



**Integral University, Lucknow**  
**Integral Institute of Agricultural Science and Technology**  
**Evaluation Scheme of Post Graduate Program**  
**w.e.f. Session 2020-21**

**M. Sc. (Ag.) Agronomy**

**Semester-II**

Course Code	Course Title	Type of Course	Periods/Per week			Evaluation Scheme Theory Mid Sem			Evaluation Scheme Practical Mid Sem			Practical End Sem Exam	Sub Total (Mid Sem Theory + Practical End Sem Exam)	End Sem Theory Exam	Subject Total	Credit	Total Credit Points	Attributes								
			L	T	P	CT	TA	Total	CT	TA	Total							Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics		
AA506	Principle and Practices of Water Management	Core courses (Compulsory)	2	0	2	20	10	30	-	-	-	20	50	50	100	2:0:1	3	√		√						
AA507	Soil Fertility Management and Fertilizer Use		2	0	2	20	10	30	-	-	-	20	50	50	100	2:0:1	3	√		√		√	√	√		
<b>Total</b>																	*									
*Major Course (Core course + Optional course) should not exceed more than 9 credit																										
AA509	Agronomy of Major Field Crop (Rabi)	Minor/Related/Supporting courses	3	0	0	20	10	30	-	-	-	-	30	70	100	3:0:0	3	√		√						
<b>Total</b>																	**									
PGS502	Technical Writing and Communications Skills	Non Credit Course (Compulsory)	0	0	2	0	0	-	-	-	-	25	75	0	100	0:0:1	1 <sup>#</sup>	√		√						√
PGS505 (e-Course)	Agricultural Research, Research Ethics and Rural Development Programmes		1	0	0	20	10	30	-	-	-	0	0	70	100	1:0:0	1 <sup>#</sup>	√		√				√	√	
PGS506 (e-Course)	Disaster Management		1	0	0	20	10	30	-	-	-	0	0	70	100	1:0:0	1 <sup>#</sup>	√		√						
AA510	M. Sc. (Ag.) Seminar		-	-	-	-	-	-	-	-	-	-	-	-	100	0:0:1	1			√						
AA520	M. Sc. (Ag.) Research		-	-	-	-	-	-	-	-	-	-	-	-	S/US	0:0:3	3 <sup>§</sup>	√		√			√	√		
<b>Grand Total</b>																	***									

*Grand Total (\*\*\*) = \*+\*\*, Total credit should not exceed more than 18 credit in one semester; <sup>#</sup>Non-Gradual Course; <sup>§</sup>M.Sc. (Ag.) Research credit to be counted in Final Semester examinations; S/US=Satisfactory/Unsatisfactory*

**M.Sc. (Ag.) Agronomy**  
**SEMESTER-II**  
**Course Title: Principle and Practices of Water Management**  
**Paper Code: AA506**  
**w.e.f. Session 2020-21**

**3(2+1)**

**Unit I**

Water and it's in plants; water resources of India; major irrigation projects and extent of area and crops irrigation in India and in different states; soil water movement and water availability, uptake, transport and transpiration in plants; soil- water plant relationship

**Unit II**

Plant response to water stress; scheduling, depth and methods of irrigation; micro irrigation systems fertigation, management of water in controlled environments and polyhouses.

**Unit III**

Water use efficiency water management crop and cropping systems; soil plant and metrological factors determining water needs of crop; crop plant adaptation to moisture stress condition quality of irrigation water; effect of saline water and soil salinity on plant water relation and management of crops

**Unit IV**

Excess soil water and plant growth; water management in problem soils; drainage requirement of crops and methods of field drainage, their layout and spacing irrigability of lands

**Practical:** Measurement of soil moisture using tensiometer, pressure plate and membrane; making of soils moisture characteristics curves; water flow measurement using different devices, determining soil profile moisture deficit and irrigation requirements; computation of water requirements of crop using modified Penman formula; measurement of water flux under saturated and unsaturated conditions; determination of infiltration rate and hydraulic conductivity.

**Suggested Readings:**

1. Lenka D. 1999. Irrigation and Drainage. Kalyani Publications, New Delhi.
2. Michael AM. 1978. Irrigation: Theory and Practice. Vikas Publ.
3. Paliwal KV. 1972. Irrigation with Saline Water. IARI Monograph, New Delhi.
4. Panda SC. 2003. Principles and Practices of Water Management. Agrobios.
5. Prihar SS & Sandhu BS. 1987. Irrigation of Food Crops - Principles and Practices. ICAR.
6. Reddy SR. 2000. Principles of Crop Production. Kalyani Pulishers

**M.Sc. (Ag.) Agronomy**  
**SEMESTER-II**  
**Course Title: Soil Fertility Management and Fertilizer Use**  
**Paper Code: AA507**  
**w.e.f. Session 2020-21**

**3(2+1)**

**Unit I**

Soil fertility and productivity; soil composition in relation to crop production –organic and inorganic constituents; essential plants nutrients; deficiency and toxicity symptoms of major and micronutrients and their remedial measures

**Unit II**

Transformations and dynamic of major plant nutrients; kind of fertilizer-straight, complex and bulk blended; methods of fertilizer applications; crop response to nutrients; fertilizer use efficiency, agronomic chemical and physiological

**Unit III**

Methods of increasing fertilizer use efficiency; nutrient interactions; fertilizer application in cropping system system-direct, residual and cumulative effects; integrated plants nutrient supply system, organic manures, compost green manures

**Unit IV**

Vermin-compost, bio-fertilizers, crop residue and inorganic fertilizers; sustainable agriculture and soil fertility; fertilizer and environment; fertilizer use in problem soils; soil moisture nutrients interaction

**Practical:** Determination of soil pH, organic C, total N, available N, P, K & S in soils; total N, P, K & S in plants; interpretation effect and computation of economic yield optimum.

**Suggested Readings**

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

**M.Sc. (Ag.) Agronomy**  
**SEMESTER-II**  
**Course Title: Fodder and Forage Crop**  
**Paper Code: AA508**  
**w.e.f. Session 2020-21**

**3(2+1)**

**Unit-I**

Adaptation, distribution, varietal improvement, Agro techniques and quality aspects including anti-quality factors of improvement fodder crops likes teosinte, maize, bajra, guar, cowpea, oats, barley, berseem, senji, lucern and clovers;

**Unit II**

Year round fodder production and management, preservation and utilization of forage and pasture crops; principles and methods of hay and silage making; chemical and biochemical changes, nutrient losses and factors affecting quality of hay and silage;

**Unit III**

Use of physical and chemical enrichment and biological methods for improvement nutrition value of poor quality fodder, Economics of forage cultivation. Grassland of India and their improvement, principles of grassland ecology, economic aspect of grassland, their problems and management, improvement of grassland.

**Unit IV**

Pasture grasses and legumes for improving soil fertility; importance classification and advantage of pastures; establishment of pasture, their improvement and renovation; ley farming. Agro technology for pasture grasses and forage legumes for different agro-ecological situations, Grazing management. Nutrient Management.

**Practical:** Exercises on farm operations in raising fodder crops; exercises on canopy measurement, yield and quality estimation, viz. crude protein, NDF, ADF, Lignin, Silica cellulose etc. of various fodder and forage crops and anti quality components like HCN in sorghum and such factors in other crops; hay and silage making and economics of their preparation.

**Suggested Readings:**

1. Chatterjee BN. 1989. Forage Crop Production - Principles and Practices. Oxford & IBH.
2. Das NR. 2007. Introduction to Crops of India. Scientific Publ.
3. Narayanan TR & Dabadghao PM. 1972. Forage Crops of India. ICAR.
4. Singh P & Srivastava AK. 1990. Forage Production Technology. IGFRI, Jhansi.
5. Singh C, Singh P & Singh R. 2003. Modern Techniques of Raising Field Crops. Oxford & IBH.

**M.Sc. (Ag.) Agronomy**  
**SEMESTER-II**  
**Course Title: Agronomy of Major Field Crops (Rabi)**  
**Paper Code: AA509**  
**w.e.f. Session 2020-21**

**3(3+0)**

**Unit I**

Origin, history, distribution, adaptation, classification, morphology, phenology, physiology, Varietal improvement and production technology of Wheat, Barley, Chickpea, Peas, Lentil, Rajma

**Unit II**

Origin, history, distribution, adaptation, classification, morphology, phenology, physiology, Varietal improvement and production technology of Rapeseed and Mustard, Linseed, Safflower, Tara mira, Potato, Tobacco and Sugar Beet

**Unit III**

Quality components and industrial uses of the main and by- products and their post harvest handling for marketing

**Suggested Readings:**

1. Das NR. 2007. Introduction to Crops of India. Scientific Publ.
2. Hunsigi G & Krishna KR. 1998. Science of Field Crop Production. Oxford & IBH.
3. Khare D & Bhale MS. 2000. Seed Technology. Scientific Publ.
4. Kumar Ranjeet & Singh NP. 2003. Maize Production in India: Golden Grain in Transition. IARI, New Delhi.
5. Pal M, Deka J & Rai RK. 1996. Fundamentals of Cereal Crop Production. Tata McGraw Hill.
6. Prasad, Rajendra. 2002. Text Book of Field Crop Production. ICAR.

**M.Sc. (Ag.)/MBA Agribusiness Management**  
**SEMESTER-II**  
**Course Title: Technical Writing and Communications Skills**  
**Paper Code: PGS502**  
**w.e.f. Session 2018-19**

**1(0+1)**

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

**Suggested Readings**

1. Wren PC & Martin H. 2006. High School English Grammar and Composition. S. Chand & Co.
2. Robert C. (Ed.). 2005. Spoken English: Flourish Your Language. Abhishek.
3. Mohan K. 2005. Speaking English Effectively. MacMillan India.
4. Sethi J & Dhamija PV. 2004. Course in Phonetics and Spoken English. 2nd Ed. Prentice Hall of India.
5. Hornby AS. 2000. Comp. Oxford Advanced Learner's Dictionary of Current English. 6th Ed. Oxford University Press.
6. Joseph G. 2000. MLA Handbook for Writers of Research Papers. 5th Ed. Affiliated East-West Press.
7. Chicago Manual of Style. 14th Ed. 1996. Prentice Hall of India.
8. Collins' Cobuild English Dictionary. 1995. Harper Collins.
9. James HS. 1994. Handbook for Technical Writing. NTC Business Books.
10. Gordon HM & Walter JA. 1970. Technical Writing. 3rd Ed. Holt, Rinehart & Winston.
11. Richard WS. 1969. Technical Writing. Barnes & Noble.

**M.Sc. (Ag.)/MBA Agribusiness Management  
SEMESTER-II**

**Course Title: Agricultural Research, Research Ethics and Rural Development Programmes (e-Course)**

**Paper Code: PGS505  
w.e.f. Session 2018-19**

**1(1+0)**

**Unit I**

History of agriculture in brief; Global agricultural research system: need, scope, opportunities; Role in promoting food security, reducing poverty and protecting the environment; National Agricultural Research Systems (NARS) and Regional Agricultural Research Institutions; Consultative Group on International Agricultural Research (CGIAR): International Agricultural Research Centers (IARC), partnership with NARS, role as a partner in the global agricultural research system, strengthening capacities at national and regional levels; International fellowships for scientific mobility.

**Unit II**

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

**Unit III**

Concept and connotations of rural development, rural development policies and strategies. Rural development programmes: Community Development Programme, Intensive Agricultural District Programme, Special group – Area Specific Programme, Integrated Rural Development Programme (IRDP) Panchayati Raj Institutions, Co-operatives, Voluntary Agencies/Non-Governmental Organizations. Critical evaluation of rural development policies and programmes. Constraints in implementation of rural policies and programmes.

**Suggested Readings:**

1. Bhalla GS & Singh G. 2001. Indian Agriculture - Four Decades of Development. Sage Publ.
2. Punia MS. Manual on International Research and Research Ethics. CCS, Haryana Agricultural University, Hisar.
3. Rao BSV. 2007. Rural Development Strategies and Role of Institutions - Issues, Innovations and Initiatives. Mittal Publ.
4. Singh K. 1998. Rural Development - Principles, Policies and Management. Sage Publ.

**M.Sc. (Ag.)/MBA Agribusiness Management**  
**SEMESTER-II**  
**Course Title: Disaster Management (e-Course)**  
**Paper Code: PGS506**  
**w.e.f. Session 2018-19**

**1(1+0)**

**Unit I**

Natural Disasters- Meaning and nature of natural disasters, their types and effects. Floods, Drought, Cyclone, Earthquakes, Landslides, Avalanches, Volcanic eruptions, Heat and cold Waves, Climatic Change: Global warming, Sea Level rise, Ozone Depletion.

**Unit II**

Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire. Oil fire, air pollution, water pollution, deforestation, Industrial wastewater pollution, road accidents, rail accidents, air accidents, sea accidents.

**Unit III**

Disaster Management- Efforts to mitigate natural disasters 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.

**Suggested Readings:**

1. Gupta HK. 2003. Disaster Management. Indian National Science Academy. Orient Blackswan.
2. Hodgkinson PE & Stewart M. 1991. Coping with Catastrophe: A Handbook of Disaster Management. Routledge.
3. Sharma VK. 2001. Disaster Management. National Centre for Disaster Management, India.