output operations. e-Agriculture, concepts and applications
	C	Use of ICT in Agriculture.
	Unit 4	**Use of computers for farms, market pricing and post-harvest management**
	A	Computer Models for understanding plant processes. IT application for computation of water and nutrient requirement of crops
	B	Computer-controlled devices (automated systems) for Agri-input management, Smartphone Apps in Agriculture for farm advises, market price, postharvest management etc
	C	Geospatial technology for generating valuable agri-information.
	Unit 5	**Application of Soil Information Systems for supporting Farm decisions**

	A	Decision support systems, concepts, components and applications in Agriculture, Agriculture Expert System		
	B	Soil Information Systems etc for supporting Farm decisions		
	C	Preparation of contingent crop-planning using IT tools.		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*			
	Other References			

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: III**
1	Course Code	BAG 118
2	Course Title	Farm Machinery and Power
3	Credits	1
4	Contact Hours (L-T-P)	1-0-0
	Course Status	Compulsory
5	Course Objective	1. To have basic knowledge of energy 2. To understand the application of mechanical technology in agriculture. 3. To know about motors. 4. To understand the use of tools in agriculture to make operations easy.
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand the basic concept of energy **CO2:** know about various tools use in agricultural operations **CO3:** learn about construction and performance of motors. **CO4:** learn about agricultural tools **CO5:** get familiar with different equipment and their uses
7	Course Description	This course is designed to provide basic knowledge about agricultural equipment and their application in agriculture..
8	Outline syllabus	
	Unit 1	**Energy and its type**
	A	Basic concepts of various forms of energy
	B	Unit and dimensions of force energy
	C	Power, calculations with realistic examples.
	Unit 2	**Different farm machinery operations**
	A	IC Engines: Basic principles of operation of compression, ignition and spark ignition engines, two stroke and four stroke engines
	B	Cooling and lubrication system, power transmission system, broad understanding of performance and efficiency
	C	Tractors, power tillers and their types and uses
	Unit 3	**Electric motor types**
	A	Type of electrical motors
	B	Construction of electric motors
	C	Performance comparison of electric motors
	Unit 4	**Types of equipment and their uses in agricultural field operations**
	A	Tillage: objectives, method of ploughing. Primary tillage implements: construction and function of indigenous ploughs,
	B	Improved indigenous ploughs, mould board ploughs, disc and rotary ploughs. Secondary tillage implements:
	C	Construction and function of tillers, harrows, levelers, ridgers and bund formers.
	Unit 5	Sowing and transplanting equipment
	A	Seed drills, potato planters, seedling transplanter. Grafting, pruning and training tools and equipment

	B	Inter-culture equipment: sweep. Junior hoe, weeders, long handle weeders.		
	C	Crop harvesting equipments: potato diggers, fruit pluckers, tapioca puller and hoists.		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Farm machinery by T. P. Singh		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: III**
1	Course Code	BAG 119
2	Course Title	Production Technology for Vegetables and Spices
3	Credits	1
4	Contact Hours (L-T-P)	1-0-0
	Course Status	Compulsory
5	Course Objective	1. To know about the importance of vegetables and spices 2. To understand basic practices for the cultivation of vegetables and spices 3. To aware about the production technology of cucurbits and other crops. 4. To understand the production technology of cole, root and spices
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand importance of vegetables and spices for healthy diet **CO2:** understand the production technology for solanaceous crops **CO3:** understand the production technology for cucurbits. **CO4:** understand the production technology for cole crops **CO5:** understand the production technology for root, tuber vegetables and spices
7	Course Description	This course is designed to learn about the production technologies of vegetables and spices for increase the quality as well as productivity of crops.
8	Outline syllabus	
	Unit 1	**Importance of vegetables and spices in various field**
	A	Importance of vegetables & spices in human nutrition
	B	Importance of vegetables & spices in national economy
	C	Different types of gardening
	Unit 2	**Production technology of solanaceous crops**
	A	Brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disorders of tomato and brinjal.
	B	Brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disorders of chilli and capsicum.
	C	Brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disorders of cucumber
	Unit 3	**Conventional pesticides**
	A	Brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disorders of melon and gourds
	B	Brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, transplanting techniques, planting distance, fertilizer

		requirements, irrigation, weed management, harvesting and yield, physiological disorders of pumpkins and French bean		
	C	Brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disorders of peas.		
	Unit 4	**Production technology for cucurbits and beans**		
	A	Brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disorders of cabbage, knol-khol and cauliflower		
	B	Production technology for onion		
	C	Production technology for garlic		
	Unit 5	**Production technology for tuber, leafy and perennial vegetables**		
	A	Production technology for carrot, beet root and radish		
	B	Production technology for tuber crops		
	C	Production technology for leafy and perennial vegetables		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Applied production technology for vegetables by P.K. Singh		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: III**
1	Course Code	BAG 120
2	Course Title	Environmental Studies and Disaster Management
3	Credits	2
4	Contact Hours (L-T-P)	2-0-0
	Course Status	Compulsory
5	Course Objective	1. To know about importance and scope of environmental studies 2. To understand the concept of ecosystem and it's type 3. To know the importance of biodiversity and pollution & its control 4. To get aware about social issues related with environment.
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** Understand the use of natural resources **CO2:** have the knowledge to conserve ecosystem **CO3:** understand the importance of biodiversity for the conservation of variability **CO4:** resolve social issues related to environment **CO5:** understand and manage the natural disasters
7	Course Description	This course is designed to make students proficient environment, natural resource conservation etc.
8	Outline syllabus	
	Unit 1	**Importance and scope of environmental studies**
	A	Multidisciplinary nature of environmental studies Definition, scope and importance. Natural Resources: Renewable and non-renewable resources, Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies.
	B	Timber extraction, mining, dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity,
	C	Energy resources: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources. Case studies. f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. • Role of an individual in conservation of natural resources. • Equitable use of resources for sustainable lifestyles.
	Unit 2	**Ecosystem and its type**
	A	Ecosystems: Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem
	B	Ecological succession, Food chains, food webs and ecological pyramids
	C	Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. Desert ecosystem d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

	Unit 3	**Biodiversity and its conservation**		
	A	Biodiversity and its conservation: - Introduction, definition, genetic, species & ecosystem diversity and biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.		
	B	Biodiversity at global, National and local levels, India as a mega-diversity nation. Hot-sports of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity		
	C	Environmental Pollution: definition, cause, effects and control measures of: a. Air pollution b. Water pollution c. Soil pollution d. Marine pollution e. Noise pollution f. Thermal pollution g. Nuclear hazards. Solid Waste Management: causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution.		
	Unit 4	**Social issues and their solutions related to environment**		
	A	Social Issues and the Environment: From Unsustainable to Sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management. Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. dies.		
	B	Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness.		
	C	Human Population and the Environment: population growth, variation among nations, population explosion, Family Welfare Programme. Environment and human health: Human Rights, Value Education, HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health.		
	Unit 5	**Disaster management**		
	A	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.		
	B	Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation, industrial waste water pollution, road accidents, rail accidents, air accidents, sea accidents.		
	C	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; 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.		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Disaster management by Dhyeya		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: III**
1	Course Code	BAG 121
2	Course Title	Livestock and Poultry Management
3	Credits	3
4	Contact Hours (L-T-P)	3-0-0
	Course Status	Compulsory
5	Course Objective	1. To understand the role of livestock in national economy as well as in agriculture 2. To manage calves, beifers and milch animals . 3. To know about the exotic breeds of cattle, buffalo and other animals. 4. To understand the feeding and digestion in animals
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand the importance of livestock in national economy **CO2:** know about the management of animals for better health. **CO3:** be aware about the feeding and digestion in animals. **CO4:** understand the importance of livestock in agriculture **CO5:** know about Diseases of livestock and poultry and their management.
7	Course Description	This course is designed to make students proficient livestock and its utilization in agriculture
8	Outline syllabus	
	Unit 1	**Importance of livestock**
	A	Role of livestock in the national economy
	B	Reproduction in farm animals and poultry.
	C	Housing principles, space requirements for different species of livestock and poultry.
	Unit 2	**Management of animals**
	A	Management of calves, growing heifers and milch animals
	B	Management of sheep, goat and swine. Incubation
	C	Hatching and brooding. Management of growers and layers.
	Unit 3	**Important breed of cattles**
	A	Important Indian and exotic breeds of cattle, buffalo, sheep and goat
	B	Important Indian and exotic breeds of swine and poultry
	C	Improvement of farm animals and poultry.
	Unit 4	**Digestion in livestock and poultry**
	A	Digestion in livestock and poultry. Classification of feedstuffs.
	B	Proximate principles of feed. Nutrients and their functions.
	C	Feed ingredients for ration for livestock and poultry. Feed supplements and feed additives. Feeding of livestock and poultry.
	Unit 5	**Diseases of poultry and livestock**
	A	Introduction of livestock and poultry diseases
	B	Control of important diseases of livestock and poultry.

	C	Prevention (including vaccination schedule) and control of important diseases of livestock and poultry.		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Livestock and poultry management by Ramesh, N.		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: III**
1	Course Code	BAG 122
2	Course Title	Statistical Methods
3	Credits	1
4	Contact Hours (L-T-P)	1-0-0
	Course Status	Compulsory
5	Course Objective	1. To aware about statistical methods and its application 2. To understand the basic concept of statistics 3. Ability to apply statistics for the analysis of data. 4. Ability to apply different test of statistics.
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** have the knowledge of Introduction and application of statistic in agriculture **CO2:** understand different terms related to statistic **CO3:** know about correlation **CO4:** get aware about different types of statistical tests **CO5:** understand the different methods for the analysis of data
7	Course Description	This course is designed to make students proficient in statistical methods and its use in agriculture for the analysis of data.
8	Outline syllabus	
	Unit 1	**Statistical methods and their application**
	A	Introduction to Statistics and its Applications in Agriculture
	B	Graphical Representation of Data
	C	Measures of Central Tendency & Dispersion.
	Unit 2	**Probability and types**
	A	Probability: Definition, Addition and Multiplication Theorem (without proof).
	B	Simple Problems Based on Probability.
	C	Binomial & Poisson Distributions.
	Unit 3	**Correlation and its application**
	A	Correlation: Definition, Scatter Diagram
	B	Karl Pearson's Coefficient of Correlation
	C	Linear Regression Equations.
	Unit 4	**Different types of tests**
	A	Test of Significance: Introduction to Test of Significance
	B	One sample & two sample test t for Means, Chi-Square Test of Independence of Attributes in 2 ×2 Contingency Table
	C	Introduction to Analysis of Variance (ANOVA), Analysis of One Way Classification.
	Unit 5	**Sampling methods in agriculture**
	A	Sampling methods: Introduction to Sampling Methods, Sampling versus
	B	Complete Enumeration, Simple Random Sampling with and without replacement
	C	Use of Random Number Tables for selection of Simple Random Sample.

	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. An introduction to statistical methods by Horace Secrist		

School: SBSR		**Batch: 2018-2022**		
Program: B.Sc.		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: IV**		
1	Course Code	**BAG 229**		
2	Course Title	**Crop Production Technology-II (*Rabi* crops)**		
3	Credits	**1**		
4	Contact Hours (L-T-P)	**1-0-0**		
	Course Status	Compulsory		
5	Course Objective	1. To make the students familiar with different Rabi crops. 2. To understand and appreciate the economic importance of these crops. 3. To know the cultural practices. 4. To understand the concept medicinal and aromatic plants.		
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand the concept of Rabi crops. **CO2:** understand the concept of soil and climatic requirements of various crops. **CO3:** use of fertilizers and irrigations techniques. **CO4:** understand the various critical stages. **CO5:** understand the cultural practices.		
7	Course Description	This course is designed to make students proficient in Rabi crops production etc.		
8	Outline syllabus			
	Unit 1	**Origin and distribution of rabi crops**		
	A	Origin, geographical distribution		
	B	Economic importance		
	C	soil and climatic requirements		
	Unit 2	**Varieties and cultural practices for cereal and pulses crops**		
	A	Varieties, cultural practices and yield of *Rabi* crops		
	B	cereals –wheat and barley		
	C	pulses-chickpea, lentil, peas		
	Unit 3	**Varieties and cultural practices for oil seeds**		
	A	oilseeds-rapeseed		
	B	mustard and sunflower		
	C	sugar crops-sugarcane		
	Unit 4	**Varieties and cultural practices for MAP's**		
	A	Medicinal crops		
	B	Aromatic crops		
	C	mentha, lemon grass and citronella		
	Unit 5	**Varieties and cultural practices for forage crops**		
	A	Forage crops		
	B	berseem, lucerne		
	C	oat		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Textbook of field crops by Joshi and Mukund		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: IV**
1	Course Code	**BAG 230**
2	Course Title	**Production Technology for Ornamental Crops, MAPs and Landscaping**
3	Credits	**1**
4	Contact Hours (L-T-P)	1-0-0
	Course Status	Compulsory
5	Course Objective	1. To make the students familiar with landscaping. 2. To understand and appreciate the Characteristics of medicinal & aromatic plants. 3. To know the landscape uses of trees, shrubs and herbs. 4. To understand the concept of Processing and value addition in ornamental crops and MAPs produce.
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand the concept of MAPs. **CO2:** understand the concept of Lanscaping. **CO3:** use of shrubs and climbers in landscaping. **CO4:** understanding various crops like- lilium, marigold etc. **CO5:** understand the package of practices for loose flowers
7	Course Description	This course is designed to make students proficient in ornamental, medicinal, aromatic crops etc. Principles of landscaping etc.
8	Outline syllabus	
	Unit 1	**Importance and scope of ornamental crops**
	A	Importance of ornamental crops, medicinal and aromatic plants
	B	Scope of ornamental crops, medicinal and aromatic plants
	C	Landscaping
	Unit 2	**Concept of landscaping**
	A	Principles of landscaping
	B	Landscape uses of trees
	C	shrubs and climbers
	Unit 3	**Production technology for cut flower**
	A	Production technology of important cut flowers like rose, gerbera, carnation, lilium
	B	orchids under protected conditions
	C	gladiolus, tuberose, chrysanthemum under open conditions
	Unit 4	**Pakage practices for loose flower**
	A	Package of practices for loose flowers
	B	practices for marigold
	C	practices for jasmine
	Unit 5	**Varieties and cultural practices for medicinal plants**

	A	Production technology of important medicinal plants like ashwagandha, asparagus, aloe, costus, Cinnamomum, periwinkle, isabgol		
	B	Aromatic plants like mint, lemongrass, citronella, palmarosa, ocimum, rose, geranium, vetiver.		
	C	Processing and value addition in ornamental crops and MAPs produce.		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Ornamental Horticulture by Jack Ingels		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: IV**
1	Course Code	**BAG 231**
2	Course Title	**Renewable Energy and Green Technology**
3	Credits	**1**
4	Contact Hours (L-T-P)	1-0-0
	Course Status	Compulsory
5	Course Objective	1. To make the students familiar with Renewable and non- renewable energy. 2. To understand and appreciate its benefits in Agriculture. 3. To know the biomass concept. 4. To understand the concept of wind energy.
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand the concept of biogas, biodiesel etc. **CO2:** understand the concept of energy resources in agriculture. **CO3:** use of developing bio-gas in agriculture. **CO4:** Familiarize with solar energy gadgets **CO5:** understand the solar drying, solar pond, solar distillation, solar photovoltaic system and their application.
7	Course Description	This course is designed to make students proficient in Renewable and non renewable energy resources and its use in Agriculture.
8	Outline syllabus	
	Unit 1	**Energy sources and its classification**
	A	Classification of energy sources
	B	contribution of these of sources
	C	contribution of these of sources in agricultural sector
	Unit 2	**Biomass utilization for fuel**
	A	Familiarization with biomass
	B	biomass utilization for bio-fuel production
	C	biomass application
	Unit 3	**Biogas plants**
	A	Familiarization with types of bio-gas plants and gasifiers
	B	biogas, bio-alcohol, biodiesel and bio-oil production
	C	Biogas utilization as bioenergy resource.
	Unit 4	**An introduction to solar enery**
	A	Introduction of solar energy, collection and their application,
	B	Familiarization with solar energy gadgets: solar cooker, solar water heater, application of solar energy:
	C	Solar drying, solar pond, solar distillation, solar photovoltaic system and their application.
	Unit 5	**An idea of wind energy**
	A	Introduction of wind energy
	B	Application of wind energy.
	C	Its application in Agriculrure.

	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Introduction to renewable energy by Nelson		

School: SBSR		**Batch: 2018-2022**		
Program: B.Sc.		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: IV**		
1	Course Code	**BAG 232**		
2	Course Title	**Problematic Soils and their Management**		
3	Credits	**2**		
4	Contact Hours (L-T-P)	2-0-0		
	Course Status	Compulsory		
5	Course Objective	1. To make the students familiar with Soil quality and soil health. 2. To understand and appreciate the Characteristics of problematic soils. 3. To know the various reclamation process. 4. To understand the concept of remote sensing and GIS.		
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand the concept of wastelands. **CO2:** understand the concept of Reclamation. **CO3:** use of remote sensing in Agriculture. **CO4:** understand the cause of problematic soil. **CO5:** understand the bio-remediation.		
7	Course Description	This course is designed to make students proficient in soil quality and soil health, various reclamation practices, remote sensing and GIS etc.		
8	Outline syllabus			
	Unit 1	**Soil quality and health**		
	A	Soil quality and health,		
	B	Distribution of Waste land and problem soils in India		
	C	Their categorization based on properties.		
	Unit 2	**Management of saline and sodic soil**		
	A	Reclamation and management of Saline and sodic soils,		
	B	Acid soils, Acid Sulphate soils,		
	C	Eroded and Compacted soils, Flooded soils, Polluted soils.		
	Unit 3	**Irrigation water**		
	A	Irrigation water		
	B	quality and standards		
	C	Utilization of saline water in agriculture.		
	Unit 4	**Remote sensing and GIS & their uses in agriculture**		
	A	Remote sensing and GIS		
	B	Remote sensing and GIS in diagnosis		
	C	Management of problem soils.		
	Unit 5	**Problematic soil and its solution**		
	A	Multipurpose tree species, bio remediation through MPTs of soils		
	B	Land capability and classification, land suitability classification.		
	C	Problematic soils under different Agro-ecosystems.		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Introduction to Soil Science by D. K. Das		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: IV**
1	Course Code	BAG 233
2	Course Title	**Production Technology for Fruit and Plantation Crops**
3	Credits	**1**
4	Contact Hours (L-T-P)	1-0-0
	Course Status	Compulsory
5	Course Objective	1. To understand the students about the different fruits cultivation in India 2. To understand the production technology of the fruits 3. To know about different types of plantation crops
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand the concept production technology of fruits **CO2**: have knowledge about the importance of rootstock **CO3:** have Knowledge about management of fruits crops **CO4:** understand the knowledge of harvesting of crop **CO5:** have knowledge about different types of plantation crops
7	Course Description	This course is designed to give knowledge about production technology of fruits crops and plantation crops.
8	Outline syllabus	
	Unit 1	**Introduction to fruit and plantation crop**
	A	Importance of fruit and plantation crop industry in India
	B	scope of fruit and plantation crop industry in India
	C	Importance of rootstocks
	Unit 2	**Production technology for fruits-I**
	A	Production technologies for the cultivation of major fruits-mango, banana
	B	Production technologies for the cultivation of major fruits- citrus, grapes
	C	Production technologies for the cultivation of major fruits- guava, litchi.
I	**Unit 3**	**Production technology for fruits-II**
	A	Production technologies for the cultivation of major fruits- Papaya, sapota,
	B	Production technologies for the cultivation of major fruits- apple, pear, peach
	C	Production technologies for the cultivation of major fruits- apple, pear, peach
	Unit 4	**Production technology for fruits-III**
	A	Production technologies for the cultivation of major fruits-- date, ber,
	B	Production technologies for the cultivation of major fruits- pineapple, pomegranate
	C	Production technologies for the cultivation of major fruits- jackfruit and strawberry
	Unit 5	**Plantation crops**
	A	Plantation crops-coconut and arecanut
	B	Plantation crops- cashew and tea
	C	Plantation crops- coffee & rubber
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)

	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Fruit crops by Radha and Mathew 2. Systematics of Fruits Crops by Girish Sharma		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year:**
Branch: Agriculture		**Semester: IV**
1	Course Code	BAG 234
2	Course Title	**Principles of seed technology**
3	Credits	**1**
4	Contact Hours (L-T-P)	1-0-0
	Course Status	Compulsory
5	Course Objective	1. To understand the students about the seed technology 2. To know about the different types of seed 3. To know about duty and powers of seed inspector, offences and penalties.
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand the deterioration causes of crop varieties and their control **CO2**: have knowledge on seed production of important cereals, pulses, oilseeds, fodder and vegetables. **CO3:** understand Seed Act and Seed Act enforcement. **CO4:** have knowledge on Seed drying, processing and their steps **CO5:** understand seed marketing
7	Course Description	This course is designed to give knowledge on seed and seed testing for quality assessment
8	Outline syllabus	
	Unit 1	**Seed and seed technology**
	A	Introduction, definition and importance
	B	Deterioration causes of crop varieties and their control
	C	Maintenance of genetic purity during seed production, seed quality.
	Unit 2	**Seed certifications methods**
	A	Definition, Characters of good quality seed, different classes of seed.
	B	Foundation and certified seed production of important cereals, pulses, oilseeds, fodder and vegetables.
	C	Seed certification, phases of certification, procedure for seed certification, field inspection.
I	**Unit 3**	**Seed Act and Seed Act enforcement**
	A	Duty and powers of seed inspector, offences and penalties.
	B	Seeds Control Order 1983, Varietal Identification through Grow Out Test and Electrophoresis, Molecular and Biochemical test.
	C	Detection of genetically modified crops, Transgene contamination in non-GM crops, GM crops and organic seed production.
	Unit 4	**Seed drying, processing and their steps**
	A	seed testing for quality assessment, seed treatment, its importance, method of application and seed packing.
	B	Seed storage; general principles, stages and factors affecting seed longevity during storage.
	C	Measures for pest and disease control during storage.
	Unit 5	**Seed marketing**

	A	Structure and organization, sales generation activities, promotional media.		
	B	Factors affecting seed marketing, Role of WTO and OECD in seed marketing.		
	C	Private and public sectors and their production and marketing strategies.		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Seed Technology by Agrawal		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: IV**
	Course Code	BAG 235
	Course Title	**Farming System and Sustainable Agriculture**
	Credits	1
	Contact Hours (L-T-P)	1-0-0
	Course Status	Compulsory
	Course Objective	1. To make students aware about farming system and sustainable development 2. To know about the different types integrated farming system 3. To know about Sustainable agriculture-problems and its impact on agriculture, indicators of sustainability
	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand Integrated farming system **CO2**: have knowledge on Allied enterprises and their importance **CO3:** understand Farming system components **CO4:** have knowledge on systems of farming system **CO5:** have the knowledge of resource cycling and flow of energy
7	Course Description	This course is designed to give knowledge on Integrated farming system, resource use efficiency and optimization techniques
8	Outline syllabus	
	Unit 1	**Farming System**
	A	Introduction, definition and importance
	B	Scope, importance, and concept
	C	Types and systems of farming system and factors affecting types of farming
	Unit 2	**Farming system components and their maintenance**
	A	Cropping system and pattern
	B	Multiple cropping system
	C	Efficient cropping system and their evaluation.
I	**Unit 3**	**Efficient cropping system and their evaluation.**
	A	Its impact on agriculture, indicators of sustainability, adaptation and mitigation
	B	Conservation agriculture strategies in agriculture
	C	HEIA, LEIA and LEISA and its techniques for sustainability.
	Unit 4	**Tools for determining production**
	A	Allied enterprises and their importance
	B	Tools for determining production
	C	Efficiencies in cropping and farming system.
	Unit 5	**Integrated farming system**
	A	Historical background, objectives and characteristics, components of IFS and its advantages

	B	Site specific development of IFS model for different agro-climatic zones, resource use efficiency and optimization techniques		
	C	Resource cycling and flow of energy in different farming system, farming system and environment, Visit of IFS.		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. A *Textbook* of *Farming System and Sustainable Agriculture*" by Aniket Kalhapure		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: IV**
1	Course Code	BAG 236
2	Course Title	**Agricultural Marketing, Trade and Prices**
3	Credits	2
4	Contact Hours (L-T-P)	2-0-0
	Course Status	Compulsory
5	Course Objective	1. To make students understand about marketing trades in the agriculture sector. 2. To know about the Agricultural prices and policy: Meaning and functions of price; administered prices; need for agricultural price policy 3. To know about Trade: Concept of International Trade and its need, theories of absolute and comparative advantage
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand market integration **CO2**: have knowledge on competitive strategies, pricing and promotion strategies **CO3:** understand market functionaries and marketing channels **CO4:** understand physical functions of marketing **CO5:** understand nature and determinants of demand and supply of farm products
7	Course Description	This course Is designed to give knowledge on marketing efficiency; marketing costs, margins and price spread and Role of Govt. in agricultural marketing
8	Outline syllabus	
	Unit 1	**Agricultural Marketing**
	A	Concepts and definitions of market, marketing, agricultural marketing, market structure, marketing mix and market segmentation
	B	classification and characteristics of agricultural markets**;** demand, supply and producer's surplus of agri-commodities
	C	Meaning and its types, marketable and marketed surplus, factors affecting marketable surplus of agri-commodities.
	Unit 2	**Product life cycle (PLC) and competitive strategies**
	A	Meaning and stages in PLC; characteristics of PLC; strategies in different stages of PLC; pricing and promotion strategies: pricing considerations and approaches
	B	Cost based and competition based pricing; market promotion – advertising, personal selling, sales promotion and publicity – their meaning and merits & demerits; marketing process and functions
	C	Marketing process-concentration, dispersion and equalization; exchange functions – buying and selling; physical functions
I	**Unit 3**	**Market functionaries and marketing channels**
	A	Types and importance of agencies involved in agricultural marketing
	B	Meaning and definition of marketing channel, number of channel levels

	C	Marketing channels for different farm products; Integration, efficiency, costs and price spread.		
	Unit 4	**Meaning, definition and types of market integration**		
	A	Marketing efficiency; marketing costs, margins and price spread; factors affecting cost of marketing; reasons for higher marketing costs of farm commodities		
	B	Ways of reducing marketing costs; Role of Govt. in agricultural marketing:		
	C	Role of Govt. in agricultural marketing: Public sector institutions- CWC, SWC, FCI, CACP & DMI – their objectives and functions; cooperative marketing in India; Risk in marketing		
	Unit 5	**Agricultural prices and policy**		
	A	Meaning and functions of price; administered prices; need for agricultural price policy		
	B	Trade: Concept of International Trade and its need, theories of absolute and comparative advantage. Present status and prospects of international trade in agri-commodities		
	C	GATT and WTO; Agreement on Agriculture (AoA) and its implications on Indian agriculture; IPR.		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Textbook Of Agricultural Marketing And Co operation by Dhushyant Bhagat		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: IV**
1	Course Code	BAG 237
2	Course Title	**Introductory Agro-meteorology and Climate Change**
3	Credits	1
4	Contact Hours (L-T-P)	1-0-0
	Course Status	Compulsory
5	Course Objective	1. To make students understand Agricultural Meteorology 2. To know about the Basics of weather forecasting 3. To know about Effect of climate change on horticulture
6	Course Outcomes	After the completion of this course, the student will be able to CO1 have knowledge on how plants sense and respond to changes in CO2 concentration. CO2: understand Changes in secondary metabolites and pest disease reaction of plants. CO3: understand effects of increased temperature and plants in tropical/sub-tropical climates CO4 have knowledge of acclimation CO5: understand effect of climate change on horticulture
7	Course Description	This course Is designed to give knowledge on effect of increased temperature and plants in tropical/sub-tropical climates
8	Outline syllabus	
	Unit 1	**Agricultural Meteorology**
	A	Introduction, definition of meteorology, scope and practical utility of Agricultural meteorology.
	B	Composition and structure of atmosphere and definition of weather and climate, aspects involved in weather and climate, atmospheric temperature, soil temperature, solar radiation, atmospheric pressure, atmospheric humidity
	C	Evaporation and transpiration, monsoons, rainfall, clouds, drought, weather disasters and their management atmospheric pollution and role of meteorology.
	Unit 2	**Basics of weather forecasting**
	A	Climate change-causes
	B	Global warming-cause
	C	Remote sensing
I	**Unit 3**	**Effect of climate change**
	A	Horticulture Past and future changes in greenhouse gases within the atmosphere
	B	Sources and sinks for greenhouse gases.
	C	Atmospheric chemistry
	Unit 4	**Plants sense and respond to changes in CO2 concentration**
	A	Measurement of short-term effects and mechanisms underlying the observed responses in C3 and C4 species. plant development affected by growth in elevated CO2. Physiology of rising CO2 on nitrogen use and soil fertility, its implication for production.

	B	Methodology for studying effect of CO2. Change in secondary metabolites and pest disease reaction of plants.		
	C	The mechanisms of ozone and UV damage and tolerance in plants.		
	Unit 5	**Increased temperature and plants in tropical/sub-tropical climates**		
	A	Effect on growing season, timing of flowering, duration of fruit development and impacts on crop yields and potential species ranges, interaction of temperature with other abiotic/biotic stress.		
	B	Mitigation strategies and prospects for genetic manipulation of crops to maximize production in the future atmosphere.		
	C	Modifying Rubisco, acclimation, metabolism of oxidizing radicals, and sink capacity as potential strategies.		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Introduction to Agro-Meteorology by H. S. Mavi		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: V**
1	Course Code	BAG 338
2	Course Title	Principles of Integrated Pest and disease management
3	Credits	2
4	Contact Hours (L-T-P)	2-0-0
	Course Status	Compulsory
5	Course Objective	1. To make the students familiar with use of Pesticides 2. To understand and appreciate the concept of IPM. 3. To know the implementation and impact of IPM. 4. To understand the various methods of control.
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand the concept of IPM **CO2:** appreciate real life applications of IPM **CO3:** understand Ecological management of crop environment. **CO4:** understand the Implementation and impact of IPM **CO5:** understanding the Safety issues in pesticide uses.
7	Course Description	This course is designed to make students proficient in IPM. They also learn about certain properties of IPM, its principles and its ecological management etc.
8	Outline syllabus	
	Unit 1	**IPM**
	A	Categories of insect pests and diseases
	B	IPM: Introduction, history, importance, concepts, principles and tools of IPM.
	C	Economic importance of insect pests, diseases and pest risk analysis.
	Unit 2	**Insect pest and disease diagnosis**
	A	Methods of detection and diagnosis of insect pest and diseases.
	B	Calculation and dynamics of economic injury level and importance of Economic threshold level.
	C	Methods of control: Host plant resistance, cultural, mechanical, physical, legislative, biological and chemical control.
	Unit 3	**Conventional pesticides**
	A	Ecological management of crop environment.
	B	Introduction to conventional pesticides for the insect pests
	C	disease management.
	Unit 4	**Forecasting of Insect pest and diseases**
	A	Survey surveillance and forecasting of Insect pest and diseases.
	B	Development and validation of IPM module.
	C	Implementation and impact of IPM (IPM module for Insect pest and disease.
	Unit 5	**Safety issues in pesticide uses.**
	A	Safety issues in pesticide uses.
	B	Political, social and legal implication of IPM.
	C	Case histories of important IPM programmes.

	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Integrated Pest Management by Dhaliwal and Arora		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: V**
1	Course Code	BAG 339
2	Course Title	Manures, Fertilizers and Soil Fertility Management
3	Credits	2
4	Contact Hours (L-T-P)	2-0-0
	Course Status	Compulsory
5	Course Objective	1. To make the students familiar with use of organic manures. 2. To understand and appreciate the chemical manures. 3. To know the soil fertility index. 4. To understand the Factor influencing nutrient use efficiency
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand the concept of Organic manures. **CO2:** appreciate real life applications of Chemical fertilizers. **CO3:** understand use of organic manures etc. **CO4:** understand the soil chemistry **CO5:** understand the various application of fertilizer application.
7	Course Description	This course is designed to make students proficient in Organic, chemical manures. They also learn about certain properties of soil and fertilizers.
8	Outline syllabus	
	Unit 1	**Organic manures**
	A	Introduction and importance of organic manures, properties and methods of preparation of bulky and concentrated manures.
	B	Green/leaf manuring. Fertilizer recommendation approaches.
	C	Integrated nutrient management.
	Unit 2	**Chemical fertilizers**
	A	Chemical fertilizers: classification, composition and properties of major nitrogenous
	B	phosphatic, potassic fertilizers, secondary & micronutrient fertilizers, Complex fertilizers,
	C	nano fertilizers Soil amendments, Fertilizer Storage, Fertilizer Control Order.
	Unit 3	**Soil fertility and plant nutrition**
	A	History of soil fertility and plant nutrition.
	B	criteria of essentiality.
	C	role, deficiency and toxicity symptoms of essential plant nutrients, Mechanisms of nutrient transport to plants, factors affecting nutrient availability to plants.
	Unit 4	**Soil chemistry**
	A	Chemistry of soil nitrogen, phosphorus, potassium, calcium, magnesium, sulphur and micronutrients.
	B	Soil fertility evaluation, Soil testing. Critical levels of different nutrients in soil.
	C	Forms of nutrients in soil, plant analysis, rapid plant tissue tests. Indicator plants.
	Unit 5	**Fertilizer recommendations**
	A	Methods of fertilizer recommendations to crops.

	B	Factor influencing nutrient use efficiency (NUE),		
	C	Methods of application under rainfed and irrigated conditions.		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Soil Fertility and Nutrient Management by SS Rana		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: V**
1	Course Code	**BAG 340**
2	Course Title	**Pests of Crops and Stored Grain and their Management**
3	Credits	**2**
4	Contact Hours (L-T-P)	2-0-0
	Course Status	Compulsory
5	Course Objective	1. To make the students familiar with different types of pests. 2. To understand and appreciate the damages caused by these pests. 3. To know the Factors affecting losses of stored grain 4. To understand the concept Storage structure
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand the concept of pests. **CO2:** understand real life applications of Pesticides/Insecticides. **CO3:** have the knowledge of Pesticides. **CO4:** understand the cause of pest infestation. **CO5:** understand the factors affecting losses of stored grain
7	Course Description	This course is designed to make students proficient in Pest management. They also learn about certain properties of matter Pesticides.
8	Outline syllabus	
	Unit 1	
	A	Pests
	B	General account on nature of different arthropods pests.
	C	General account on type of damage by different arthropods pests.
	Unit 2	
	A	Scientific name, order, family, host range,
	B	Distribution, biology and bionomics
	C	Nature of damage, and management of major pests
	Unit 3	
	A	Scientific name, order, family, host range, distribution, nature of damage
	B	control practice other important arthropod pests of various field crop,
	C	Vegetable crop, fruit crop, plantation crops, ornamental crops, spices and condiments.
	Unit 4	
	A	Factors affecting losses of stored grain
	B	role of physical, biological, mechanical and chemical factors in deterioration of grain.
	C	Insect pests, mites, rodents, birds and microorganisms associated with stored grain and their management.
	Unit 5	
	A	Storage structure
	B	methods of grain storage
	C	Fundamental principles of grain store management.

	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Insects of stored grain by David Rees		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: V**
1	Course Code	**BAG 341**
2	Course Title	**Diseases of Field and Horticultural Crops and their Management-I**
3	Credits	**2**
4	Contact Hours (L-T-P)	2-0-0
	Course Status	Compulsory
5	Course Objective	1. To make the students familiar with various diseases of field crops. 2. To understand horticultural crops diseases. 3. To know the causal organisms of various diseases. 4. To understand the concept of managing these diseases.
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand the concept of disease, etiology. **CO2:** do management various horticultural crops from pests and diseases. **CO3:** use various control methods for several diseases. **CO4:** understand the cause of disease and its causal organisms. **CO5:** understand the correction measures for various horticultural crops.
7	Course Description	This course is designed to make students proficient in Diseases of various crops. They also learn about certain properties of diseases.
8	Outline syllabus	
	Unit 1	
	A	Symptoms, etiology, disease cycle and management of major diseases of following crops
	B	Field Crops: Rice: blast, brown spot, bacterial blight, sheath blight, false smut, khaira and tungro;
	C	Maize: stalk rots, downy mildew, leaf spots; Sorghum: smuts, grain mold and anthracnose, Bajra :downy mildew and ergot;
	Unit 2	
	A	Groundnut: early and late leaf spots, wilt Soybean: Rhizoctonia blight, bacterial spot, seed and seedling rot and mosaic;
	B	Pigeonpea: Phytophthora blight, wilt and sterility mosaic; Finger millet: Blast and leaf spot; black & green gram:
	C	Cercospora leaf spot and anthracnose, web blight and yellow mosaic; Castor: Phytophthora blight; Tobacco: black shank, black root rot and mosaic.
	Unit 3	
	A	Horticultural Crops: Guava: wilt and anthracnose;
	B	Banana: Panama wilt, bacterial wilt, Sigatoka and bunchy top;
	C	Papaya: foot rot, leaf curl and mosaic, Pomegranate: bacterial blight;
	Unit 4	
	A	Cruciferous vegetables: Alternaria leaf spot and black rot; Brinjal: Phomopsis blight and fruit rot and Sclerotinia blight;
	B	Tomato: damping off, wilt, early and late blight, buck eye rot and leaf curl and mosaic; Okra: Yellow Vein Mosaic;

	C	Beans: anthracnose and bacterial blight; Ginger: soft rot; Colocasia: Phytophthora blight;		
	Unit 5			
	A	Plantation crops		
	B	Coconut: wilt and bud rot;		
	C	Tea: blister blight; Coffee: rust		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Plant Diseases by R.S. Singh		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year:2018-19**
Branch: Agriculture		**Semester: V**
1	Course Code	**BAG 342**
2	Course Title	**Crop Improvement-I *(Kharif Crops)***
3	Credits	**1**
4	Contact Hours (L-T-P)	1-0-0
	Course Status	Compulsory
5	Course Objective	1. To make the students familiar with crop improvement practices. 2. To understand and appreciate the plant genetic resources. 3. To know the various kinds of stresses. 4. To understand the concept of centre of origin etc.
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand the concept of utilization of plant genetic resources. **CO2:** understand real life applications of seed. **CO3:** use hybrid seeds. **CO4:** understand the cause of stresses. **CO5:** understand the climate resilient.
7	Course Description	This course is designed to make students proficient in hybrid seed production. Also to know about plant genetic resources. Etc.
8	Outline syllabus	
	Unit 1	
	A	Centers of origin,
	B	distribution of species, wild relatives in different cereals; pulses;
	C	oilseeds; fibres; fodders and cash crops; vegetable and horticultural crops;
	Unit 2	
	A	Plant genetic resources, its utilization and conservation
	B	study of genetics of qualitative and quantitative characters;
	C	Important concepts of breeding self pollinated, cross pollinated and vegetatively propagated crops
	Unit 3	
	A	Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield,
	B	adaptability, stability, abiotic stress
	C	biotic stress tolerance and quality (physical, chemical, nutritional)
	Unit 4	
	A	Hybrid seed production technology
	B	Hybrid seed production technology in Maize, Rice, Sorghum
	C	Hybrid seed production technology in Pearl millet and Pigeonpea
	Unit 5	
	A	Ideotype concept
	B	climate resilient
	C	climate resiliency for future
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)

	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Principles of Crop Improvement by P. Singh		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: V**
1	Course Code	**BAG 343**
2	Course Title	**Entrepreneurship Development and Business Communication**
3	Credits	**1**
4	Contact Hours (L-T-P)	1-0-0
	Course Status	Compulsory
5	Course Objective	1. To make the students familiar with Entrepreneurship development 2. To understand and appreciate the Characteristics of entrepreneurs 3. To know the SWOT analysis. 4. To understand the concept of chain management.
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand the concept of SWOT analysis. **CO2:** understand the concept of economic reforms. **CO3:** have an understanding of developing organizational skill. **CO4:** understand the cause of financing of enterprise. **CO5:** understand the opportunities for agri-entrepreneurship and rural enterprise.
7	Course Description	This course is designed to make students proficient in Entrepreneurship Development and Business Communication
8	Outline syllabus	
	Unit 1	
	A	Concept of Entrepreneur,
	B	Entrepreneurship Development,
	C	Characteristics of entrepreneurs
	Unit 2	
	A	SWOT Analysis
	B	achievement motivation, Government policy
	C	programs and institutions for entrepreneurship development,
	Unit 3	
	A	Impact of economic reforms
	B	Impact of economic reforms on Agribusiness
	C	Impact of economic reforms Agri-enterprises
	Unit 4	
	A	Entrepreneurial Development Process; Business Leadership Skills;
	B	Developing organizational skill (controlling, supervising, problem solving, monitoring & evaluation),
	C	Developing Managerial skills, Business Leadership Skills (Communication, direction and motivation Skills), Problem solving skill,
	Unit 5	
	A	Supply chain management and Total quality management
	B	Project Planning Formulation and report preparation;

	C	Financing of enterprise, Opportunities for agri-entrepreneurship and rural enterprise.		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Entrepreneurship Development and Business Communication by Vasant and Rai		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year:2018-19**
Branch: Agriculture		**Semester: V**
1	Course Code	**BAG 344**
2	Course Title	**Geoinformatics and Nano-technology and Precision Farming**
3	Credits	**1**
4	Contact Hours (L-T-P)	1-0-0
	Course Status	Compulsory
5	Course Objective	1. To make the students familiar with precision agriculture. 2. To understand and appreciate the Characteristics of geo-informatics. 3. To know the remote sensing. 4. To understand the concept of GPS.
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand the concept of soil mapping. **CO2:** understand the concept of GPS. **CO3:** use spatial data. **CO4:** understand the crop Simulation Models **CO5:** understand the nanotechnology
7	Course Description	This course is designed to make students proficient in geoinformatics and Nano-technology and Precision Farming
8	Outline syllabus	
	Unit 1	
	A	Precision agriculture: concepts and techniques;
	B	their issues and concerns for Indian agriculture
	C	Geo-informatics- definition, concepts, tool and techniques; their use in Precision Agriculture.
	Unit 2	
	A	Crop discrimination and Yield monitoring,
	B	soil mapping; fertilizer recommendation using geospatial technologies;
	C	Spatial data and their management in GIS
	Unit 3	
	A	Remote sensing concepts and application in agriculture
	B	Image processing and interpretation
	C	Global positioning system (GPS), components and its functions
	Unit 4	
	A	Introduction to crop Simulation Models
	B	their uses for optimization of Agricultural Inputs
	C	STCR approach for precision agriculture
	Unit 5	
	A	Nanotechnology, definition, concepts and techniques, brief introduction about nanoscale effects, nano-particles,
	B	nano-pesticides, nano-fertilizers, nano-sensors,
	C	Use of nanotechnology in seed, water, fertilizer, plant protection for scaling-up farm productivity.

	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Geoinformatics and Nano-technology for Precision Farming by SR Reddy		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year:2018-19**
Branch: Agriculture		**Semester: VI**
1	Course Code	BAG 346
2	Course Title	**Rainfed Agriculture & Watershed Management**
3	Credits	**1**
4	Contact Hours (L-T-P)	1-0-0
	Course Status	Compulsory
5	Course Objective	1. To aware the students about soil and water management. 2. To understand students about the agriculture practices which should done in rainfed region. 3. To understand the concept of rainfed agriculture.
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand the concept of rainfed agriculture practices. **CO2:** have Knowledge about crop rotation and mitigation to drought **CO3:**Know about management of crops in rainfed areas **CO4:** understand the cause of drought in agriculture **CO5:** understand components of watershed management and factors affecting watershed management
7	Course Description	This course is designed to give knowledge about Rainfed agriculture and watershed management, crop management and mitigation to drought, effect of water deficit on physio-morphological characteristics of plant.
8	Outline syllabus	
	Unit 1	**Rainfed agriculture**
	A	Introduction, types, History of rainfed agriculture
	B	Watershed in India
	C	Problems and prospects of rainfed agriculture in India
	Unit 2	**Soil and water**
	A	Conditions prevalent in rainfed areas
	B	Soil conservation techniques
	C	Water conservation techniques
	Unit 3	**Drought adaption of plant**
	A	Effect of water deficit on physio-morphological characteristics of the plants
	B	Types of water deficit on physio-morphological characteristics of the plants
	C	Crop adaptation and mitigation to drought
	Unit 4	Water harvesting
	A	Efficient utilization of water through soil management practices
	B	Efficient utilization of water through and crop management practices
	C	Management of crops in rainfed areas
	Unit 5	**Crop planning in rainfed region**
	A	Contingent crop planning for aberrant weather conditions
	B	Concept, objective, principles and components of watershed management
	C	Factors affecting watershed management.
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)

	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Water Management by J.S. Murthy		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year:2018-19**
Branch: Agriculture		**Semester: VI**
1	Course Code	BAG 347
2	Course Title	**Protected Cultivation and Secondary Agriculture**
3	Credits	**1**
4	Contact Hours (L-T-P)	1-0-0
	Course Status	Compulsory
5	Course Objective	1. To aware the students about protected cultivation 2. To understand students about the different practices of cultivation in protected cultivation 3. To understand the concept of protected cultivation
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand the concept of protected cultivation and secondary agriculture **CO2**: have Knowledge about irrigation system used in protected cultivation CO3: Know about management of crops in protected cultivation CO4: understand importance of protected cultivation CO5: know Measures taken for protected cultivation
7	Course Description	This course is designed to give knowledge about protected cultivation, importance of green house, what are the measures taken for protected cultivation, irrigation system which are used in protected cultivation
8	Outline syllabus	
	Unit 1	**Green house technology**
	A	Introduction of green house
	B	Types of green house
	C	Plant response to Green house environment
	Unit 2	**Planning and design of greenhouses**
	A	Design criteria of green house for cooling and heating purposes
	B	Green house equipments
	C	Materials of construction for traditional and low cost green houses
	Unit 3	**Techniques used in green house**
	A	Irrigation systems used in greenhouses
	B	Typical applications, passive solar green house, hot air green house heating systems, green house drying
	C	Cost estimation and economic analysis
	Unit 4	**Mechanism of green house**
	A	Important Engineering properties such as physical, thermal and aero & hydrodynamic properties of cereals
	B	Important Engineering properties such as physical, thermal and aero & hydrodynamic properties of pulses and oilseeds
	C	Application of physical, thermal and aero & hydrodynamic properties in PHT equipment design and operation
	Unit 5	**Measures taken for green house construction**
	A	Drying and dehydration; moisture measurement, EMC, drying theory
	B	Various drying method, commercial grain dryer

	C	Material handling equipment; conveyer and elevators, their principle, working and selection.		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%

School: SBSR		**Batch: 2018-2022**		
Program: B.Sc.		**Current Academic Year:2018-19**		
Branch: Agriculture		**Semester: VI**		
1	Course Code	BAG 348		
2	Course Title	**Diseases of Field and Horticultural Crops and their Management-II**		
3	Credits	**2**		
4	Contact Hours (L-T-P)	2-0-0		
	Course Status	Compulsory		
5	Course Objective	1. To aware the students about different types of diseases 2. To know the management about different diseases 3. Different types of diseases which are harmful for the crops		
6	Course Outcomes	After the completion of this course, the student will be able to CO1: understand about different types of diseases which occurs in the crop field CO2: understand Different types of measure taken to control the diseases CO3:have knowledge on Effect of yield and growth of the crop CO4:identify Symptoms of different types of diseases CO5:identify Diseases cycle and their management		
7	Course Description	This course is designed to give knowledge about the diseases which are normally occurs in the field which damages the crop and reduces the yield of the crop and Diseases cycle and their management		
8	Outline syllabus			
	Unit 1	**Diseases of crops**		
	A	Symptoms, etiology, disease cycle and management of field crops		
	B	Symptoms, etiology, disease cycle and management of sugarcane		
	C	Symptoms, etiology, disease cycle and management of sunflower		
	Unit 2	**Diseases of crops-II**		
	A	Symptoms, etiology, disease cycle and management of Mustard		
	B	Symptoms, etiology, disease cycle and management of Grams		
	C	Symptoms, etiology, disease cycle and management of Cotton and pea		
	Unit 3	**Diseases of horticulture crops**		
	A	Symptoms, etiology, disease cycle and management of Mango		
	B	Symptoms, etiology, disease cycle and management of Grapes vines		
	C	Symptoms, etiology, disease cycle and management ofApple and citrus		
	Unit 4	**Disease of horticulture crops-II**		
	A	Symptoms, etiology, disease cycle and management of Peach		
	B	Symptoms, etiology, disease cycle and management ofStarwberry		
	C	Symptoms, etiology, disease cycle and management of Cucurbits		
	Unit 5	**Diseases of horticulture crops-III**		
	A	Symptoms, etiology, disease cycle and management of Chillies		
	B	Symptoms, etiology, disease cycle and management of Turmeric		
	C	Symptoms, etiology, disease cycle and management of Rose		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Principles of Plant Disease Management by W. E. Fry		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year:2018-19**
Branch: Agriculture		**Semester: VI**
1	Course Code	BAG 349
2	Course Title	**Post-harvest Management and Value Addition of Fruits and Vegetables**
3	Credits	**1**
4	Contact Hours (L-T-P)	1-0-0
	Course Status	Compulsory
5	Course Objective	1. To aware the students about the post-harvest management 2. How post-harvest management help in value addition of fruits and vegetables 3. Process/ Steps taken for the post-harvest management
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** know about different processes of post-harvest management **CO2:** understand importance of post-harvest management **CO3:** know Types of management **CO4:**understand Proper Harvesting process which can prevent fruit **CO5:**have knowledge on Methods of preservation of fruits and vegetables
7	Course Description	This course is designed to give knowledge about the proper management of the fruits or vegetables after harvesting for long storage by which it gives value addition to the farmer's economy and for future preservation.
8	Outline syllabus	
	Unit 1	**Post-harvest Management**
	A	Importance of post-harvest processing of fruits
	B	Importance of post-harvest processing of vegetables
	C	Extent and possible causes of post harvest losses
	Unit 2	**factors affecting postharvest**
	A	Pre-harvest factors affecting postharvest quality
	B	Pre-harvest factors affecting postharvest maturity, ripening and changes occurring during ripening
	C	Respiration and factors affecting respiration rate
	Unit 3	**Caring done for fruit quality management**
	A	Harvesting and field handling; Storage (ZECC, cold storage, CA, MA, and hypobaric)
	B	Value addition concept
	C	Principles and methods of preservation
	Unit 4	**Types of moisture fruits**
	A	Intermediate moisture food- Jam, jelly, marmalade, preserve, candy – Concepts and Standards
	B	Fermented and non-fermented beverages
	C	Tomato products- Concepts and Standards
	Unit 5	**Methods of post harvests**
	A	Drying/ Dehydration of fruits and vegetables – Concept and methods
	B	Canning -– Concepts and Standards
	C	Packaging of products.

	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Post Harvest Technoogy of Horticultural Crops by K.V. Peter		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year:2018-19**
Branch: Agriculture		**Semester: VI**
1	Course Code	BAG 350
2	Course Title	**Management of Beneficial Insect**
3	Credits	**1**
4	Contact Hours (L-T-P)	1-0-0
	Course Status	Compulsory
5	Course Objective	1. To aware the students about different types of beneficial insects 2. Management of beneficial insects 3. Role of insects in pollination
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:**have knowledge about different types of beneficial insects **CO2:**understand importance insects **CO3:**have knowledge on role of insects in pollination CO4: understand Use of insects like a pesticides CO5: understand Silk production by the help of insects
7	Course Description	This course is designed to give knowledge about the different types of insects which help in different types of agriculture practices.
8	Outline syllabus	
	Unit 1	**Use of beneficial insecgts**
	A	Importance of beneficial Insects
	B	Bee pasturage, bee foraging and communication. Insect pests and diseases of honey bee
	C	Role of pollinators in cross pollinated plants
	Unit 2	**Importance of silkworms**
	A	Types of silkworm, voltinism and biology of silkworm
	B	. Rearing, mounting and harvesting of cocoons.
	C	Pest and diseases of silkworm, management, rearing appliances of mulberry silkworm and methods of disinfection
	Unit 3	**lac insect**
	A	Species of lac insect
	B	morphology, biology, host plant, lac production
	C	button lac, shellac, lac- products.
	Unit 4	**Biopesticides**
	A	Identification of major parasitoids and predators commonly being used in biological control
	B	Insect orders bearing predators
	C	Parasitoids used in pest control and their mass multiplication techniques
	Unit 5	**Important species of pollinator**
	A	Important species of pollinator
	B	Important species of weed killers

	C	Scavengers and their importance		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Economic Entomology by David and Ramamurthy		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year:2018-19**
Branch: Agriculture		**Semester: VI**
1	Course Code	BAG 351
2	Course Title	**Crop Improvement-II *(Rabi crops)***
3	Credits	**1**
4	Contact Hours (L-T-P)	1-0-0
	Course Status	Compulsory
5	Course Objective	1. To aware the students about the improvement in the cereals crops cultivation 2. Different approaches for Management of rabi crops 3. To learn for hybrid seed production
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** know about the cultivation practices done in rabi crops CO2: understand hybrid seed production technology in rabi crops CO3:understand Ideotype concept and climate resilient crop varieties for future CO4:have knowledge on Centers of origin, distribution of species, wild relatives in different rabi crops CO5:have knowledge on Plant genetic resources, its utilization and conservation; study of genetics of qualitative and quantitative characters
7	Course Description	This course is designed to give knowledge about the crop improvement for the rabi season crops and the hybrid seed production technology and also Ideotype concept and climate resilient crop varieties for future.
8	Outline syllabus	
	Unit 1	**Improvement in rabi crops**
	A	Centers of origin, distribution of species, wild relatives in different cereals; pulses
	B	Centers of origin, distribution of species, wild relatives in different oilseeds, fodder crops
	C	Centers of origin, distribution of species, wild relatives in different vegetables and horticulture crops
	Unit 2	**Genetic value of crop**
	A	Plant genetic resources, its utilization and conservation
	B	study of genetics of qualitative
	C	quantitative characters
	Unit 3	**Approaches for yield improvement**
	A	Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield
	B	adaptability, stability,
	C	abiotic and biotic stress tolerance and quality (physical, chemical, nutritional)
	Unit 4	**Hybrid seed production**
	A	Hybrid seed production technology of different cereals; pulses
	B	Hybrid seed production technology of different oilseeds; fodder crops and cash crops

	C	Hybrid seed production technology of different vegetable and horticultural crops		
	Unit 5	**Sustainable farming**		
	A	Ideotype concept and climate resilient crop varieties for future		
	B	Salt tolerant cereals crops varieties		
	C	Improved varieties of rabi crops		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Textbook of field crops by Joshi and Mukund		

School: SBSR		**Batch: 2018-2022**		
Program: B.Sc.		**Current Academic Year:2018-19**		
Branch: Agriculture		**Semester: VI**		
1	Course Code	BAG 353		
2	Course Title	**Principles of Organic Farming**		
3	Credits	**1**		
4	Contact Hours (L-T-P)	1-0-0		
	Course Status	Compulsory		
5	Course Objective	1. To aware the students about the organic farming		
6	Course Outcomes	After the completion of this course, the student will be able to CO1: know about importance of the organic farming CO2: understand certification process and standards of organic farming CO3: understand Processing and export potential of organic products CO4:understand the Choice of crops and varieties in organic farming; CO5:have knowledge on Organic farming, principles and its scope in India		
7	Course Description	This course is designed to give knowledge about the organic farming which should be done by the farmers which are so beneficial for the environment.		
8	Outline syllabus			
	Unit 1	**Organic farming**		
	A	Introduction to organic farming		
	B	principles and its scope in India		
	C	Initiatives taken by Government (central/ state), NGOs and other organizations for promotion of organic agriculture		
	Unit 2	**Organic farming concepts**		
	A	Organic ecosystem and their concepts		
	B	Organic nutrient resources and its fortification		
	C	Restrictions to nutrient use in organic farming		
	Unit 3	**Choice of crops**		
	A	Choice of crops and varieties in organic farming		
	B	Vegetables crops and horticulture crops		
	C	Cereals, oilseeds, fodder crops		
	Unit 4	**Managements**		
	A	Fundamentals of insect, pest management under organic mode of production		
	B	Fundamentals of diseases management under organic mode of production		
	C	Fundamentals of weed management under organic mode of production		
	Unit 5	**Problems in organic farming**		
	A	Operational structure of NPOP, Certification process and standards of organic farming		
	B	Processing, leveling, economic considerations and viability		
	C	marketing and export potential of organic products		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Organic Farming by C.A. Francis		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year:2018-19**
Branch: Agriculture		**Semester: VI**
1	Course Code	BAG 354
2	Course Title	**Farm Management, Production & Resource Economics**
3	Credits	**1**
4	Contact Hours (L-T-P)	1-0-0
	Course Status	Compulsory
5	Course Objective	1. To aware the students about farm management. 2. To understand the concept of cost and its types. 3. About budgeting-linear programming
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand about farm management. **CO2:** understand Different types of farm planning. **CO3:** understand relationship of farm management and other science. **CO4:** understand information about balance sheet, spreadsheet. **CO5:** understand Positive and negative externalities in agriculture
7	Course Description	This course is designed to give knowledge about farm management, concept of cost, Important issues in economics and management of common property resources of land, water, pasture and forest resources.
8	Outline syllabus	
	Unit 1	**Introduction to farm management**
	A	Meaning and concept of farm management, objectives and relationship with other sciences
	B	Meaning and definition of farms, its types and characteristics, factor determining types and size of farms
	C	Principles of farm management: concept of production function and its type, use of production function in decision-making on a farm, factor-product, factor-factor and product product relationship, law of equi-marginal/or principles of opportunity cost and law of comparative advantage.
	Unit 2	**Terms of resource of Economics**
	A	Meaning and concept of cost, types of costs and their interrelationship
	B	Importance of cost in managing farm business and estimation of gross farm income, net farm income
	C	Family labour income and farm business income
	Unit 3	**Farm business analysis**
	A	meaning and concept of farm income and profitability, technical and economic efficiency measures in crop and livestock enterprises
	B	Importance of farm records and accounts in managing a farm, various types of farm records needed to maintain on farm
	C	farm inventory, balance sheet, profit and loss accounts
	Unit 4	**Meaning and importance of farm planning**

	A	Meaning and importance of farm planning and budgeting, partial and complete budgeting, steps in farm planning and budgeting-linear programming, appraisal of farm resources selection of crops and livestock's enterprises		
	B	Concept of risk and uncertainty occurs in agriculture production, nature and sources of risks and its management strategies		
	C	Crop/livestock/machinery insurance – weather based crop insurance, features, determinants of compensation.		
	Unit 5	**Concept of resources Economics**		
	A	Concepts of resource economics, differences between NRE and agricultural economics, unique properties of natural resources.		
	B	Positive and negative externalities in agriculture, Inefficiency and welfare loss, solutions		
	C	Important issues in economics and management of common property resources of land, water, pasture and forest resources etc.		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Agricultural Economics by Reddy 2. Economics of farm Management in India by Kehon and Singh		

School: SBSR		**Batch: 2018-2022**		
Program: B.Sc.		**Current Academic Year:2018-19**		
Branch: Agriculture		**Semester: VI**		
1	Course Code	BAG 355		
2	Course Title	**Principles of Food Science and Nutrition**		
3	Credits	**2**		
4	Contact Hours (L-T-P)	2-0-0		
	Course Status	Compulsory		
5	Course Objective	1. The course will help students understand Concepts of Food Science and Food Microbiology		
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** have knowledge on Food and nutrition **CO2** understand Food microbiology **CO3:** have knowledge on Principles and methods of food processing **CO4:** understand Food composition and chemistry **CO5:** understand the concepts of Food Science		
7	Course Description	This course is designed to give knowledge about nutrient content in the food which we eat and the microbial activities in the food.		
8	Outline syllabus			
	Unit 1	**Introduction to food science**		
	A	Concepts of Food Science		
	B	measurements, density, phase change		
	C	pH, osmosis, surface tension, colloidal systems etc		
	Unit 2	**Food composition**		
	A	Food composition and chemistry		
	B	water, carbohydrates, proteins, fats, vitamins		
	C	minerals, flavours, colours, miscellaneous bioactives, important reactions		
	Unit 3	**Food microbiology**		
	A	bacteria, yeast, moulds		
	B	spoilage of fresh & processed foods		
	C	Production of fermented foods		
	Unit 4	**Food processing and preservation**		
	A	Principles and methods of food processing and preservation		
	B	use of heat, low temperature		
	C	Chemicals, radiation, drying etc.)		
	Unit 5	**Food and nutrient**		
	A	Food and nutrition, Malnutrition (over and under nutrition), nutritional disorders		
	B	Energy metabolism (carbohydrate, fat, proteins)		
	C	Balanced/ modified diets, Menu planning, New trends in food science and nutrition		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Food Science and Nutrition by Sunetra Roday		
	Other References			

School: SBSR		**Batch : 2018-2022**		
Program: B.Sc. (H)		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: VII**		
1	Course Code			
2	Course Title	RAWE and AIA		
3	Credits	20		
4	Contact Hours (L-T-P)	20-0		
	Course Status	Compulsory		
5	Course Objective	This course is one of the best means to produce well trained agricultural graduates with broad based knowledge and techniques to meet the emerging challenges.		
6	Course Outcomes	After completion of the course, the students will be able to CO1: be acquainted with training, demonstration, observation in purposeful activities CO2: have a knowledge of practice and participation CO3: orient themselves with various village development programmes CO4: provide work experience to students in rural setup and get an opportunity to interact with industries and help in technology transfer to farmers CO5: have competence to make reports and presentations		
7	**Outline syllabus**			
	Unit 1			
	A	General Orientation		
	B	Campus training		
	C	General overview of RAWE and AIA		
	Unit 2			
	A	Village attachment		
	B	Sharing of knowledge with farmers and vice versa		
	C	General participation in farm activities		
	Unit 3			
	A	Unit attachment in University		
	B	Unit attachment in KVK		
	C	Unit attachment in Research Station Attachment		
	Unit 4			
	A	Plant clinic		
	B	Advisory to farmers		
	C	Agro-Industrial Attachment		
	Unit 5			
	A	Project report preparation		
	B	Presentation		
	C	Evaluation		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Manual for Rural Agricultural Work Experience and Agro Industrial Attachment by Khare and Nabaria, JNKVV, Jabalpur		

School: SBSR		**Batch : 2018-2022**
Program: B.Sc. (H)		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: VIII**
1	Course Code	BAS-401
2	Course Title	Production Technology for Bioagents and Biofertilizer
3	Credits	10
4	Contact Hours (L-T-P)	10-0
	Course Status	Elective
5	Course Objective	The students will have hands on knowledge on the use of bio-control as management strategy in agriculture and can formulate various types of bio-control formulations
6	Course Outcomes	After completion of the course, the students will be able to CO1: have a knowledge of biofertilizers and their role in agriculture CO2: understand the quality standard of biocontrol agents and their role in sustainability CO3: understand the role of various microorganisms in agriculture CO4: have the knowledge of the role of various insects as natural enemies in agriculture CO5: have the knowledge of marketing of bioagents and biofertilizers
7	**Outline syllabus**	
	Unit 1	
	A	Biofertilizers: Introduction and types and importance of biofertilizers, Biopesticides and bioagents in agriculture and organic farming system, History of biofertilizers production Classification of biofertilizers microorganisms used in biofertilizers production.
	B	A study of growth characteristics of various microbes used in biofertilizers production. Nitrogen cycle in Nature. Process of nodule formation ,Role of Nif and Nod gene in Biological Nitrogen fixation, Enzyme nitrogenase and its component, Biochemistry of nitrogen fixation, Cross inoculation groups amongst Rhizobium, Methods used for the studying selection of efficient strain of Rhizobium
	C	Enzyme nitrogenase and its component, Biochemistry of nitrogen fixation, Cross inoculation groups amongst Rhizobium, Methods used for the studying selection of efficient strain of Rhizobium
	Unit 2	
	A	Quality standard for biofertilizers different methods of application of biofertilizers
	B	Role of microorganisms in decomposition of organic farm wastes, methods of quality control assessment in respect of biofertilizers
	C	Strategies of Mass multiplication and packing
	Unit 3	
	A	Importance of Trichoderma spp., Pseudomonas spp. and Bacillus spp. as a biocontrol agents,Mechanism of disease control by thses organisms bioagents .
	B	Types of diseases controlled bioagents formulations, Effectiveness of bioagents against seed borne and soil borne plant pathogens

	C	Mass multiplication and packing , Strategies of marking, and Registration with CIB and organic farming institute		
	Unit 4			
	A	Importance of Trichogramma, Cryptolaemus, Chrysoperla, NPV and entomofungal pathogens.		
	B	Establishing insectary for host insects and natural enemies		
	C	Mass production of Verticillium/Beauveria/Metarhzium/Nomuraea/Paecilomyces/Hirsutella thompsoni/Trichoderma, / Pseudomonas/Bacillus/Potash Mobilizers/Sulphur oxidizers /organic matter decomposers		
	Unit 5			
	A	Registration of biofertilizers.		
	B	Strategies of marking and Registration with CIB of bioagents		
	C	Strategies of marking and Registration with CIB of biopesticides		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Motsara, I.M.R., Bhattacharyya, P. and Srivastava, B. 1995. Biofertilizer Technology, Marketing and Usage- A Source Book-cum-glossary. FDCO, New Delhi. 2. Subba Rao, N.S. Biofertilizers in Agriculture and Forestry. 1993. Oxford and IBH. Publ. Co., New Delhi.		

School: SBSR		**Batch : 2018-2022**
Program: B.Sc. (H)		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: VIII**
1	Course Code	BAS-402
2	Course Title	Seed Production and Technology
3	Credits	10
4	Contact Hours (L-T-P)	10-0
	Course Status	Elective
5	Course Objective	The students will be able to understand the importance of seed and various technology developments in seed production for benefit of farmers
6	Course Outcomes	After completion of the course, the students will be able to CO1: understand the seed, its quality and the categories CO2: have the understanding of the seed development and maturation CO3: understand the process of seed dormancy and factors influencing it CO4: have the knowledge of seed testing and establishment of laboratories for seeds CO5: have the knowledge of seed health and intellectual property rights associated with seeds
7	**Outline syllabus**	
	Unit 1	
	A	Seed Technology – scope and importance, development of seed industry in India, difference between seed and grain, categories of agricultural seeds.
	B	Development of crop varieties and hybrids, their evaluation and release at National and State level.
	C	Seed quality – concept, quality characteristics.
	Unit 2	
	A	Seed development and maturation, accumulation of food reserves in seeds.
	B	Seed germination – types of seed germination, factors affecting germination, changes in seeds associated with germination, field emergence and stand establishment. Seed viability – difference between seed viability and germination, viability nomograph.
	C	Seed vigour – concept, factors affecting seed vigour, significance of assessing seed vigour.
	Unit 3	
	A	Seed dormancy – merits and demerits of dormancy in seeds, intensity and duration of dormancy, types of seed dormancy, causes, methods of breaking dormancy, induction of dormancy.
	B	Seed longevity and deterioration – orthodox and recalcitrant seeds.
	C	Factors influencing the life span of seeds, symptoms of seed deterioration, possible causes of seed deterioration, seed invigoration
	Unit 4	
	A	Seed testing– objectives
	B	Development of organisations for seed testing at international and national level

	C	Establishment of a seed testing laboratory		
	Unit 5			
	A	Seed health – pathogens, insects and other organisms causing damage to sowing quality of seed and their management		
	B	Seed legislation: Seeds Act 1966, seed law enforcement – duties and powers of seed inspectors, offences and penalties		
	C	Seeds (Control) Order 1983, other issues related to seed quality regulation. Intellectual Property Rights, patenting, WTO, Plant Breeders Rights		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Principles of seed technology - G.N.Kulkarni 2. 2. Plant physiology - R.G.S. Bidwell		

School: SBSR		**Batch : 2018-2022**		
Program: B.Sc. (H)		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: VIII**		
1	Course Code	BAS-403		
2	Course Title	Mushroom Cultivation Technology		
3	Credits	10		
4	Contact Hours (L-T-P)	10-0		
	Course Status	Elective		
5	Course Objective	The student will learn mushroom cultivation and processing so as to develop it as an entrepreneurship activity		
6	Course Outcomes	After completion of the course, the students will be able to CO1: understand the history of mushroom cultivation CO2: have the knowledge of general morphology and methodology to develop mushrooms CO3: have the knowledge of cultivating mushrooms CO4: have the knowledge of diseases affecting mushroom production CO5: understand the processing of mushrooms		
7	**Outline syllabus**			
	Unit 1			
	A	Historical development and importance of cultivated, mushroom		
	B	Historical development and importance of medicinal mushroom		
	C	Historical development and importance of poisonous mushroom		
	Unit 2			
	A	General morphology of different mushrooms		
	B	Methods of isolation of mushroom for development of mother culture.		
	C	Methods of purification of mushroom for development of mother culture		
	Unit 3			
	A	Methods for preparation of spawn		
	B	Methods of cultivation of Volvariella, Pleuratus and milky mushroom		
	C	Care of mushroom beds		
	Unit 4			
	A	Study of contaminants mushroom production.		
	B	Study of diseases limiting mushrooms		
	C	Mushroom processing		
	Unit 5			
	A	Mushroom preservation.		
	B	Development of small unit model for mushroom cultivation		
	C	Packaging of mushrooms		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Mushroom Cultivation in India - B.C.Suman and V.P.Sharma 2. Mushroom Growing for Everyone - G. Roy		

School: SBSR		**Batch : 2018-2022**		
Program: B.Sc. (H)		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: VIII**		
1	Course Code	BAS-404		
2	Course Title	Soil, Plant, Water and Seed Testing		
3	Credits	10		
4	Contact Hours (L-T-P)	10-0		
	Course Status	Elective		
5	Course Objective	The students will be able to understand the basic concepts of testing soil, plant, water and seed for effective agriculture.		
6	Course Outcomes	After completion of the course, the students will be able to CO1: have the knowledge of soil and its testing CO2: have the knowledge of plant and its testing CO3: have the knowledge of seed and its testing CO4: have the knowledge of water and its testing CO5: have the concept of various technologies developed in agriculture.		
7	**Outline syllabus**			
	Unit 1			
	A	Soil profile, components of soil.		
	B	Soil physical properties		
	C	Soil testing		
	Unit 2			
	A	Plant temperature and flow of heat in the soil		
	B	Plant uptake mechanisms		
	C	Nutrient availability in the soil for plant, plant testing		
	Unit 3			
	A	Definition, Characters of good quality seed, different classes of seed.		
	B	Foundation and certified seed production of important cereals, pulses, oilseeds, fodder and vegetables.		
	C	Seed testing		
	Unit 4			
	A	Water resources, soil-plant-water relationship, crop water requirement		
	B	Water use efficiency, irrigation- scheduling criteria and methods		
	C	Quality of irrigation water, logging.		
	Unit 5			
	A	Testing technologies for seeds, plants		
	B	Testing technologies for soil		
	C	Testing technologies for water		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Agricultural Education by BM Davis		

School: SBSR		**Batch : 2018-2022**
Program: B.Sc. (H)		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: VIII**
1	Course Code	BAS-405
2	Course Title	Commercial Beekeeping
3	Credits	10
4	Contact Hours (L-T-P)	10-0
	Course Status	Elective
5	Course Objective	To inculcate importance of bee keeping and honey processing in relation with entrepreneurship development
6	Course Outcomes	After completion of the course, the students will be able to CO1: The students will be able to understand importance of honey bees and status of bee keeping CO2: The students will be well versed with the bio-ecological importance of honey bees CO3: The students will be able to identify and control various pests and diseases of honey bees CO4: The students will have the knowledge about various techniques of bee keeping and honey processing CO5: The students will learn the regulations pertaining to beekeeping and maintenance of a bee hive for commercial value.
7	**Outline syllabus**	
	Unit 1	
	A	History of bee keeping
	B	Traditional bee keeping, Modern beekeeping
	C	Urban or backyard bee keeping, Apiculture development in India
	Unit 2	
	A	Basic concepts of morphology of honey bees
	B	Honey bee species and identification
	C	Social Organization, Annual biological cycle
	Unit 3	
	A	Diagnosis and Identification of bee pests and diseases
	B	Diagnosis and Identification of bee diseases
	C	Control methods (mechanical, chemical and biological).
	Unit 4	
	A	Selection of Bee Species for Apiculture, Artificial Bee Rearing
	B	Beehives, Bee Pasturage, Bee Keeping Equipment, Honey extraction and handling, processing of honey
	C	bee hive products
	Unit 5	
	A	Economics in small scale and large scale bee keeping, Farmer involvement in bee keeping for additional income
	B	Economic value of commercial bee keeping, Preparing bankable bee keeping project
	C	Funding sources for bee keeping

	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Bisht D.S., Agriculture, ICAR Publication 2. Singh S., Bee Keeping in India, ICAR Publication		

School: SBSR		**Batch : 2018-2022**
Program: B.Sc. (H)		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: VIII**
1	Course Code	BAS-406
2	Course Title	Commercial Horticulture
3	Credits	10
4	Contact Hours (L-T-P)	10-0
	Course Status	Elective
5	Course Objective	The students will learn about the techniques of commercial horticulture and its economic importance
6	Course Outcomes	After completion of the course, the students will be able to CO1: have knowledge of horticultural crops CO2: understand planning and layout of planting CO3: have the knowledge of growth regulators. CO4: understand orchards and rejuvenation of orchards CO5: have knowledge of organic approaches in horticulture
7	**Outline syllabus**	
	Unit 1	
	A	Economic importance and classification of horticultural crops
	B	Their culture and nutritive value, area and production
	C	Exports and imports, fruit and vegetable zones of India and of different states
	Unit 2	
	A	Nursery management practices, soil and climate, vegetable gardens, nutrition and kitchen garden and other types of gardens
	B	principles, planning and layout, management of orchards, planting systems and planting densities
	C	Production and practices for fruit, vegetable and floriculture crops, nursery techniques and their management
	Unit 3	
	A	Principles and methods of pruning and training of fruit crops
	B	Types and use of growth regulators in horticulture, water management, weed management, fertility management in horticultural crops
	C	Cropping systems, intercropping, multi-tier cropping, mulching, bearing habits
	Unit 4	
	A	Factors influencing the fruitfulness and unfruitfulness.
	B	Rejuvenation of old orchards, top working
	C	Frame working
	Unit 5	
	A	Principles of organic farming.
	B	Assessment of bearing habits, maturity standards
	C	Harvesting, grading, packaging and storage.

	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	1. Instant Horticulture by S.N. Gupta 2. Textbook of Horticulture by K. Rao		

School: SBSR		**Batch : 2018-2022**
Program: B.Sc. (H)		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: VIII**
1	Course Code	BAS-407
2	Course Title	Organic Production Technology
3	Credits	10
4	Contact Hours (L-T-P)	10-0
	Course Status	Elective
5	Course Objective	The student will be aware of organic production technology for growth of organic food.
6	Course Outcomes	After completion of the course, the students will be able to CO1: have knowledge of scope of organic farming CO2: understand the resent state of organic farming CO3: understand the organic farming systems CO4: have the knowledge of bio fertilisers, bio manures and biogas in organic farming CO5: have the knowledge of organic means of plant protection
7	**Outline syllabus**	
	Unit 1	
	A	Introduction: Farming, organic farming, concept and development of organic farming
	B	Principles of organic farming & Need for organic farming, Agencies and institutions related to organic agriculture
	C	Types of organic farming, Biodynamic farming, Benefits of organic farming.
	Unit 2	
	A	Conventional farming v/s organic farming
	B	Scope and Present state of organic farming
	C	Requirements for organic farming, Farm components for an organic farm
	Unit 3	
	A	Organic farming systems, Soil tillage, Choice of Varieties, crop notation multiple and cropping systems, intercropping in relation to maintained of soil productivity
	B	Propagation-seed, planting materials and seed treatments.
	C	Water management , Green manuring, Composting- principles, stages, types and factors, Composting methods, Earth moon Vermicomposting
	Unit 4	
	A	Bulky organic manures, Concentrated organic manures, Organic, Preparations, Organic amendments and sludges, biogas.
	B	Bio-fertilizers-methods of application, advantages and disadvantages
	C	Standards for organic inputs- fertilizers, Bio-fertilizers-types,Pheromones.
	Unit 5	
	A	Plant protection- cultural, Plant protection - mechanical .
	B	Plant protection- botanical pesticides

	C	Plant protection- biocontrol agents, National and international standards for organic inputs		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text books*	1. Science and Technology of Organic Farming by A. V. Barker		

School: SBSR		**Batch: 2018-2022**		
Program: B.Sc.		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: I**		
1	Course Code	BAP 112		
2	Course Title	Fundamentals of Soil Science lab		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-1		
	Course Status	Compulsory		
5	Course Objective	1. The objective of the course is to make students aware of the soil and its types as it is the basis of plant growth 2. To understand soil classification and composition. 3. To know the students about soil colloids and pollution in soil 4. to know the students about soil pH and soil EC		
6	Course Outcomes	After the completion of this course, the student will be able to CO1: differentiate between various kinds of soil, their formation and characteristics. CO2: have the understanding of soil profile and components CO3: have the knowledge of soil classification and composition. CO4: understand the current scenario of temperature, pH in context of soil CO5**:** understand the soil colloids and pollution in soil		
7	Outline syllabus			
	Unit 1			
	A	Study of soil sampling tools		
	B	Collection of representative soil sample		
	C	Soil sampling processing and storage		
	Unit 2			
	A	Study of soil forming rocks and minerals		
	B	Determination of soil density		
	C	Soil moisture content and porosity		
	Unit 3			
	A	Determination of soil pH		
	B	Determination of EC		
	C	Determination of cation exchange capacity of soil		
	Unit 4			
	A	Study of soil map		
	B	Determination of soil colour		
	Unit 5			
	A	Estimation of organic matter content of soil		
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	3. Textbook of Soil Sciences by S.K. Mukherjee 4. Textbook of Soil Science by N.K. Prasad		

School: SBSR		**Batch: 2018-2022**		
Program: B.Sc.		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: I**		
1	Course Code	BAP 113		
2	Course Title	Introductory Forestry Lab		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-1		
	Course Status	Compulsory		
5	Course Objective	1. The course will equip graduates with the analytical skills to determine the correlations between forests and other domains, such as natural sciences, technical production, economy and social policy. 2. Have the knowledge of Forestry and classification of Forests. 3. To know about forest menstruation 4. To know agro-forestry and cultivation process		
6	Course Outcomes	After the completion of this course, the student will be able to CO1: have the knowledge of Forestry and classification of Forests. CO2: have the understanding of forest regeneration and artificial regeneration CO3: have the knowledge of crown classification and trending operations in forestry CO4: understand the forest menstruation CO5: understand agro-forestry and cultivation practices		
7	Outline syllabus			
	Unit 1			
	A	Identification of tree species		
	B	Height measurement of standing trees by shadow method		
	Unit 2			
	A	Height measurement of standing trees by single pole method		
	B	Volume measurement of logs using various formulae		
	Unit 3			
	A	Nursery layout		
	B	Seed sowing		
	Unit 4			
	A	Vegetative propagation techniques		
	B	Forest plantation		
	Unit 5			
	A	Forest management		
	B	Visits of near by forest based industries		
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	Introduction to Forestry and Natural Resources (Academic Press)		

School: SBSR		**Batch: 2018-2022**		
Program: B.Sc.		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: I**		
1	Course Code	BAP 123		
2	Course Title	Fundamentals of Agronomy Lab		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-1		
	Course Status	Compulsory		
5	Course Objective	1. The students in this course will undertake research on scientific cultivation of crops taking into account the effects of factors like soil, climate and variety of crops and adjusts production techniques suitably depending on the situation. 2. Understanding of crop nutrition and efficiency 3. To make students aware of weeds, their importance and management 4. To give the knowledge of water resources and irrigation		
6	Course Outcomes	After the completion of this course, the student will be able to CO1: have the knowledge of agronomy and its scope CO2: have the understanding of crop nutrition and efficiency CO3: have the knowledge of water resources and irrigation CO4: have the awareness of weeds, their importance and management CO5: understand growth and development of crop and their management technologies		
7	Outline syllabus			
	Unit 1			
	A	Identification of crops, seeds, fertilizers, pesticides and tillage implements		
	B	Study of agroclimatic zones of india		
	C	Identification of weeds in crops		
	Unit 2			
	A	Methods of herbicides application		
	B	Methods of fertilizer application		
	C	Study of yield contributing characters and yield estimation		
	Unit 3			
	A	Seed germination and viability test		
	B	Numerical exercises on fertilizer requirement		
	C	Numerical Exercise on plant population		
	Unit 4			
	A	Numerical Exercise on herbicides requirement		
	B	Numerical Exercise on water requirement		
	C	Use of tillage implements- Reversible plough, one way plough, harrow, leveller and seed drill		
	Unit 5			
	A	Study of soil moisture measuring devices		
	B	Measurement of field capacity		
	C	Measurement Bulk density and infiltration rate		
	Mode of examination	Class test (5), Assignments (5) and presentation (5)		
		CA	MTE	ETE

	Weightage Distribution	30%	20%	50%
	Text book/s*	2. Principles of Agronomy by Reddy and Reddy		

School: SBSR		**Batch: 2018-2022**		
Program: B.Sc.		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: I**		
1	Course Code	BAP 107		
2	Course Title	Fundamentals of Horticulture Lab		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-1		
	Course Status	Compulsory		
5	Course Objective	1. This course will help improve how we use plants, for food and other human purposes, as well as repairing the environment and personal aesthetics. 2.To give the knowledge of horticulture and its importance 3. To make them understand about importance of medicinal and aromatic plants 4. To make them aware of technologies associated with training and pruning		
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** have the knowledge of horticulture and its importance **CO2:** have the understanding of botanical classification and type of soil use for horticulture **CO3:** have the knowledge of plant propagation and seed management **CO4:** have the awareness of technologies associated with training and pruning **CO5:** understand growth and development of medicinal and aromatic plants		
7	Outline syllabus			
	Unit 1			
	A	Identification of garden tools		
	B	Identification of horticultural crops		
	C	Preparation of seed bed		
	Unit 2			
	A	Preparation of nursery bed		
	B	Practice of sexual propagation		
	C	Practice of asexual propagation		
	Unit 3			
	A	Practice of micro-propagation		
	B	Layout of orchard		
	C	Planting of orchard		
	Unit 4			
	A	Training of fruit trees		
	B	Pruning of fruit trees		
	Unit 5			
	A	Preparation potting mixture		
	B	Fertilizer application in horticultural crops.		
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%

	Text book/s*	3. Fundamentals of Horticulture, Edmond, J.B., Sen., T.L., Andrews, F.S and Halfacre R.G, 1963. Tata McGraw Hill Publishing Co., New Delhi. 4. 2 Introduction to Horticulture, Kumar, N. 1990. Rajyalakshmi Publications, Nagarcoil, Tamilnadu.

School: SBSR		**Batch : 2018-2022**		
Program: B.Sc. (H)		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: II**		
1	Course Code	BAP 125		
2	Course Title	Plant pathology Lab		
3	Credits	1		
4	Contact Hours (L-T-P)	1-0		
	Course Status	Compulsory		
5	Course Objective	The students after studying this course will be well acquainted with the pathogen causing disease in plants.		
6	Course Outcomes	After successful completion of the course, the student will be able to CO1: be aware of the importance and history of plant diseases CO2: get acquainted with the disease development and various pathogens CO3: to identify fungi as pathogen and its importance CO4: to identify bacteria as pathogen and its importance CO5: to get aware of the growth and reproduction of plant pathogens.		
7	**Outline syllabus**			
	Unit 1			
	A	Acquaintance with various laboratory equipments and microscopy		
	B	collection		
	C	preservation of disease specimen		
	Unit 2			
	A	Preparation of media,.		
	B	isolation		
	C	Koch's postulates		
	Unit 3			
	A	General study of different structures of fungi		
	B	Study of various plant diseases.		
	C	Symptoms of various plant diseases		
	Unit 4			
	A	Study of identification of plant parasitic nematodes.		
	B	morphological features		
	C	Sampling and extraction of nematodes		
	Unit 5			
	A	preparation of nematode mounting.		
	B	Study of fungicides and their formulations.		
	C	Methods of pesticide application and their safe use. Calculation of fungicide sprays concentrations.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	2. Introduction to Plant Pathology by R. S. SIngh		

School: SBSR		**Batch : 2018-2022**		
Program: B.Sc. (H)		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: II**		
1	Course Code	BAP 105		
2	Course Title	Microbiology Lab		
3	Credits	1		
4	Contact Hours (L-T-P)	1-0-0		
	Course Status	Compulsory		
5	Course Objective	This course will help students get aware of the various microorganisms causing diseases in plants and their disease mechanisms.		
6	Course Outcomes	After completion of the course, the students will be able to CO1: be aware of the microbial world. CO2: be acquainted with the bacteria cell structure and reproduction CO3: be aware of the role of microbes in crop production CO4: identify the nitrogen fixing bacteria and fixation CO5: be aware of microbes in human welfare.		
7	**Outline syllabus**			
	Unit 1			
	A	Introduction to microbiology laboratory		
	B	equipments.		
	C	Microscope- parts		
	Unit 2			
	A	principles of microscopy		
	B	resolving power		
	C	numerical aperture		
	Unit 3			
	A	Methods of sterilization		
	B	Nutritional media		
	C	preparations		
	Unit 4			
	A	. Methods of isolation		
	B	purification		
	C	microbial cultures		
	Unit 5			
	A	Staining		
	B	microscopy		
	C	examination of microbes.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	2. Textbook of Microbiology by D.R.Arora and B.B. Arora		

School: SBSR		**Batch : 2018-2022**		
Program: B.Sc. (H)		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: II**		
1	Course Code	BAP 106		
2	Course Title	Genetics Lab		
3	Credits	1		
4	Contact Hours (L-T-P)	1-0-0		
	Course Status	Compulsory		
5	Course Objective	The students will learn the application of *genetics in agriculture* which is the main cause of sustainable and adaptable farming today in the form of new and well adapted crop species or varieties which perform better and stands well in crucial environment and soil factors.		
6	Course Outcomes	After completion of the course, the students will be able to CO1: acquaint themselves with genetics and heredity CO2: be aware of chromosomal theory of inheritance CO3: be aware of sex and blood group genetics CO4: have the knowledge of mutation and genetic disorders CO5: have the understanding of the nature and structure of genetic material		
7	**Outline syllabus**			
	Unit 1			
	A	Study of microscope.		
	B	Study of cell structure.		
	C	cell division.		
	Unit 2			
	A	Meiosis		
	B	Meiosis		
	C	Experiments on monohybrid,		
	Unit 3			
	A	dihybrid		
	B	trihybrid		
	C	test cross and back cross.		
	Unit 4			
	A	Practice on mitotic cell divission		
	B	meiotic cell division.		
	C	Experiments on probability		
	Unit 5			
	A	Chi-square test		
	B	study on sex linked inheritance in Drosophila.		
	C	Study of models on DNA and RNA structures.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	3. B. D. Singh. 2014, fundamentals of genetics, kalyani publication. 4. P. K. Gupta, 2007, Genetics: classical to modern. Meerut, India: Rastogi Publications.		

School: SBSR		**Batch : 2018-2022**		
Program: B.Sc. (H)		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: II**		
1	Course Code	BAP 126		
2	Course Title	Crop Physiology Lab		
3	Credits	1		
4	Contact Hours (L-T-P)	1-0-0		
	Course Status	Compulsory		
5	Course Objective	The course will help students to have knowledge of both the genetic potentia1ities and the environment which will help operate to produce the quantity and quality of growth or phenotype		
6	Course Outcomes	After completion of the course, the students will be able to CO1: have the knowledge of physiology of plants CO2: acquaint with plant cell and its functions CO3: understand about the nutrition in plants CO4: have the knowledge of photosynthesis and metabolism in plants CO5: understand about the plant growth regulators		
7	**Outline syllabus**			
	Unit 1			
	A	study of plant cells		
	B	structure		
	C	distribution of stomata		
	Unit 2			
	A	Imbibitions		
	B	osmosis		
	C	plasmolysis		
	Unit 3			
	A	measurement of root pressure		
	B	rate of transpiration		
	C	Separation of photosynthetic pigments		
	Unit 4			
	A	paper chromatography		
	B	Rate of transpiration		
	C	photosynthesis,		
	Unit 5			
	A	respiration		
	B	Tissue test for mineral nutrients		
	C	estimation of relative water content		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	2. Robert M. Devlin Francis M. Witham. 1986. Plant Physiology. Published by CBS Publishers and Distributers, New Delhi		

School: SBSR		**Batch : 2018-2022**		
Program: B.Sc. (H)		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: II**		
1	Course Code	BAP 110		
2	Course Title	soil and water conservation Engineering lab		
3	Credits	1		
4	Contact Hours (L-T-P)	1-0-0		
	Course Status	Compulsory		
5	Course Objective	The student will get aware of the Soil and water which are two important natural resources and the basic needs for agricultural production.		
6	Course Outcomes	After completion of the course, the students will be able to CO1: have the knowledge of the soil and water conservation CO2: understand the gully classification and soil loss measure. CO3: have the knowledge of erosion and its control CO4: acquaint with harvesting of water CO5: have the knowledge of wind erosion and its control		
7	**Outline syllabus**			
	Unit 1			
	A	General status of soil conservation in India.		
	B	Calculation of erosion index		
	C	Estimation		
	Unit 2			
	A	Soil loss		
	B	measurement		
	C	Soil loss		
	Unit 3			
	A	Preparation of contour maps		
	B	Design		
	C	grassed water ways.		
	Unit 4			
	A	Design		
	B	contour bunds		
	C	Design of graded bunds.		
	Unit 5			
	A	Design of bench terracing system.		
	B	wind erosion		
	C	Problems		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	2. T.P. Ojha and A.M. Michael. (2005) Principles of Agricultural Engineering (Volume-1), Jain Brothers		

School: SBSR		**Batch : 2018-2022**		
Program: B.Sc. (H)		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: II**		
1	Course Code	BAP 127		
2	Course Title	Entomology Lab		
3	Credits	1		
4	Contact Hours (L-T-P)	1-0-0		
	Course Status	Compulsory		
5	Course Objective	3. Students after this course can detect the role of insects in the spread of disease and discovering ways of protecting food and fiber crops, and livestock from being damaged. 4. They will study the way beneficial insects contribute to the wellbeing of humans, animals, and plants.		
6	Course Outcomes	After completion of the course, the students will be able to CO1: have the knowledge of Entomology, morphology and relationship of insects with other arthropods CO2: have the understanding of the physiological processes of insect CO3: acquaint themselves with insect ecology and environmental resistance CO4: have the knowledge of the pests and Integrated Pest Management. CO5: understand the systematics and binomial nomenclature of insecta		
7	**Outline syllabus**			
	Unit 1			
	A	Methods of collection		
	B	preservation of insects		
	C	immature stages		
	Unit 2			
	A	External features of Grasshopper		
	B	Blister		
	C	beetle		
	Unit 3			
	A	Types of insect antennae		
	B	mouthparts		
	C	**legs**		
	Unit 4			
	A	Wing venation		
	B	types of wings		
	C	wing coupling apparatus		
	Unit 5			
	A	Types of insect larvae and pupae		
	B	Dissection of digestive system in insects		
	C	Insecticides and their formulations. Pesticide appliances and their maintenance.		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	2. Insecta: An Introduction by Ragumoorthi and Balasubramani		

School: SBSR		**Batch : 2018-2022**		
Program: B.Sc. (H)		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: II**		
1	Course Code	BAP 128		
2	Course Title	Agriculture Extension Education Lab		
3	Credits	1		
4	Contact Hours (L-T-P)	1-0-0		
	Course Status	Compulsory		
5	Course Objective	This course will help the students in understanding the planning and implementation of plans at village level for increasing agricultural production.		
6	Course Outcomes	After completion of the course, the students will be able to CO1: understand the meaning, scope and types of education CO2: have the knowledge of various extension development programmes CO3: have the knowledge of rural development CO4: have the knowledge of monitoring and evaluation processes CO5: understand ICT applications in agriculture		
7	**Outline syllabus**			
	Unit 1			
	A	To get acquainted with university extension system		
	B	Group discussion- exercise		
	C	handling and use of audio visual equipments		
	Unit 2			
	A	preparation and use of AV aids,		
	B	digital camera and LCD projector		
	C	preparation of extension literature		
	Unit 3			
	A	leaflet, booklet, folder, and		
	B	pamphlet news stories		
	C	success stories		
	Unit 4			
	A	Presentation skills exercis		
	B	micro teaching exercise		
	C	A visit to village		
	Unit 5			
	A	understand the problems		
	B	remedy		
	C	solutions		
	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*			

School: SBSR		**Batch : 2018-2022**
Program: B.Sc. (H)		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: II**
1	Course Code	BAP 129
2	Course Title	Plant Biochemistry and Biotechnology Lab
3	Credits	1
4	Contact Hours (L-T-P)	1-0-0
	Course Status	Compulsory
5	Course Objective	
6	Course Outcomes	After completion of the course, the students will be able to CO1: have the knowledge of various biochemical processes of the plant CO2: understand the enzymes and their classification CO3: have the knowledge of plant biotechnology and its significance CO4: understand the embryo rescue and its significance CO5: understand transgenics and its importance
7	**Outline syllabus**	
	Unit 1	
	A	Preparation of solutio
	B	pH
	C	buffers
	Unit 2	
	A	Qualitative tests of carbohydrates
	B	amino acid
	C	Quantitative estimation of glucose
	Unit 3	
	A	proteins.
	B	Paper chromatography
	C	TLC demonstration for separation of amino acids
	Unit 4	
	A	Monosaccharides.
	B	Sterilization techniques.
	C	Composition of various tissue culture media
	Unit 5	
	A	preparation of stock solutions for MS nutrient medium
	B	Callus induction from various explants. Micro-propagation, hardening and acclimatizatio
	C	Demonstration on isolation of DNA. Demonstration of gel electrophoresis techniques and DNA finger printing.

	Mode of examination	Theory		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	2. A textbook of plant physiology, biochemistry and biotechnology by S.K. Verma		

School: SBSR		**Batch: 2018-2022**		
Program: B.Sc.		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: III**		
1	Course Code	BAP 114		
2	Course Title	Crop production technology-I (*Kharif* crops) Lab		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-1		
	Course Status	Compulsory		
5	Course Objective	4. To make the students familiar with kharif season crops. 5. To know the production technology of crops. 6. To increase the production by improving technologies.		
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** Familiariase with kharif season crops **CO2:** understand the production technology of cereals. **CO3:** understand the production technology of pulses **CO4:** understand the production technology of oil seeds **CO5:** understand the production technology of forage crops		
7	Course Description	This course is designed to make students familiar with the kharif crops sowing season and their production technologies.		
8	Outline syllabus			
	Unit 1			
	A	Rice nursery preparation.		
	B	Transplanting of rice.		
	C	Sowing methods of rice.		
	Unit 2			
	A	Effect of seed size on germination		
	B	seedling vigour of *kharif* season crops		
	C	Modern techniques of raising field crops		
	Unit 3			
	A	Effect of sowing depth on germination of *kharif* crops		
	B	Identification of weeds in *kharif* season crops,		
	C	Identification of pests in *kharif* season crops,		
	Unit 4			
	A	Top dressing of nutrients		
	B	Foliar feeding of nutrients.		
	C	Study of yield contributing characters		
	Unit 5			
	A	Yield calculation of *kharif* season crops,		
	B	Morphological description of *kharif* season crops,		
	C	Visit to research centres of related crops		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	2. Textbook of field crops by Joshi and Mukund		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: III**
1	Course Code	BAP 115
2	Course Title	Fundamentals of Plant Breeding Lab
3	Credits	1
4	Contact Hours (L-T-P)	0-0-1
	Course Status	Compulsory
5	Course Objective	5. To know about the history, concept and nature of breeding 6. To get familiar with breeding methods. 7. Application of breeding in crop development. 8. To understand the importance of biotechnological tools for increase production.
6	Course Outcomes	After the completion of this course, the student will be able to CO1: To know about basic terms related to breeding. CO2: To know about breeding methods for crop improvement. CO3: understand improved technologies in breeding. CO4: Use hybridization, polyploidy and heterosis for crop improvement. CO5: design biotechnology and markers in agriculture.
7	Course Description	This course is designed to make students proficient by genetic improvement techniques. They also learn about certain breeding technologies and their application in agriculture.
8	Outline syllabus	
	Unit 1	
	A	Plant Breeder's kit
	B	Study of germplasm of various crops.
	C	Plant breeding methods
	Unit 2	
	A	Study of floral structure of self-pollinated crops
	B	Study of floral structure of cross pollinated crops
	C	Emasculation in cross pollinated crops.
	Unit 3	
	A	Emasculation in self pollinated crops.
	B	Hybridization techniques in self pollinated crops.
	C	Hybridization techniques in cross pollinated crops.
	Unit 4	
	A	Study of male sterility system.
	B	Methods of calculating mean, heritability
	C	Methods of calculating range
	Unit 5	
	A	Methods of calculating variance,standard deviation
	B	Analysis of Randomized Block Design
	C	Designs used in plant breeding experiments
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)

	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	2. Plant breeding by B.D. Singh		

School: SBSR		**Batch: 2018-2022**		
Program: B.Sc.		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: III**		
1	Course Code	BAGP 116		
2	Course Title	Agricultural Finance and Cooperation Lab		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-1		
	Course Status	Compulsory		
5	Course Objective	5. To get familiar with agricultural financing. 6. Source and role of agricultural finance. 7. To know about the institutions involved in providing the finance for agriculture 8. To learn about agricultural cooperation and it's status in India		
6	Course Outcomes	After the completion of this course, the student will be able to CO1: Understand the concept of agricultural finance CO2: understand the source of agricultural financing CO3: get familiar with Institutions involved in agricultural financing. CO4: know about agricultural cooperation. CO5: know the status of agricultural cooperation.		
7	Course Description	This course is designed to make students familiar with the institution for financing the technologies and loan facilities for agriculture.		
8	Outline syllabus			
	Unit 1			
	A	Determination of most profitable level of capital use.		
	B	Analysis of balance sheet		
	C	Analysis of progress of cooperatives using published data.		
	Unit 2			
	A	Analysis of performance of cooperatives using published data.		
	B	Analysis of progress of commercial banks using published data.		
	C	Analysis of performance of commercial banks using published data.		
	Unit 3			
	A	Analysis of performance of RRBs using published data.		
	B	Analysis of progress RRBs using published data.		
	C	Estimation of credit requirement of farm business – A case study.		
	Unit 4			
	A	Preparation of income statement – A case study		
	B	Analysis of income statement – A case study		
	C	Appraisal of loan proposal – A case study		
	Unit 5			
	A	Study about different agriculture banks.		
	B	Study about the functioning of co-operative society.		
	C	Visit to different bank.		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	2. Agriculture finance and management by Reddy and Ram		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: III**
1	Course Code	BAP 117
2	Course Title	Agri- Informatics Lab
3	Credits	1
4	Contact Hours (L-T-P)	1-0-0
	Course Status	Compulsory
5	Course Objective	5. To provide basic knowledge about computer application 6. To understand the use of informatics for the data collection. 7. To aware about the role of agri-informatics to understand the plant processes 8. To understand the preparation of contingent crop-planning using IT tools.
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand and learn about the basics of computer. **CO2:** apply of MS- Office and excel for data collection and analysis **CO3:** have knowledge of application of computer languages **CO4:** Use technologies in agricultural marketing. **CO5:** to get familiar with preparation of contingent crop-planning using IT tools.
7	Course Description	This course is designed to make students proficient in agricultural informatics and its application in data collection, analysis and agricultural marketing.
8	Outline syllabus	
	Unit 1	
	A	Study of Computer Components, accessories,
	B	Practice of important DOS Commands.
	C	Introduction of different operating systems such as windows, Unix/ Linux, Creating, Files & Folders, File Management.
	Unit 2	
	A	Use of MS-WORD for creating, editing and presenting a scientific Document.
	B	Use of MS Power-point for creating, editing and presenting a scientific Document.
	C	MS-EXCEL - Creating a spreadsheet, use of statistical tools, writing expressions,.
	Unit 3	
	A	MS-EXCEL - creating graphs, analysis of scientific data.

	B	MS-ACCESS: Creating Database, preparing queries.		
	C	MS-ACCESS: Creating reports, demonstration of Agri-information system.		
	Unit 4			
	A	Introduction to World Wide Web (WWW)		
	B	Introduction of programming languages.		
	C	Introduction of Geospatial Technology for generating valuable information for Agriculture.		
	Unit 5			
	A	Study of mail merge.		
	B	Study of Agri informatics for soil information.		
	C	Use of Agri informatics in determining soil PH.		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*			
	Other References			

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: III**
1	Course Code	BAP 118
2	Course Title	Farm Machinery and Power Lab
3	Credits	1
4	Contact Hours (L-T-P)	0-0-1
	Course Status	Compulsory
5	Course Objective	5. To have basic knowledge of energy 6. To understand the application of mechanical technology in agriculture. 7. To know about motors. 8. To understand the use of tools in agriculture to make operations easy.
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand the basic concept of energy **CO2:** know about various tools use in agricultural operations **CO3:** learn about construction and performance of motors. **CO4:** learn about agricultural tools **CO5:** get familiar with different equipment and their uses
7	Course Description	This course is designed to provide basic knowledge about agricultural equipment and their application in agriculture..
8	Outline syllabus	
	Unit 1	
	A	Calculation on force.
	B	Calculation on energy.
	C	Power, calculations with realistic examples.
	Unit 2	
	A	IC engines – showing the components of dismantled engines
	B	IC engines – showing the components of motors.
	C	Tractors, power tillers and their types and uses
	Unit 3	
	A	Spraying equipment.
	B	Construction of electric motors
	C	calibration and operation of electric motor
	Unit 4	
	A	Primary and secondary tillage implements, hitching.
	B	Primary and secondary tillage adjustments and operations.

	C	Construction and function of tillers, harrows, levelers, ridgers and bund formers.		
	Unit 5			
	A	Seed drills, potato planters, seedling transplanter. Grafting, pruning and training tools and equipment		
	B	Plant protection equipment,		
	C	Calculation of dilution ratio and operation.		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	2. Farm machinery by T. P. Singh		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: III**
1	Course Code	BAP 119
2	Course Title	Production Technology for Vegetables and Spices lab
3	Credits	1
4	Contact Hours (L-T-P)	0-0-1
	Course Status	Compulsory
5	Course Objective	5. To know about the importance of vegetables and spices 6. To understand basic practices for the cultivation of vegetables and spices 7. To aware about the production technology of cucurbits and other crops. 8. To understand the production technology of cole, root and spices
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand importance of vegetables and spices for healthy diet **CO2:** understand the production technology for solanaceous crops **CO3:** understand the production technology for cucurbits. **CO4:** understand the production technology for cole crops **CO5:** understand the production technology for root, tuber vegetables and spices
7	Course Description	This course is designed to learn about the production technologies of vegetables and spices for increase the quality as well as productivity of crops.
8	Outline syllabus	
	Unit 1	
	A	Identification of vegetables and their seeds.
	B	Identification of spice crops and their seeds.
	C	Different types of gardening
	Unit 2	
	A	Nursery raising
	B	Direct seed sowing
	C	transplanting
	Unit 3	
	A	Study of morphological characters of different vegetables
	B	Study of morphological characters of different spices
	C	Fertilizers applications.
	Unit 4	
	A	Harvesting of vegetables and spices for markets.
	B	Production technology for onion
	C	Production technology for garlic
	Unit 5	
	A	Preparation of vegetables and spices for markets
	B	Economics of vegetables cultivation

	C	Economics of spices cultivation		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	2. Applied production technology for vegetables by P.K. Singh		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: III**
1	Course Code	BAP 120
2	Course Title	Environmental Studies and Disaster Management Lab
3	Credits	1
4	Contact Hours (L-T-P)	0-0-1
	Course Status	Compulsory
5	Course Objective	5. To know about importance and scope of environmental studies 6. To understand the concept of ecosystem and it's type 7. To know the importance of biodiversity and pollution & its control 8. To get aware about social issues related with environment.
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** Understand the use of natural resources **CO2:** have the knowledge to conserve ecosystem **CO3:** understand the importance of biodiversity for the conservation of variability **CO4:** resolve social issues related to environment **CO5:** understand and manage the natural disasters
7	Course Description	This course is designed to make students proficient environment, natural resource conservation etc.
8	Outline syllabus	
	Unit 1	
	A	Pollution case studies.
	B	Case Studies- Field work:
	C	Visit to a local area to document environmental assets river/ forest/ grassland/ hill/ mountain,
	Unit 2	
	A	visit to a local polluted site-Urban.
	B	visit to a local polluted site-Rural
	C	visit to a local polluted site-Industrial
	Unit 3	
	A	visit to a local polluted site- Agricultural.
	B	Study of Bio gas plant.
	C	Study of common plants.
	Unit 4	
	A	Study of common insects
	B	Study of common birds.
	C	Study of simple ecosystem.
	Unit 5	
	A	Study about the different layers of atmosphere.
	B	Study of different hierrachy of classification.
	C	Study of pond ecosystem .

	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	2. Disaster management by Dhyeya		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: III**
1	Course Code	BAP 121
2	Course Title	Livestock and Poultry Management lab
3	Credits	1
4	Contact Hours (L-T-P)	0-0-1
	Course Status	Compulsory
5	Course Objective	5. To understand the role of livestock in national economy as well as in agriculture 6. To manage calves, beifers and milch animals . 7. To know about the exotic breeds of cattle, buffalo and other animals. 8. To understand the feeding and digestion in animals
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** understand the importance of livestock in national economy **CO2:** know about the management of animals for better health. **CO3:** be aware about the feeding and digestion in animals. **CO4:** understand the importance of livestock in agriculture **CO5:** know about Diseases of livestock and poultry and their management.
7	Course Description	This course is designed to make students proficient livestock and its utilization in agriculture
8	Outline syllabus	
	Unit 1	
	A	External body parts of cattle, buffalo, sheep.
	B	External body parts of goat, swine and poultry.
	C	Handling and restraining of livestock
	Unit 2	
	A	Identification methods of farm animals and poultry.
	B	Visit to IDF to study breeds of livestock and daily routine farm operations and farm records.
	C	Visit to IPF to study breeds of poultry and daily routine farm operations and farm records.
	Unit 3	
	A	Judging of cattle, buffalo and poultry
	B	Planning and layout of housing for different types of livestock.
	C	Computation of rations for livestock.
	Unit 4	
	A	Formulation of concentrate mixtures.
	B	Clean milk production, milking methods
	C	Hatchery operations, incubation and hatching equipments.
	Unit 5	

	A	Management of chicks, growers and layers.		
	B	. Debeaking, dusting and vaccination		
	C	Economics of cattle, buffalo, sheep, goat, swine and poultry production.		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	2. Livestock and poultry management by Ramesh, N.		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: III**
1	Course Code	BAP 122
2	Course Title	Statistical Methods Lab
3	Credits	1
4	Contact Hours (L-T-P)	0-0-1
	Course Status	Compulsory
5	Course Objective	5. To aware about statistical methods and its application 6. To understand the basic concept of statistics 7. Ability to apply statistics for the analysis of data. 8. Ability to apply different test of statistics.
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:** have the knowledge of Introduction and application of statistic in agriculture **CO2:** understand different terms related to statistic **CO3:** know about correlation **CO4:** get aware about different types of statistical tests **CO5:** understand the different methods for the analysis of data
7	Course Description	This course is designed to make students proficient in statistical methods and its use in agriculture for the analysis of data.
8	Outline syllabus	
	Unit 1	
	A	Graphical Representation of Data
	B	Measures of Central Tendency (Ungrouped data) with Calculation of Quartiles, Deciles & Percentiles
	C	Measures of Central Tendency (Grouped data) with Calculation of Quartiles, Deciles & Percentiles.
	Unit 2	
	A	Measures of Dispersion (Ungrouped Data)
	B	. Measures of Dispersion (Grouped Data)
	C	. Moments, Measures of Skewness & Kurtosis (Ungrouped Data).
	Unit 3	
	A	Moments, Measures of Skewness & Kurtosis (Grouped Data).
	B	Correlation & Regression Analysis
	C	Application of One Sample t-test.
	Unit 4	
	A	Application of Two Sample Fisher's t-test
	B	Chi-Square test of Goodness of Fit
	C	Chi-Square test of Independence of Attributes for 2×2 contingency table.
	Unit 5	
	A	Analysis of Variance: One Way Classification.
	B	Analysis of Variance: Two Way Classification
	C	Selection of random sample using Simple Random Sampling.

	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	2. An introduction to statistical methods by Horace Secrist		

School: SBSR		**Batch: 2018-2022**		
Program: B.Sc.		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: IV**		
1	Course Code	**BAP 229**		
2	Course Title	**Crop Production Technology-II (*Rabi* crops) Lab**		
3	Credits	**1**		
4	Contact Hours (L-T-P)	**0-0-2**		
	Course Status	Compulsory		
5	Course Objective	5. To make the students familiar with different Rabi crops. 6. To understand and appreciate the economic importance of these crops. 7. To know the cultural practices. 8. To understand the concept medicinal and aromatic plants.		
6	Course Outcomes	After the completion of this course, the student will be able to CO1: understand the concept of Rabi crops. CO2: understand the concept of soil and climatic requirements of various crops. CO3: use of fertilizers and irrigations techniques. CO4: understand the various critical stages. CO5: understand the cultural practices.		
7	Course Description	This course is designed to make students proficient in Rabi crops production etc.		
8	Outline syllabus			
	Unit 1			
	A	Sowing methods		
	B	Sowing methods of wheat		
	C	Sowing methods of sugarcane		
	Unit 2			
	A	weeds		
	B	Identification of weeds		
	C	weeds in *rabi* season crops		
	Unit 3			
	A	morphological characteristics		
	B	Study of morphological characteristics of *rabi* crops		
	Unit 4			
	A	yield contributing characters		
	B	Study of yield contributing characters of *rabi* season crops		
	C	yield and juice quality analysis of sugarcane		
	Unit 5			
	A	important agronomic experiments		
	B	Study of important agronomic experiments of *rabi* crops		
	C	Visit experimental farms.		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	2. Textbook of field crops by Joshi and Mukund		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: IV**
1	Course Code	**BAP 230**
2	Course Title	**Production Technology for Ornamental Crops, MAPs and Landscaping Lab**
3	Credits	**1**
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Compulsory
5	Course Objective	5. To make the students familiar with landscaping. 6. To understand and appreciate the Characteristics of medicinal & aromatic plants. 7. To know the landscape uses of trees, shrubs and herbs. 8. To understand the concept ofProcessing and value addition in ornamental crops and MAPs produce.
6	Course Outcomes	After the completion of this course, the student will be able to CO1: understand the concept of MAPs. CO2: understand the concept of Lanscaping. CO3: use of shrubs and climbers in landscaping. CO4: understanding various crops like- lilium, marigold etc. CO5: understand the package of practices for loose flowers
7	Course Description	This course is designed to make students proficient in ornamental, medicinal, aromatic crops etc. Principles of landscaping etc.
8	Outline syllabus	
	Unit 1	
	A	Ornamental plants.
	B	Ornamental plants identification
	C	Identification of Medicinal and Aromatic Plants.
	Unit 2	
	A	Nursery
	B	Nursery bed preparation
	C	Nursery bed preparation and seed sowing.
	Unit 3	
	A	Training
	B	pruning
	C	Training and pruning of Ornamental plants.
	Unit 4	
	A	garden
	B	Planning of garden.
	C	layout of garden.
	Unit 5	
	A	MAPs
	B	Intercultural operations
	C	Intercultural operations in flowers and MAP.
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)

	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	2. Ornamental Horticulture by Jack Ingels		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: IV**
1	Course Code	**BAP 231**
2	Course Title	**Renewable Energy and Green Technology Lab**
3	Credits	**1**
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Compulsory
5	Course Objective	5. To make the students familiar with Renewable and non- renewable energy. 6. To understand and appreciate its benefits in Agriculture. 7. To know the biomass concept. 8. To understand the concept of wind energy.
6	Course Outcomes	After the completion of this course, the student will be able to CO1: understand the concept of biogas, biodiesel etc. CO2: understand the concept of energy resources in agriculture. CO3: use of developing bio-gas in agriculture. CO4:Familiarize with solar energy gadgets CO5: understand the solar drying, solar pond, solar distillation, solar photovoltaic system and their application.
7	Course Description	This course is designed to make students proficient in Renewable and non renewable energy resources and its use in Agriculture.
8	Outline syllabus	
	Unit 1	
	A	renewable energy
	B	Familiarization with renewable energy
	C	Familiarization with different renewable energy gadgets.
	Unit 2	
	A	Biogas
	B	To study biogas plants
	C	Visit to biogas plants
	Unit 3	
	A	biodiesel
	B	To study the production process of biodiesel
	C	Process involved in production.
	Unit 4	
	A	bio-fuels.
	B	To study the production process of bio-fue
	C	Process involved in production.
	Unit 5	
	A	To study solar photovoltaic system
	B	solar light,
	C	solar pumping, solar fencing.
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)

	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	2. Introduction to renewable energy by Nelson		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: IV**
1	Course Code	**BAP 233**
2	Course Title	**Production Technology for Fruit and Plantation Crops Lab**
3	Credits	**1**
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Compulsory
5	Course Objective	4. To understand the students about the different fruits cultivation in India 5. To understand the production technology of the fruits 6. To know about different types of plantation crops 7. To understand about PGRs.
6	Course Outcomes	After the completion of this course, the student will be able to CO1: understand the concept production technology of fruits CO2: have knowledge about the importance of rootstock CO3:have Knowledge about management of fruits crops CO4:understand the knowledge of harvesting of crop CO5:have knowledge about different types of plantation crops
7	Course Description	This course is designed to give knowledge about production technology of fruits crops and plantation crops.
8	Outline syllabus	
	Unit 1	
	A	Seed propagation.
	B	Scarification
	C	Stratification of seeds.
	Unit 2	
	A	Propagation methods
	B	Propagation methods for fruit.
	C	Propagation methods for plantation crops.
I	**Unit 3**	
	A	identification of fruit
	B	Description of fruit
	C	Seasonal fruits.
	Unit 4	
	A	plant bio regulators
	B	plant bio regulators uses.
	C	Its preparation
	Unit 5	
	A	Important pests
	B	diseases fruit and plantation crops
	C	physiological disorders of fruit and plantation crops
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)

	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	3. Fruit crops by Radha and Mathew 4. Systematics of Fruits Crops by Girish Sharma		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year:**
Branch: Agriculture		**Semester: IV**
1	Course Code	**BAP 234**
2	Course Title	**Principles of seed technology Lab**
3	Credits	2
4	Contact Hours (L-T-P)	0-0-4
	Course Status	Compulsory
5	Course Objective	4. To understand the students about the seed technology 5. To know about the different types of seed 6. To know about duty and powers of seed inspector, offences and penalties. 7. To know about seed vigour.
6	Course Outcomes	After the completion of this course, the student will be able to CO1: understand the deterioration causes of crop varieties and their control CO2: have knowledge on seed production of important cereals, pulses, oilseeds, fodder and vegetables. CO3:understand Seed Act and Seed Act enforcement. CO4:have knowledge on Seed drying, processing and their steps CO5:understand seed marketing
7	Course Description	This course is designed to give knowledge onseed and seed testing for quality assessment
8	Outline syllabus	
	Unit 1	
	A	Seed production in major crops
	B	Wheat, Rice, Maize, Moong
	C	Pea, Soybean, Groundnut and Mustard
	Unit 2	
	A	Seed sampling and testing
	B	Physical purity
	C	germination, viability, etc.
I	**Unit 3**	
	A	Seed vigour
	B	Seed and seedling vigour test
	C	Seed viability
	Unit 4	
	A	Genetic purity test
	B	Grow out test
	C	electrophoresis
	Unit 5	
	A	Seed certification
	B	Procedure, Field inspection
	C	Preparation of field inspection report
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)

	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	2. Seed Technology by Agrawal		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: IV**
1	Course Code	**BAP 236**
2	Course Title	**Agricultural Marketing, Trade and Prices Lab**
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Compulsory
5	Course Objective	4. To make students understand about marketing trades in the agriculture sector. 5. To know about the Agricultural prices and policy: Meaning and functions of price; administered prices; need for agricultural price policy 6. To know about Trade: Concept of International Trade and its need, theories of absolute and comparative advantage 7. Price behaviour.
6	Course Outcomes	After the completion of this course, the student will be able to **CO1:**understand market integration **CO2**: have knowledge on competitive strategies, pricing and promotion strategies **CO3:**understand market functionaries and marketing channels **CO4:**understand physical functions of marketing **CO5:**understand nature and determinants of demand and supply of farm products
7	Course Description	This course Is designed to give knowledge on marketing efficiency; marketing costs, margins and price spread and Role of Govt. in agricultural marketing
8	Outline syllabus	
	Unit 1	
	A	demand and supply curves
	B	Plotting and study of demand and supply curves.
	C	calculation of elasticities
	Unit 2	
	A	market arrivals
	B	Study of relationship between market arrivals and prices
	C	prices of some selected commodities
	Unit 3	
	A	price behaviour
	B	Study of price behaviour over time for some selected commodities
	C	Construction of index numbers
	Unit 4	
	A	Visit to a local market
	B	Study of a local market
	C	various marketing functions performed by different agencies
	Unit 5	
	A	Study of marketing structure.
	B	Market functionaries.
	C	Marketing systems

	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	2. Textbook Of Agricultural Marketing And Co operation by DhushyantBhagat		

School: SBSR		**Batch: 2018-2022**
Program: B.Sc.		**Current Academic Year: 2018-19**
Branch: Agriculture		**Semester: IV**
1	Course Code	**BAP 237**
2	Course Title	**Introductory Agro-meteorology and Climate Change Lab**
3	Credits	1
4	Contact Hours (L-T-P)	0-0-2
	Course Status	Compulsory
5	Course Objective	4. To make students understand Agricultural Meteorology 5. To know about the Basics of weather forecasting 6. To know about Effect of climate change on horticulture 7. To know about synoptic charts.
6	Course Outcomes	After the completion of this course, the student will be able to CO1 have knowledge on how plants sense and respond to changes in CO2 concentration. CO2: understand Changes in secondary metabolites and pest disease reaction of plants. CO3: understand effects of increased temperature and plants in tropical/sub-tropical climates CO4have knowledge of acclimation CO5: understand effect of climate change on horticulture
7	Course Description	This course Is designed to give knowledge on effect of increased temperature and plants in tropical/sub-tropical climates
8	Outline syllabus	
	Unit 1	
	A	Site selection
	B	Agromet observatory
	C	Functions of different observatories.
	Unit 2	
	A	Measurement of temperature
	B	Measurement of rainfall
	C	Their applications.
	Unit 3	
	A	Measurement of evaporation
	B	Measurement of atmospheric evaporation
	C	Measurement of soil evaporation
	Unit 4	
	A	Measurement of atmospheric pressure
	B	Its applications.
	C	Measurement of sunshine duration and solar radiation
	Unit 5	
	A	Measurement of wind direction
	B	Measurement of speed and relative humidity
	C	Study of weather forecasting and synoptic charts

	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*	2. Introduction to Agro-Meteorology by H. S. Mavi		

School: SBSR		**Batch: 2018-2022**		
Program: B.Sc.		**Current Academic Year: 2018-19**		
Branch: Agriculture		**Semester: IV**		
1	Course Code	**BAY 107**		
2	Course Title	**Protected cultivation Lab**		
3	Credits	**1**		
4	Contact Hours (L-T-P)	0-0-2		
	Course Status	Compulsory		
5	Course Objective	1. To understand the students about the different Protected structures. 3. To understand the Seed and seedling 3. To know about different types sowing methods. 4. To understand about fertigation		
6	Course Outcomes	After the completion of this course, the student will be able to CO1: understand the concept of bed preparation. CO2: have knowledge about the importance of rootstocks CO3:have Knowledge about management of crops in polyhouses. CO4:understand the knowledge of soil Ph and EC CO5:have knowledge about different types of portrays.		
7	Course Description	This course is designed to give knowledge about production technology of fruits crops and plantation crops.		
8	Outline syllabus			
	Unit 1			
	A	Raising of seedlings		
	B	Raising of seedlings and saplings under protected conditions		
	C	use of protrays in quality planting material production		
	Unit 2			
	A	Bed preparation		
	B	planting of crop for production		
	C	Inter cultural operations		
	Unit 3			
	A	Regulation of irrigation		
	B	irrigation and fertilizers		
	C	Regulation through drip, fogging ad misting		
	Unit 4			
	A	Soil EC measurement		
	B	Soil pH measurement		
	C	Use of STFR meter		
	Unit 5			
	A	Various irrigation techniques.		
	B	Drip irrigation and sprinkler irrigation.		
	C	Fertigation.		
	Mode of examination	Class test (10) ,Assignments (10) and presentation (10)		
	Weightage Distribution	CA	MTE	ETE
		30%	20%	50%
	Text book/s*			

School: SBSR		**Batch : 2018-22**		
Program: B.Sc.		**Current Academic Year: 2020-2021**		
Branch: Agriculture		**Semester: V**		
1	Course Code	BAP 339		
2	Course Title	MANURES, FERTILIZERS AND SOIL FERTILITY MANAGEMENT LAB		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-1		
	Course Status	Compulsory		
5	Course Objective	1. To make students familiar with estimation of N:P:K in the soil. 2. Understanding of soil organic carbon 3. To make students aware of soil extractable P in soils 4. To give the knowledge of different elements of the soil.		
6	Course Outcomes	After the completion of this course, the student will be able to CO1: describe the knowledge of different analytical instruments CO2: understand flame photometry CO3: understand knowledge of SOC CO4: familiarise with different N:P:K extraction CO5: understand DTPA extractable Zn in soils		
7	Outline syllabus			
	Unit 1			
	A	Introduction of analytical instruments		
	B	Principle of analytical instruments		
	C	calibration		
	Unit 2			
	A	and applications		
	B	Colorimetry and		
	C	flame photometry		
	Unit 3			
	A	Estimation of soil organic carbon		
	B	Estimation of alkaline hydrolysable N in soils		
	C	Estimation of soil extractable P in soils		
	Unit 4			
	A	Estimation of exchangeable K; Ca in soils		
	B	Estimation of exchangeable Mg in soils		
	C	Estimation of DTPA extractable Zn in soils		
	Unit 5			
	A	Estimation of N in plants.		
	B	Estimation of P in plants.		
	C	Estimation of K in plants.		
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text book/s*			

School: SBSR		Batch : 2018-2022
Program: B.Sc.		Current Academic Year: 2020-2021
Branch: Agriculture		Semester: V
1	Course Code	BAP 340
2	Course Title	PESTS OF CROPS AND STORED GRAIN AND THEIR MANAGEMENT LAB
3	Credits	1
4	Contact Hours (L-T-P)	0-0-1
	Course Status	Compulsory
5	Course Objective	1. The objective is to disseminate knowledge of pests and losses causes by them 2. Understanding of storage pests 3. To make students aware of fumigation 4. To give the knowledge of mites
6	Course Outcomes	After the completion of this course, the student will be able to CO1: describe the knowledge of life cycle and seasonal history of various insect pests attacking crops and their produce CO2: Determine the doses of insecticides application. CO3: understand knowledge of pests of stored grains CO4: familiarise with different types of damage CO5: understand growth and development pests.
7	Outline syllabus	
	Unit 1	Identification of different types of damage.
	A	Identification and study of life cycle of various insect pests attacking crops and their produce:
	B	seasonal history of various insect pests attacking crops and their produce:
	C	(a) Field Crops; (b) Vegetable Crops; (c) Fruit Crops;
	Unit 2	
	A	(d) Plantation, gardens, Narcotics, spices & condiments.
	B	Identification of insect pests
	C	and Mites associated with stored grain.
	Unit 3	
	A	Determination of insect infestation by different methods.
	B	Assessment of losses due to insects
	C	Calculations on the doses of insecticides application technique
	Unit 4	
	A	Fumigation of grain store / godown
	B	Identification of rodents
	C	and rodent control operations in godowns.
	Unit 5	
	A	Visit to Indian Storage Management
	B	Visit to Research Institute, Hapur and Quality Laboratory, Department of Food., Delhi.
	C	Visit to nearest FCI godowns
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)

	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text book/s*			

School: SBSR		Batch : 2018-2022		
Program: B.Sc.		Current Academic Year: 2020-2021		
Branch: Agriculture		Semester: V		
1	Course Code	BAP348		
2	Course Title	DISEASES OF FIELD AND HORTICULTURAL CROPS AND THEIR MANAGEMENT-I LAB		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-1		
	Course Status	Compulsory		
5	Course Objective	1. To aware students regarding various types of plant diseases. 2. Understanding of histopathological studies of selected diseases of field 3. To make students aware of different field problems 4. To give the knowledge of insect pest infestation on crops.		
6	Course Outcomes	After the completion of this course, the student will be able to CO1: describe the knowledge of different types of plant diseases CO2: understand visual sign and symptoms of diseases CO3: understand knowledge of diseases like wilt, anthracnose etc. CO4: familiarise with different field problems CO5: diagnose the plant diseases.		
7	Outline syllabus			
	Unit 1			
	A	Identification of selected diseases of field		
	B	histopathological studies of selected diseases of field		
	C	Identification of horticultural crops		
	Unit 2			
	A	histopathological studies of horticultural crops		
	B	Field visit		
	C	for the diagnosis of field problems.		
	Unit 3			
	A	Collection of plant diseased specimens for Herbarium		
	B	preservation of plant diseased specimens for Herbarium		
	C	Herbarium preparation		
	Unit 4			
	A	Diseases of Rice		
	B	Diseases of Maize		
	C	Diseases of Groundnut		
	Unit 5			
	A	Diseases of Guava		
	B	Diseases of Banana		
	C	Diseases of Sorghum		
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE
		60%		40%

School: SBSR		Batch : 2018-2022
Program: B.Sc.		Current Academic Year: 2020-2021
Branch: Agriculture		Semester: V
1	Course Code	BAP 342
2	Course Title	CROP IMPROVEMENT-I *(Kharif Crops)* LAB
3	Credits	1
4	Contact Hours (L-T-P)	0-0-1
	Course Status	Compulsory
5	Course Objective	1. To make students aware of different hybridisation techniques. 2. Understanding of inbreeding 3. To make students aware of field techniques for seed production 4. To give the knowledge of quality characters, donor parents for different characters
6	Course Outcomes	After the completion of this course, the student will be able to CO1: describe the knowledge of emasculation CO2: understand heterosis CO3: understand knowledge of heritability CO4: familiarise with different methods of seed production CO5: understand pedigree, bulk mthods etc
7	Outline syllabus	
	Unit 1	
	A	Floral biology,
	B	emasculation
	C	hybridization techniques in different crop species
	Unit 2	
	A	viz., Rice, Maize, Sorghum, Pearl millet, Mungbean, Soybean,
	B	Cowpea, Okra and Cucurbitaceous crops.
	C	Maintenance breeding of different kharif crops
	Unit 3	
	A	Handling of germplasm
	B	and segregating populations by different methods like pedigree, bulk and single seed decent methods;
	C	Study of field techniques for seed production
	Unit 4	
	A	hybrid seeds production in Kharif crops;
	B	Estimation of heterosis, inbreeding depression and heritability;
	C	Layout of field experiments
	Unit 5	
	A	Study of quality characters, donor parents for different characters
	B	Visit to seed production plots

	C	and AICRP plots of different field crops		
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text book/s*			

School: SBSR		Batch : 2018-2022		
Program: B.Sc.		Current Academic Year: 2020-2021		
Branch: Agriculture		Semester: V		
1	Course Code	BAP 344		
2	Course Title	GEOINFORMATICS AND NANO-TECHNOLOGY AND PRECISION FARMING LAB		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-1		
	Course Status	Compulsory		
5	Course Objective	1. To make students familiar with remote sensing techniques. 2. Understanding of GPS,GIS & VTR. 3. To make students aware of image processing software. 4. To give the knowledge of nanoparticles in agriculture.		
6	Course Outcomes	After the completion of this course, the student will be able to CO1: describe the knowledge of GPS & GIS in agriculture CO2: understand remote sensing CO3: understand knowledge of spatial data CO4: familiarise with different spectral profiles of different objects CO5: understand remote sensing images.		
7	Outline syllabus			
	Unit 1			
	A	Introduction to GIS software,		
	B	spatial data creation		
	C	and editing.		
	Unit 2			
	A	Introduction to image processing software.		
	B	Visual interpretation of remote sensing images		
	C	digital interpretation of remote sensing images		
	Unit 3			
	A	Generation of spectral profiles		
	B	of different objects		
	C	Supervised classification		
	Unit 4			
	A	and unsupervised classification		
	B	and acreage estimation.		
	C	Use of GPS for agricultural survey.		
	Unit 5			
	A	Formulation of nanoparticles in agriculture.		
	B	characterization of nanoparticles in agriculture.		
	C	applications of nanoparticles in agriculture.		
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text book/s*			

School: SBSR		Batch : 2018-2022		
Program: B.Sc.		Current Academic Year: 2020-2021		
Branch: Agriculture		Semester: VI		
1	Course Code	BAP 347		
2	Course Title	Protected Cultivation and Secondary Agriculture Lab		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-1		
	Course Status	Compulsory		
5	Course Objective	1. To make students familiar with different types of green houses 2. Understanding of green house equipments. 3. To make students aware of Moisture content of various grains 4. To give the knowledge of moisture meter		
6	Course Outcomes	After the completion of this course, the student will be able to CO1: describe the knowledge of polyhouses CO2: understand the phenomenon of growing crops inside polyhouses. CO3: understand knowledge of green house equipments. CO4: familiarise with different systems inside polyhouse CO5: understand growth and development of crops in the protected structures.		
7	Outline syllabus			
	Unit 1			
	A	Green house		
	B	Study of different type of green houses based on shape.		
	C	Determine the rate of air exchange in an active summer winter cooling system.		
	Unit 2			
	A	Study of green house equipments		
	B	Visit to various Post Harvest Laboratories.		
	C	Determination of Moisture content		
	Unit 3			
	A	of various grains by oven drying &		
	B	infrared moisture methods		
	C	Determination of engineering properties		
	Unit 4			
	A	(shape and size, bulk density)		
	B	(porosity of biomaterials).		
	C	Determination of Moisture content of various grains		
	Unit 5			
	A	by moisture meter.		
	B	Visit to green house.		
	C	Field visit to seed processing plant.		
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text book/s*			

School: SBSR		Batch : 2018-2022		
Program: B.Sc.		Current Academic Year: 2020-2021		
Branch: Agriculture		Semester: V		
1	Course Code	BAP 345		
2	Course Title	PRACTICAL CROP PRODUCTION – I (*Kharif* crops)		
3	Credits	2		
4	Contact Hours (L-T-P)	0-0-2		
	Course Status	Compulsory		
5	Course Objective	1. To make students familiar with kharif crop production. 2. Understanding of nursery 3. To make students aware of seed treatment. 4. To give the knowledge of insect pest management during crop production.		
6	Course Outcomes	After the completion of this course, the student will be able to CO1: describe the knowledge of practical crop production on real field conditions CO2: understand crop planning CO3: understand knowledge of raising field crops in multiple cropping systems CO4: familiarise with different intercultural operations. CO5: understand growth and development of kharif crops		
7	Outline syllabus			
	Unit 1			
	A	Crop planning,		
	B	raising field crops in multiple cropping systems		
	C	Field preparation,		
	Unit 2			
	A	seed treatment,		
	B	nursery raising, sowing, nutrient, water		
	C	weed management and management of insect-pests		
	Unit 3			
	A	diseases of crops, harvesting, threshing,		
	B	drying winnowing, storage and marketing of produce.		
	C	The emphasis will be given to seed production,		
	Unit 4			
	A	mechanization, resource conservation		
	B	and integrated nutrient,		
	C	insect-pest and disease management technologies.		
	Unit 5			
	A	Preparation of balance sheet		
	B	including cost of cultivation,		
	C	net returns per student as well as per team of 8-10 students		
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text book/s*			

School: SBSR		Batch : 2018-22		
Program: B.Sc.		Current Academic Year: 2018-19		
Branch: Agriculture		Semester: V		
1	Course Code	BAP 346		
2	Course Title	Rainfed Agriculture & Watershed Management lab		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-1		
	Course Status	Compulsory		
5	Course Objective	1. To make students familiar with rainfed areas of the country. 2. Understanding of rainfall in rainfed areas 3. To make students aware of evapotranspiration 4. To give the knowledge of soil & moisture conservation		
6	Course Outcomes	After the completion of this course, the student will be able to CO1: describe the knowledge of withdrawal of monsoons. CO2: understand interpretation of meteorological data. CO3: understand knowledge of water harvesting structures CO4: familiarise with different rainfed areas in the country CO5: understand climate.		
7	Outline syllabus			
	Unit 1			
	A	Studies on climate classification		
	B	Studies on rainfall pattern in rainfed areas of the country		
	C	and pattern of onset		
	Unit 2			
	A	and withdrawal of monsoons.		
	B	Studies on cropping pattern of different rainfed areas in the country		
	C	and demarcation of rainfed area on map of India.		
	Unit 3			
	A	Interpretation of meteorological data and		
	B	scheduling of supplemental irrigation on the basis of evapo-transpiration demand of crops.		
	C	Studies on cultural practices		
	Unit 4			
	A	for mitigating moisture stress.		
	B	Field demonstration on soil conservation measures.		
	C	Field demonstration on moisture conservation measures.		
	Unit 5			
	A	Field demonstration on construction of water harvesting structures.		
	B	Visit to rainfed research station.		
	C	Visit to watershed research station		
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text book/s*			

School: SBSR		Batch : 2018-22		
Program: B.Sc.		Current Academic Year: 2018-19		
Branch: Agriculture		Semester: VI		
1	Course Code	BAP 348		
2	Course Title	DISEASES OF FIELD AND HORTICULTURAL CROPS AND THEIR MANAGEMENT-II LAB		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-1		
	Course Status	Compulsory		
5	Course Objective	1. To aware students regarding various types of plant diseases. 2. Understanding of histopathological studies of selected diseases of field 3. To make students aware of different field problems 4. To give the knowledge of insect pest infestation on crops.		
6	Course Outcomes	After the completion of this course, the student will be able to CO1: describe the knowledge of different types of plant diseases CO2: understand visual sign and symptoms of diseases CO3: understand knowledge of blotch, wilt, anthracnose etc. CO4: familiarise with different field problems CO5: diagnose the plant diseases.		
7	Outline syllabus			
	Unit 1			
	A	Identification of selected diseases of field		
	B	histopathological studies of selected diseases of field		
	C	Identification of horticultural crops		
	Unit 2			
	A	histopathological studies of horticultural crops		
	B	Field visit		
	C	for the diagnosis of field problems.		
	Unit 3			
	A	Collection of plant diseased specimens for Herbarium		
	B	preservation of plant diseased specimens for Herbarium		
	C	Herbarium preparation		
	Unit 4			
	A	Diseases of wheat		
	B	Diseases of Sugarcane		
	C	Diseases of Mango		
	Unit 5			
	A	Diseases of citrus		
	B	Diseases of chillies		
	C	Diseases of potato		
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text book/s*			

School: SBSR		Batch : 2018-22		
Program: B.Sc.		Current Academic Year: 2018-19		
Branch: Agriculture		Semester: VI		
1	Course Code	BAP 349		
2	Course Title	Post-harvest Management and Value Addition of Fruits and Vegetables Lab		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-1		
	Course Status	Compulsory		
5	Course Objective	1. To make students familiar with Post-harvest Management and Value Addition of Fruits and Vegetables 2. Understanding of shelf life 3. To make students aware of difference in quality of produce 4. To give the knowledge of packaging		
6	Course Outcomes	After the completion of this course, the student will be able to CO1: describe the knowledge of chilling and freezing injury in vegetables and fruits CO2: understand Quality evaluation of products CO3: understand knowledge of shelf life in fruits and vegetables. CO4: familiarise with different types of packaging CO5: understand Extraction and preservation of pulps and juices		
7	Outline syllabus			
	Unit 1			
	A	Applications of different types of packaging,		
	B	containers for shelf life extension		
	C	Effect of temperature		
	Unit 2			
	A	on shelf life and		
	B	quality of produce.		
	C	Demonstration of chilling injury in vegetables		
	Unit 3			
	A	Demonstration of freezing injury in vegetables		
	B	Demonstration of chilling injury in fruits		
	C	Demonstration of freezing injury in fruits		
	Unit 4			
	A	Extraction of pulps and juices		
	B	preservation of pulps and juices		
	C	Quality evaluation of products		
	Unit 5			
	A	physico-chemical and		
	B	sensory		
	C	Visit to processing unit/ industry		
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text book/s*			

School: SBSR		Batch : 2018-22
Program: B.Sc.		Current Academic Year: 2018-19
Branch: Agriculture		Semester: VI
1	Course Code	BAP 350
2	Course Title	Management of Beneficial Insect Lab
3	Credits	1
4	Contact Hours (L-T-P)	0-0-1
	Course Status	Compulsory
5	Course Objective	1. To make students familiar with different species of honey bees 2. Understanding of lac culture 3. To make students aware of different hosts of silkworms 4. To give the knowledge of biology of silkworm.
6	Course Outcomes	After the completion of this course, the student will be able to CO1: describe the knowledge of lac cultivation in India. CO2: understand natural enemies CO3: understand knowledge of bee pasturage, foraging. CO4: familiarise with different pollinators, weed killers and scavengers CO5: understand growth and development of natural enemies and their mass multiplication
7	Outline syllabus	
	Unit 1	
	A	Honey bee species,
	B	castes of bees
	C	Beekeeping appliances and
	Unit 2	
	A	seasonal management, bee enemies and disease
	B	Bee pasturage,
	C	bee foraging and communication.
	Unit 3	
	A	Types of silkworm,
	B	voltinism and biology of silkworm
	C	Mulberry cultivation, mulberry varieties and
	Unit 4	
	A	methods of harvesting and preservation of leaves
	B	Species of lac insect,
	C	host plant identification
	Unit 5	
	A	Identification of other important pollinators, weed killers and scavengers
	B	Visit to research and training institutions devoted to beekeeping, sericulture, lac culture and natural enemies.

	C	Identification and techniques for mass multiplication of natural enemies		
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text book/s*			

School: SBSR		Batch : 2018-22		
Program: B.Sc.		Current Academic Year: 2018-19		
Branch: Agriculture		Semester: VI		
1	Course Code	BAP 351		
2	Course Title	CROP IMPROVEMENT-II *(Kharif Crops)* LAB		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-1		
	Course Status	Compulsory		
5	Course Objective	1. To make students aware of different hybridisation techniques. 2. Understanding of inbreeding 3. To make students aware of field techniques for seed production 4. To give the knowledge of quality characters, donor parents for different characters		
6	Course Outcomes	After the completion of this course, the student will be able to CO1: describe the knowledge of emasculation CO2: understand heterosis CO3: understand knowledge of heritability CO4: familiarise with different methods of seed production CO5: understand pedigree, bulk methods etc.		
7	Outline syllabus			
	Unit 1			
	A	Floral biology,		
	B	emasculation		
	C	hybridization techniques in different crop species		
	Unit 2			
	A	Wheat, Oat, Barley, Chickpea, Lentil,		
	B	Field pea, Rajma, Horse gram, Rapeseed Mustard, Sunflower,		
	C	Safflower, Potato, Berseem. Sugarcane, Tomato, Chilli, Onion.		
	Unit 3			
	A	Handling of germplasm		
	B	and segregating populations by different methods like pedigree, bulk and single seed decent methods;		
	C	Study of field techniques for seed production		
	Unit 4			
	A	hybrid seeds production in Kharif crops;		
	B	Estimation of heterosis, inbreeding depression and heritability;		
	C	Layout of field experiments		
	Unit 5			
	A	Study of quality characters, donor parents for different characters		
	B	Visit to seed production plots		
	C	and AICRP plots of different field crops		
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE

School: SBSR		Batch : 2018-22		
Program: B.Sc.		Current Academic Year: 2018-19		
Branch: Agriculture		Semester: VI		
1	Course Code	BAP 354		
2	Course Title	Farm Management, Production & Resource Economics Lab		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-1		
	Course Status	Compulsory		
5	Course Objective	1. To make students familiar with management of farms. 2. Understanding of assets. 3. To make students aware of CACP 4. To give the knowledge of least cost combination of inputs.		
6	Course Outcomes	After the completion of this course, the student will be able to CO1: describe the knowledge of farm plan and budget CO2: Plan the budget according to the size of the farm. CO3: understand knowledge of estimation of CACP CO4: familiarise with different level of inputs used in a farm production process CO5: Determine cost of fencing of a farm		
7	Outline syllabus			
	Unit 1			
	A	Preparation of farm layout		
	B	Determination of cost of fencing of a farm		
	C	and Computation of depreciation cost of farm assets		
	Unit 2			
	A	Application of equi-marginal returns/opportunity cost principle in allocation of farm resources		
	B	Determination of most profitable level of		
	C	inputs use in a farm production process.		
	Unit 3			
	A	Application of cost principles		
	B	including CACP concepts in the estimation of		
	C	cost of crop and livestock enterprises.		
	Unit 4			
	A	Determination of least cost combination of inputs		
	B	Preparation of farm plan		
	C	and budget,		
	Unit 5			
	A	farm records and		
	B	accounts and		
	C	profit & loss accounts.		
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text book/s*			

Program: B.Sc.		Current Academic Year: 2018-19		
Branch: Agriculture		Semester: VI		
1	Course Code	BAP 352		
2	Course Title	PRACTICAL CROP PRODUCTION – II (*Rabi* crops)		
3	Credits	2		
4	Contact Hours (L-T-P)	0-0-2		
	Course Status	Compulsory		
5	Course Objective	1. To make students familiar with Rabi crop production. 2. Understanding of nursery 3. To make students aware of seed treatment. 4. To give the knowledge of insect pest management during crop production.		
6	Course Outcomes	After the completion of this course, the student will be able to CO1: describe the knowledge of practical crop production on real field conditions CO2: understand crop planning CO3: understand knowledge of raising field crops in multiple cropping systems CO4: familiarise with different intercultural operations. CO5: understand growth and development of Rabi crops		
7	Outline syllabus			
	Unit 1			
	A	Crop planning,		
	B	raising field crops in multiple cropping systems		
	C	Field preparation,		
	Unit 2			
	A	seed treatment,		
	B	nursery raising, sowing, nutrient, water		
	C	weed management and management of insect-pests		
	Unit 3			
	A	diseases of crops, harvesting, threshing,		
	B	drying winnowing, storage and marketing of produce.		
	C	The emphasis will be given to seed production,		
	Unit 4			
	A	mechanization, resource conservation		
	B	and integrated nutrient,		
	C	insect-pest and disease management technologies.		
	Unit 5			
	A	Preparation of balance sheet		
	B	including cost of cultivation,		
	C	net returns per student as well as per team of 8-10 students		
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text book/s*			

School: SBSR		Batch : 2018-22		
Program: B.Sc.		Current Academic Year: 2018-19		
Branch: Agriculture		Semester: VI		
1	Course Code	BAY 103		
2	Course Title	**Agri-business Management Lab**		
3	Credits	1		
4	Contact Hours (L-T-P)	0-0-1		
	Course Status	Compulsory		
5	Course Objective	1. To make students familiar with business of agricultural products. 2. Understanding input and output markets. 3. To make students aware of retail trade 4. To give the knowledge of financial institutions.		
6	Course Outcomes	After the completion of this course, the student will be able to CO1: describe the knowledge of value added products. CO2: understand agri input market CO3: understand knowledge of product markets CO4: familiarise with different financing institutions CO5: understand output market.		
7	Outline syllabus			
	Unit 1			
	A	Study of agri-input markets:		
	B	Seed,		
	C	fertilizers, pesticides		
	Unit 2			
	A	Study of output markets: grains,		
	B	fruits, vegetables,		
	C	flowers		
	Unit 3			
	A	Study of product markets,		
	B	retails trade commodity trading, and		
	C	value added products.		
	Unit 4			
	A	Study of financing institutions-		
	B	Cooperative,		
	C	Commercial banks,		
	Unit 5			
	A	RRBs,		
	B	Agribusiness Finance Limited,		
	C	NABARD.		
	Mode of examination	Class test (5) ,Assignments (5) and presentation (5)		
	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text book/s*			

School: SBSR		Batch : 2018-22		
Program: B.Sc. (H)		Current Academic Year: 2018-19		
Branch: Agriculture		Semester: VII		
1	Course Code	BAP 401		
2	Course Title	RAWE and AIA		
3	Credits	12		
4	Contact Hours (L-T-P)	0-0-12		
	Course Status	Compulsory		
5	Course Objective	This course is one of the best means to produce well trained agricultural graduates with broad based knowledge and techniques to meet the emerging challenges.		
6	Course Outcomes	After completion of the course, the students will be able to CO1: find the training, demonstration, observation in purposeful activities CO2: translate the practice and participation CO3: identify various village development programs CO4: analyze the work experience to students in rural setup and get an opportunity to interact with industries and help in technology transfer to farmers CO5:evaluate the competence to make reports and presentations CO6: improve the research station understanding		
7	Outline syllabus General orientation & on campus training by different faculties Village attachment Unit attachment in Univ./ College. KVK/ Research Station Attachment			
	Mode of examination	Practical		
	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text book/s*	2. Manual for Rural Agricultural Work Experience and Agro Industrial Attachment by Khare and Nabaria, JNKVV, Jabalpur		

School: SBSR		Batch : 2018-22		
Program: B.Sc. (H)		Current Academic Year: 2018-19		
Branch: Agriculture		Semester: VII		
1	Course Code	BAP 402		
2	Course Title	RAWE and AIA		
3	Credits	8		
4	Contact Hours (L-T-P)	0-0-8		
	Course Status	Compulsory		
5	Course Objective	This course is one of the best means to produce well trained agricultural graduates with broad based knowledge and techniques to meet the emerging challenges.		
6	Course Outcomes	After completion of the course, the students will be able to CO1: find the basic knowledge of plant clinic CO2: interpret the Agro-Industrial area CO3: build the association of agriculture and industry CO4: distinguish the several approaches of Plant clinic CO5: conclude the importance of agro-industrial attachment		
7	Outline syllabus Plant clinic Agro-Industrial Attachment			
	Mode of examination	Practical		
	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text book/s*	1. Manual for Rural Agricultural Work Experience and Agro Industrial Attachment by Khare and Nabaria, JNKVV, Jabalpur		

School: SBSR		Batch : 2018-22		
Program: B.Sc. (H)		Current Academic Year: 2018-19		
Branch: Agriculture		Semester: VII		
1	Course Code	BAP 403		
2	Course Title	RAWE and AIA		
3	Credits	4		
4	Contact Hours (L-T-P)	0-0-12		
	Course Status	Compulsory		
5	Course Objective	This course is one of the best means to produce well trained agricultural graduates with broad based knowledge and techniques to meet the emerging challenges.		
6	Course Outcomes	After completion of the course, the students will be able to CO1: find the basic understanding of project report and other activities CO2: summarize the data of interest CO3: identify various approaches of presentation and evaluation CO4: simplify the content through data analysis CO5:choose the appropriate approach for data presentation CO6: improve the presentation skills		
7	Outline syllabus Project report preparation, Presentation and Evaluation			
	Mode of examination	Practical		
	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text book/s*	1. Manual for Rural Agricultural Work Experience and Agro Industrial Attachment by Khare and Nabaria, JNKVV, Jabalpur		

ELECTIVES FOR SEMESTER VIII

School: SBSR		Batch : 2018-22
Program: B.Sc. (H)		Current Academic Year: 2018-19
Branch: Agriculture		Semester: VIII
1	Course Code	
2	Course Title	Production Technology for Bioagents and Biofertilizer
3	Credits	15
4	Contact Hours (L-T-P)	0-0-30
	Course Status	Elective
5	Course Objective	The students will have hands on knowledge on the use of bio-control as management strategy in agriculture and can formulate various types of bio-control formulations
6	Course Outcomes	After completion of the course, the students will be able to CO1: explain knowledge of biofertilizers and their role in agriculture CO2: understand the quality standard of biocontrol agents and their role in sustainability CO3: understand the role of various microorganisms in agriculture CO4: describe the role of various insects as natural enemies in agriculture CO5: explain knowledge of marketing of bioagents CO6: create knowledge and understanding on use of biofertilizers
7	Outline syllabus	
	Unit 1	
	A	Biofertilizers: Introduction and types and importance of biofertilizers, Biopesticides and bioagents in agriculture and organic farming system, History of biofertilizers production Classification of biofertilizers microorganisms used in biofertilizers production.
	B	A study of growth characteristics of various microbes used in biofertilizers production. Nitrogen cycle in Nature. Process of nodule formation ,Role of Nif and Nod gene in Biological Nitrogen fixation, Enzyme nitrogenase and its component, Biochemistry of nitrogen fixation, Cross inoculation groups amongst Rhizobium, Methods used for the studying selection of efficient strain of Rhizobium
	C	Enzyme nitrogenase and its component, Biochemistry of nitrogen fixation, Cross inoculation groups amongst Rhizobium, Methods used for the studying selection of efficient strain of Rhizobium
	Unit 2	
	A	Quality standard for biofertilizers different methods of application of biofertilizers
	B	Role of microorganisms in decomposition of organic farm wastes, methods of quality control assessment in respect of biofertilizers
	C	Strategies of Mass multiplication and packing
	Unit 3	
	A	Importance of Trichoderma spp., Pseudomonas spp. and Bacillus spp. as a biocontrol agents,Mechanism of disease control by thses organisms bioagents .

	B	Types of diseases controlled bioagents formulations, Effectiveness of bioagents against seed borne and soil borne plant pathogens		
	C	Mass multiplication and packing , Strategies of marking, and Registration with CIB and organic farming institute		
	Unit 4			
	A	Importance of Trichogramma, Cryptolaemus, Chrysoperla, NPV and entomofungal pathogens.		
	B	Establishing insectary for host insects and natural enemies		
	C	Mass production of Verticillium/Beauveria/Metarhzium/Nomuraea/Paecilomyces/Hirsutella thompsoni/Trichoderma, / Pseudomonas/Bacillus/Potash Mobilizers/Sulphur oxidizers /organic matter decomposers		
	Unit 5			
	A	Registration of biofertilizers.		
	B	Strategies of marking and Registration with CIB of bioagents		
	C	Strategies of marking and Registration with CIB of biopesticides		
	Mode of examination	Practical		
	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text book/s*	3. Motsara, I.M.R., Bhattacharyya, P. and Srivastava, B. 1995. Biofertilizer Technology, Marketing and Usage- A Source Book-cum-glossary. FDCO, New Delhi. 4. Subba Rao, N.S. Biofertilizers in Agriculture and Forestry. 1993. Oxford and IBH. Publ. Co., New Delhi.		

School: SBSR		Batch : 2018-22
Program: B.Sc. (H)		Current Academic Year: 2018-19
Branch: Agriculture		Semester: VIII
1	Course Code	
2	Course Title	Seed Production and Technology
3	Credits	15
4	Contact Hours (L-T-P)	0-0-30
	Course Status	Elective
5	Course Objective	The students will be able to understand the importance of seed and various technology developments in seed production for benefit of farmers
6	Course Outcomes	After completion of the course, the students will be able to CO1: describe the seed, its quality and the categories CO2: explain the understanding of the seed development and maturation CO3: understand the process of seed dormancy and factors influencing it CO4: understand the knowledge of seed testing and establishment of laboratories for seeds CO5: create the knowledge of intellectual property rights associated with seeds CO6: explain various step involved in seed quality regulations and plant breeder right
7	Outline syllabus	
	Unit 1	
	A	Seed Technology – scope and importance, development of seed industry in India, difference between seed and grain, categories of agricultural seeds.
	B	Development of crop varieties and hybrids, their evaluation and release at National and State level.
	C	Seed quality – concept, quality characteristics.
	Unit 2	
	A	Seed development and maturation, accumulation of food reserves in seeds.
	B	Seed germination – types of seed germination, factors affecting germination, changes in seeds associated with germination, field emergence and stand establishment. Seed viability – difference between seed viability and germination, viability nomograph.
	C	Seed vigour – concept, factors affecting seed vigour, significance of assessing seed vigour.
	Unit 3	
	A	Seed dormancy – merits and demerits of dormancy in seeds, intensity and duration of dormancy, types of seed dormancy, causes, methods of breaking dormancy, induction of dormancy.
	B	Seed longevity and deterioration – orthodox and recalcitrant seeds.
	C	Factors influencing the life span of seeds, symptoms of seed deterioration, possible causes of seed deterioration, seed invigoration
	Unit 4	

	A	Seed testing– objectives		
	B	Development of organisations for seed testing at international and national level		
	C	Establishment of a seed testing laboratory		
	Unit 5			
	A	Seed health – pathogens, insects and other organisms causing damage to sowing quality of seed and their management		
	B	Seed legislation: Seeds Act 1966, seed law enforcement – duties and powers of seed inspectors, offences and penalties		
	C	Seeds (Control) Order 1983, other issues related to seed quality regulation. Intellectual Property Rights, patenting, WTO, Plant Breeders Rights		
	Mode of examination	Practical		
	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text book/s*	3. Principles of seed technology - G.N.Kulkarni 2. 4. Plant physiology - R.G.S. Bidwell		

School: SBSR		Batch : 2018-22		
Program: B.Sc. (H)		Current Academic Year: 2018-19		
Branch: Agriculture		Semester: VIII		
1	Course Code			
2	Course Title	Mushroom Cultivation Technology		
3	Credits	15		
4	Contact Hours (L-T-P)	0-0-30		
	Course Status	Elective		
5	Course Objective	The student will learn mushroom cultivation and processing so as to develop it as an entrepreneurship activity		
6	Course Outcomes	After completion of the course, the students will be able to CO1: explain the history of mushroom cultivation CO2: describe knowledge of general morphology and methodology to develop mushrooms CO3: explain of cultivating mushrooms CO4: describe diseases affecting mushroom production CO5: understand the processing of mushrooms CO6: describe post-production technologies		
7	**Outline syllabus**			
	Unit 1			
	A	Historical development and importance of cultivated, mushroom		
	B	Historical development and importance of medicinal mushroom		
	C	Historical development and importance of poisonous mushroom		
	Unit 2			
	A	General morphology of different mushrooms		
	B	Methods of isolation of mushroom for development of mother culture.		
	C	Methods of purification of mushroom for development of mother culture		
	Unit 3			
	A	Methods for preparation of spawn		
	B	Methods of cultivation of Volvariella, Pleuratus and milky mushroom		
	C	Care of mushroom beds		
	Unit 4			
	A	Study of contaminants mushroom production.		
	B	Study of diseases limiting mushrooms		
	C	Mushroom processing		
	Unit 5			
	A	Mushroom preservation.		
	B	Development of small unit model for mushroom cultivation		
	C	Packaging of mushrooms		
	Mode of examination	Practical		
	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text book/s*	3. Mushroom Cultivation in India - B.C.Suman and V.P.Sharma 4. Mushroom Growing for Everyone - G. Roy		

School: SBSR		Batch : 2018-22		
Program: B.Sc. (H)		Current Academic Year: 2018-19		
Branch: Agriculture		Semester: VIII		
1	Course Code			
2	Course Title	Soil, Plant, Water and Seed Testing		
3	Credits	15		
4	Contact Hours (L-T-P)	0-0-30		
	Course Status	Elective		
5	Course Objective	The students will be able to understand the basic concepts of testing soil, plant, water and seed for effective agriculture.		
6	Course Outcomes	After completion of the course, the students will be able to CO1: understand the knowledge of soil and its testing CO2: describe of plant uptake mechanisms and temperature effect CO3: describes characters seed quality and its testing CO4: explain knowledge of water and its testing CO5: describes different testing technologies used for soil analysis in agriculture CO6: explain different testing technologies for seed quality assessment		
7	**Outline syllabus**			
	Unit 1			
	A	Soil profile, components of soil.		
	B	Soil physical properties		
	C	Soil testing		
	Unit 2			
	A	Plant temperature and flow of heat in the soil		
	B	Plant uptake mechanisms		
	C	Nutrient availability in the soil for plant, plant testing		
	Unit 3			
	A	Definition, Characters of good quality seed, different classes of seed.		
	B	Foundation and certified seed production of important cereals, pulses, oilseeds, fodder and vegetables.		
	C	Seed testing		
	Unit 4			
	A	Water resources, soil-plant-water relationship, crop water requirement		
	B	Water use efficiency, irrigation- scheduling criteria and methods		
	C	Quality of irrigation water, logging.		
	Unit 5			
	A	Testing technologies for seeds, plants		
	B	Testing technologies for soil		
	C	Testing technologies for water		
	Mode of examination	Practical		
	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text book/s*	2. Agricultural Education by BM Davis		

School: SBSR		Batch : 2018-22
Program: B.Sc. (H)		Current Academic Year: 2018-19
Branch: Agriculture		Semester: VIII
1	Course Code	
2	Course Title	Commercial Beekeeping
3	Credits	15
4	Contact Hours (L-T-P)	0-0-30
	Course Status	Elective
5	Course Objective	To inculcate importance of bee keeping and honey processing in relation with entrepreneurship development
6	Course Outcomes	After completion of the course, the students will be able to CO1: understand importance of honey bees and status of bee keeping CO2: understand the importance of bio-ecological importance of honey bees CO3: understand to identify and control various pests and diseases of honey bees CO4: describe the knowledge about various techniques of bee keeping and honey processing CO5: explain the regulations pertaining to beekeeping and maintenance of a bee hive for commercial value. CO6: familiarise student with different funding agencies for bee keeping
7	**Outline syllabus**	
	Unit 1	
	A	History of bee keeping
	B	Traditional bee keeping, Modern beekeeping
	C	Urban or backyard bee keeping, Apiculture development in India
	Unit 2	
	A	Basic concepts of morphology of honey bees
	B	Honey bee species and identification
	C	Social Organization, Annual biological cycle
	Unit 3	
	A	Diagnosis and Identification of bee pests and diseases
	B	Diagnosis and Identification of bee diseases
	C	Control methods (mechanical, chemical and biological).
	Unit 4	
	A	Selection of Bee Species for Apiculture, Artificial Bee Rearing
	B	Beehives, Bee Pasturage, Bee Keeping Equipment, Honey extraction and handling, processing of honey
	C	bee hive products
	Unit 5	
	A	Economics in small scale and large scale bee keeping, Farmer involvement in bee keeping for additional income
	B	Economic value of commercial bee keeping, Preparing bankable bee keeping project
	C	Funding sources for bee keeping

	Mode of examination	Practical		
	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text book/s*	3. Bisht D.S., Agriculture, ICAR Publication 4. Singh S., Bee Keeping in India, ICAR Publication		

School: SBSR		Batch : 2018-22
Program: B.Sc. (H)		Current Academic Year: 2018-19
Branch: Agriculture		Semester: VIII
1	Course Code	
2	Course Title	Commercial Horticulture
3	Credits	15
4	Contact Hours (L-T-P)	0-0-30
	Course Status	Elective
5	Course Objective	The students will learn about the techniques of commercial horticulture and its economic importance
6	Course Outcomes	After completion of the course, the students will be able to CO1: familiarise with various horticultural crops CO2: understand planning and layout of planting CO3: describe different growth regulators. CO4: understand orchards and rejuvenation of orchards CO5: understand different approaches applied in organic horticulture CO6: explain importance of packaging and storage
7	**Outline syllabus**	
	Unit 1	
	A	Economic importance and classification of horticultural crops
	B	Their culture and nutritive value, area and production
	C	Exports and imports, fruit and vegetable zones of India and of different states
	Unit 2	
	A	Nursery management practices, soil and climate, vegetable gardens, nutrition and kitchen garden and other types of gardens
	B	principles, planning and layout, management of orchards, planting systems and planting densities
	C	Production and practices for fruit, vegetable and floriculture crops, nursery techniques and their management
	Unit 3	
	A	Principles and methods of pruning and training of fruit crops
	B	Types and use of growth regulators in horticulture, water management, weed management, fertility management in horticultural crops
	C	Cropping systems, intercropping, multi-tier cropping, mulching, bearing habits
	Unit 4	
	A	Factors influencing the fruitfulness and unfruitfulness.
	B	Rejuvenation of old orchards, top working
	C	Frame working
	Unit 5	
	A	Principles of organic farming.
	B	Assessment of bearing habits, maturity standards

	C	Harvesting, grading, packaging and storage.		
	Mode of examination	Practical		
	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text book/s*	3. Instant Horticulture by S.N. Gupta 4. Textbook of Horticulture by K. Rao		

School: SBSR		Batch : 2018-22
Program: B.Sc. (H)		Current Academic Year: 2018-19
Branch: Agriculture		Semester: VIII
1	Course Code	
2	Course Title	Organic Production Technology
3	Credits	15
4	Contact Hours (L-T-P)	0-0-30
	Course Status	Elective
5	Course Objective	The student will be aware of organic production technology for growth of organic food.
6	Course Outcomes	After completion of the course, the students will be able to CO1: familiarise with the knowledge of scope of organic farming CO2: understand the resent state of organic farming CO3: understand the organic farming systems CO4: describe the knowledge of bio fertilisers, bio manures and biogas in organic farming CO5: organic means of plant protection CO6: explain different biocontrol agents
8	**Outline syllabus**	
	Unit 1	
	A	Introduction: Farming, organic farming, concept and development of organic farming
	B	Principles of organic farming & Need for organic farming, Agencies and institutions related to organic agriculture
	C	Types of organic farming, Biodynamic farming, Benefits of organic farming.
	Unit 2	
	A	Conventional farming v/s organic farming
	B	Scope and Present state of organic farming
	C	Requirements for organic farming, Farm components for an organic farm
	Unit 3	
	A	Organic farming systems, Soil tillage, Choice of Varieties, crop notation multiple and cropping systems, intercropping in relation to maintained of soil productivity
	B	Propagation-seed, planting materials and seed treatments.
	C	Water management , Green manuring, Composting- principles, stages, types and factors, Composting methods, Earth moon Vermicomposting
	Unit 4	
	A	Bulky organic manures, Concentrated organic manures, Organic, Preparations, Organic amendments and sludges, biogas.
	B	Bio-fertilizers-methods of application, advantages and disadvantages
	C	Standards for organic inputs- fertilizers, Bio-fertilizers-types,Pheromones.
	Unit 5	
	A	Plant protection- cultural, Plant protection - mechanical .
	B	Plant protection- botanical pesticides

	C	Plant protection- biocontrol agents, National and international standards for organic inputs		
	Mode of examination	Practical		
	Weightage Distribution	CA	MTE	ETE
		60%		40%
	Text books*	1. Science and Technology of Organic Farming by A. V. Barker		