Total Credits= 16

	Semester 1st	_	onta		Max]	Marks	Total	~ 1 1.
Subject Code	Subject Name		Hour	S			Marks	Credits
, and the second		L	T	P	Int.	Ext.		
MAGRS2-101	Modern concepts in Crop Production	3	-	-	40	60	100	3
MAGRS2-102	Fertilizer use in Crop Production	2	-	-	40	60	100	2
MAGRS2-103	Principles and Practices of Weed Management	2	-	-	40	60	, 100	2
MAGRS2-104	Technical Writing and Communication Skills, Library and Information Services	2	-	-	40	60	100	2
MAGRS2-105	Intellectual Property Management, Biodiversity and Biosafety	2	-	_	40	60	100	2
MAGRS2-106	Principles and Practices of Weed Management lab	-	1	2	60	40	100	1
MAGRS2-107	Technical Writing and Communication Skills, Library and Information Services lab		-	2	60	40	100	1
MAGRS2-108	Master's research	-		6	-	-	-	3
	Total	11		10	320	380	700	16

Total Credits= 18

	Semester 2 nd		onta Hour		Max 1	Marks	Total	Credits
Subject Code	Subject Name	L	Т	P	Int.	Ext.	Marks	
MAGRS2-201	Principles and Practices of Water Management	2	-	-	40	60	100	2
MAGRS2-202	Field Plot Techniques	2	-	-	40	60	100	2
MAGRS2-203	Statistical Methods for Research Workers	2	-	-	40	60	100	2
MAGRS2-204	Soil Fertility and Fertilizer Use	2	-	-	40	60	100	2
MAGRS2-205	Principles and Practices of Water Management lab	-	-	2	60	40	100	1
MAGRS2-206	Field Plot Techniques lab	-	-	2	60	40	100	1
MAGRS2-207	Statistical Methods for Research Workers lab	-	-	2	60	40	100	1
MAGRS2-208	Soil Fertility and Fertilizer Use lab	-	-	2	60	40	100	1
MAGRS2-209	Master's research	-	-	12	-	-	-	6
	Total	8	-	20	400	400	800	18

Total Credits=17

	Semester 3 rd	C	Conta	ct	Mov	Marks	Total	
Subject Code	Subject Name]	Hour	S	Max	viai KS	Marks	Credits
	3	L	Т	P	Int.	Ext.		
MAGRS2-301	Agronomy of Major Cereals and Pulses	2	-	ı	40	60	100	2
MAGRS2-302	Agronomy of Fodder and Forage Crops	2	-	-	40	60	100	2
MAGRS2-303	Analytical Techniques and Instrumental Methods in Soil and Plant Analysis	2	-	-	40	60	100	2
MAGRS2-304	Management of Problem Soils and Water	2	-	-	40	60	100	2
MAGRS2-305	Agronomy of Major Cereals and Pulses lab	-	-	2	60	40	100	1
MAGRS2-306	Agronomy of Fodder and Forage Crops lab	-		2	60	40	100	1
MAGRS2-307	Analytical Techniques and Instrumental Methods in Soil and Plant Analysis lab			2	60	40	100	1
MAGRS2-308	Management of Problem Soils and Water lab	-		2	60	40	100	1
MAGRS2-309	Master's research	-	-	10	-	-	-	5
	Total	8	- 1	18	400	400	800	17

Total Credits= 16

	Semester 4 th	C	onta	ct	May	Marks	Total	
Subject Code	Subject Name]	Hour	S	IVIAX I	viaiks	Marks	Credits
J		L	T	P	Int.	Ext.		
MAGRS2-401	Master Seminar	-	-	-	100	100	200	3
MAGRS2-402	Research and Publication Ethics	1	-	-	40	60	100	1
MAGRS2-403	Research and Publication Ethics (practical)	-	-	2	60	40	100	1
MAGRS2-404	-	-	22	•	-	-	11	
	Total				200	200	400	16

Overall Marks / Credits

Semester	Marks	Credits
1 st	700	16
2 nd	800	18
3 rd	800	17
4 th	400	16
Total	2700	67



MODERN CONCEPTS IN CROP PRODUCTION

Subject Code: MAGRS2-101 L T P C Duration: 45 (Hrs.)

3 0 0 3

Course Objectives:

The main objective of soil management for agriculture is to **create favorable conditions for good crop growth**, seed germination, emergence of young plants, root growth, plant development, grain formation and harvest. Sustained productivity goes in hand with good management practices.

Course Outcomes:

- 1. Students will learn about the modern concepts of crop growth and productivity with regards to climate change.
- 2. To know about the modern concepts of tillage and farm mechanization.
- 3. To learn about the fundamentals and components of organic farming, vermiculture, and resource-conservation technology.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			2									
CO2					3							
CO3						2						

UNIT-I (10 Hours)

Crop growth analysis in relation to environment.

Geo-ecological zones of India, Quantitative agro-biological principles and inverse yieldnitrogen law.

UNIT-II (12 Hours)

Mitscherlich yield equation, its interpretation and applicability. Baule unit. Effect of lodgingin cereals. Physiology of grain yield in cereals.

Optimization of plant population and planting geometry in relation to different resources, concept of ideal plant type and crop modelling for desired crop yield.

UNIT-III (13 Hours)

Scientific principles of crop production. Crop response production functions.

Concept of soil plant relations. Yield and environmental stress.

Integrated farming systems, organic farming and resource conservation technologyincluding modern concept of tillage; dry farming.

UNIT-IV (10 Hours)

Determining the nutrient needs for yield potentiality of crop plants, concept of balance nutrition and integrated nutrient management. Precision agriculture.

- 1. Havlin JL, Beaton JD, Tisdale SL & Nelson WL. 2006. Soil Fertility and Fertilizers. 7th Ed. Prentice Hall.
- 2. Paroda R.S. 2003. Sustaining our Food Security. Konark Publ.
- 3. Reddy SR. 2000. Principles of Crop Production. Kalyani Publ.
- 4. Sankaran S & Mudaliar TVS. 1997. Principles of Agronomy. The Bangalore Printing & Publ.
- 5. Singh SS. 2006. Principles and Practices of Agronomy. Kalyani.

FERTILIZER USE IN CROP PRODUCTION

Subject Code: MAGRS2-102 L T P C Duration: 30(Hrs.)

 $2 \ 0 \ 0 \ 2$

Course Objectives:

- 1. The making of various organic manures will be covered with the students.
- 2. To understand the importance of plant nutrients, how they are delivered to plants, and the variables that affect their availability.
- 3. To comprehend how crops react to various fertilisers.

Course Outcomes:

- 1. Students will learn about the preparation and composition of different organic manures.
- 2. To recognize the significance of plant nutrients, their mechanisms of transport to plants, and the factors that control their availability.
- 3. To understand the crop responses to different fertilizers.

Mapping

ı		Tuppin	5										
	CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
	CO1			3									
	CO2				2								
	CO3				2								

UNIT-I (7 Hours)

Crop response to fertilizer-effect on germination, growth and nutrient removal. Problems of supply and availability of nutrients, relation between nutrient supply and crop growth. Organic farming - basic concept and definitions.

UNIT-II (7 Hours)

Preparation and use of farmyard manure, compost, green manures, vermin-compost, bio-fertilizers and other organic concentrates their composition, availability and crop responses, recycling of organic wastes and residue management. Commercial fertilizers, composition, relative fertilizer value and cost.

UNIT-III (8 Hours)

Crop response to different nutrients, residual effects and fertilizer use efficiency, fertilizer mixtures and grades. Agronomic, chemical and physiological methods of increasing fertilizer use efficiency. Nutrient interactions. Time and methods of manures and fertilizers application. Foliar fertilizer application and its concept.

UNIT-IV (8 Hours)

Relative performance of organic and inorganic manures. Economics of fertilizer use. Integrated nutrient management. Site specific nutrient management. Effect of fertilizers on environment, Nutrient cycling integrated farming systems, Long effects of fertilizers use on crop yield and soil productivity.

- 1. Brady NC & Weil R.R 2002. The Nature and Properties of Soils. 13th Ed. Pearson Edu.
- 2. Fageria NK, Baligar VC & Jones CA. 1991. Growth and Mineral Nutrition of Field Crops. Marcel Dekker.
- 3. Havlin JL, Beaton JD, Tisdale SL & Nelson WL. 2006. Soil Fertility and Fertilizers. 7th Ed. Prentice Hall.
- 4. Prasad R & Power JF. 1997. Soil Fertility Management for Sustainable Agriculture. CRC Press. Yawalkar KS, Agrawal JP & Bokde S. 2000. Manures and Fertilizers. Agri-Horti

Publ.

- 5. Prasad R & Power JF. 1997. Soil Fertility Management for Sustainable Agriculture. CRC Press
- 6. Yawalkar KS, Agrawal JP & Bokde S. 2000. Manures and Fertilizers. Agri-Horti Publ.

PRINCIPLES AND PRACTICES OF WEED MANAGEMENT

Subject Code: MAGRS2-103 L T P C Duration: 30 (Hrs.)

2 0 0 2

Course Objectives:

1. The biology of weeds and their ecological cycle will be taught to students.

2. Disseminating information on how various herbicides are applied.

3. To comprehend various weed-control strategies that preserve ecological harmony.

Course Outcomes:

- 1. Students will learn about the weed biology and ecological cycle of weeds.
- 2. Providing knowledge about the different herbicides application.
- 3. To understand different methods of weed control with maintaining ecological balance.

Mapping

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CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
001												
CO1					2							
CO2				2.								
002				_								
CO3							3					

UNIT-I (7 Hours)

Weed biology, ecology and crop-weed competition including allelopathy. Principles and methods of weed control. Weed indices. History and development of herbicide.

UNIT-II (8 Hours)

Classification and selectivity of herbicides based on chemical, physiological application and selectivity. Mode and mechanism of action of important herbicides. Herbicide structure- activity relationship and factors affecting the efficiency of herbicides. Herbicide formulations and mixtures.

UNIT-III (7 Hours)

Weed control through bio-herbicides, myco-herbicides and allelochemicals, Degradation of herbicides in soil and plants. Herbicide resistance in weeds and crops herbicide rotations. Weed management in major crops and cropping systems.

UNIT-IV (8 Hours)

Management of parasitic weeds and special weed problems. Weed shifts in cropping systems. Aquatic and perennial weed control. Integrated weed management. Cost: benefit analysis of weed management.

- 1. Aldrich RJ & Kramer RJ. 1997. Principles in Weed Management. Panima Publ.
- 2. Ashton FM & Crafts AS. 1981. Mode of Action of Herbicides. 2nd Ed. Wiley Inter-Science.
- 3. Gupta OP. 2007. Weed Management Principles and Practices. Agrobios.

- 4. Mandal RC. 1990. Weed, Weedicides and Weed Control Principles and Practices. AgroBotanical Publ.
- 5. Rao VS. 2000. Principles of Weed Science. Oxford & IBH.
- 6. Subramanian S, Ali AM & Kumar RJ. 1997. All About Weed Control. Kalyani.
- 7. Zimdahl RL. 1999. Fundamentals of Weed Science. 2nd Ed. Academic Press. 4

TECHNICAL WRITING AND COMMUNICATION SKILLS, LIBRARY AND INFORMATION SERVICES

Subject Code: MAGRS2-104 L T P C Duration: 30 (Hrs.)

2 0 0 2

Course Objectives:

- 1. Skill in written and vocal communication.
- 2. The competence in English.
- 3. The ability to use the English language well through word power

Course Outcomes: 1. Competency in communication both written and oral

- 1. The ability to speak English well.
- 2. Word power to effectively use the English language

Mapping

	wappiii	g										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		
CO2									2			
CO3										2		

UNIT-I (7 Hours)

Technical Writing-Various forms of technical writing-theses, technical papers, reviews, electronic communication etc; qualities of technical writing

UNIT-II (8 Hours)

Parts of research communications- titlepage, content page, authorship, preface, introduction, review of literature, materials and methods, experimental results, documentation; photographs and drawings with suitable captions; pagination, citations; writing of abstracts; précis; synopsis

UNIT-III (7 Hours)

Editing and proof reading. Communication Skills-defining communication; types of communication-verbal and non-verbal; assertive communication; assertive communication; using language for effective communication:

UNIT-IV (8 Hours)

Techniques of dyadic communication- message pacing and message chunking, self-disclosure, mirroring, expressing conversational intent; paraphrasing; vocabulary building- word roots, prefixes, Greek and Latin roots.

- 1. Raman M and Sharma S (2015) Technical Communication Principles and Practice. *Oxford University Press*, 3rd edition.
- 2. Farhathullah T M (2017) Communication Skill for Technical Students. Sangam Books Ltd.

INTELLECTUAL PROPERTY MANAGEMENT, BIODIVERSITY AND BIOSAFETY

Subject Code: MAGRS2-105 L T P C Duration: 30 (Hrs.)

 $2 \ 0 \ 0 \ 2$

Course Objectives:

- 1. Students will study the background, principles, and varieties of international treaties and conventions for the protection of intellectual property.
- 2. To educate people on the importance that intellectual property plays in trade, commerce, and growth.
- 3. The many ecosystems and their sustainable applications will be taught to students.

Course Outcomes:

- 1. Students will learn about the history, concepts and types, international treaties and conventions for protection of IP'S.
- 2. To provide knowledge about the role of intellectual property in growth, development, trade and commerce.
- 3. Students will learn about the different ecosystems and their sustainable uses.

Mapping

	Happin	5										
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2											
CO2												1
CO3							2					

UNIT-I (8 Hours)

Introduction to Intellectual Property: history, concepts and types. International treaties and conventions for protection of IP'S. Role of intellectual property in growth, development, trade and commerce; Indian legislations for the protection of various types of Intellectual Property with a special reference to history and evolution of the concepts of geographical indicators, variety protection and patents.

UNIT-II (8 Hours)

R & D expenditure visà-vis patents. PPVFRA: Process for protection of plant varieties, issues related to compliance sand infringements. GI: Process for protection of goods, community involvement and benefit sharing. Patents: Search, process of filing patents, infringement and compliances. Biodiversity: Definition, importance, historical and geographical causes for diversity. Species and population biodiversity,

UNIT-III (7 Hours)

Maintenance of ecological biodiversity. Biodiversity hot spots in India, Collection, conservation, documentation and characterization of biodiversity, development and maintenance of live repositories, community gene banks. Convention on biological diversity. National biodiversity protection initiatives; sustainable use of bio-diversity, benefit sharing, Bio-safety guidelines for the development and protection of genetically modified organisms

UNIT-IV (7 Hours)

Cartagena Protocol of Bio-safety, its objective, salient features, risk assessment and risk management for GMO's, Bio-safety guidelines, rules and regulations and regulatory frame work for GMO in India; institutional arrangements at national level, procedure for direct use of GMO's in India. Licensing of technologies, Material transfer agreements, Research collaboration agreement, License Agreement.

- 1. Sibi G (2021) Intellectual Property Rights, Bioethics, Biosafety and Enterpreneurship in Biotechnology. *Dreamtech Press*.
- 2. Goel D and Parashar S (2013) IPR Biosafety and Bioethics.

PRINCIPLES AND PRACTICES OF WEED MANAGEMENT LAB

Subject Code: MAGRS2-106 L T P C Duration: 30 (Hrs.)

0 0 2 1

Course Objectives:

- 1. Herbarium sheets can be made to identify weeds.
- 2. The formulation of various spray solutions and the economics of weed control will be taught to the students.
- 3. Different herbicide requirements and their aftereffects will also be taught to the students.

Course Outcomes:

- 1. Identification of weeds by preparing herbarium sheets.
- 2. Students will learn about formulation of different spray solutions and economics of weed control.
- 3. Students will also learn about different herbicides requirements and their residual effects.

Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1											2	
CO2				2								
CO3					3							

PRACTICALS

- 1. Identification of important crop weeds.
- 2. Preparation of a weed herbarium.
- 3. Weed survey in crops and cropping systems.
- 4. Crop-weed competition studies.
- 5. Weed indices.
- 6. Preparation of spray solutions of herbicides for high and low-volume sprayers.
- 7. Use of various types of spray pumps and nozzles and calculation of swath width.
- 8. Economics of weed control.
- 9. Herbicide residue analysis in plant and soil.
- 10. Bioassay of herbicide residue.
- 11. Calculation of herbicidal requirement.

TECHNICAL WRITING AND COMMUNICATION SKILLS, LIBRARY AND INFORMATION SERVICES LAB

Subject Code: MAGRS2-107 L T P C Duration: 30(Hrs.)

0 0 2 1

Course Objectives::

- 1. Skill in written and vocal communication.
- 2. Having good English language skills.
- 3. Word strength to use the English language well

Course Outcomes: -

- 1. Competency in communication both written and oral
- 2. The ability to speak English well.
- 3. Word power to effectively use the English language.

Mapping

		-										
CO/PO	PO1	PO2	PO3	РО	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1										3		
CO2									2			
CO3										2		

PRACTICALS

- 1. Editing and Proof-reading technical articles using language tools for effective writing
- 2. Listening to audio-video conversations aimed at testing the comprehension of the students
- 3. Oral presentations on a given topic related to agriculture
- 4. Evaluation of body language and communication skills based on group discussions and interviews
- 5. Role plays and pronunciation exercises using eye contact and visual clues for effective listening skills
- 6. Word stress application and voice modulation
- 7. Soft skills; rhetoric skills; self-assessment exercises.
- 8. Introduction to Library and its services; Five laws of library science; type of documents
- 9. Classification and cataloguing
- 10. Organization of documents
- 11, Sources of information-primary, secondary and tertiary
- 12. Current awareness and SDI services
- 13. Tracing information from reference sources
- 14. Library survey
- 15. Preparation of bibliography
- 16. Use of Online Public Access Catalogue
- 17. Use of CD-ROM databases and other computerized library services, CeRA, J-Gate
- 18. Use of Internet including search engines and its resources; e-resources and access methods.