UG COURSE CURRICULUM

(*As per ICAR 6th Deans' Committee Report*)

B.SC. (HONS.) AGRICULTURE

COLLEGE OF AGRICULTURE

MITS Institute of Professional Studies (MIPS)

Rayagada, Odisha

B.Sc. (Hons.) Agriculture: Four (04) Years Degree Program

A total of **177 Credits**; **167 Credits** offered by the parent Institute

10 Credits online courses to be taken by the student.

Semester-wise distribution of Academic Programme -

Semester-wise course and credits Allocation - (*As per ICAR 6th Deans' Committee Report*)

Sl. No.	Course Title	Credit Hours	Total Credit Hours
First Year - Semester I			
1	*Deeksharambh* (Induction cum Foundation course)	1 week Non-Gradial	
2	Skill Enhancement Course-I (Mushroom production technology)	2 (0+2)	**21 (11+10)**
3	Skill Enhancement Course-II (Horticulture nursery management)	2 (0+2)	
4	Communication Skills	2 (1+1)	
5	Farming based livelihood systems	3 (2+1)	
6	Rural Sociology and Educational Psychology	2 (2+0)	
7	Fundamentals of Agronomy	3 (2+1)	
8	Fundamentals of Soil Science	3 (2+1)	
9	Fundamentals of Horticulture	3 (2+1)	
10	National Service Scheme (NSS-I)	1 (0+1)	
11	Introductory Mathematics (need based)	1 (1+0) Non-Gradial	

DETAILED SYLLABI

Semester-I

***Deeksharambh* (Induction-cum-Foundation Course)-Non gradial** **Credit -1 (1+0)**

i. Sessions on personality development (instilling life and social skills, social awareness, ethics and values, team work, leadership, etc.) and communication skills

ii. Interaction with alumni, business leaders, perspective employers, outstanding achievers in related fields, and people with inspiring life experiences

iii. Group activities to identify the strength and weakness of students as well as to create a platform for students to learn from each other's life experiences

iv. Activities to enhance cultural Integration of students from different backgrounds.

v. Field visits to related fields/ establishments

Course Code - SE 111 **Course Title - Communication Skill** **Credit - 2 (1+1)**

Theory : Communication Process**:** The magic of effective communication; Building self-esteem and overcoming fears; Concept, nature and significance of communication process; Meaning,

types and models of communication; Verbal and non-verbal communication; Linguistic and non-linguistic barriers to communication and reasons behind communication gap/ miscommunication.

Basic Communication Skills: Listening, Speaking, Reading and Writing Skills; Precis writing/ Abstracting/Summarizing; Style of technical communication Curriculum vitae/resume writing; Innovative methods to enhance vocabulary, analogy questions.

Structural and Functional Grammar**:** Sentence structure, modifiers, connecting words and verbal; phrases and clauses; Case: subjective case, possessive case; objective case; Correct usage of nouns, pronouns and antecedents, adjectives, adverbs and articles; Agreement of verb with the subject: tense, mood, voice; Writing effective sentences; Basic sentence faults;

Practical : Listening and note taking; Writing skills: precis writing, summarizing and abstracting; Reading and comprehension (written and oral) of general and technical articles; Micro-presentations and Impromptu Presentations: Feedback on presentations; Stage manners: grooming, body language, voice modulation, speed; Group discussions; Public speaking exercises; vocabulary building exercises; Interview Techniques; organization of events.

Suggested readings

1. Kumar S and Pushpa Lata. 2011. Communication Skills. Oxford University Press.
2. Raman M and Singh P. 2000. Business Communication. Oxford University Press.
3. Thomson A J and Martinet A V. 1977. A Practical English Grammar. Oxford University.

Course Code - AG 112 Course Title - Farming based livelihood systems Credit -3 (2+1)

Theory : Status of agriculture in India and different states, Income of farmers and rural people in India, Livelihood-Definition, concept and livelihood pattern in urban and rural areas, Different indicators to study livelihood systems. Agricultural livelihood systems (ALS): Meaning, approach, approaches and framework, Definition of farming systems and farming based livelihood systems Prevalent Farming systems in India contributing to livelihood. Types of traditional and modern farming systems. Components of farming system/ farming-based livelihood systems-Crops and cropping systems, Livestock (Dairy, Piggery, Goatry, Poultry, Duckry etc.), Horticultural crops, Agro--forestry systems, Aqua culture Duck/Poultry cum Fish, Dairy cum Fish, Piggery cum Fish etc., Small-, medium- and large- enterprises including value chains and secondary enterprises as livelihood components for farmers, Factors affecting integration of various enterprises of farming for livelihood. Feasibility of different farming systems for different agro-climatic zones, Commercial farming-based livelihood models by NABARD, ICAR and other organizations across the country, Case studies on different livelihood enterprises associated with the farming. Risk and success factors in farming-based livelihood systems, Schemes and programs by Central and State Government, Public and Private organizations involved in promotion of farming-based livelihood opportunities. Role of farming-based livelihood enterprises in 21st Century in view of circular economy, green economy, climate change, digitalization and changing life style.

Practical : Survey of farming systems and agricultural based livelihood enterprises, Study of components of important farming based livelihood models/ systems in different agro-climatic zones, Study of production and profitability of crop based, livestock based, processing based and integrated farming based livelihood models, Field visit of innovative farming system models. Visit of Agri-based enterprises and their functional aspects for integration of production, processing and distribution sectors and Study of agri-enterprises involved in industry and service sectors (Value Chain Models), Learning about concept of project formulation on farming-based livelihood systems along with cost and profit analysis, Case study of Start-Ups in agri-sectors.

Suggested Readings :

1. Panwar et al. 2020. Integrated Farming System models for Agricultural Diversification, Enhanced Income and employment, Indian Council of Agricultural Research, New Delhi.
2. Reddy, S.R.2016. Farming System & Sustainable Agriculture, Kalyani Publishers, New Delhi.
3. Singh, J.P., et al. 2015. Region Specific Integrated Farming System Models, ICAR-Indian Institute of Farming Systems Research, Modipuram.

Course Code- EE 111 Rural Sociology and Educational Psychology Credit- 2 (2+0)

Theory : Extension Education and Agricultural Extension: Meaning, definition, scope, and importance. Sociology and rural sociology: Meaning, definition, scope, importance of rural sociology in Agricultural Extension, and interrelationship between rural sociology and Agricultural Extension. Indian Rural Society: important characteristics, differences and relationship between rural and urban societies. Social Groups: Meaning, definition, classification, factors considered information and organization of groups, motivation in group formation and role of social groups in Agricultural Extension.

Social Stratification: Meaning, definition, functions, basis for stratification, forms of social stratification- characteristics and- differences between class and caste system. Cultural concepts: culture, customs, folkways, mores, taboos, rituals. Traditions: Meaning, definition and their role in Agricultural Extension. Social Values and Attitudes: Meaning, definition, types and role of social values and attitudes in agricultural Extension. Social Institutions: Meaning, definition, major institutions in rural society, functions, and their role in agricultural Extension. Social Organizations: Meaning, definition, types of organizations and role of social organizations in agricultural Extension. Social Control: Meaning, definition, need of social control and means of social control. Social change: Meaning, definition, nature of social change, dimensions of social change and factors of social change. Leadership: Meaning, definition, classification, roles of leader, different methods of selection of professional and lay leaders. Training of Leaders: Meaning, definition, methods of training, Advantages and limitations in use of local leaders in Agricultural Extension, Psychology and educational psychology: Meaning, definition, scope, and importance of educational psychology in Agricultural Extension. Intelligence: Meaning, definition, types, factors affecting intelligence and importance of intelligence in Agricultural Extension. Personality: Meaning, definition, types, factors influencing the personality and role of personality in agricultural Extension. Teaching: Learning process: Meaning and definition of teaching, learning, learning experience and learning situation, elements of learning situation and its characteristics. Principles of learning and their implication of teaching.

Suggested readings :

1. Ray, G. L. -Extension Communication and Management
2. A. R. Desai -Rural Sociology in India
3. Dahama O. P. and Bhatnagar, O. P. - Education and Communication for Development
4. J.B. Chitambar -Introductory Rural Sociology
5. Sandhu A. S. -Textbook on Agricultural Communication

Course Code- AG 111 Course Title- Fundamentals of Agronomy Credit- 3 (2 +1)

Theory : Agronomy and its scope: Definition, meaning and scope of Agronomy; art, science and business of crop production, relation of Agronomy with other disciplines of Agricultural Science, fields crops and classification, importance, ecology and ecosystem. Seeds and sowing: Definitions of crops, variety and seed. Factors affecting crop stands establishment: good quality seed, proper

tillage, time of sowing seed rate, depth and method of sowing: broadcasting, drilling, dibbling, transplanting etc. Tillage and tilth: Definition, objectives, types, advantages and disadvantages of tillage including conservation tillage. Crop density and geometry: plant geometry and planting geometry, its effect on growth, yield.

Crop nutrition: Definition of essential nutrients, criteria of essentiality, functional elements, classification of essential nutrients, role of macro and micro nutrients. Nutrient absorption, active and passive absorption of nutrients, forms of plant nutrients absorbed by plants, Combined /un- combined forms. Manures and fertilizers, nutrient use efficiency: Sources of nutrients: Inorganic (fertilizers), organic (manures) and bio-fertilizers; their classification and characteristics, method of preparation and role of organic manures in crop production. Integrated Nutrient Management (INM): Meaning, different approaches and advantages of INM. Green manure- role in crop production: Definition, objectives types of green manuring, desirable characteristics, advantages and limitations of green manuring.

Water management: Water resources of the world, India and the state; Soil Moisture constants: gravitational water, capillary water, hygroscopic water, Soil moisture constants.

Weeds: Definition, Importance and basics of classification of weeds and their control. Agro- climatic zones of India and the state, cropping systems: Factors affecting cropping systems, major cropping patterns and systems in the country. Sustainable crop production: Definition, importance and practices, natural resources and conservation pollution and pollutants, Allelopathy: Meaning and importance in crop production, Growth and development of crops: Definition, Meaning and factors affecting growth and development.

Practical: A visit to Instructional Crop farm and study on field crops, Identification of crops, seeds, fertilizers, pesticides, Crops and cropping systems in different Agro-climatic zones of the state, Study of some preparatory tillage implements, Study of inter tillage implements, Practice of ploughing / puddling, Study and practice of inter cultivation in field crops, Numerical exercises on calculation of seed, plant population and fertilizer requirement, Study of yield contributing characters and yield estimation of crops, Identification of weeds in different crops, Seed germination and viability test of seed, Practice on time and method of application of manures and fertilizers.

Suggested readings:

1. Reddy Yellamanda T and Shankar Reddy G H. 1995. Principles of Agronomy. Kalyani Publishers, Ludhiana.
2. Reddy, S. R. 2008. Principle of Crop Production, Kalyani Publisher, Ludhiana.
3. Rao V S. 1992. Principles of Weed Science. Oxford and IBH Publishing Co. New Delhi.
4. William L Donn. 1965. Meteorology. McGraw-Hill Book Co. New York.
5. Yawalkar K S and Agarwal J P. 1977. Manures and Fertilizers. Agricultural Horticultural Publishing House, Nagpur.

Course Code- SC 111 Course Title- Fundamentals of Soil Science Credit-3 (2+1)

Theory : Soil: Pedological and edaphalogical concepts. Rocks and minerals, weathering, Silicate clays: constitution and properties, sources of charge, ion exchange, cation and anion exchange capacity and base saturation (after buffering capacity), Soil formation, Soil organic matter, Pedogenic processes, Soil colloids: inorganic and organic, Properties of soil colloids and Ion exchange in soils, Soil profile, soil texture, soil structure. Bulk density and particle density, soil consistency, soil temperature, soil air, soil water. Soil reaction and buffering capacity. Soil taxonomy, keys to soil orders. Soils of India.

Practical: Study of general properties of minerals, study of minerals-silicate and non-silicate minerals, study of rocks-igneous, sedimentary and metamorphic rocks; study of a soil profile, collection and processing of soil for analysis, study of soil texture-feel method, mechanical analysis, determination particle density and soil porosity, determination of soil colour, study of soil structure and aggregate analysis, determination of soil moisture, determination of soil moisture constants- field capacity; water holding capacity. Study of infiltration rate of soil, determination of pH and Electrical conductivity of soil.

Suggested readings:

1. Introductory Soil Science – By Dilip Kumar Das, Kalyani Publishers
2. Soil Fertility and Nutrient Management – By S. S. Singh, Kalyani Publishers
3. Soil Fertility and Fertilizers – By Samual L. Tisdale, Werner L. Nelson and James D. Beaton, Macmillan Publishing Company, New York
4. The Nature and Properties of Soils – By Harry O. Buckman and Nyle C.

Course Code- HT 111 Course Title- Fundamentals of Horticulture Credit- 3 (2+1)

Theory: Horticulture: Its different branches, importance and scope, Horticulture and botanical classification, soil and climate for horticultural crops. Plant propagation: methods and propagation structures, seed dormancy and seed germination, Merits and demerits of sexual and asexual propagation Stock-scion relationship.

Principles of orchard establishment, principles and methods of training and pruning of fruit crops, Juvenility and flower bud differentiation, unfruitfulness in horticultural crops, pollination, pollinizers and pollinators, fertilization and parthenocarpy, importance of bio regulators in horticultural crops, irrigation and its methods, Fertilizer application in horticultural crops.

Practical : Identification and nomenclature of fruit, Layout of an orchard, pit making and system of planting, Nursery raising techniques of fruit crops, Understanding of plant propagation structures, Propagation through seeds and plant parts, Propagation techniques for horticultural crops, Container, potting mixture, potting and repotting, Training and pruning methods on fruit crops, Preparation of fertilizer mixture and application, Preparation and application of PGR, Layout of different irrigation systems, Maturity studies, harvesting, grading, packaging and storage.

Suggested readings

1. Basics of Horticulture by Jitendra Singh
2. Introduction to Horticulture by N. Kumar
3. Handbook of Horticulture by ICAR

Course Code- NSS I Course Title- National Service Scheme (NSS) Credit- 1 (1+0)

Evoking social consciousness among students through various activities viz., working together, constructive, and creative social work, to be skilful in executing democratic leadership, developing skill in programme, to be able to seek self-employment, reducing gap between educated and uneducated, increasing awareness and desire to help sections of society.

Introduction and Basic Components of NSS

- Orientation: history, objectives, principles, symbol, badge; regular programs under NSS
- Organizational structure of NSS, Code of conduct for NSS volunteers, points to be considered by NSS volunteers' awareness about health.

- NSS program activities: Concept of regular activities, special camping, day camps, basis of adoption of village/slums, conducting survey, analyzing guiding financial patterns of scheme, youth program/ schemes of GOI, coordination with different agencies and maintenance of diary. Understanding youth. Definition, profile, categories, issues and challenges of youth; and opportunities for youth who is agent of the social change.
- Community mobilization: Mapping of community stakeholders, designing the message as per problems and their culture; identifying methods of mobilization involving youth-adult partnership. Social harmony and national integration
- Indian history and culture, role of youth in nation building, conflict resolution and peace- building. Volunteerism and shramdaan. Indian tradition of volunteerism, its need, importance, motivation, and constraints; shaman as part of volunteerism
- Citizenship, constitution, and human rights: Basic features of constitution of India, fundamental rights and duties, human rights, consumer awareness and rights and rights to information. Family and society. Concept of family, community (PRIs and other community- based organizations) and society

Course Code- EM 111 Introductory Mathematics (Non-gradial) Credit- 1 (1+0)

Theory: Algebra: Progressions- Arithmetic, Geometric and Harmonic Progressions. Matrices: Definition of Matrices, Addition, Subtraction, Multiplication, Transpose and Inverse up to 3rd order by adjoint method, Properties of determinants up to 3rd order and their evaluation.

Differential Calculus: Definition - Differentiation of function using first principle, Derivatives of sum, difference, product and quotient of two functions, Methods, Increasing and Decreasing Functions. Application of Differentiation- Growth rate, Average Cost, and Marginal cost, Marginal Cost, Marginal Revenue. Partial differentiation: Homogeneous function, Euler's theorem, Maxima and Minima of the functions of the form $y = f(x)$ and $y = f(x1, x2)$.

Integral Calculus: Integration -Definite and Indefinite Integrals-Methods- Integration by substitution, Integration by parts. Area under simple well-known curves.

Mathematical Models: Agricultural systems - Mathematical models - classification of mathematical models- Fitting of Linear, quadratic and exponential models to experimental data.

Examination and Evaluation system

A uniform system of the evaluation and grading will be followed with Grade point average (GPA) system. The following pattern of examination is-

	External theory	Internal theory (Mid-term)	Quiz/ progressive assessment	Final Practical
For courses having both theory and practical components	40%	20%	20%	20%
For courses with theory only	50%	30%	20%	-
Courses with practical only	-	30%	20%	50% (Internal)

The evaluation will be done on a 10-point scale. **10 point = 100 marks**

The per cent of marks in a subject will be divided by 10 to obtain the grade point. The grade point average for a Semester will be calculated as follows-

$$\boldsymbol{GPA = \frac{\sum(Grade\ point \times Credit\ hours)\ in\ one\ semester}{Total\ credit\ hours\ in\ the\ semester}}$$

The Cumulative grade point earned at any stage of the course will be calculated as cumulative grade point average (CGPA) as follows-

$$\boldsymbol{CGPA = \frac{\sum(Grade\ point \times Credit\ hours)\ until\ last\ semester}{Total\ credit\ hours\ until\ last\ semester}}$$

If a student passes in a subject in a second attempt, for calculation of CGPA, the grade point for the subject in the second attempt will only be considered. The final CGPA will be named as overall grade point average (OGPA), which will be mentioned in the final transcript of the students.

Award of Divisions

The award of the divisions will be as follows-

OGPA	Division
5 to < 6	Pass
6 to < 7	2nd Division
7 to < 8	1st Division
≥ 8	1st Division and distinction