M.Sc. (Genetics & Plant Breeding) Agriculture First Year /First Semester (I/I)

Name of Course/subject: Principles of Genetics

Course Code: APG 510

Course Objective

- Introduction to genetics and historical perspective of genetics.
- Detection of linkage and estimation.
- To aware the students about the fine structure of genes
- To impart the knowledge of induction, detection and mechanism of mutation.
- To study about the extranuclear inheritance and polygenic inheritance.

Course Outcome:

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	able to know what are the basic laws and discoveries in genetics.
CO2	able to detect and estimate the linkage and recombination frequency
CO3	Students learned about the fine structure of gene or gene concept
CO4	Students know how to induce, detect and the knowledge of mechanism of mutation.
CO5	Learned about the inheritance of cytoplasmic genes and polygenes.

CO-PO MAPPING:

	CO	**PO1** Basic Genetics and Plant Breeding knowledge	**PO2** Problem Solving	**PO3** Identification and Designing of research problems		**PO5** The Plant Breeder and Society	**PO6** Environment and sustainability	**PO7** EEthics	**PO8** Individual and team work	**PO9** Communication	**PO10** Lifelong learning
CO1	able to know what are the basic laws and discvories in genetics.	3	1	1	2	3	1		2		3
CO2	able to detect and estimate the linkage and recombination frequency	3	3	2	3	2	1		2		2
CO3	Students learned about the fine structure of gene or gene concept	3	2	1	3	2	1		1		3
CO4	Students know how to induce, detect and the knowledge of mechanism of mutation.	3	2	2	3	3	2		2		3
CO5	Learned about the inheritance of cytoplasmic genes and polygenes.	3	1	2	3	3	1		2		3

Name of Course/subject: Principles of cytogenetics

Course Code: APG 512

Course Objective

- To introduce the knowledge of cell and cell division
- To introduce the knowledge of chromosome and their role
- To introduce the knowledge of chromosomal aberrations

Course Outcome:

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	It will help in the knowledge of basic knowledge of cell and cell organelles and their role as well as chromosome structure will help in the understanding of its role in heredity
CO2	able to know the difference between prokaryotes and eukaryotes.
CO3	able to use the knowledge of chromosome aberrations in determination of disease
CO4	Students will understand the genetics cell and karyotype, idiogram
CO5	Will help in understanding of plant breeding research

CO-PO MAPPING:

	CO	**PO1** Basic Genetic and plant breeding knowledge	**PO2** Problem Solving	**PO3** Identification and designing of research problems		**PO5** The Plant breeder and society	**PO6** Environment and sustainability	**PO7** Ethics	**PO8** Individual and team work	**PO9** Communication	**PO10** Lifelong learning
CO1	It will help in the knowledge of basic knowledge of cell and cell organelles and their role as well as chromosome structure will help in the understanding of its role in heredity	3	3	1	3		3		1	2	3
CO2	able to know the difference between prokaryotes and eukaryotes.	3	2	3	2		2		3	1	3
CO3	able to use the knowledge of chromosome aberrations in determination of disease	3	2	2	1		1		2	1	3
CO4	Students will understand the genetics cell and karyotype, idiogram	3	2	3	2		3		3	1	3
CO5	Will help in understanding of plant breeding research	3	1	3	3		2		3	2	3
3: Strong contribution, 2: average contribution, 1: Low contribution											

Name of Course/subject: Biotechnology for crop improvement

Course Code: APG 515

Course Objective

- To introduce the different biotechnological methods for crop improvement
- To introduce the knowledge of different mapping populations
- To introduce the knowledge of bioinformatics, genomics

Course Outcome:

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	help in the knowledge of different molecular markers, plant tissue culture techniques
CO2	able to know different mapping populations and molecular breeding techniques for crop improvement
CO3	Able to know the different bioinformatics techniques and IPRs
CO4	can figure out the measures to prevent the biotic and abiotic stress for crop improvement
CO5	understand the genomics and advanced molecular techniques for crop improvement

CO-PO MAPPING:

		PO1 Basic Genetic and plant breeding knowledge	**PO2** Problem Solving	**PO3** Identification and designing of research problems		**PO5** The Plant breeder and society	**PO6** Environment and sustainability	**PO7** Ethics	**PO8** Individual and team work	**PO9** Communication	**PO10** Lifelong learning
CO1	help in the knowledge of different molecular markers, plant tissue culture techniques	2	3	1	3		3		2	2	3
CO2	able to know different mapping populations and molecular breeding techniques for crop improvement	3	2	3	2		2		3	1	3
CO3	Able to know the different bioinformatics techniques and IPRs	3	2	2	3		2		2	1	3
CO4	can figure out the measures to prevent the biotic and abiotic stress for crop improvement	2	2	3	3		3		2	1	3
CO5	understand the genomics and advanced molecular techniques for crop improvement	3	1	3	3		2		3	2	3
3: Strong contribution, 2: average contribution, 1: Low contribution											

Name of Course/subject: Breeding for crop quality

Course Code: APG 519

Course Objective

- To introduce the knowledge of different quality traits of cereals.
- To introduce the different method of quality improvement of oil seed crops
- To introduce the knowledge of relation of yield and breeding objectives

Course Outcome:

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	help in the knowledge of different quality parameters of rice, maize, wheat,brassicaetc
CO2	able to know what is the specific protein present in rice, wheat and other crops in addition to determine the quality parameters.
CO3	can deliver the knowledge of quality parameters of different cereals and oil seed crop to the farmers.
CO4	can figure out the measures to prevent the loss of quality traits.
CO5	understand the genetics of quality parameters and different methods to improve that.

CO-PO MAPPING:

	CO	**PO1** Basic Genetic and plant breeding knowledge	**PO2** Problem Solving	**PO3** Identification and designing of research problems	**PO4** Scientific skills	**PO5** The Plant breeder and society	**PO6** Environment and sustainability	**PO7** Ethics	**PO8** Individual and team work	**PO9** Communication	**PO10** Lifelong learning
CO1	help in the knowledge of different quality parameters of rice, maize, wheat,brassicaetc	2	3	1	3		3		2	2	3
CO2	able to know what is the specific protein present in rice, wheat and other crops in addition to determine the quality parameters.	3	2	3	2		2		3	1	3
CO3	can deliver the knowledge of quality parameters of different cereals and oil seed crop to the farmers.	3	2	2	3		2		2	1	3
CO4	can figure out the measures to prevent the loss of quality traits.	2	2	3	3		3		2	1	3
CO5	understand the genetics of quality parameters and different methods to improve that.	3	1	3	3		2		3	2	3
3: Strong contribution, 2: average contribution, 1: Low contribution											

COURSE: Modern Concept in Crop Production
COURSE CODE: APA510
COURSE OBJECTIVES:

- Knowledge and concept of different techniques of crop production
- Basics of crop growth in relation to environment and sustainability
- Knowledge of tillage (zero and minimum tillage)
- Basic concepts of crop modelling for maximizing crop yield
- Study of Cropping and farming systems for sustainable agriculture

COURSE OUTCOMES (CO):
After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Crop production techniques and crop growth in relation to environment
CO2	Zero and minimum tillage: their basics and application
CO3	Precision agriculture and Precision farming, their concepts and application
CO4	Biotic and a biotic stresses; concept of ideal plant type
CO5	Basics and application crop production under protective agriculture

CO-PO MAPPING:

	CO	PO 1. Basic Agronomy knowledge	PO 2. Research	PO 3. Field Experiments	PO 4.Modern implementation usage	PO 5.Modern concepts of crop production	PO 6. Modern farming system	PO 7. Soil-water-plant relationship	PO 8. Environment and sustainability	PO 9. Ethics	PO 10. Individual and team work	PO 11. Communication	PO 12. Life-long learning
CO1	Crop production techniques and crop growth in relation to environment	3	3	2	2	3	2	3	3	3	2	2	3
CO2	Zero and minimum tillage: their basics and application	2	3	2	2	2	2	2	1	2	1	2	2
CO3	Precision agriculture and Precision farming, their concepts and application	3	3	3	3	3	3	2	2	3	1	2	3
CO4	Biotic and a biotic stresses; concept of ideal plant type	3	3	2	2	2	2	1	1	2	1	3	3
CO5	Basics and application crop production under protective agriculture	2	2	3	3	2	2	2	3	3	2	2	2
3: Strong contribution, 2: average contribution, 1: Low contribution													

COURSE: Experimental Designs

COURSE CODE: MT519

COURSE OBJECTIVES:

- Basic concepts of Experiments, designs and analysis of covariance
- Comparative experiments, need for designing of experiments
- In depth knowledge of principles of design of experiment: randomization, replication and local control
- Knowledge of completely randomized design, Randomized Block Design and Latin square design and their analysis of variance
- Balanced Incomplete Block Design (BIBD) and its parameters
- Analysis of missing plot design (Fisher's Rule),analysis of Randomized Block Design with one missing observation

COURSE OUTCOMES (CO):

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Students will have basic knowledge of Experiments, designs and analysis of covariance
CO2	Students will have knowledge of Comparative experiments
CO3	The students will be able to prepare their experimental fields on the basis of designs
CO4	Students can have the knowledge of completely Randomized Design, Randomized Block Design and Latin square design and their analysis of variance
CO5	Students can analyze their results according to the designs

CO-PO MAPPING:

	CO	PO 1. Basic Agriculture knowledge	PO 2. Problem Solving	PO 3. Field Experimentations	PO 4.Modern implementation usage	PO 5.Modern Horticultural implements	PO 6. Modern Plant Protection implements	PO 7. Extension Program	PO 8. Environment and sustainability	PO 9. Ethics	PO 10. Individual and team work	PO 11. Communication	PO 12. Life-long learning
CO1	Students will have basic knowledge of Experiments, designs and analysis of covariance	2	3	2	2	2	2	1	1	2	2	1	3
CO2	Students will have knowledge of Comparative experiments	2	3	2	2	2	2	1	1	1	3	1	3
CO3	The students will be able to prepare their experimental fields on the basis of designs	2	3	2	2	2	2	1	1	2	3	1	3
CO4	Students can have the knowledge of completely Randomized Design, Randomized Block Design and Latin square design and their analysis of variance	2	3	2	2	2	2	1	1	2	3	1	3
CO5	Students can analyze their results according to the designs	2	3	2	2	2	2	1	1	2	3	1	3
3: Strong contribution, 2: average contribution, 1: Low contribution													

COURSE: Intellectual Property and Its Management in Agriculture

COURSE CODE: PGS 503 (e-course)

COURSE OBJECTIVES:

- Knowledge, concept and introduction of Intellectual Property Right regime; TRIPs and various provisions in TRIPS Agreement
- Basics of Legislations for the protection of various types of Intellectual Properties
- Fundamentals of patents, copyrights, geographical indications, designs and layout
- Basic concepts of Protection of plant varieties and farmers' rights and bio-diversity protection, Convention on Biological Diversity; International Treaty on Plant Genetic Resources for Food and Agriculture
- Study of Licensing of technologies, Material transfer agreements, Research collaboration Agreement, License Agreement

COURSE OUTCOMES (CO): ***After completion of the course, a student will be able to***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Concept of Intellectual Property Right regime; TRIPs and various provisions in TRIPS Agreement
CO2	Knowledge of Legislations for the protection of various types of Intellectual Properties
CO3	Concepts of Protection of plant varieties and farmers' rights and bio-diversity protection, Convention on Biological Diversity; International Treaty on Plant Genetic Resources for Food and Agriculture
CO4	Knowledge of Convention on Biological Diversity; International Treaty on Plant Genetic Resources for Food and Agriculture
CO5	Knowledge of Socio-economic impact, Research collaboration Agreement, License Agreement

CO-PO MAPPING:

	CO	PO 1. Basic Agronomy knowledge	PO 2. Research	PO 3. Field Experiments	PO 4.Modern implementation usage	PO 5.Modern concepts of Crop production	PO 6. Modern farming system	PO 7. Soil-water-plant relationship	PO 8. Environment and sustainability	PO 9. Ethics	PO 10. Individual and team work	PO 11. Communication	PO 12. Life-long learning
CO1	Concept of Intellectual Property Right regime; TRIPs and various provisions in TRIPS Agreement	2	3	3	3	1	1	1	3	3	2	3	3
CO2	Knowledge of Legislations for the protection of various types of Intellectual Properties	2	3	2	2	1	1	1	1	2	3	1	3
CO3	Concepts of Protection of plant varieties and farmers' rights and bio-diversity protection, Convention on Biological Diversity; International Treaty on Plant Genetic Resources for Food and Agriculture	3	3	3	3	1	1	2	2	3	3	2	3
CO4	Knowledge of Convention on Biological Diversity; International Treaty on Plant Genetic Resources for Food and Agriculture	3	3	2	2	1	1	1	1	2	3	3	3
CO5	Knowledge of Socio-economic impact, Research collaboration Agreement, License Agreement	3	3	2	3	1	1	1	3	3	3	3	1
3: Strong contribution, 2: average contribution, 1: Low contribution													

COURSE: Basic Concepts in Laboratory Techniques
COURSE CODE: PGS504

COURSE OBJECTIVES:

- Basic concepts of Safety measures while handling instruments, chemicals, glasswares, etc. in lab
- Use of different instruments, chemicals, glasswares, etc. of lab
- Preparation of different agrochemical doses in field and pot applications
- Preparation of buffers of different strengths and pH values
- Preparation of media and methods of sterilization
- Seed viability testing, testing of pollen viability

COURSE OUTCOMES (CO): ***After completion of the course, a student will be able to***

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Students will have basic knowledge of handling and safety measures of instruments, chemicals, glasswares, etc. in lab before and after use
CO2	Students will have knowledge of usage of different type of lab equipments, instruments, glasswares, plasticwares, etc.
CO3	The students will be able to prepare different agrochemical doses in field and pot applications
CO4	Students can have the knowledge to prepare media, acid and bases of different strengths and buffer solutions
CO5	Students can also perform seed and pollen viability testing

CO-PO MAPPING:

	CO	PO 1. Basic Agriculture knowledge	PO 2. Problem Solving	PO 3. Field Experimentations	PO 4.Modern implementation usage	PO 5.Modern Horticultural implements	PO 6. Modern Plant Protection implements	PO 7. Extension Program	PO 8. Environment and sustainability	PO 9. Ethics	PO 10. Individual and team work	PO 11. Communication	PO 12. Life-long learning
CO1	Students will have basic knowledge of handling and safety measures of instruments, chemicals, glasswares, etc. in lab before and after use	2	2	2	2	1	2	1	2	2	2	1	3
CO2	Students will have knowledge of usage of different type of lab equipments, instruments, glasswares, plasticwares, etc.	2	2	2	2	1	2	1	2	1	2	1	3
CO3	The students will be able to prepare different agrochemical doses in field and pot applications	3	3	3	2	1	2	1	2	2	2	1	3
CO4	Students can have the knowledge to prepare media, acid and bases of different strengths and buffer solutions	3	3	3	2	1	2	1	2	2	2	1	3
CO5	Students can also perform seed and pollen viability testing	3	3	3	2	2	2	1	2	2	2	1	3
3: Strong contribution, 2: average contribution, 1: Low contribution													

COURSE: e-Agriculture
COURSE CODE:PGS-507

COURSE OBJECTIVES:

1.To gain basic knowledge of e-Agriculture

2. The aim of improving communication and learning processes between various sectors in agriculture locally, regionally and worldwide

3. They gain knowledge to increase the production and productivity of Agriculture

4. Type of education and Agricultural Journalism

5. Knowledge of Innovative Information sources

COURSE OUTCOMES (CO):*After completion of the course, a student will be able to*

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Use of Information and Communication Technology in Agriculture
CO2	Know about Online Agricultural resources, e-agriculture community
CO3	Know about Centre for Agricultural Bioinformatics, national Agricultural Bioinformatics Grid.
CO4	Knowledge of education and their Characteristics and Agricultural Journalism
CO5	Knowledge of contact methods, Kissan Call center and e-Chaupal.

CO-PO MAPPING:

	CO	**PO1**.Basic Agronomy Concepts	**PO2** .Research	**PO3** .Field Experiments	**PO4**.Modern implementation u usage	**PO5** .Modern concepts of crop production	**PO6** .Modern farming system	**PO7** Soil-water-plant relationship	**PO8** .Environment and sustainability	**PO9.**Ethics	**PO10** .Individual and team work	**PO11**.Communication F	**PO12** Lifelong learning
CO1	Use of Information and Communication Technology in Agriculture	3	3	2	1	1	3	1	1	1	3	3	3
CO2	Know about Online Agricultural resources, e-agriculture community	3	3	2	2	1	1	1	2	2	2	3	2
CO3	Know about Centre for Agricultural Bioinformatics, national Agricultural Bioinformatics Grid.	3	3	1	1	2	2	1	2	2	3	3	3
CO4	Knowledge of education and their Characteristics and Agricultural Journalism	3	3	1	2	3	1	2	1	1	2	3	2
CO5	Knowledge of contact methods, Kissan Call center and e-Chaupal.	3	3	1	1	1	1	1	1	1	2	3	2
3: Strong contribution, 2: average contribution, 1: Low contribution													

M.Sc. (Genetics & Plant Breeding) Agriculture First Year/Second Semester (I/II)

Principles of Plant Breeding

COURSE CODE: APG511

COURSE OBJECTIVES:

- Basic concept of plant breeding-history, objectives and achievements
- Knowledge of domestication and acclimatization, patterns of evolution in crop plants
- Basic knowledge of Modes of reproduction in plants and mating systems
- Basic concepts of Genetic consequences of self and cross- fertilization

Principles of mutation breeding, polyploidy and distant hybridization in plant breeding.

COURSE OUTCOMES (CO): ***After completion of the course, a student will be able to***

COURSE OUTCOME (CO)	**DESCRIPTION**
CO1	Students will have basic knowledge of plant breeding
CO2	In-depth knowledge of domestication and acclimatization, patterns of evolution in crop plants
CO3	Knowledge of Genetic consequences of self and cross- fertilization
CO4	Modes of reproduction in plants-asexual and sexual reproduction
CO5	Basic concepts of mutation breeding, polyploidy and distant hybridization in plant breeding

CO-PO MAPPING:

	CO	PO1 Basic Genetic and plant breeding knowledge	PO2 Problem Solving	PO3 Identification and designing of research problems	PO4 Scientific skills	PO5 The Plant breeder and society	PO6 Environment and sustainability	PO7 Ethics	PO8 Individual and team work	PO9 Communication	PO10 Lifelong learning
CO1	Students will have basic knowledge of plant breeding	3	2	3	3	3	2	3	3	2	2
CO2	In-depth knowledge of domestication and acclimatization, patterns of evolution in crop plants	3	2	2	2	2	2	3	2	2	2
CO3	Knowledge of Genetic consequences of self and cross-fertilization	3	2	2	3	3	2	3	2	2	2
CO4	Modes of reproduction in plants-asexual and sexual reproduction	2	2	2	2	2	2	2	3	2	2
CO5	Basic concepts of mutation breeding, polyploidy and distant hybridization in plant breeding	2	3	3	2	2	2	2	3	3	2
3: Strong contribution, 2: average contribution, 1: Low contribution											

COURSE: Principles of Quantitative Genetics

Course Code: APG 513

Course Objectives

- Introduction to basic concept of quantitative genetics and historical perspective of biometrical genetics.
- To understand the concept of gene, genotype frequency, component of variation, heritability, combining ability and gene action.
- To familiarize the students about correlation analysis, path coefficient and stability parameters
- To impart the basics of different mating designs and their analysis.
- To study about the basics of polygenes, their inheritance and effect of environment on minor genes.

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Learned about the basic concept of quantitative genetics and history of biometrical genetics.
CO2	ableto understand the concept of gene, genotype frequency, component of variation, heritability, combining ability and gene action.
CO3	Students learned about the correlation analysis, path coefficient and stability parameters
CO4	Students know the analysis and the features of the different mating designs
CO5	Learned about thebasics of polygenes, their inheritance and effect of environment on minor genes.

Course Outcome:*After completion of the course, a student will be able to*

CO-PO MAPPING:

	CO	**PO1** Basic Genetics and Plant Breeding knowledge	**PO2** Problem Solving	**PO3** Identification and Designing of research problems		**PO5** The Plant Breeder and Society	**PO6** Environment and sustainability	**PO7** EEthics	**PO8** Individual and team work	**PO9** Communication	**PO10** Lifelong learning
CO1	Learned about the basic concept of quantitative genetics and history of biometrical genetics.	3	1	2	2	2	1		3		3
CO2	ableto understand the concept of gene, genotype frequency, component of variation, heritability, combining ability and gene action.	3	3	3	3	3	1		3		3
CO3	Students learned about the correlation analysis, path coefficient and stability parameters	3	3	3	3	3	1		3		3
CO4	Students know the analysis and the features of the different mating designs	3	3	3	3	3	1		3		3
CO5	Learned about thebasics of polygenes, their inheritance and effect of environment on minor genes.	3	2	3	3	3	1		3		3

Name of Course/subject: Methods of Plant Breeding

Course Code: APG 514

Course Objectives

- To acquaint students with the knowledge of different methods of plant breeding and its use in crop improvement
- To introduce the knowledge of use of different molecular techniques in plant breeding
- To introduce the knowledge of different biosafety regulations of plant breeding

Course Outcome:*After completion of the course, a student will be able to*

COURSE OUTCOME (CO)	**DESCRIPTION**
CO1	Know the different methods of plant breeding
CO2	Know the different molecular approaches used in plant breeding
CO3	know the different methods of plant breeding
CO4	This course will sensitize the learners about the different methods of plant reproduction and conditions favoring them .
CO5	Know the different biosafety regulations of plant breeding

CO-PO MAPPING:

	CO	PO1 Basic Genetic and plant breeding knowledge	PO2 Problem Solving	PO3 Identification and designing of research problems	PO4 Scientific skills	PO5 The Plant breeder and society	PO6 Environment and sustainability	PO7 Ethics	PO8 Individual and team work	PO9 Communication	PO10 Lifelong learning
CO1	Know the different methods of plant breeding	3	3	2	3		3	1	1	2	3
CO2	Know the different molecular approaches used in plant breeding	3	2	3	2		2	1	3	1	3
CO3	know the different methods of plant breeding	3	3	2	3		1	1	2	1	3
CO4	This course will sensitize the learners about the different methods of plant reproduction and conditions favoring them .	3	2	3	2		3	1	3	1	3
CO5	Know the different biosafety regulations of plant breeding	3	1	3	3		2	3	3	2	3
3: Strong contribution, 2: average contribution, 1: Low contribution											

Name of Course/ Subject: Agronomy of Major Field Crops (Rabi)

Paper code: APA 520

Course objective:

- To study about the origin, history, distribution, adaptation, classification, morphology, physiology of major field crops
- To study about the adaptation, classification, morphology, physiology of major field crops
- To study about the phenology, varietal improvement and production technology of major field crops
- To know about the quality components and industrial use of the main and by products
- To know about the post-harvest handling of main and by products for marketing

Course Outcome

After completion of course, a student will be able to

COURSE OUTCOME (CO)	**DESCRIPTION**
CO1	learn study about the origin, history, distribution, adaptation, classification, morphology, physiology of major field crops
CO2	learn about the adaptation, classification, morphology, physiology of major field crops
CO3	Understand the phenology, varietal improvement and production technology of major field crops
CO4	Know the quality components and industrial use of the main and by products
CO5	Understand the post-harvest handling of main and by products for marketing

	CO	PO 1. Basic Agronomy knowledge	PO 2. Research	PO 3. Field Experiments	PO 4.Modern implementation usage	PO 5.Modern concepts of crop production	PO 6. Modern farming system	PO 7. Soil-water-plant relationship	PO 8. Environment and sustainability	PO 9. Ethics	PO 10. Individual and team work	PO 11. Communication	PO 12. Life-long learning
CO1	learn study about the origin, history, distribution, adaptation, classification, morphology, physiology of major field crops	2	2	3	3	3	3	3	3	3	2	2	2
CO2	learn about the adaptation, classification, morphology, physiology of major field crops	3	2	1	2	2	2	3	2	2	3	2	2
CO3	Understand the phenology, varietal improvement and production technology of major field crops	2	2	3	3	3	3	2	3	3	3	2	3
CO4	Know the quality components and industrial use of the main and by products	3	3	2	2	2	2	1	3	2	2	3	3
CO5	Understand the post-harvest handling of main and by products for marketing	3	2	3	2	2	1	1	3	2	2	3	3
3: Strong contribution, 2: average contribution, 1: Low contribution													

Name of Course/subject: Breeding of Vegetable Crops

Course Code: AG 512

Course Objectives

1. To acquaint students with the knowledge of different methods of vegetable breeding and its use in crop improvement

2. To introduce the knowledge of use of different molecular techniques in vegetable breeding

3. To introduce the knowledge of different biosafety regulations of vegetable breeding

Course Outcome:

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	**DESCRIPTION**
CO1	Know the different methods of vegetable breeding
CO2	Know the different molecular approaches used in vegetable breeding
CO3	know the different methods of vegetable breeding
CO4	This course will sensitize the learners about the different methods of vegetable crops reproduction and conditions favoring them .
CO5	Know the different biosafety regulations of vegetable breeding

CO-PO MAPPING:

	Know the different methods of vegetable breeding	**PO1** Basic Genetic and plant breeding knowledge	**PO2** Problem Solving	**PO3** Identification and designing of research problems	**PO4** Scientific skills	**PO5** The Plant breeder and society	**PO6** Environment and sustainability	**PO7** Ethics	**PO8** Individual and team work	**PO9** Communication	**PO10** Lifelong learning
CO1	Know the different molecular approaches used in vegetable breeding	3	3	2	3		3	1	1	2	3
CO2	know the different methods of vegetable breeding	3	2	3	2		2	1	3	1	3
CO3	This course will sensitize the learners about the different methods of vegetable crops reproduction and conditions favoring them .	3	3	2	3		1	1	2	1	3
CO4	Know the different biosafety regulations of vegetable breeding	3	2	3	2		3	1	3	1	3
CO5	Know the different methods of vegetable breeding	3	1	3	3		2	3	3	2	3
3: Strong contribution, 2: average contribution, 1: Low contribution											

Name of Course/ Subject: Writing and communication skills

Subject Code: PGS502

Course objective

1. To give knowledge about the various forms of scientific writings
2. To give knowledge about the various parts of thesis, research communications
3. To give knowledge about writing of abstracts, summaries, citations etc
4. To give knowledge about research communications, illustrations, photograph, drawings
5. To give knowledge about pagination, scientific write ups, editing and proof reading, and writing of review article

Course Outcome

After completion of course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Learn that what are the various forms of scientific writings
CO2	Learn how to write the various parts of thesis, research communications
CO3	Learn how todowriting of abstracts, summaries and what are citations etc
CO4	Learn research communications, illustrations, photograph, drawings
CO5	Learn pagination, scientific write ups, editing and proof reading, and writing of review article

CO-PO MAPPING

	CO	**PO1** Basic Agricultural knowledge	**PO2** Problem Solving	**PO3** Lab/Field Experimentations	**PO4** Modern implements usage	**PO5** Modern Horticultural/ Agricultural implements	**PO6** Modernplant protection implements	**PO7** Extension Programme	**PO8** Ethics	**PO9** Individual and team work	**PO10** Communication	**PO11**Lifelong learning
CO1	Learn that what are the various forms of scientific writings	3	3	1	2	0		2		1	1	3
CO2	Learn how to write the various parts of thesis, research communications	3	3	1	2	0	3	2				2
CO3	Learn how todowriting of abstracts, summaries and what are citations etc	3	3	1		0	1	2				3
CO4	Learn research communications, illustrations, photograph, drawings	3	3	2	3		2	2				3
CO5	Learn pagination, scientific write ups, editing and proof reading, and writing of review article	3	3	2	3		3	2	1			3
		1: Low contribution,	2: Average contribution,	3: Strong contribution								

COURSE: Agriculture Research, Research Ethics and Rural Development Programmes

COURSE CODE: PGS505

Objectives:

- Appreciate the objective and principle of extension education
- Obtain idea on various development programmes in agriculture and allied area to help farmers.
- To enlighten the students about the organization and functioning of agricultural research systems at national and international levels, research ethics, and rural development programmes and policies of Government.

Outcomes:

After completion of the course, a student will be able to

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Students capable, efficient and self-reliant in character. .
CO2	They gain knowledge to help rural families in better appreciation of SWOT in the village.
CO3	They know about to open new opportunities for developing talents and leadership of rural people.
CO4	To provide knowledge and help for better management of farms and increase incomes.
CO5	To promote better social, natural recreational intellectual and spiritual file among the people.

CO-PO MAPPING:

	CO	**PO1** Basic Agriculture knowledge	**PO2** Problem Solving	**PO3** Field Experimentations		Agricultural/Horticultural implements	**PO6** Modernplant protection implements	**PO7** ExtensionProgramme	**PO8** Environment and sustainability	**PO9** Ethics	**PO10** Individual and team work	**PO11** Communication	**PO12** Lifelong learning
CO1	Students capable, efficient and self-reliant in character.	3	1	2	1	1	3	3	3	2	3	1	3
CO2	They gain knowledge to help rural families in better appreciation of SWOT in the village.	3	3	3	1	1	3	3	3	2	3	3	2
CO3	They know about to open new opportunities for developing talents and leadership of rural people.	3	2	1	1	1	2	3	3	2	1	2	3
CO4	To provide knowledge and help for better management of farms and increase incomes.	3	2	2	2	1	3	3	3	2	2	3	3
CO5	To promote better social, natural recreational intellectual and spiritual file among the people.	3	1	1	1	1	2	3	3	2	2	3	3
3: Strong contribution, 2: average contribution, 1: Low contribution													

Name of Course/ Subject: Disaster Management

Course Code: PGS506(e-Course)

Course objective

1. To give knowledge prompt assistance to victims
2. To give knowledge about the different techniques and to achieve rapid and effective recovery.
3. To give knowledge about how to reduce, or avoid, the potential losses from hazards,
4. To give knowledge about assure prompt and appropriate assistance to victims of disaster, and achieve rapid and effective recovery

Course Outcome

After completion of course, a student will be able to

COURSE OUTCOME (CO)	**DESCRIPTION**
CO1	Able to know what are the basic criteria for disaster management
CO2	Can use the basic knowledge regarding prompt assistance to victims
CO3	Students are able to know about to reduce, or avoid, the potential losses from hazards
CO4	Study to assure prompt and appropriate assistance to victims of disaster and pollution
CO5	By the end of course students will be able to know the knowledge regarding different methods to control and to avoid disaster.

CO-PO MAPPING

	CO	**PO1** Basic Agricultural knowledge	**PO2** Problem Solving	**PO3** Lab/Field Experimentations	**PO4** Modern implements usage	**PO5** Modern Horticultural/ Agricultural implements	**PO6** Modernplant protection implements	**PO7** Extension Programme	**PO8** Ethics	**PO9** Individual and team work	**PO10** Communication	**PO11**Lifelong learning
CO1	Able to know what are the basic criteria for disaster management	3	3	1	2	0		2		1	1	3
CO2	Can use the basic knowledge regarding prompt assistance to victims	3	3	1	2	0	3	2				2
CO3	Students are able to know about to reduce, or avoid, the potential losses from hazards	3	3	1		0	1	2				3
CO4	Study to assure prompt and appropriate assistance to victims of disaster and pollution	3	3	2	3		2	2				3
CO5	By the end of course students will be able to know the knowledge regarding different methods to control and to avoid disaster.	3	3	2	3		3	2	1			3
		1: Low contribution,	2: Average contribution,	3: Strong contribution								