

Integral University, Lucknow Integral Institute of Agricultural Science and Technology Evaluation Scheme of Post Graduate Program w.e.f. Session 2022-23

M. Sc. (Ag.) Soil Science

Semester-III

Course Code	Course Title	Type of Course	pe of Periods/ urse Per week		ls/ ek	Evaluation Scheme Theory Mid Sem			Evaluation Scheme Practical Mid Sem			Practica Sub l End Total	Sub Total	End Sem	Subject Total	Credit	Total Credit	Attributes							United Nations sustainable
			L	T	P	C T	T A	Total	СТ	TA	Total	Sem Exam	Sem (Mid Exam Sem Theory + Practical End Sem Exam)				Points	Employability	Entrepreneurship	Skill Development	Gender Equality	Environment & Sustainability	Human Value	Professional Ethics	development goals (SDGs)
AS512	Soil Mineralogy, Genesis, Classification and Survey	Core courses (Compulsory)	2	0	2	20	10	30	-	-	-	20	50	50	100	2:0:1	3								
Total	•																								
		Optional Courses																							
Total																	*								
*Major Course (Core course + Optional course) should not exceed more than 9 credit																									
AA505	Agronomy of Major Field Crop (Kharif)	Minor	3	0	0	20	10	30	-	-	-	0	0	70	100	3:0:0	3	V		V		V			2
AS511	Management of Problematic Soils and Waters	Related/ Supporting courses	2	0	2	20	10	30	-	-	-	20	50	50	100	2:0:1	3ª		V	V		V		V	
Total																	**								
PGS501	Library and Information Services	Non Credit Course (Compulsory)	0	0	2	-	-	-	-	25	25	75	25	-	100	0:0:1	1#			V				V	
AS520	M. Sc. (Ag.) Research		-	-	-	-	-	-	-	-	-	-	-	-	S/US	0:0:7	7 ^{\$}	V		V			V	V	4
Grand Tota	al																***								

Grand Total (***) = *+**, Total credit should not exceed more than 18 credit in one semester; [#]Non-Gradial Course; ^{\$}M.Sc. (Ag.) Research credit to be counted in Final Semester examinations; S/US=Satisfactory/Unsatisfactory

M.Sc. (Ag.) Soil Science SEMESTER-III Course Title: Soil Mineralogy, Genesis, Classification and Survey Paper Code: AS512 w.e.f. Session 2021-22

Unit I

3(2+1)

Fundamentals of crystallography, space lattice, coordination theory, isomorphism and polymorphism. **Unit II**

Classification, structure, chemical composition and properties of clay minerals; genesis and transformation of crystalline and non-crystalline clay minerals; identification techniques; amorphous soil constituents and other non-crystalline silicate minerals and their identification; clay minerals in Indian soils.

Unit III

Factors of soil formation, soil formation models; soil forming processes; weathering of rocks and mineral transformations; soil profile; weathering sequences of minerals with special reference to Indian soils.

Unit IV

Concept of soil individual; soil classification systems - historical developments and modern systems of soil classification with special emphasis on soil taxonomy; soil classification, soil mineralogy and soil maps – usefulness.

Unit V

Soil survey and its types; soil survey techniques - conventional and modern; soil series – characterization and procedure for establishing soil series; benchmark soils and soil correlations; soil survey interpretations; soil mapping, thematic soil maps, cartography, mapping units, techniques for generation of soil maps. **Unit VI**

Landform – soil relationship; major soil groups of India with special reference to respective states; land capability classification and land irrigability classification; land evaluation and land use type (LUT) – concept and application; approaches for managing soils and landscapes in the framework of agroecosystem.

Practical: Identification and quantification of minerals in soil fractions, Morphological properties of soil profile in different landforms, Classification of soils using soil taxonomy, Calculation of weathering indices and its application in soil formation, Grouping soils using available data base in terms of soil quality, Aerial photo and satellite data interpretation for soil and land use, Cartographic techniques for preparation of base maps and thematic maps, processing of field sheets, compilation and obstruction of maps in different scales, Land use planning exercises using conventional and RS tools.

Suggested Readings:

1. The Nature and Properties of Soils. 13th Ed.- Brady NC & Weil RR. 2002, Pearson Edu.

- 2. Soil Genesis and Classification. 4th Ed.- Buol EW, Hole ED, MacCracken RJ & Southard RJ. 1997. Panima Publ.
- 3. Minerals in Soil Environments. 2nd Ed.- Dixon JB & Weed SB 1989, Soil Science Society of America, Madison.
- 4. Clay Mineralogy- Grim RE. 1968, McGraw Hill.
- 5. Sehgal J. 2002. Introductory Pedology: Concepts and Applications. New Delhi.
- 6. Pedology Concepts and Applications- Sehgal J. 2002, Kalyani.
- 7. Basic Concepts of Soil Science- Kolay AK. 2017, New Age International Publishers.
- 8. Fundamentals of Soil Science- Indian Society of Soil Science (ISSS) 2012, 2nd edition.

M.Sc. (Ag.) Agronomy Semester-III Course Title: Agronomy of Major Field Crops (Kharif) Course Code: AA505 w.e.f. Session 2020-21

Theory

Unit I

Origin, history, distribution, adaptation, classification, morphology, phenology, varietal improvement and production technology of Rice Maize, Sorghum, Pearl-millet

Unit II

Origin, history, distribution, adaptation, classification, morphology, phenology, varietal improvement and production technology of Smaller-millet, Pigeon pea, Mung bean, Urd bean, Cowpea, Moth bean, Groundnut, Sunflower, Sesame, Niger, Caster, Soybean, Cotton, Jute, Mesta & Sugarcane.

Unit III

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

Suggested Readings:

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

3 (3+0)

COURSE OBJECTIVES:

COURSE OUTCOMES (CO):

- Knowledge and concept of major field crops (including cereals, pulses, oilseeds and fiber crops)
- Basics of soil requirements for field crops including fertilizers, manures, Farm yard manures
- Knowledge of seed rates, morphology phenology, varietal improvement of crops
- Basic concepts of origin, history, distribution, adaptations of different crops according to the environment
- Study of sustainable agriculture and cropping and farming systems

After completion of the course, a student will be able to COURSE OUTCOME (CO) DESCRIPTION CO1 Concept of major field crops (including cereals, pulses, oilseeds and fiber crops) CO2 Knowledge of farm yard manures soil requirements for field crops including fertilizers, manures, CO3 Basics if origin, history, distribution, adaptations of different crops according to the environment CO4 In-depth knowledge of sustainable agriculture and cropping and farming systems CO5 In-depth knowledge of production technology

	CO-PO MAPPING:												
	СО	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
C01	Concept of major field crops (including cereals, pulses, oilseeds and fiber crops)	2	2	3	3	3	3	3	3	3	2	2	2
C02	Knowledge of farm yard manures soil requirements for field crops including fertilizers, manures,	3	2	1	2	2	2	3	2	2	3	2	2
CO3	Basics if origin, history, distribution, adaptations of different crops according to the environment	2	2	3	3	3	3	2	3	3	3	2	3
C04	In-depth knowledge of sustainable agriculture and cropping and farming systems	3	3	2	2	2	2	1	3	2	2	3	3
CO5	In-depth knowledge of production technology	3	2	3	2	2	1	1	3	2	2	3	3
	3: Strong contribution, 2: average contribution, 1: Low contribution												

M.Sc. (Ag.) Soil Science Semester-III Course Title: Management of Problematic Soils and Waters Course Code: AS511 w.e.f. Session 2021-22

Theory

Unit I

Area and distribution of problem soils – acidic, saline, sodic and physically degraded soils; origin and basic concept of problematic soils, and factors responsible.

Unit II

Morphological features of saline, sodic and saline-sodic soils; characterization of salt-affected soils - soluble salts, ESP, pH; physical, chemical and microbiological properties.

Unit III

Management of salt-affected soils; salt tolerance of crops - mechanism and ratings; monitoring of soil salinity in the field; management principles for sandy, clayey, red lateritic and dry land soils.

Unit IV

Acid soils - nature of soil acidity, sources of soil acidity; effect on plant growth, lime requirement of acid soils; management of acid soils; biological sickness of soils and its management.

Unit V

Quality of irrigation water; management of brackish water for irrigation; salt balance under irrigation; characterization of brackish waters, area and extent; relationship in water use and quality.

Unit VI

Agronomic practices in relation to problematic soils; cropping pattern for utilizing poor quality ground waters.

Practical

Characterization of acid, acid sulfate, salt-affected and calcareous soils, Determination of cations (Na⁺, K⁺, Ca⁺⁺ and Mg⁺⁺) in ground water and soil samples, Determination of anions (Cl⁻, SO₄⁻⁻, CO₃⁻⁻ and HCO₃⁻⁻) in ground waters and soil samples, Lime and gypsum requirements of acid and sodic soils.

Suggested Readings:

- Chemistry of the Soil-Bear FE. 1964, Oxford & IBH.
- Salt-affected Soils- Jurinak JJ. 1978, Department of Soil Science & Biometeorology. Utah State Univ.
- Diagnosis and improvement of Saline and Alkali Soils- USDA Handbook No. 60. 1954, Oxford & IBH.
- Fundamentals of Soil Science- Indian Society of Soil Science (ISSS) 2012, 2nd edition.

3(2+1)

COURSE OBJECTIVES:

- Students will gain knowledge on concepts and principles of problematic soils and waters
- Students will acquire knowledge about reclamation and management of soil physical and chemical constraints and irrigation water quality and standards.
- Utilization of saline water in agriculture.

COURSE OUTCOMES (CO):

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

COURSE OUTCOME	DESCRIPTION
(CO)	
C01	To gain basic knowledge about the problematic soils and its factors
CO2	To provide knowledge of classification and characterization of salt affected soils of India
CO3	To imparts knowledge on reclamation and management of soil physical and chemical constraints
CO4	To study about the crop management practices in problematic soils and waters for irrigation
CO5	To deal with survey and mapping of problematic soils of India

CO-PO MAPPING:

M.Sc. (Ag.)/MBA Agribusiness Management Semester-III Course Title: Library and Information Services Course Code: PGS501 w.e.f. Session 2019-20

1 (0+1)

Practical

Introduction to library and its services; Role of libraries in education, research and technology transfer; Classification systems and organization of library; Sources of information- Primary Sources, Secondary Sources and Tertiary Sources; Intricacies of abstracting and indexing services (Science Citation Index, Biological Abstracts, Chemical Abstracts, CABI Abstracts, etc.); Tracing information from reference sources; Literature survey; Citation techniques/Preparation of bibliography; Use of CD-ROM Databases, Online Public Access Catalogue and other computerized library services; Use of Internet including search engines and its resources; e-resources access methods.

Suggested Readings:

- Singh G. Information Sources, Services and Systems, 2013 Edition. Prentice Hall India Learning Private Limited
- Library Science, 2018 Edition. Ramesh Publishing House
- Subhankar Biswas, Durga Sankar Rath. Cataloguing in the New Era: Gazing through the Bodleian Catalogues to RDA, 2017 Edition. Ess Ess Publications

COURSE OBJECTIVES:

- To study about the role of library in education, research and technology
- Obtain idea of Intricacies of abstracting and indexing services
- To enlighten the students about the computerized library services
- To give the knowledge of e resources and search engines

COURSE OUTCOMES (CO):

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

COURSE OUTCOME (CO)	DESCRIPTION
CO1	Students gain knowledge about the library importance in different sites.
CO2	They gain knowledge of Intricacies of abstracting and indexing services
CO3	They know about the computerized library services
CO4	To provide knowledge of e resources
CO5	To give basic information about search engines

CO-PO MAPPING:

	со	PO1 Basic Agriculture knowledge	PO2 Problem Solving	PO3 Field Experimentations	PO4 Modern implementation usage	PO5 Modern Agricultural/Horticultural implements	PO6 Modern plant protection implements	PO7 Extension Programme	PO8 Environment and sustainability	PO9 Ethics	PO10 Individual and team work	PO11 Communication	PO12 Lifelong learning
C01	Students gain knowledge about the library importance in different sites.	3	3	1	1	1	3	3	3	2	3	1	3
C02	They gain knowledge of Intricacies of abstracting and indexing services	3	3	1	3	3	3	1	3	2	3	3	2
CO3	They know about the computerized library services	3	2	1	3	3	2	1	3	2	1	2	3
C04	To provide knowledge of e resources	3	2	1	3	3	3	1	3	2	2	3	3
C05	To give basic information about search engines	3	1	1	3	3	3	1	3	2	2	3	3
	3: Strong contribution 2: average contribution 1: Low contribution												

3: Strong contribution, 2: average contribution, 1: Low contribution