MAA Pateswari University, Balarampur, U.P

To,
The Registrar,
MAA Pateswari University, Balarampur, U.P

Date: 29/08/2025

Subject: Discussion on approval of unified syllabus of Agriculture regarding to ICAR Rule.

Respected Sir,
The virtual meeting of Board of Studies (BOS) was organized on 09/04/2025, 20/06/2025 31/07/2025, 01/08/2025 and 17/08/2025 for preparing the unified syllabus of UG (Four Year) with respect to ICAR guidlines.
Following members participated in the discussion.

Sr.No.	Name of Expert/BOS Member	Designation	Department	College/ University
1.	Dr. Rekha Sharma	Convener	Department of Botany	S.L.B.S. Degree College, Gonda
2.	Dr. Shiv Mahendra Singh	Member	Department of Botany	M.L.K P. G College, Balrampur
3.	Dr. Deepak Kumar Singh	Member	Department of Botany	A.N.D Kisan P.G College, Babhnan, Gonda
4.	Prof. Anil Kumar Dwivedi	Member	Department of Botany	D. D. U University, Gorakhpur
5.	Prof. N.K Singh *(Ret. Principal)*	Member	Department of Botany	M.L.K P. G College, Balrampur
6	Dr. Ashutosh Kumar Verma	Member	Department of Botany	Siddharth University, Kapilvastu, Siddharth Nagar

After discussion and amendment, the committee reached on a common platform. The unanimously accepted unified syllabus is enclosed as pdf for your kind approval.
With Regards

Rekha

Dr. Rekha Sharma (Convener)
Department of Botany
S.L.B.S. Degree College, Gonda

MAA Pateswari University, Balarampur, U.P

U.G AGRICULTURE SYLLABUS FACULTY OF AGRICULTURE

MAA Pateswari University, Balarampur, U.P

Syllabus Developed/Proposed by				
Sr.No.	Name of Expert/BOS Member	Designation	Department	College/ University
1.	Dr. Rekha Sharma	Convener	Department of Botany	S.L.B.S. Degree College, Gonda
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6	Dr. Ashutosh Kumar Verma	Member	Department of Botany	Siddharth University, Kapilvastu, Siddharth Nagar

Dr. Rekha Sharma (Convener) **Dr. Shiv Mahendra Singh** **Dr. Deepak Kumar Singh** **Prof. Anil Kumar Dwivedi**

Prof. N.K Singh (Ret. Principal) **Dr. Ashutosh Kumar Verma**

MAA Pateswari University, Balarampur, U.P

Maa Pateswari University, Balrampur, (U. P.) India

Semester-wise distribution of B.Sc. (Ag.) courses

Ist Semester

S.No.	Course Title	Credit Hours	Course No.	Mid Term	Theory	Practical	Total
1	Fundamentals of Agronomy	3(2+1)	AG -101	20	50	30	100
2	Fundamentals of Genetics	3(2+1)	AG -102	20	50	30	100
3	Fundamentals of Soil Science	3(2+1)	AG -103	20	50	30	100
4	Fundamentals of Horticulture	2(1+1)	AG -104	20	50	30	100
5	Rural Sociology & Educational Psychology	2(1+1)	AG -105	20	50	30	100
6	Introduction to Forestry	2(1+1)	AG-106	20	50	30	100
7	Introductory Animal Husbandry	3(2+1)	AG-107	20	50	30	100
8	Comprehension & Communication Skills in English	2(1+1)	AG -108	20	50	30	100
9	Agricultural Heritage*	1(1+0)	AG-109	40	60	----------	100
10	Introductory Biology*/Basic Agriculture-I	2(1+1)	AG - 11OA/11OB	20	50	30	100
11	Elementry Mathematics/Basic Agriculture-II	2(2+0)	AG-111A/111B	40	60	----------	100
12	NSS/NCC/Physical Education & Yoga Practices	2(0+2)	AG-112A/112B/112C	-----	------	100	100
TOTAL CREDIT		**27**		----	-----		

Note- Passing marks in particular paper is 50%
Grade = Marks obtained in particular course divided by 10
The minimum grade point average (GPA) must be 5.0 in every semester

Pass : **5.0-5.99**
Second Division : **6.0-6.99**
First Division :**7.0-7.99**
First division with distinction : **8.0 and above**

MAA Pateswari University, Balarampur, U.P

AGRONOMY

Fundamentals of AgronomyAG-101-3(2+1)

Theory

Agronomy and its scope, seeds and sowing, tillage and tilth, plant density and geometry, Crop nutrition, manures and fertilizers application, crop water requirement, water use efficiency, irrigation-
scheduling and methods, quality of irrigation water. Weeds- importance, classification, crop weed competition, concepts of weed management-principles and methods, herbicides-classification. Growth and development of plants, factors affecting growth and development, crop rotation and its principles, has-vesting of crops.

Practical

Identification of crops, seeds, fertilizers, pesticides and tillage implement, study of agroclimatic zones of India, Identification of weeds in crops, Methods of herbicide and fertilizer application, Study of yield contributing characters and yield estimation, Seed germination and viability test, Numerical exercises on fertilizer requirement, plant population, herbicides and water requirement, Use of tillage implements, Measurement of irrigation water.

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MAA Pateswari University, Balarampur, U.P

GENETICS AND PLANT BREEDING

Fundamentals of Genetics AG-102-3(2+1)

Theory

Pre and Post Mendelian concepts of heredity, Mendelian principles of heredity. Architecture of chromosome., special types of chromosomes. Chromosomal theory of inheritance-cell cycle and cell division-mitosis and meiosis. Probability and Chi-square. Dominance relationships, Epistatic interactions with example. Multiple alleles, pleiotropism and pseudo alleles, Sex determination and sex linkage, sex limited and sex influenced traits, Linkage and its estimation, crossing over mechanisms, chromosome mapping. Structural and numerical variations in chromosome and their implications, Use of haploids, diploids and doubled haploids in Genetics. Mutation, classification, Methods of inducing mutations & CIB technique, mutagenic agents and induction of mutation. Qualitative & Quantitative traits, Polygenes and continuous variations, multiple factor hypothesis, Cytoplasmic inheritance. Gene concept: Gene structure, function and regulation, Lac. and Trp operons,

Practical

Study of microscope. Study of cell structure_ Mitosis and Meiosis cell division. Experiments qn monohybrid, dihybrid, trihybrid, test cross and back cross, Experiments on epistatic interactions including test cross and back cross, Practice on mitotic and meiotic cell division, Experiments on probability and Chi-square test. Determination of linkage and cross-over analysis (through two-point test cross and three-point test cross data). Study on s linked inheritance in Drosophila. Study of models on DNA and RNA structures.

MAA Pateswari University, Balarampur, U.P

SOIL SCIENCE & AGRICULTURAL CHEMISTRY

Fundamentals of Soil Science AG-103-3(2+1)

Theory

Soil as a natural body, Pedological and edaphological concepts of soil; Soil genesis: soil forming rocks and minerals; weathering, processes and factors of soil formation; Soil Profile, components of soil; Soil physical properties: soil-texture, structure, density and porosity, soil colour, consistence and plasticity; Elementary knowledge of soil taxonomy classification and soils of India; Soil water retention, movement and availability; Soil air, composition, gaseous exchange, problem and plant growth, Soil temperature; source, amount and flow of heat in soil; effect on plant growth, Soil reaction-pH, soil acidity and alkalinity, buffering, effect of pH on nutrient availability; soil colloids - inorganic and organic; silicate clays: constitution and properties; sources of charge; ion exchange, cation exchange capacity, base saturation; soil organic matter: composition, properties and its influence on soil properties; humic substadc.es - nature and properties; soil organisms: macro and micro organisms, their beneficial and harmful effects; So il pollution - behaviour of pesticides and inorganic contaminants, Prevention and mitigation of soil pollution.

Practical

Study of soil profile in field. Study of soil sampling tools, collection of representative soil sample, its processing and storage. Study of soil forming rocks and minerals. Determination of soil density, moisture content and porosity. Determination of soil texture by feel and Bouyoucos Methods. Studies of capillary rise phenomenon of water in soil column and water movement in soil. Determination of soil pH and electrical conductivity. Determination of cation exchange capacity of soil. Study of soil map. Determination of soil colour. Demonstration of heat transfer in soil. Estimation of organic matter content

MAA Pateswari University, Balarampur, U.P

HORTICULTURE

Fundamentals of Horticulture AG-104-2(1+1)

Theory

Horticulture - Its definition and branches, importance and scope; horticultural and botanical classification; climate and soil for horticultural crops; Plant propagation-methods and propagating structures; principles of orchard establishment; Principles and methods of training and pruning juvenility and flower bud differentiation; unfruitful ness; pollination, pollinizes and pollinators; fertilization and parthenocarpy; importance of plant bio-regulators in horticulture. Irrigation — methods, Fertilizer application in horticultural crops.

Practical

Identification of garden tools, Identification of horticultural crops. Preparation of seed bed/ nursery bed. Practice of sexual and asexual methods of propagation. Layout and planting of orchard. Training and pruning of fruit trees. Fertilizer application in different crops, Visits to commercial nurseries/ orchard.

MAA Pateswari University, Balarampur, U.P

AGRICULTURAL EXTEN ION and COMMUNICATION

Rural Sociology & Educational Psychology AG-105-2(1+1)

Theory

Sociology and Rural sociology: Definition and scope, its significance in agriculture extension, Social Ecology, Rural society, Social Groups, Social Stratification, Culture concept, Social Institution, Social Change & Development. Educational psychology Meaning & its importance in agriculture extension. Behaviour: Cognitive, affective, psychomotor domain, Personality, Learning, Motivation, Theories of Motivation, intelligence. Rural leadership: concept and definition, type of leaders in rural context. Need: definition, type, classification and methods of ascertaining the felt needs.

Practical

Socio-economic survey of village communities. Developing schedules and questionnaires. Visit and gairin2 of Practical knowledge about the working of basic rural institutions. Identification of important value systems in the rural setting as a means of social control, Identification of rural personality traits that affect the development of personality in rural situation, Preparation of practical record.

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BIOCHEMISTRY/ PHYSIOLOGY/141 ICROBIOLOGY/ ENVIRONMENTAL

Introduction to Forestry AG-106-2(1+1)

Theory

Introduction — definitions o f basic terms related to forestry, objectives of silviculture, forest classification, salient features of Indian Forest Policies. Forest regeneration, Natural regeneration-natural regeneration from seed and vegetative parts, coppicing, pollarding, root suckers; Artificial regeneration — objectives, choice between natural and artificial regeneration, essential preliminary considerations. Crown classification. Tending operations — weeding, cleaning, thinning— mechanical, ordinary, crown and advance thinning. Forest mensuration — objectives, diameter measurement, instruments used in diameter measurement; Non instrumental methods of height measurement- shadow and single pole method; Instrumental methods of height measurement - geometric and trigonometric principles, instruments used in height measurement; tree stern form, form factor, form quotient, measurement of volume of felled and standing trees, age determination of trees. Agroforestry— definitions, importance, criteria of selection of trees in agroforestry, different agroforestry systems prevalent in the country, shifting cultivation, taungya, alley cropping, wind breaks and shelter belts, home gardens. Cultivation practices of two important fast growing tree species of the region,

Practical

Identification of tree-species. Diameter measurements using calipers and tape, diameter measurements of forked, buttressed, fluted and leaning trees. Height measurement of standing trees by shadow method, single pole method and hypsometer. Volume measurement of logs using various formulae. Nursery lay out, seed sowing, vegetative propagation techniques. Forest plantations and their management. Visits of nearby forest-based industries.

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ANIMAL HUSBANDARY AND DAIRYING

Introductory Animal husbandry AG-107-30+11

Theory

General: importance of livestock in agriculture and economy. Dairying under specialized and mixed farming, livestock and milk production statistics. Dairy cattle and buffaloes' management cattle and buffalo breeds, breeding method & systems, care and management of pregnant and mulch cow, raising of calves, management of heifers and bulls, maintenance of livestock records, milking methods and principle. Clean milk production, feeds and feeding conservation of fodder. Housing for dairy animals. Pig management: importance, important breeds, raising of piglets up to age of slaughter, general aspects of breeding, care of sow and bor, Sheep and goat management: importance, importance breeds, raising of kids and lambs. Breeding, feeding of goats and sheep. Health management: common animal diseases of cattle, buffalo, goat sheep and swine viz. Anthrax. Bq, hs, brucellosis, mastitis, milk fever. Bloat. Swine fever and enterotoxaemia, vaccination schedule.

Practical

Study of external body parts, study of phenotypic and physiological difference between cow and-buffaloes. Estimation of body weight by measurements, Identification of animals, Castration, Dehorning, Estimation of cost of milk production, problems on computation of ration, casting and throwing, Grooming Scheme of fodder production round the year, Recording temperature, pulse rate and respiration rate of animals.

MAA Pateswari University, Balarampur, U.P

LANGUAGE

Comprehension and Communication Skills in English AG-108-2(1+1)

Theory

War Minus Shooting-The sporting Spirit. A Dilemma- A layman looks at science Raymond B. Fosdick, You and Your English — Spoken English and broken English GB. Shaw. Reading Comprehension, Vocabulary-Antonym, Synonym, Homophones, Homonyms, often confused words. Exercises to Help the students in the enrichment of vocabulary based on TOEFL and other competitive examinations. Functional grammar: Articles, Prepositions, Verb, Subject verb Agreement, Transformation, Synthesis, Direct and Indirect Narration. Written Skills: Paragraph writing, Precise writing, Report writing and Proposal writing. The Style: Importance of professional writing. Preparation of Curriculum Vitae and Job applications. Synopsis Writing. Interviews: kinds, Importance and

Practical

Listening Comprehension: Listening to short talks lectures, speeches (scientific, commercial and general in nature). Oral Communication: Phonetics, stress and intonation, Conversation practice. Conversation: rate of speech, clarity of voice, speaking and listening, politeness &Reading skills: reading dialogues, rapid reading, intensive reading, improving reading skills. Mock Interviews: testing initiative, team spirit, leadership, intellectual ability. Group Discussions.

MAA Pateswari University, Balarampur, U.P

REMEDIAL COURSES
Agricultural Heritage AG-109-111+0)

Theory

Introduction of Indian agricultural heritage; Ancient agricultural practices, Revanches of-heritage to present day agriculture; Past and present status of agriculture and farmers in society; Journey of Indian agriculture and its development from past to modern; Plant production and protection through indigenous traditional knowledge; Crop voyage in India and world; Agriculture scope; Importance of agriculture and agricultural resources available in India; Crop significance and class Reifications; National agriculture setup in India; Current scenario of India agriculture; Indian agricultural concerns and future prospects.

Introductory Biology AG-110A-2 (1 +1)

OR

Basic Agriculture-I AG-110B-2(1+1)

Theory

Introduction to the living world, diversity and characteristics of life, origin of life, Evolution and Eugenics. Binomial nomenclature and classification Cell and cell division. Morphology allowing plants. Seed and seed germination. Plant systematic-viz; Brassicaceae, Fabaceae and Poaceae, Role of animals in agriculture.

Practical

Morphology of flowering plants —root, stern and leaf and their modifications. Inflorescence, flower and fruits. Cell, tissues & cell division. Internal structure of root, stem and leaf, Study of specimens and slides, Description of plants - Brassicaceae, Fabaceae and Poaceae,

MAA Pateswari University, Balarampur, U.P

REMEDIAL COURSES

Elementary Mathematics AG-**MA-2(2+01**
OR
Basic Agriculture-II AG-MB-2(2+0)

Theory

Straight lines : Distance formula, section formula (internal and external division), Change of axes (only origin changed), Equation of co-ordinate axes, Equation of lines parallel to axes, Slope-intercept form of equation of line, Slope-point form of equation of line, Two point form of equation of line, Intercept form of equation of line, Normal form of equation of line, General form of equation of line, Point of intersection of two st. lines, Angles between two st. lines, Parallel lines, Perpendicular lines, Angle of bisectors between two lines, Area of triangle and quadrilateral. Circle: Equation of circle whose center and radius is known, Genera! equation of a circle, Equation of circle passing through three given points, Equation of circle whose diameters is line joining two points (xl, y I) & (x2,y2), Tangent and Normal to a given circle at given point (Simple problems), Condition of tangency of a line y = rnx c to the given circle x2 + y2 = a2. Differential Calculus : Definition of function, limit and continuity, Simple problems on limit, Simple problems on continuity, Differentiation of xn , ex , sin x & cos x from first principle, Derivatives of sum, difference, product and quotient of two functions, Differentiation of functions of functions (Simple problem based on it), Logarithmic differentiation (Simple problem based on it), Differentiation by substitution method and simple problems based on it, Differentiation of Inverse Trigonometric functions. Maxima and Minima of the functions of the form rf (x) (Simple problems based on it). Integral Calculus: Integration of simple functions, Integration of Product of two functions, Integration by substitution method, Definite Integral (simple problems based on it), Area under simple well-known curves (simple problems based on it). Matrices and Determinants: Definition of Matrices, Addition, Subtraction, Multiplication, Transpose and Inverse up to 3rd order, Properties of determinants up to 3rd order and their evaluation.

MAA Pateswari University, Balarampur, U.P

NON-GRADIAL COURSES

NSS/NCC/Physical Education & Yoga Practices AG-112A/112B/112C-2(0+2)

Theory

Course aims at evoking social consciousness among students through various activities viz., working together, constructive and creative social work, to be skillful in executing democratic leadership, developing skill in program development to be able for self-employment, reducing gap between educated and uneducated, increasing awareness and desire to help sections of society.

Following activities are to be taken up under the MSS course: -

* Introduction and basic components of INS:
Orientation N SS programs and activities
* Tander standing youth
*Community mobilization
* Social harmony and national integration
*Volunteerism and shram daan
Citizenship, constitution and human rights
* Family and society
* Importance and role of youth leadership
*Life competencies
* Youth development programs
*Health, hygiene and sanitation
* Youth health, lifestyle, HIV AIDS and first aid
*Youth and yoga
* Vocational skill development
*Issues related environment
* Disaster management
* Entrepreneurship development
Formulation of production-oriented project
* Documentation and data reporting
* Resource mobilization
*Additional life skills
11 Activities directed by the Central and State Government

All the activities related to the National Service Scheme course is distributed under four different courses viz,, National Service Scheme I, National Service Scheme II, National Service Scheme III and National Service Scheme IV each having one credit load. The entire four courses should be offered continuously for two years. A student enrolled in NS S course should put in at least 60 hours of social work in different activities in a semester other than five regular one day camp in a year and one special camp for duration of 7 days at any semester break period in the two years. Different activities will include orientation lectures and practical works, Activities directed by the Central and State Government have to be performed by all the volunteers of NSS a per direction.

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SYLLABUS Semester I Course Title:

National Service Scheme I

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 programs and 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 peacebuilding.

Volunteerism and shram daan Indian tradition of volunteerism, its need, importance, motivation and constraints; shram daan as part of volunteerism.

Citizenship, constitution and human rights 1 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

MAA Pateswari University, Balarampur, U.P

SYLLABUS Semester I Course Title: National Cadet Corps

National Cadet Corps Credit hours: 2(0+2)

1. Aims, objectives, organization of NCC and NCC song. DG's cardinals of discipline.
2. Drill- aim, general words of command, attention, stands at ease, stand easy and turning.
3. Sizing, numbering, forming in three ranks, open and close order march and dressing.
4. Saluting at the halt, getting on parade, dismissing and falling out.
5. Marching, length of pace, and time of marching in quick/slow time and halt. Side pace, pace forward and to the rear.
6. Turning on the march and wheeling. Saluting on the march.
7. Marking time, forward march and halt.
8. Changing step, formation of squad and squad drill.
9. Command and control, organization, badges of rank, honors and awards Nation Building-cultural heritage, religions, traditions and customs of India.
10. National integration.
11. Values and ethics, perception, communication, motivation, decision making, discipline and duties
12. of good citizen. Leadership traits, types of leadership. Character/personality development.
13. Civil defense organization, types of emergencies, firefighting, protection,
14. Maintenance of essential services, disaster management, aid during development projects.
15. Basics of social service, weaker sections of society & their needs, NGO's & their contribution, contribution of youth towards social welfare and family planning.
16. Structure and function of human body, diet and exercise, hygiene and sanitation.
17. Preventable diseases including AIDS, safe blood donation, first aid, physical and mental health.
18. Adventure activities
19. Basic principles of ecology, environmental conservation, pollution and its control.
20. Precaution and general behavior of girl cadets, prevention of untoward incidents, vulnerable parts of the body, self-defense.

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SYLLABUS Semester I Course Title: Physical Education and Yoga Practices1 Physical Education and Yoga Practices Credit hours: 2(0+2) (0+2) Physical Education and Yoga Practices

1. Teaching of skills of Football-demonstration, practice of the skills, correction, involvement in game situation (For girls teaching of Tennikoit)
2. Teaching of different skills of Football-demonstration, practice of the skills, correction, involvement in game situation (For girls teaching of Tennikoit)
3. Teaching of advance skills of Football-involvement of all the skills in game situation with teaching of rules of the game
4. Teaching of skills of Basketball-demonstration, practice of the skills, correction of skills, involvement in game situation
5. Teaching of skills of Basketball-demonstration, practice of the skills, involvement in game situation
6. Teaching of skills of Basketball-involvement of all the skills in game situation with teaching of rule of the game
7. Teaching of skills of Kabaddi-demonstration, practice of the skills, correction of, skills, involvement in game situation
8. Teaching of skills of Kabaddi-demonstration, practice of the skills, correction of skills, involvement in game situation
9. Teaching of advance skills of Kabaddi-involvement of all the skills in game situation with teaching of rule of the game
10. Teaching of skills of Ball Badminton - demonstration, practice of the skills, correction of skills, involvement in game situation
11. Teaching of skills of Ball Badminton-involvement of all the skills in game situation with teaching of rule of the game
12. Teaching of some of Asanas- demonstration, practice, correction and practice
13. Teaching of some more of Asanas- demonstration, practice, correction and practice
14. Teaching of skills of Table Tennis - demonstration, practice of skills, correction and practice and involvement in game situation
15. Teaching of skills of Table Tennis- demonstration, practice of skills, correction and practice and involvement in game situation
16. Teaching of skills of Table Tennis-involvement of all the skills in game situation with teaching of rule of the game
17. Teaching-Meaning, Scope and importance of Physical Education
18. Teaching-Definition, Type of Tournaments
19. Teaching-Physical Fitness and Health Education
20. Construction and laying out of the track and field (*The girls will have Tennikoit and Throw Ball).

MAA Pateswari University, Balarampur, U.P

Semester-wise distribution of B.Sc. (Ag.) courses

IInd Semester

S.No.	Course Title	Credit Hours	Course No.	Mid Term	Theory	Practical	Total
1	Fundamentals of Crop Physiology	3(2+1)	AG -201	20	50	30	100
2	Fundamentals of Plant Biochemistry	3(2+1)	AG -202	20	50	30	100
3	Fundamentals of Entomology-l	3(2+1)	AG -203	20	50	30	100
4	Fundamentals of Agricultural Economics	2(1+1)	AG -204	20	50	30	100
5	Principles of Organic Farming	2(1+1)	AG -205	20	50	30	100
6	Fundamentals of Plant Pathology	4(3+1)	AG -206	20	50	30	100
7	Production Technology for Vegetables and Spices	2(1+1)	AG -207	20	50	30	100
8	Fundamentals of Agricultural Extension Education	3(2+1)	AG -208	20	50	30	100
9	Food Processing and Safety Issues	3(2+1)	AG -209	20	50	30	100
10	Human Values & Ethics (Non Gradial)	1(0+1)	AG -210	____	____	100	100
	TOTAL CREDIT	**26**					

Note- Passing marks in particular paper is 50%
Grade = Marks obtained in particular course divided by 10
The minimum grade point average (GPA) must be 5.0 in every semester

Pass : **5.0-5.99**
Second Division : **6.0-6.99**
First Division :**7.0-7.99**
First division with distinction : **8.0 and above**

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BIOCHEMISTRY/PHYSIOLOGY/MICROBIOLOGY/ENVIRONMENTAL

Fundamentals of Crop Physiology AG-201-3(2+1)

Theory

Introduction to crop physiology and its importance in Agriculture; Plant cell: an Overview; Diffusion and osmosis; Absorption of water, transpiration and Stomatal Physiology; Mineral nutrition of Plants: Functions and deficiency symptoms of nutrients, nutrient uptake mechanisms; Photosynthesis: Light and Dark reactions, C3, C4 and CAM plants; Respiration: Glycolysis, TCA cycle and electron transport chain; Fat Metabolism: Fatty acid synthesis and Breakdown; Plant growth regulators: Physiological roles and agricultural uses, Physiological aspects of growth and development of major crops: Growth analysis, Role of Physiological growth parameters in crop productivity.

Practical

Study of plant cells, structure and distribution of stomata, imbibition, osmosis, plasmolysis, measurement of root pressure, rate of transpiration, Separation of photosynthetic pigments through paper chromatography, Rate of transpiration, photosynthesis, respiration, tissue test for mineral nutrients, estimation of relative water content, Measurement of photosynthetic CO2 assimilation by Infra-Red Gas Analyzer (IRGA).

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BIOCHEMISTRY/PHYSIOLOGY/MICROBIOLOGY/ENVIRONMENTAL

Fundamentals of Plant Biochemistry AG-202-3(2+1)

Theory

Importance of Biochemistry. Properties of Water, pH and Buffer. Carbohydrate: Importance and classification. Structures of Monosaccharides, Reducing and oxidizing properties of Monosaccharides, Mutarotation; Structure of Disaccharides and Poly saccharides. Lipid: Importance and classification; Structures and properties of fatty acids; storage lipids and membrane lipids. Proteins: Importance of proteins and classification; Structures, titration and zwitterions nature of amino acids; Structural organization of proteins. Enzymes: General properties; Classification; Mechanism of action; Michaelis& Menten and Line Weaver Burk equation & plots; Introduction to allosteric enzymes. Nucleic acids: Importance and classification; Structure of Nucleotides, A, B & ZDNA; RNA: Types and Secondary & Tertiary structure. Metabolism of carbohydrates: Glycolysis, TCA cycle, Glyoxylate cycle, Electron transport chain. Metabolism of lipids: Beta oxidation, Biosynthesis of fatty acids.

Practical

Preparation of solution, pH & buffers, Qualitative tests of carbohydrates and amino acids. Quantitative estimation of glucose/proteins. Titration methods for estimation of amino acids/ lipids, Effect of pH, temperature and substrate concentration on enzyme action, Paper chromatography, Monosaccharides. Estimation of Ca,CaO and CaCO, in Hcl extract. Estimation of reducing and non-reducing in cane sugar juice.

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ENTOMOLOGY AG-203-3(2+1)

Theory

Classification of phylum Arthropoda up to classes. Relationship of class' Insecta with other classes of Arthropoda. Morphology: Structure and functions of insect cuticle and molting. Body segmentation. Structure of Head, thorax and abdomen. Structure and modifications of insect antennae, mouth parts, legs, Wing venation, modifications and wing coupling apparatus. Structure of male and female genital organ. Metamorphosis and diapause in insects. Types of larvae and pupae. Structure and functions of digestive, circulatory, excretory, respiratory, nervous, secretary (Endocrine) and reproductive system, in insects. Types of reproduction in insects. Major sensory organs like simple and compound eyes, chemoreceptor. Systematics: Taxonomy-importance, history and development and binomial nomenclature. Definitions of Biotype, Sub-species, Species, Genus, Family and Order. Classification of class Insecta up to Orders, basic groups of present day insects with special emphasis to orders and families of Agricultural importance like Orthoptera: Acrididae, Dictyoptera: Mantidae, Odonata; Isoptera: Termitidae; Thysanoptera: Thripidae; Hemiptera: Pentatomidae, Coreidae, Cimicidae, Pyrrhocoridae, Lygaeidae, Cicadellidae, Delphacidae, Aphididae, Coccidae, Lophophidae, Aleurodidae, Pseudococcidae; Neuroptera: Chrysopidae; Lepidoptera: Pieridae, Papiloinidae,Noctuidae, Sphingidae, Pyralidae, Gelechiidae,Arctiidae, Saturnidae, Bombycidae; Coleoptera: Coccinellidae, Chrysomelidae, Cerambycidae, Curculionidae, Bruchidae, Scarabaeidae; Hymenoptera: Tenthridinidae, Apidae. Trichogrammatidae, Ichneumonidae, Braconidae, Chalcididae; Diptera: Cecidomyiidae, Tachinidae, Agromyziidae, Culicidae,Muscidae, Tephritidae.

Practical

Methods of collection and preservation of insects including immature stages; External features of Grasshopper/Blister beetle; Types of insect antennae, mouthparts and legs; Wing venation, types of wings and wing coupling apparatus. Types of insect larvae and pupae; Dissection of digestive system in insects (Grasshopper); Dissection of male and female reproductive systems in insects (Grasshopper); Study of characters of orders Orthoptera, Dictyoptera, Odonata, Isoptera, Thysanoptera, Hemiptera, Lepidoptera, Neuroptera, Coleoptera, Hymenoptera, Diptera and their families of agricultural importance. Insecticides and their formulations. Pesticide appliances and their maintenance. Sampling techniques for estimation of insect population and damage.

MAA Pateswari University, Balarampur, U.P

AGRICULTURAL ECONOMICS

Fundamentals of Agricultural Economics AG-204-2(1+1)

Theory

Agricultural economics: meaning, definition, characteristics of agriculture, importance and its role in economic development. Agricultural planning and development in the country. Demand: meaning, law of demand, schedule and demand curve, determinants, utility theory; law of diminishing marginal utility, equi-marginal utility principle. Consumer's equilibrium and derivation of demand curve, concept of consumer surplus. Elasticity of demand: concept and measurement of price elasticity, income elasticity and cross elasticity. Production: process, creation of utility, factors of production, input output relationship. Laws of returns: Law of variable proportions and law of returns to scale. Cost: concepts, shor trun and long run cost curves. Supply, law of supply, schedule, supply curve, determinants of supply, elasticity of supply. Market structure: meaning and types of market, basic features of perfectly competitive and imperfect markets. Price determination under perfect competition; Concepts of rent, wage, interest and profit. National Income: Meaning and importance, circular flow, concepts of national income accounting and approaches to measurement, difficulties in measurement. Population: Importance, Malthusian and Optimum population theories, natural and socioeconomic determinants, current policies and programs on population control. Money: Barter system of exchange and its problems, evolution, meaning and functions of money, classification of money, supply, general price index, inflation and deflation. Banking: Role in modern economy, types of banks, functions of commercial and central bank, credit creation policy. Agricultural and public finance: meaning, micro v/s macro finance, need for agricultural finance, public revenue and public expenditure.

Practical

Study of demand supply curve and calculation of elasticities. Survey of function of some nationalized bank. Calculation of agri loan interest of the formers.

MAA Pateswari University, Balarampur, U.P

AGRONOMY

Principles of Organic Farming AGRONOMY AG-205-2(1+1)

Theory

Organic farming, principles and its scope in India; Initiatives taken by Government (central/ state), NGOs and other organizations for promotion of organic agriculture; Organic nutrient resources and its fortification; Restrictions to nutrient use in organic farming; Choice of crops and varieties in organic farming; Fundamentals of insect, pest, disease and weed management under organic mode of production; Certification process and standards of organic farming.

Practical

Visit of organic farms to study the various components and their utilization; Preparation of enrich compost, vermicompost, Indigenous technology knowledge (ITK) for nutrient, insect, pest disease and weed management; Cost of organic production system; Quality aspect, grading, packaging and handling.

MAA Pateswari University, Balarampur, U.P

PLANT PATHOLOGY

Fundamentals of Plant Pathology AG-206-4(3+1)

Theory

Introduction: Importance of plant diseases, scope and objectives of Plant Pathology. History of Plant Pathology with special reference to Indian work. Terms and concepts in Plant Pathology. Pathogenesis. Causes/factors affecting disease development: disease triangle and tetrahedron and classification of plant diseases. Important plant pathogenic organisms, different groups: fungi, bacteria, fastidious vesicular bacteria, phytoplasmas, spiroplasmas, viruses, viroids, algae, protozoa, phanerogamic parasites and nematodes with examples of diseases caused by them. Diseases and symptoms due to abiotic causes. Fungi: general characters, definition of fungus, somatic structures, types of fungal thalli, fungi. tissues, modifications of thallus, reproduction (asexual and sexual). Nomenclature, Binomial system of nomenclature, rules of nomenclature, classification of fungi. Key to divisions, sub-divisions, orders and classes. Bacteria and mollicutes: general morphological characters. Basic methods of classification and reproduction. Viruses: nature, structure, replication and transmission. Study of phanerogamic plant parasites. Epidemiology: Factors affecting disease development. Principles and methods of plant disease management. Nature, chemical combination, classification, mode of action and formulations of fungicides and antibiotics.

Practical

Acquaintance with various laboratory equipment and microscopy. Collection and preservation of disease specimen. Preparation of media, isolation and Koch's postulates. General study of different structures of fungi. Study of symptoms of various plant diseases. Study of representative fungal genera. Staining and identification of plant pathogenic bacteria. Transmission of plant viruses. Study of phanerogamic plant parasites. Study of morphological features and identification of plant parasitic nematodes.

MAA Pateswari University, Balarampur, U.P

HORTICULTURE

Production Technology for Vegetable and Spices AG-207-2(1+1)

Theory

Importance of vegetables & spices in human nutrition and national economy, kitchen gardening, brief about origin, area, climate, soil, improved varieties and cultivation practices such as time of sowing, transplanting techniques, planting distance, fertilizer requirements, irrigation, weed management, harvesting and yield, physiological disorders, of important vegetable and spices (Tomato, Brinjal, Chilli, Capsicum, Cucumber, Melons, Gourds, Pumpkin, French bean, Peas; Cole crops such as Cabbage, Cauliflower, Knol-khol; Bulb crops such as Onion, Garlic; Root crops such as Carrot, Radish, Beetroot; Tuber crops such as Potato; Leafy vegetables such as Amaranth, Palak. Perennial vegetables).

Practical

Identification of vegetables & spice crops and their seeds. Nursery raising. Direct seed sowing and transplanting. Study of morphological characters of different vegetables & spices. Fertilizers applications. Harvesting & preparation for market. Economics of vegetables and spices cultivation.

MAA Pateswari University, Balarampur, U.P

AGRICULTURAL EXTENSION and COMMUNICATION

Fundamentals of Agricultural Extension Education AG-208-3(2+1)

Theory

Education: Meaning, definition & Types; Extension Education-meaning, definition, scope and process; objectives and principles of Extension Education; Extension Programme planning-Meaning, Process, Principles and Steps in Programme Development. Extension systems in India: extension efforts in pre-independence era (Sriniketan, Marthandam, Firka Development Scheme, Gurgaon Experiment, etc.) and post-independence era (Etawah PilotProject, Nilokheri Experiment, etc.) various extension/ agriculture development programmes launched by ICAR/Govt. of India (IADP, IAAP, HYVP, KVK, IVLP, ORP, ND, NATP, NAIP, etc.). New trends in agriculture extension: privatization extension, cyber extension' e-extension, market-led extension, farmer-led extension, expert systems, etc. Rural Development: concept, meaning, definition; various rural development programmes launched by Govt. of India. Community Dev.-meaning, definition, concept & principles, Philosophy of C.D. extension administration: meaning and concept, principles and functions. Monitoring and evaluation: concept and definition, monitoring and evaluation of extension programmes; transfer of technology: concept and models, capacity building ofextension personnel; extension teaching methods: meaning, classification, individual, group and mass contact methods.

Practical

To get acquainted with university extension system. Group discussion- exercise; handling and usp of audio visual equipments and digital camera and LCD projector, preparation and use of AV aids, preparation of extension literature - leaflet, booklet, folder, pamphlet news stories and success stories; Presentation skills exercise; micro teaching exercise; A visit to village to understand the problems being encountered by the villagers/ farmers; to study organization and functioning of DRDA and other development departments at district level; visit to NGO and learning from their experience in rural development; understanding PRA techniques and their application in village development planning; exposure to mass media: visit to community radio and television studio for understanding the process of programme production; script writing, writing for print and electronic media, developing script for radio and television.

MAA Pateswari University, Balarampur, U.P

ANIMAL HUSBANDRYAND DAIRYING

FOOD PROCESSINGAND SAFETY ISSUES AG-209 -3(2+1)

Theory

GENERAL: Definition of food, Constituents of food: Water, Carbohydrate, Fat, Protein, Vitamins and Minerals with reference to milk, Detailed composition of milk and colostrum. FOOD PROCESSING: Pasteurization, Sterilization, Bactofugation, Uperization, Stassanization. U.H.T Pasteurization and Homogenization of milk, Neutralization of milk Cream. Cooling and chilling ofmilk. Manufacturing of common dairy product viz. Cream, Butter, Ghee, Dahi, Yoghart, Shrikhand & Ice cream. Manufacturing of Khoa, Evaporated milk, condensed milk, WMP, SMP, Paneer, Cheese, Chhena, Cheddar cheese and Mozzarella cheese (Pizza cheese). FOOD SAFETY: Definition, Importance, Scope, Hazards and risk Food safety management HACCP, ISO Series, TQM-Concept and need for quality component of TQM Basic water tests.

Practical

1. Demonstration of Cream separation. 2. Preparation of indigenous dairy product viz, Chhena, Khoa, Paneer, Cream, Ghee, Shrikand. 3. Water quality analysis. 4. Problem on neutralization of milk and cream. 5. Preparation of plants for implementation of HACCP and ISO series, 6. Problems on over run. 7. Calculation of Ice cream mix.

MAA Pateswari University, Balarampur, U.P

NON GRADIAL AG-210-1(0+1)

Human Value and Ethics

Theory

Values and ethics-An introduction. Goal and mission of life. Vision of life. Principles and philosophy. Self-exploration. Self-awareness. Self-satisfaction. Decision making. Motivation. Sensitivity. Success. Selfless Service. Case study of ethical lives. Positive spirit. Body, Mind and Soul. Attachment and Detachment Spirituality Quotient, Examination.

MAA Pateswari University, Balarampur, U.P

Semester-wise distribution of B.Sc. (Ag.) courses

IIIrd Semester

S. No.	Course Title	Credit Hours	Course No.	Mid Term	Theory	Practical	Total
1	Crop Production Technology - 1 (Kharif Crops)	2(1+1)	AG -301	20	50	30	100
2	Practical Crop Production - I (Kharif crops)	2(0+2)	AG -302	___	___	100	100
3	Fundamentals of Plant Breeding	3(2+1)	AG -303	20	50	30	100
4	Agricultural Microbiology	2(1+1)	AG -304	20	50	30	100
5	Agricultural Finance and Co-operation	3(2+1)	AG -305	20	50	30	100
6	Farm Machinery and Power	2(1+1)	AG -306	20	50	30	100
7	Principles of Integrated Pest and Disease Management	3(2+1)	AG -307	20	50	30	100
8	Environmental Studies and Disaster Management	3(2+1)	AG -308	20	50	30	100
9	Statistical Methods	2(1+1)	AG -309	20	50	30	100
10	Introductory Soil and Water Conservation Engineering	2(1+1)	AG -310	20	50	30	100
11	Dairy Science	3(2+1)	AG -311	20	50	30	100
12	Fundamentals of Entomology-II	2(1+1)	AG -312	20	50	30	100
TOTAL CREDIT		**29**					

Note- Passing marks in particular paper is 50%
Grade = Marks obtained in particular course divided by 10
The minimum grade point average (GPA) must be 5.0 in every semester

Pass : **5.0-5.99**
Second Division : **6.0-6.99**
First Division :**7.0-7.99**
First division with distinction : **8.0 and above**

MAA Pateswari University, Balarampur, U.P

AGRONOMY

Crop Production Technology-I (Kharif Crops) AG-301-2(1+1)

Theory

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Kharif crops. Cereals-rice, maize, sorghum, pearl millet and finger millet, pulses-pigeon pea, mung bean and urd bean; oilseeds-groundnut, and soybean; fiber crops-cotton & jute; forage crops-sorghum, cowpea, cluster bean and Napier.

Practical

Rice nursery preparation, transplanting of rice, sowing of soybean, pigeonpea and mungbean. maize, groundnut and cotton, effect of sowing depth on germination of kharif crops, identification of weeds in kharif season crops, top dressing and foliar feeding of nutrients, study of yield contributing characters and yield calculation of

kharif season crops, study of crop varieties and important agronomic experiments at experimental farm. study of forage experiments, morphological description of kharif season crops, visit to research centers of related crops.

MAA Pateswari University, Balarampur, U.P

AGRONOMY

Practical Crop Production-I (Kharif Crops) AG-302-2(0+2)

Practical

Crop planning, raising field crops in multiple cropping systems: Field preparation, seed, treatment, nursery raising, sowing, nutrient, water and weed management and management of insect-pests' diseases of crops, harvesting, threshing, drying winnowing, storage and marketing of produce. The emphasis will be given to seed production, mechanization, resource conservation and integrated nutrient, insect pest and disease management technologies. Preparation of balance sheet including cost of cultivation, net returns per student as well as per team of 8-10 students.

MAA Pateswari University, Balarampur, U.P

AGRICULTURAL ECONOMICS Entrepreneurship Development and Business Communication AG-407-2(1+1)

Theory

Concept of Entrepreneur, Entrepreneurship Development, Characteristics of entrepreneurs; SWOT Analysis & achievement motivation, Government policy and programs and institutions for entrepreneurship development, Impact of economic reforms on Agribusiness/ Agri enterprises, Entrepreneurial Development Process; Business Leadership Skills; Developing organizational skill (controlling, supervising, problem solving, monitoring & evaluation), Developing Managerial skills, Business Leadership Skills (Communication, direction and motivation Skills), Problem solving skill, Supply chain management and Total quality management, Project Planning Formulation and report preparation; Financing of enterprise, Opportunities for Agri entrepreneurship and rural enterprise.

Practical

Assessing entrepreneurial traits, problem solving skills, managerial skills and achievement motivation, exercise in creativity, time audit through planning, monitoring and supervision, identification and selection of business idea, preparation of business plan and proposal writing, visit to entrepreneurship development institute and entrepreneurs.

MAA Pateswari University, Balarampur, U.P

GENETICS AND PLANT BREEDING AG-303-3(2+1)

Fundamentals of Plant Breeding

Theory

Historical development, concept, nature and role of plant breeding, major achievements and future prospects; Genetics in relation to plant breeding, modes of reproduction and apomixes, self-incompatibility and male sterility-genetic consequences. Domestication, Acclimatization and Introduction; Centers of origin/diversity, components of Genetic variation; Heritability and genetic advance; Genetic basis and breeding methods in self- pollinated crops - mass and pure line selection, hybridization techniques and handling of segregating population; Multiline concept. Concepts of population genetics and Hardy-Weinberg Law, Genetic basis and methods of breeding cross pollinated crops, modes of selection; Population improvement Schemes-Ear to row method, Modified Ear to Row, recurrent selection schemes; Heterosis and inbreeding depression, development of inbred lines and hybrids, composite and synthetic varieties; Breeding methods in asexually propagated crops, clonal selection and hybridization; Maintenance of breeding records and data collection; Wide hybridization and pre breeding; Polyploidy in relation to plant breeding, mutation breeding-methods and uses; Breeding for important biotic and abiotic stresses; Biotechnological tools-DNA markers and marker assisted selection.

Practical

Plant Breeder's kit, Study of germplasm of various crops. Study of floral structure of self-pollinated and crosspollinated crops. Emasculation and hybridization techniques in self- & cross-pollinated crops. Consequences of inbreeding on genetic structure of resulting populations. Study of male sterility system. Handling of segregation populations. Designs used in plant breeding experiments, analysis of Randomized Block Design. To work out the mode of pollination in a given crop and extent of natural out-crossing. Prediction of performance of double cross hybrids.

BIOCHEMISTRY/PHYSIOLOGY/MICROBIOLOGY/ENVIRONMENTAL Agricultural Microbiology AG-304-2(1+1)

Theory

Introduction. Microbial world: Prokaryotic and eukaryotic microbes. Bacteria: cell structure, chemoautotrophy, photo autotrophy, growth. Bacterial genetics: Genetic recombination transformation, conjugation and transduction, plasmids, transposon. Role of microbes in soil fertility and crop production: Carbon, Nitrogen, Phosphorus and Sulphur cycles. Biological nitrogen fixation-symbiotic, associative and asymbiotic. Azolla, blue green algae and mycorrhiza. Rhizosphere and phyllosphere. Microbes in human welfare: silage production, biofertilizers, biopesticides, biofuel production and biodegradation of agro-waste.

Practical

Introduction to microbiology laboratory and its equipment; Microscope- parts, principles of microscopy, resolving power and numerical aperture. Methods of sterilization. Nutritional media and their preparations. Enumeration of microbial population in soil-bacteria, fungi, actinomycetes. Methods of isolation and purification of microbial cultures. Isolation of Rhizobium from legume root nodule. Isolation of Azotobacter from soil. Isolation of *Azospirillum* from roots. Isolation of BGA. Staining and microscopic examination of microbes.

AGRICULTURAL ECONOMICS Agricultural Finance and Co-Operation AG-305-3(2+1)

Theory

Agricultural Finance- meaning, scope and significance, credit needs and its role in Indian agriculture. Agricultural credit: meaning, definition, need, classification. Credit analysis: 4 R's, and 3C's of credits. Sources of agricultural finance: institutional and non-institutional sources, commercial banks, social control and nationalization of commercial banks, Micro financing including KCC. Lead bank scheme, RRBS, Scale of finance and unit cost. An introduction to higher financing institutions-RBI, NABARD, ADB, IMF, world bank, Insurance and Credit Guarantee Corporation of India. Cost of credit. Recent development in agricultural credit. Preparation and analysis of financial statements - Balance Sheet and Income Statement. Agricultural Cooperation-Meaning, brief history of cooperative development in India, objectives, principles of cooperation, significance of cooperatives in Indian agriculture. Agricultural Cooperation in India- credit, marketing, consumer and multi-purpose cooperatives, farmers' service cooperative societies, processing cooperatives, farming cooperatives, cooperative warehousing; role of ICA, NCUI, NCDC, NAFED.

Practical

Analysis of progress and performance of commercial banks and RRBs using published data. Visit to a commercial bank, cooperative bank and cooperative society to acquire firsthand knowledge of their management, schemes and procedures. Estimation of credit requirement of farm business-A case study. Preparation and analysis of balance sheet -A case study. Preparation and analysis of income statement - A case study. Appraisal of a loan proposal -A case study. Techno-economic parameters for preparation of projects. Preparation of Bankable projects for various agricultural products and its value-added products.

MAA Pateswari University, Balarampur, U.P

AGRICULTURAL ENGINEERING AG-306-2(1+1)

Farm Machinery and Power

Theory

Status of Farm Power in India, Sources of Farm Power, I.C. engines, working principles of IC engines, comparison oftwo stroke and four stroke cycle engines, Study of different components of L.C. engine, I.C. engine terminology and solved problems, Familiarization with different systems of I.C. engines: Air cleaning, cooling, lubrication, fuel supply and hydraulic control system of a tractor, Familiarization with Power transmission system: clutch, gear box, differential and final drive of a tractor Tractor types, Cost analysis of tractor power and attached implement, Familiarization with Primary and Secondary Tillage implement, Implement for hill agriculture, implement for intercultural operations, Familiarization with sowing and planting equipment, calibration of a seed drill and solved examples, Familiarization with Plant Protection equipment, Familiarization with harvesting and threshing equipment.

Practical

Study of different components of I.C. engine. To study air cleaning and cooling system of engine, Familiarization with clutch, transmission, differential and final drive ofa tractor, Familiarization with lubrication and fuel supply system of engine, Familiarization with brake, steering, hydraulic control system of engine, Learning of tractor driving, Familiarization with operation of power tiller, Implements for hill agriculture, Familiarization with different types of primary and secondary tillage implements: mould plough, disc plough and disc harrow. Familiarization with seed cum-fertilizer drills their seed metering mechanism and calibration, planters and transplanter Familiarization with different types of sprayers and dusters Familiarization with different inter cultivation equipment, Familiarization with harvesting and threshing machinery.

MAA Pateswari University, Balarampur, U.P

PLANT PATHOLOGY

Principles of Integrated Pest and Disease Management AG-307-3(2+1)

Theory

Categories of insect pests and diseases, IPM: Introduction, history, importance, concepts, principles and tools of IPM. Economic importance of insect pests, diseases and pest risk analysis. Methods of detection and diagnosis of insect pest and diseases. Calculation and diynamics of economic injury level and importance of Economic threshold level. Methods of control: Host plant resistance, cultural, mechanical, physical, legislative, biological and chemical control. Ecological management of crop environment. Introduction to conventional pesticides for the insect pests and disease management. Survey surveillance and forecasting of Insect pest and diseases. Development and validation of IPM module. Implementation and impact of IPM (IPM module for Insect pest and disease. Safety issues in pesticide uses. Political, social and legal implication of IPM. Case histories of important IPM programs. Case histories of important IPM programs.

Practical

Methods of diagnosis and detection of various insect pests, and plant diseases, Methods of insect pests and plant disease measurement, Assessment of crop yield losses, calculations based on economics of IPM, Identification of biocontrol agents, different predators and natural enemies. Mass multiplication of Trichoderma, Pseudomonas, Trichogramma, NPV etc. Identification and nature of damage of important insect pests and diseases and their management. Crop (agroecosystem) dynamics of a selected insect pest and diseases. Plan & assess preventive strategies (IPM module) and decision making. crop monitoring attacked by insect, pest and diseases. Awareness campaign at farmers' fields.

MAA Pateswari University, Balarampur, U.P

BIOCHEMISTRY/PHYSIOLOGY/MICROBIOLOGY/ENVIRONMENTAL

Environmental Studies and Disaster Management AG-308-3(2+1)

Theory

Multidisciplinary nature of environmental studies Definition, scope and importance. Natural Resources: Renewable and non-renewable resources, Natural resources and associated problems. a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forest and tribal people. b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. e) Energy resources: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources. Case studies. f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles. 1 Ecosystems: Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem. Ecological succession, Food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem: a. Forest ecosystem b. Grassland ecosystem c. d. Desert ecosystem Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) Biodiversity and its conservation: - Introduction, definition, genetic, species & ecosystem diversity and biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, National and local levels, India as a mega-diversity nation. Hot-sports of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. Environmental Pollution: definition, cause, effects and control measures of: a. Air pollution b. Water pollution d. Marine pollution e.

Noise pollution c. Soil pollution f. Thermal pollution g. nuclear hazards. Solid Waste Management: causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Social Issues and the Environment: From Unsustainable to Sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management. Environmental ethics: Issues and possible solutions, climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. dies. Wasteland reclamation. Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness. Human Population and the Environment: population growth, variation among nations, population explosion, Family Welfare Program. Environment and human health: Human Rights, Value Education, HIV/ AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health. Disaster Management 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. Man Made Disasters-Nuclear disasters, chemical disasters, biological disasters, building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation, industrial waste water pollution, road accidents, rail accidents, air accidents, sea accidents. Disaster Management- Effect to migrate natural disaster 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.

Practical

Pollution case studies. Case Studies- Field work: Visit to a local area to document environmental assets river/forest/grassland/hill/mountain, visit to a local polluted site-Urban/Rural/Industrial/ Agricultural, study of common plants, insects, birds and study of simple ecosystems-pond, river, hill slopes, etc.

MAA Pateswari University, Balarampur, U.P

STATISTICS, COMPUTER APPLICATION AND IPR

Statistical Methods 1 AG-309-2(1+1)

Theory

Introduction to Statistics and its Applications in Agriculture, Graphical Representation of Data, Measures of Central Tendency & Dispersion, Definition of Probability, Addition and Multiplication Theorem (without proof). Simple Problems Based on Probability. Binomial & Poisson Distributions, Definition of Correlation, Scatter Diagram. Karl Pearson's Coefficient of Correlation. Linear Regression Equations. Introduction to Test of Significance, one sample & two sample test t for Means, Chi- Square Test of Independence of Attributes in 2~2 Contingency Table. Introduction to Analysis of Variance, Analysis of One-Way Classification. Introduction to Sampling Methods, Sampling versus Complete Enumeration, Simple Random Sampling with and without replacement, Use of Random Number Tables for selection of Simple Random Sample.

Practical

Graphical Representation of Data. Measures of Central Tendency (Ungrouped data) with Calculation of Quartiles, Deciles & Percentiles. Measures of Central Tendency (Grouped data) with Calculation of Quartiles, Deciles & Percentiles. Measures of Dispersion (Ungrouped Data). Measures of Dispersion (Grouped Data). Moments, Measures of Skewness & Kurtosis (Ungrouped Data). Moments, Measures of Skewness & Kurtosis (Grouped Data). Correlation & Regression Analysis. Application of One Sample t-test. Application of Two Sample Fisher's t-test. Chi-Square test of Goodness of Fit. Chi-Square test of Independence of Attributes for2~2 contingency table. Analysis of Variance One Way Classification. Analysis of Variance Two Way Classification. Selection of random sample using Simple Random Sampling.

MAA Pateswari University, Balarampur, U.P

AGRICULTURAL ENGINEERING

Introductory Soil and Water Conservation Engineering AG-310-2(1+1)

Theory

Introduction to Scil and Water Conservation, causes of soil erosion. Definition and agents of soil erosion, water erosion: Forms of water erosion. Gully classification and control measures. Soil loss estimation by universal Loss Soil Equation. Soil loss measurement techniques. Principles of erosion control: Introduction to contouring, strip cropping. Contour bund. Graded bund and bench terracing. Grassed waterways and their design. Water harvesting and its techniques. Wind erosion: mechanics of wind erosion, types of soil movement. Principles of wind erosion control and its control measures.

Practical

General status of soil conservation in India. Calculation of erosion index. Estimation of soil loss. Measurement of soil loss. Preparation of contour maps. Design of grassed water ways. Design of contour bunds. Design of graded bunds. Design of bench terracing system. Problem on wind erosion.

MAA Pateswari University, Balarampur, U.P

ANIMAL HUSBANDRY AND DAIRYING DAIRY SCIENCE AG-311-3(2+1)

Theory

GENERAL: Concept of Dairying, Dairying in India. Dairy development in different five-year plans. Dairy production statistics. Cleaning and sanitization of dairy equipment. Dairy cooperatives, functioning of dairy cooperatives societies, Functioning of Anand Pattern, White revolution. Objectives and achievements of operation flood. Milk and its secretion, Transportation and milk distribution, pricing policy of milk. Platform tests Filtration, Straining and Clarification of milk, Standardization, Milk adulteration and its detection. Common preservatives of milk and their detection, Legal standards of milk. Factors affecting the quality and quantity of milk, Nutritive value of milk and milk product. Basic principle of refrigeration and cold storage of milk and milk product. Common adulterants of ghee, khoa and their detection.

Practical

1. Sampling of milk.
2. C.O.B Test
3. M.B.R. Test
4. Sediment Test.
5. Problems on Standardization.
6. Problems on adulteration.
7. Detection of adulterants viz. water.
8. Starch, urea, detergent and refined oil 18 Hansa Test.
9. Detection of preservatives.
10. Alcohol test.
11. Acidity of milk.

MAA Pateswari University, Balarampur, U.P

ENTOMOLOGY I AG-312-2(1+1)

Theory

Insect Ecology: Introduction, Environment and its components. Effect of abiotic factors temperature, moisture, humidity, rainfall, light, atmospheric pressure and air currents. Effect of biotic factors-food competition, natural and environmental resistance. Categories of pests. Concept of IPM, Practices, scope and limitations of IPM. Classification of insecticides, toxicity of insecticides and formulations of insecticides. Chemical control importance, hazards and limitations. Recent methods of pest control, repellents, anti-feed ants, hormones, attractants, gamma radiation. Insecticides Act 1968- Important provisions. Application techniques of spray fluids. Symptoms of poisoning, first aid and antidotes. Survey surveillance and forecasting of insect -pests, safety issues of pesticides use.

Practical

Sampling Techniques for estimation of insect population and damage. Insecticides and their formulation pesticide appliances and their maintenance.

MAA Pateswari University, Balarampur, U.P

Semester-wise distribution of B.Sc. (Ag.) courses

IVth Semester

S.No.	Course Title	Credit Hours	Course No.	Mid Term	Theory	Practical	Total
1	Crop Production Technology -II (Rabi Crops)	2(1+1)	AG -401	20	50	30	100
2	Practical Crop Production-II (Rabi crops)	2(0+2)	AG -402	___	___	100	100
3	Principles of Seed Technology	3(1+2)	AG -403	20	50	30	100
4	Problematic Soils and their Management	2(1+1)	AG -404	20	50	30	100
5	Renewable Energy and Green Technology	2(1+1)	AG -405	20	50	30	100
6	Production Technology for Ornamental Crops, MAP and Landscaping	2(1+1)	AG -406	20	50	30	100
7	Entrepreneurship Development and Business Communication	2(1+1)	AG -407	20	50	30	100
8	Introductory Agro-meteorology & Climate Change	2(1+1)	AG -408	20	50	30	100
9	Agri-Informatics	2(1+1)	AG -409	20	50	30	100
10	Livestock & Poultry Management	3(2+1)	AG -410	20	50	30	100
TOTAL CREDIT		**22**					

Note- Passing marks in particular paper is 50%
Grade = Marks obtained in particular course divided by 10
The minimum grade point average (GPA) must be 5.0 in every semester

Pass : **5.0-5.99**
Second Division : **6.0-6.99**
First Division :**7.0-7.99**
First division with distinction : **8.0 and above**

MAA Pateswari University, Balarampur, U.P

AGRONOMY

Crop Production Technology-II (Rabi crops) AG-401-2(1+1)

Theory

Origin, geographical distribution, economic importance, soil and climatic requirements, varieties, cultural practices and yield of Rabi crops; cereals-wheat and barley, pulses-chickpea, lentil, peas, oilseeds-rapeseed, mustard and sunflower; sugar crops-sugarcane; other crop-potato. Forage crop berseem, lucerne and oat.

Practical

Sowing methods of wheat and sugarcane, identification of weeds in rabi season crops, study of morphological characteristics of rabi crops, study of yield contributing characters yield calculation of rabi season crops, yield and juice quality analysis of sugarcane, study of important agronomic experiments of rabi crops at experimental farms. Study of rabi forage experiments, visit to research stations of related crops.

MAA Pateswari University, Balarampur, U.P

AGRONOMY

Practical Crop Production-Iİ (Rabi Crops) AG-402-2(0+2)

Practical

Crop planning, raising field crops in multiple cropping systems: Field preparation, seed, treatment, nursery raising, sowing, nutrient, water and weed management and management of insect-pests diseases of crops, harvesting, threshing, drying winnowing, storage and marketing of produce. The emphasis will be given to seed production, mechanization, resource conservation and integrated nutrient, insect pest and disease management technologies. Preparation of balance sheet including cost of cultivation, net returns per student as well as per team of 8-10 students.

MAA Pateswari University, Balarampur, U.P

GENETICS AND PLANT BREEDING

Principles of Seed Technology AG-403-3(1+2)

Theory

Seed and seed technology: introduction, definition and importance. Deterioration causes of crop varieties and their control; Maintenance of genetic purity during seed production, seed quality; Definition, Characters of good quality seed, different classes of seed. Foundation and certified seed production of important cereals, pulses, oilseeds, fodder and vegetables. Seed certification, phases of certification, procedure for seed certification, field inspection. Seed Act and Seed Act enforcement. Duty and powers of seed inspector, offences and penalties. Seeds Control Order 1983, seed testing for quality assessment, seed treatment, its importance, method of application and seed packing. Seed storage; general principles, stages and factors affecting seed longevity during storage. Measures for pest and disease control during storage. Seed marketing: structure and organization, Private and public sectors and their production and marketing strategies.

Practical

Seed production in major cereals: Wheat, Rice, Maize, Sorghum, Bajra and Ragi. Seed production in major pulses: Urd, Mung, Pigeonpea, Lentil, Gram, Field bean, pea. Seed production in major oilseeds: Rapeseed and Mustard. Seed production in important vegetable crops. Seed sampling and testing: Physicalpurity, germination, viability, etc. Seed and seedling vigour test. Genetic purity test: Seed certification: Procedure, Field inspection, Preparation of field inspection report. Visit to seed production farms, seed testing laboratories and seed processing plant.

SOIL SCIENCE & AGRICULTURAL CHEMISTRY

Problematic Soils and their Management AG-404-2(1+1)

Theory

Soil quality and health, Distribution of Waste land and problem soils in India. Their categorization based on properties. Reclamation and management of Saline and sodic soils, Acid soils, Acid Sulphate soils, Eroded and Compacted soils, flooded soils, Polluted soils. Irrigation water-quality and standards, utilization of saline water in agriculture. Remote sensing and GIS in diagnosis and management of problem soils. Multipurpose tree species, bio remediation through MPTs of soils, land capability and classification, land suitability classification. Problematic soils under different Agro-ecosystems.

Practical

Determination of pH and Ec in soil and water. Lime and gypsum requirement in soil. ESP and ŞAR in Soils. Application of remote sensing and GIS in delineating problematic soil in U.P. Visit problematic Soil in U.P.

MAA Pateswari University, Balarampur, U.P

AGRICULTURAL ENGINEERING

Renewable Energy and Green Technology AG-405-2(1+1)

Theory

Classification of energy sources, contribution of these of sources in agricultural sector, Familiarization with biomass utilization for biofuel production and their application, Familiarization with types of biogas plants and gasifiers, biogas, bio alcohol, biodiesel and biooil production and their utilization as bioenergy resource, introduction of solar energy, collection and their application, Familiarization with solar energy gadgets: solar cooker, solar water heater, application of solar energy: solar drying, solar pond, solar distillation, solar photovoltaic system and their application, introduction of wind energy and their application.

Practical

Familiarization with renewable energy gadgets. To study biogas plants, To study gasifier, To study the production process of biodiesel, To study briquetting machine, To study the production process of bio-fuels. Familiarization with different solar energy gadgets. To study solar photovoltaic system: solar light, solar pumping, solar fencing. To study solar cooker, To study solar drying system. To study solar distillation and solar pond.

MAA Pateswari University, Balarampur, U.P

HORTICULTURE

Production Technology for Ornamental Crops, MAPs and Landscaping Theory AG-406-2(1+1)

Theory

Importance and scope of ornamental crops, medicinal and aromatic plants and landscaping. Principles of landscaping. Landscape uses of trees, shrubs and climbers. Production technology of important cut flowers like rose, gerbera, carnation, lilium and orchids under protected conditions and gladiolus, tuberose, chrysanthemum under open conditions. Package of practices for loose flowers like marigold and jasmine under open conditions. Production technology of aromatic plants like mint, lemongrass, citronella, palmarosa, Ocimum, rose, geranium, vetiver.

Practical

Identification of Ornamental plants. Identification of Medicinal and Aromatic Plants. Nursery bed preparation and seed sowing. Training and pruning of Ornamental plants. Planning and layout of garden. Bed preparation and planting of MAP. Protected structures-care and maintenance. Intercultural operations in flowers and MAP. Harvesting and post-harvest handling of cut and loose flowers. Processing of MAP. Visit to commercial flower/MAP unit.

MAA Pateswari University, Balarampur, U.P

AGRONOMY

Introductory Agrometeorology & Climate Change AG-408-2(1+1)

Theory

Meaning and scope of agricultural meteorology; Earth atmosphere- its composition, extent and structure; Atmospheric weather variables; Atmospheric pressure, its variation with height; Wind, types of wind, daily and seasonal variation of wind speed, cyclone, anticyclone, land breeze and sea breeze; Nature and properties of solar radiation, solar constant, depletion of solar radiation, short wave, longwave and thermal radiation, net radiation, albedo; Atmospheric temperature, temperature inversion, lapse rate, daily and seasonal variations of temperature, vertical profile of temperature, Energy balance of earth; Atmospheric humidity, concept of saturation, vapor pressure, process of condensation, formation of dew, fog, mist, frost, cloud; Precipitation, process of precipitation, types of precipitation such as rain, snow, sleet, and hail, cloud formation and classification; Artificial rainmaking. Monsoon-mechanism and importance in Indian agriculture, Weather hazards- drought, floods, frost, tropical cyclones and extreme weather conditions such as heat-wave and cold-wave. Agriculture and weather relations; Modifications of crop microclimate, climatic normal for crop and livestock production. Weather forecasting- types of weather forecast and their uses. Climate change, climatic variability, global warming, causes of climate change and its impact on regional and national Agriculture.

Practical Visit of Agrometeorological Observatory, site selection of observatory, exposure of instruments and weather data recording. Measurement of total, shortwave and longwave radiation, and its estimation using Planck's intensity law. Measurement of albedo and sunshine duration, computation of Radiation Intensity using BSS. Measurement of maximum and minimum air temperatures, its tabulation, trend and variation analysis. Measurement of soil temperature and computation of soil heat flux. Determination of vapor pressure and relative humidity. Determination of dew point temperature. Measurement of atmospheric pressure and analysis of atmospheric conditions. Measurement of wind speed and wind direction, preparation of wind rose. Measurement, tabulation and analysis of rain. Measurement of open pan evaporation and evapotranspiration. Computation of PET and AET.

MAA Pateswari University, Balarampur, U.P

STATISTICS, COMPUTERAPPLICATION AND IPR

Agri-Informatics AG-409-2(1+1)

Theory

Introduction to Computers, Operating Systems, definition and types, Applications of MSOffice for document creation & Editing, Data presentation, interpretation and graph creation, statistical analysis, mathematical expressions, Database, concepts and types, uses of DBMS in Agriculture, World Wide Web (WWW): Concepts and components. Introduction to computer programming languages, concepts and standard input/output operations. e-Agriculture, concepts and applications, Use of ICT in Agriculture. Computer Models for understanding plant processes. IT application for computation of water and nutrient requirement of crops, Computer-controlled devices (automated systems) for Agri-input management, Smartphone Apps in Agriculture for farm advises, market price, postharvest management etc; Geospatial technology for generating valuable agri-information. Decision support systems, concepts, components and applications in Agriculture, Agriculture Expert System, Soil Information Systems etc for supporting Farm decisions. Preparation of contingent crop-planning using IT tools.

Practical

Study of Computer Components, accessories, practice of important DOS Commands. Introduction of different operating systems such as windows, Unix/Linux, Creating, Files & Folders, File Management. Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific Document. MS-EXCEL-Creating spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data.MS-ACCESS: Creating Database, preparing queries and reports, demonstration of Agri-information system. Introduction to World Wide Web (WWW). Introduction of programming languages. Hands on Crop Simulation Models (CSM) such as DSSAT/ Crop-Info/Crop Syst/ Wofost; Computation of water and nutrient requirements of crop using CSM and IT tools. Introduction of Geo spatial Technology for generating valuable information for Agriculture. Hands on Decision Support System. Preparation of contingent crop planning.

MAA Pateswari University, Balarampur, U.P

ANIMAL PRODUCTION

Livestock & Poultry Management AG-410-3(2+1)

Theory

Role of livestock in the national economy. Reproduction in farm animals and poultry. Housing principles, space requirements for different species of livestock and poultry. Management of calves, growing heifers and milch animals. Management of sheep, goat and swine. Incubation, hatching and brooding. Management of growers and layers. Important Indian and exotic breeds of cattle, buffalo, sheep, goat, swine and poultry. Improvement of farm animals and poultry. Digestion in livestock and poultry. Classification of feedstuffs. Proximate principles of feed. Nutrients and their functions. Feed ingredients for ration for livestock and poultry. Feed supplements and feed additives. Feeding of livestock and poultry. Introduction of livestock and poultry diseases. Prevention (including vaccination schedule) and control of important diseases of livestock and poultry.

Practical

External body parts of cattle, buffalo, sheep, goat, swine and poultry. Handling and restraining of livestock. Identification methods of farm animals and poultry. Visit to IDF and IPF to study breeds of livestock and poultry and daily routine farm operations and farm records. Judging of cattle, buffalo and poultry. Culling of livestock and poultry. Planning and layout of housing for different types of livestock. Computation of rations for livestock. Formulation of concentrate mixtures. Clean milk production, milking methods. Hatchery operations, incubation and hatching equipment. Management of chicks, growers and layers. Debeaking, dusting and vaccination. Economics of cattle, buffalo, sheep, goat, swine and poultry production.

MAA Pateswari University, Balarampur, U.P

Semester-wise distribution of B.Sc. (Ag.) courses

Vth Semester

S.No.	Course Title	Credit Hours	Course No.	Mid Term	Theory	Practical	Total
1	Rainfed Agriculture & Watershed Management	2(1+1)	AG -501	20	50	30	100
2	Crop Improvement -I (Kharif)	2(1+1)	AG -502	20	50	30	100
3	Pests of Crops and Stored Grain and their Management	3(2+1)	AG -503	20	50	30	100
4	Agricultural Marketing Trade & Prices	3(2+1)	AG -504	20	50	30	100
5	Protected Cultivation and Secondary Agriculture	2(1+1)	AG -505	20	50	30	100
6	Diseases of Field and Horticultural Crops and their Management-I	3(2+1)	AG-506	20	50	30	100
7	Production Technology for Fruit ad Plantation Crops	2(1+1)	AG-507	20	50	30	100
8	Communication Skills and Personality Development	2(1+1)	AG -508	20	50	30	100
9	Intellectual Property Rights	1(1+0)	AG-509	40	60	___	100
10	Principles of Food Science and Nutrition	2(1+1)	AG-510	20	50	30	100
11	Geoinformatics, Nano-technologyand Precision Farming	2(1+1)	AG-511	20	50	30	100
12	Elective Course-3 (AG-51/AG-52/ AG53/ AG-54/ AG-55/ AG-56)	3(2+1) each	AG- 51-56	20	50	30	100
		27					

Note- Passing marks in particular paper is 50%
Grade = Marks obtained in particular course divided by 10
The minimum grade point average (GPA) must be 5.0 in every semester

Pass : **5.0-5.99**
Second Division : **6.0-6.99**
First Division :**7.0-7.99**
First division with distinction : **8.0 and above**

MAA Pateswari University, Balarampur, U.P

AGRONOMY

Theory

Rainfed Agriculture and Watershed Management AG-501-2(1+1)

Rainfed and dry land agriculture: Introduction, types, Problems and prospects of rainfed agriculture in India; Soil and climatic conditions prevalent in rainfed areas; Drought: types, effect of water defection physio-morphological characteristics of the plants, Crop adaptation, Water harvesting: importance, its techniques, Efficient utilization of water through soil and crop management practices, Management of crops in rainfed areas, Contingent crop planning for aberrant weather conditions, Concept, objective, principles and components of watershed management, factors affecting watershed management.

Practical Studies on climate classification, studies on rainfall pattern in rainfed areas of the country and pattern of onset and withdrawal of monsoons. Studies on cropping pattern of different rainfed areas in the country and demarcation of rainfed area on map of India. Interpretation of meteorological data and scheduling of supplemental irrigation on the basis of evapo-transpiration demand of crops. Critical analysis of rainfall and possible drought period in the country, effective rainfall and its calculation. Studies on cultural practices for mitigating moisture stress. Characterization and delineation of model watershed. Field demonstration on soil & moisture conservation measures. Field demonstration on construction of water harvesting structures. Visit to rainfed research station/watershed.

MAA Pateswari University, Balarampur, U.P

GENETICS AND PLANT BREEDING

Crop Improvement -I (Kharif) AG-502-2(1+1)

Theory

Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds; fibers; fodders and cash crops; vegetable and horticultural crops; Plant genetic resources, its utilization and conservation, study of genetics of qualitative and quantitative characters; Important concepts of breeding self-pollinated, cross pollinated and vegetatively propagated crops; Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional); Hybrid seed production technology in Maize, Rice, Sorghum, Pearl millet and Pigeonpea, etc.

Practical

Floral biology, emasculation and hybridization techniques in different crop species; viz., Rice, Jute, Maize, Sorghum, Pearl millet, Ragi, Pigeonpea, Urdbean, Mungbean, Soybean, Groundnut, Seasame, Caster, Cotton, Cowpea, Tobacco, Brinjal, Okra and Cucurbitaceous crops. Maintenance breeding of different kharif crops. Handling of germplasm and segregating populations by different methods like pedigree, bulk and single seed decent methods; Study of field techniques for seed production and hybrid seeds production in Kharif crops; Estimation of heterosis, inbreeding depression and heritability; Layout of field experiments; Study of quality characters, donor parents for different characters; Visit to seed production plots; Visit to AICRP plots of different field crops.

MAA Pateswari University, Balarampur, U.P

ENTOMOLOGY

Pests of Crops and Stored Grains and their Management AG-503-3(2+1)

Theory

General account on nature and type of damage by different arthropods pests. Scientific name, order, family, host range, distribution, biology and bionomics, nature of damage, and management of major pests and scientific name, order, family, host range, distribution, nature of damage and control practice other important arthropod pests of various field crop. Factors affecting losses of stored grain and role of physical, biological, mechanical and chemical factors in deterioration of grain. Insect pests, mites, rodents, birds and microorganisms associated with stored grain and their management. Storage structure and methods of grain storage and fundamental principles of grain store management.

Practical

Identification of different types of damage. Identification and study of life cycle and seasonal history of various insect pests attacking crops and their produce: (a) Field Crops; (b) Vegetable Crops; (c) Fruit Crops; (d) Plantation, gardens, Narcotics, spices & condiments. Identification of insect pests and Mites associated with stored grain. Determination of insect infestation by different methods. Assessment of losses due to insects. Calculations on the doses of insecticides application technique. Fumigation of grain store/godown. Identification of rodents and rodent control operations Ingo downs. Identification of birds and bird control operations in godowns. Determination of moisture content of grain. Methods of grain sampling under storage condition. Visit to Indian Storage Management and Research Institute, Hapur and Quality Laboratory, Department of Food., Delhi. Visit to nearest FCI godowns.

MAA Pateswari University, Balarampur, U.P

AGRICULTURAL ECONOMICS

Agricultural Marketing, Trade and Prices AG-504-3(2+1)

Theory

Agricultural Marketing: Concepts and definitions of market, marketing, agricultural marketing, market structure, marketing mix and market segmentation, classification and characteristics of agricultural markets; demand, supply and producer's surplus of agri-commodities: nature and determinants of demand and supply of farm products, producer's surplus- meaning and its types, marketable and marketed surplus, factors affecting marketable surplus of agri-commodities; marketing process and functions: Marketing process-- storage, transport and processing; facilitating functions-packaging, branding, grading, quality control and labeling (Agmark); Market functionaries and marketing channels: Types and importance of agencies involved in agricultural marketing; meaning and definition of marketing channel; number of channel levels; marketing channels for different farm products; Integration, efficiency, costs and price spread: Meaning, definition and types of market integration; marketing efficiency; marketing costs, margins and price spread; factors affecting cost of marketing; reasons for higher marketing costs of farm commodities; ways of reducing marketing costs; Agricultural prices and policy: Meaning and functions of price; need for agricultural price policy; Trade: Concept of International Trade and its need, theories of absolute and comparative advantage. Present status and prospects of international trade in agri-commodities; GATT and WTO.

Practical

Study of relationship between market arrivals and prices of some selected commodities; Computation of marketable and marketed surplus of important commodities; Study of price behavior over time for some selected commodities; Construction of index numbers; Visit to a local market to study various marketing functions performed by different agencies, identification of marketing channels for selected commodity, collection of data regarding marketing costs, margins and price spread and presentation of report in the class; Visit to market institutions -NAFED, SWC, CWC, cooperative marketing society, etc. to study their organization and functioning; Application of principles of comparative advantage of international trade

MAA Pateswari University, Balarampur, U.P

AGRICULTURAL ENGINEERING

Protected Cultivation and Secondary Agriculture AG-505-2(1+1)

Theory

Greenhouse technology: Introduction, Types of Green Houses; Plant response to Greenhouse environment, Planning and design of greenhouses, Design criteria of green house for boiling and heating purposes. Green house equipment, materials of construction for traditional and low-cost green houses. Irrigation systems used in greenhouses, typical applications, passive solar green house, hot air greenhouse heating systems, greenhouse drying. Cost estimation and economic analysis. Important Engineering properties such as physical, thermal and aero & hydrodynamic properties of cereals, pulses and oilseed, their application in PHT equipment design and operation. Drying and dehydration; moisture measurement, EMC, drying theory, various drying method, commercial grain dryer (deep bed dryer, flatbed dryer, tray dryer, fluidized bed dryer, recirculatory dryer and solar dryer). Material handling equipment; conveyer and elevators, their principle, working and selection.

Practical

Study of different type of greenhouses based on shape. Determine the rate of air exchange in an active summer winter cooling system. Determination of drying rate of agricultural products inside green house. Study of greenhouse equipment. Visit to various Post Harvest Laboratories. Determination of Moisture content of various grains by oven drying & infrared moisture methods. Determination of engineering properties (shape and size, bulk density and porosity of biomaterials). Determination of Moisture content of various grains by moisture meter. Field visit to seed processing plant.

MAA Pateswari University, Balarampur, U.P

PLANT PATHOLOGY

Diseases of Field & Horticultural Crops & their Management-I

AG-506-3(2+1)

Theory

Symptoms, etiology, disease cycle and management of major diseases of following crops: Field Crops: Rice: blast, brown spot, bacterial blight, sheath blight, false smut, khaira and tungro; Maize: stalk rots, downy mildew, leaf spots; Sorghum: smuts, grain mold and anthracnose, Bajra :downy mildew and ergot; Groundnut: early and late leaf spots, wilt Soybean: Rhizoctonia blight, bacterial spot, seed and seedling rot and mosaic; Pigeonpea: Phytophthora blight, wilt and sterility mosaic; Finger millet: Blast and leaf spot; black & green gram: Cercospora leaf spot and anthracnose, web blight and yellow mosaic; Castor: Phytophthora blight; Tobacco: black shank, black root rot and mosaic. Horticultural Crops: Guava: wilt and anthracnose; Banana: Panama wilt, bacterial wilt, Sigatoka and bunchy top; Papaya: foot rot, leaf curl and mosaic, Pomegranate: bacterial blight; Cruciferous vegetables: Alternaria leafspot and black rot; Brinjal: Phomopsis blight and fruit rot and Sclerotinia blight; Tomato: damping off, wilt, early and late blight, buck eye rot and leaf curl and mosaic; Okra: Yellow Vein Mosaic; Beans: anthracnose and bacterial blight; Ginger: soft rot; Colocasia: Phytophthora blight; Coconut: wilt and bud rot; Tea: blister blight; Coffee: rust.

Practical

Identification and histopathological studies of selected diseases of field and horticultural crops covered in theory. Field visit for the diagnosis of field problems. Collection and preservation of plant diseased specimens for Herbarium; Note: Students should submit 50 pressed and well mounted specimens.

MAA Pateswari University, Balarampur, U.P

HORTICULTURE

Production Technology for Fruit and Plantation Crops AG-507-2(1+1)

Theory

Importance and scope of fruit and plantation crop industry in India; Importance of rootstocks; Production technologies for the cultivation of major fruits-mango, banana, citrus, grape, guava, litchi, papaya, apple, pear, peach, and; minor fruits-pineapple, pomegranate, jackfruit, strawberry, plantation crops-coconut, arecanut, cashew, tea, coffee & rubber.

Practical Seed propagation. Scarification and stratification of seeds. Propagation methods for fruit and plantation crops. Description and identification of fruit. Preparation of plant bio regulators and their uses, Important pests, diseases and physiological disorders of above fruit and plantation crops, Visit to commercial orchards.

MAA Pateswari University, Balarampur, U.P

AGRICULTURAL EXTENSION and COMMUNICATION

Communication Skills and Personality Development AG-508-2(1+1)

Theory

Communication Skills: Structural and functional grammar; meaning and process of communication, verbal and nonverbal communication; listening and note taking, writing skills, oral presentation skills; field diary and lab record; indexing, footnote and bibliographic procedures. Reading and comprehension of general and technical articles, precise writing, summarizing, abstracting; individual and group presentations, impromptu presentation, public speaking; Group discussion. Organizing seminars and conferences. Meaning and definition of innovation, diffusion, adoption, diffusion effect and rate of adoption, Factors affecting adoption, Difference between diffusion and communication. Innovation decision process, categories of adopters, characteristics of innovations.

Practical

Listening and note taking, writing skills, oral presentation skills; field diary and lab record; indexing, footnote and bibliographic procedures. Reading and comprehension of general and technical articles, precise writing, summarizing, abstracting; individual and group presentations.

MAA Pateswari University, Balarampur, U.P

GENETICS AND PLANT BREEDING

Intellectual Property Rights AG-509-1(1+0)

Theory

Introduction and meaning of intellectual property, brief introduction to GATT, WTO, TRIPs and WIPO, Treaties for IPR protection: Madrid protocol, Berne Convention, Budapest treaty, etc. Types of Intellectual Property and legislations covering IPR in India: -Patents, Copyrights, Trademark, Industrial design, Geographical indications, Integrated circuits, Trade secrets. Patents Act 1970 and Patent system in India, patentability, process and product patent, filing of patent, patent specification, patent claims, Patentop position and revocation, infringement, Compulsory licensing, Patent Cooperation Treaty, Patent search and patent database. Origin and history including a brief introduction to UPOV for protection of plant varieties, Protection of plant varieties under UPOV and PPV&FR Act of India, Plant breeder's rights, Registration of plant varieties under PPV&FR Act 2001, breeders, researcher and farmers rights. Traditional knowledge-meaning and rights of TK holders. Convention on Biological Diversity, International treaty on plant genetic resources for food and agriculture (ITPGRFA). Indian Biological Diversity Act, 2002 and its salient features, access and benefit sharing.

MAA Pateswari University, Balarampur, U.P

ANIMAL HUSBANDRYAND DAIRYING

PRINCIPLES OF FOOD SCIENCE AND NUTRITION AG-510-2(1+1)

Theory GENERAL: Definition of food and food science, Composition of food of animal origin. Digestive system of Ruminants. Definition, Chemistry and Function of Carbohydrate, Fat, Proteins and Water. Requirement, Availability, Functions and Nutritional deficiency disease of mineral and vitamins. Flavors and colours used in food. Food microbiology with special reference to milk, Physico Chemical properties of milk. Composition and processing of egg, meat and chicken, food additives, antibiotics, enzymes and hormones.

Practical

1. Sampling of milk.
2. Specific gravity of milk by lactometer.
3. Water quality test.
4. Study of Nutritional deficient conditions.
5. Study of Nutritional disorders.
6. Quality parameters for egg, meat and chicken.
7. Fat test by Gerbers's method.
8. T.S & S.N.F. percentage by Richmond's scale and formula.

MAA Pateswari University, Balarampur, U.P

AGRONOMY

Geoinformatics, Nano-technology and Precision Farming AG-511-2(1+1)

Theory

Precision agriculture: concepts and techniques; their issues and concerns for Indian agriculture; Geo-informatics- definition, concepts, tool and techniques; their use in Precision Agriculture. Crop discrimination and Yield monitoring, soil mapping; fertilizer recommendation using geospatial technologies; Spatial data and their management in GIS; Remote sensing concepts and application in agriculture; Image processing and interpretation; Global positioning system (GPS), components and its functions; Introduction to crop Simulation Models and their uses for optimization of Agricultural Inputs; STCR approach for precision agriculture; Nanotechnology, definition, concepts and techniques, brief introduction about nanoscale effects, nano-particles, nano-pesticides, nano-fertilizers, nano-sensors, Use of nanotechnology in seed, water, fertilizer, plant protection for scaling-up farm productivity.

Practical

Introduction to GIS software, spatial data creation and editing. Introduction to image processing software. Visual and digital interpretation of remote sensing images. Generation of spectral profiles of different objects. Supervised and unsupervised classification and acreage estimation. Multispectral remote sensing for soil mapping. Creation of thematic layers of soil fertility based on GIS. Creation of productivity and management zones. Fertilizers recommendations based of VRT and STCR techniques. Crop stress (biotic/abiotic) monitoring using geospatial technology. Use of GPS for agricultural survey. Formulation, characterization and applications of nanoparticles in agriculture. Projects formulation and execution related to precision farming.

MAA Pateswari University, Balarampur, U.P

ELECTIVE COURSES

Agri-business Management AG-51-3 (2+1)

Theory

Transformation of agriculture into agribusiness, various stakeholders and components of agribusiness systems. Importance of agribusiness in the Indian economy and New Agricultural Policy. Distinctive features of Agribusiness Management: Importance and needs of agro-based industries, Classification of industries and types of agro based industries. Institutional arrangement, procedures to set up agro based industries. Constraints in establishing agro-based industries. Agri-value chain: Understanding primary and support activities and their linkages. Business environment: PEST & SWOT analysis. Management functions: Roles & activities, Organization culture. Planning, meaning, definition, types of plans. Purpose or mission, goals or objectives, Strategies, polices procedures, rules, programs and budget. Components of a business plan, Steps in planning and implementation. Organization staffing, directing and motivation. Ordering, leading, supervision, communications, control. Capital Management and Financial management of Agribusiness. Financial statements and their importance. Marketing Management: Segmentation, targeting & positioning. Marketing mix and marketing strategies. Consumer behavior analysis, Product Life Cycle (PLC). Sales & Distribution Management. Pricing policy, various pricing methods. Project Management definition, project cycle, identification, formulation, appraisal, implementation, monitoring and evaluation. Project Appraisal and evaluation techniques.

Practical

Study of agri-input markets: Seed, fertilizers, pesticides. Study of output markets: grains, fruits, vegetables, flowers. Study of product markets, retails trade commodity trading, and value-added products. Study of financing institutions-Cooperative, Commercial banks, RRBS, Agribusiness Finance Limited, NABARD. Preparations of projects and Feasibility reports for agribusiness entrepreneur. Appraisal/evaluation techniques of identifying viable project-non-discounting techniques. Case study of agro-based industries. Trend and growth rate of prices of agricultural commodities. Net present worth technique for selection of viable project. Internal rate of return.

MAA Pateswari University, Balarampur, U.P

ELECTIVE COURSES

Agrochemicals AG-52-3 (2+1)

Theory

An introduction to agrochemicals, their type and role in agriculture, effect on environment, soil, human and animal health, merits and demerits of their uses in agriculture, management of agrochemicals for sustainable agriculture. Herbicides-Major classes, properties and important herbicides. Fate of herbicides. Fungicides - Classification-Inorganic fungicides - characteristics, preparation and use of sulfur and copper, Mode of action-Bordeaux mixture and copper oxychloride. Organic fungicides Mode of action-Di thiocarbamates-characteristics, preparation and use of Zineb and maneb. Systemic fungicides- Benomyl, carboxin, oxycarboxin, Metalaxyl, Carbendazim, characteristics and use. Introduction and classification of insecticides: inorganic and organic insecticides Organochlorine, Organophosphates, Carbamates, Synthetic pyrethroids Neonicotinoids, Biorationals, Insecticide Act and rules, Insecticides banned, withdrawn and restricted use, Fate of insecticides in soil & plant. IGRs Biopesticides, Reduced risk insecticides, Botanicals, plant and animal systemic insecticides their characteristics and uses. Fertilizers and their importance. Nitrogenous fertilizers: Feedstocks and Manufacturing of ammonium sulphate, ammonium nitrate, ammonium chloride, urea. Slow-release N fertilizers. Phosphatic fertilizers: feedstock and manufacturing of single superphosphate. Preparation of bone meal and basic slag. Potassic fertilizers: Natural sources of potash, manufacturing of potassium chloride, potassium sulphate and potassium nitrate. Mixed and complex fertilizers: Sources and compatibility-preparation of major, secondary and micronutrient mixtures. Complex fertilizers: Manufacturing of ammonium phosphates, nitro phosphates and NPK complexes. Fertilizer control order. Fertilizer logistics and marketing. Plant bio-pesticides for ecological agriculture, Bio-insect repellent.

Practical

Sampling of fertilizers and pesticides. Pesticides application technology to study about various pesticides appliances. Quick tests for identification of common fertilizers. Identification of anion and cation in fertilizer. Calculation of doses of insecticides to be used. To study and identify various formulations of insecticide available kin market. Estimation of nitrogen in Urea. Estimation of water soluble P205 and citrate soluble P205 in single super phosphate. Estimation of potassium in Muraite of Potash/ Sulphate of Potash by flame photometer. Determination of copper content in copper oxychloride. Determination of sulphur content in sulphur fungicide. Determination of thiram. Determination of ziram content.

MAA Pateswari University, Balarampur, U.P

ELECTIVE COURSES

Commercial Plant Breeding AG-53-3(1+2)

Theory

Types of crops and modes of plant reproduction. Line development and maintenance breeding in self- and cross-pollinated crops (A/B/R and two-line system) for development of hybrids and seed production. Genetic purity test of commercial hybrids. Advances in hybrid seed production of maize, rice, sorghum, pearl millet, castor, sunflower, cotton pigeon pea, Brassica etc. Quality seed production of vegetable crops under open and protected environment. Alternative strategies for the development of the line and cultivars: haploid inducer, tissue culture techniques and biotechnological tools. IPR issues in commercial plant breeding: DUS testing and registration of varieties under PPV & FR Act. Variety testing, release and notification systems in India. Principles and techniques of seed production, types of seeds, quality testing in self- and cross-pollinated crops.

Practical

Floral biology in self- and cross-pollinated species, selfing and crossing techniques. Techniques of seed production in self- and cross-pollinated crops using A/B/R and two-line system. Learning techniques in hybrid seed production using male-sterility in field crops. Understanding the difficulties in hybrid seed production, Tools and techniques for optimizing hybrid seed production. Concept of rouging in seed production plot. Concept of line its multiplication and purification in hybrid seed production. Role of pollinators in hybrid seed production. Hybrid seed production techniques in sorghum, pearl millet, maize, rice, rapeseed-mustard, sunflower, castor, pigeon pea, cotton and vegetable crops. Sampling and analytical procedures for purity testing and detection of spurious seed. Seed drying and storage structure in quality seed management. Screening techniques during seed processing viz., grading and packaging. Visit to public private seed production and processing plants.

MAA Pateswari University, Balarampur, U.P

ELECTIVE COURSES

Landscaping AG-54-3(2+1)

Theory

Importance and scope of landscaping. Principles of landscaping, garden styles and types, terrace gardening, vertical gardening, garden components, adornments, lawn making, rockery, water garden, walk-paths, bridges, other constructed features etc. gardens for special purposes. Trees: selection, propagation, planting schemes, canopy management, shrubs and herbaceous perennials: selection, propagation, planting schemes, architecture. Climber and creepers: importance, selection, propagation, planting, Annuals: selection, propagation, planting scheme, other garden plants: palms, ferns, grasses and cacti succulents. Pot plants: selection, arrangement, management. Bio-aesthetic planning: definition, need, planning; landscaping of urban and rural areas, Peri-urban landscaping, Landscaping of schools, public places like bus station, railway station, townships, river banks, hospitals, play grounds, airports, industries, institutions. Bonsai: principles and management, lawn: establishment and maintenance. CAD application.

Practical

Identification of trees, shrubs, annuals, pot plants; Propagation of trees, shrubs and annuals, care and maintenance of plants, potting and repotting, identification of tools and implements used in landscape design, training and pruning of plants for special effects, lawn establishment and maintenance, layout of formal gardens, informal gardens, special type of gardens (sunken garden, terrace garden, rock garden) and designing of conservatory and lathe house. Use of computer software, visit to important gardens/parks/ institutes.

MAA Pateswari University, Balarampur, U.P

ELECTIVE COURSES

Food Safety and Standards AG-55-3(2+1)

Theory

Food Safety-Definition, Importance, Scope and Factors affecting Food Safety. Hazards and Risks, Types of hazards - Biological, Chemical, Physical hazards. Management of hazards - Need. Control of parameters. Temperature control. Food storage. Product design. Hygiene and Sanitation in Food Service Establishments-Introduction. Sources of contamination and their control. Waste Disposal. Pest and Rodent Control. Personnel Hygiene. Food Safety Measures. Food Safety Management Tools- Basic concepts. PRPs, GHPs, GMPs, SSOPs etc. HACCP. ISO series. TQM- concept and need for quality, components of TQM, Kaizen. Risk Analysis. Accreditation and Auditing, Water Analysis, Surface Sanitation and Personal Hygiene. Food laws and Standards-Indian Food Regulatory Regime, FSSA. Global Scenario CAC. Other laws and standards related to food, Recent concerns New and Emerging Pathogens. Packaging, Product labeling and Nutritional labeling. Genetically modified foods\ transgenics. Organic foods. Newer approaches to food safety. Recent Outbreaks. Indian and International Standards for food products.

Practical

Water quality analysis physico-chemical and microbiological. Preparation of different types of media. Microbiological Examination of different food samples. Assessment of surface sanitation by swab/rinse method. Assessment of personal hygiene. Biochemical tests for identification of bacteria. Scheme for the detection of food borne pathogens. Preparation of plans for Implementation of FSMS - HACCP, ISO: 22000.

MAA Pateswari University, Balarampur, U.P

ELECTIVE COURSES

Biopesticides & Biofertilizers AG-56-3(2+1)

Theory

History and concept of biopesticides. Importance, scope and potential of biopesticide. Definitions, concepts and classification of biopesticides viz. pathogen, botanical pesticides, and biorationals. Botanicals and their uses. Mass production technology of bio-pesticides. Virulence, pathogenicity and symptoms of entomopathogenic pathogens and nematodes. Methods of application of biopesticides. Methods of quality control and Techniques of biopesticides. Impediments and limitation in production and use of biopesticide. Biofertilizers - Introduction, status and scope. Structure and characteristic features of bacterial biofertilizers- Azospirillum, Azotobacter, Bacillus, Pseudomonas, Rhizobium and Frankia; Cynobacterial biofertilizers- Anabaena, Nostoc, Hapalosiphon and fungal biofertilizers-AM mycorrhiza and ectomycorhiza. Nitrogen fixation -Free living and symbiotic nitrogen fixation. Mechanism of phosphate solubilization and phosphate mobilization, K solubilization. Production technology: Strain selection, sterilization, growth and fermentation, mass production of carrier based and liquid biofertilizers. FCO specifications and quality control of biofertilizers. Application technology for seeds, seedlings, tubers, sets etc. Biofertilizers -Storage, shelf life, quality control and marketing. Factors influencing the efficacy of biofertilizers.

Practical

Isolation and purification of important biopesticides: Trichoderma Pseudomonas, Bacillus, Metarhyzium etc. and its production. Identification of important botanicals. Visit to biopesticide laboratory in nearby area. Field visit to explore naturally infected cadavers. Identification of entomopathogenic entities in field condition. Quality control of biopesticides. Isolation and purification of Azospirillum, Azotobacter, Rhizobium, P-solubilizers and cyanobacteria. Mass multiplication and inoculums production of biofertilizers. Isolation of AM fungi -Wet sieving method and sucrose gradient method. Mass production of AM inoculants.

MAA Pateswari University, Balarampur, U.P

Semester-wise distribution of B.Sc. (Ag.) courses

VIth Semester

S.No.	Course Title	Credit Hours	Course No.	Mid Term	Theory	Practical	Total
1	Farming System, Precision Fanning & Sustainable Agriculture	2(1+1)	AG -401	20	50	30	100
2	Crop Improvement-II (Rabi)	2(1+1)	AG -402	20	50	30	100
3	Manures, Fertilizers and Soil Fertility Management	3(2+1)	AG -403	20	50	30	100
4	Farm Management, Production & Resource Economics	2(1+1)	AG -404	20	50	30	100
5	Diseases of Field and Horticultural Crops and their Management- II	3(2+1)	AG -405	20	50	30	100
6	Post-harvest Management and Value Addition of Fruits and Vegetables	2(1+1)	AG -406	20	50	30	100
7	Watershed and Wasteland Management	2(1+1)	AG -407	20	50	30	100
8	Management of Beneficial Insects	3(2+1)	AG -408	20	50	30	100
9	Elective Course-2 (AG-61/AG-62/ AG63/AG-64/ AG-65/ AG-66)	3(2+1) each	AG -409	20	50	30	100
10	Educational Tour	2(0+2)	AG -410	___	____	100	100
TOTAL CREDIT		**24**					

Note- Passing marks in particular paper is 50%
Grade = Marks obtained in particular course divided by 10
The minimum grade point average (GPA) must be 5.0 in every semester

Pass : **5.0-5.99**
Second Division : **6.0-6.99**
First Division :**7.0-7.99**
First division with distinction : **8.0 and above**

MAA Pateswari University, Balarampur, U.P

AGRONOMY

Farming System Precision Fanning and Sustainable Agriculture AG-601-2(1+1)

Theory

Farming System-scope, importance, and concept, Types and systems of farming system and factors affecting types of farming, Farming system components and their maintenance, Cropping system and pattern, multiple cropping system, Efficient cropping system and their evaluation, Sustainable agriculture-problems and its impact on agriculture, conservation agriculture strategies in agriculture, HEIA, LEIA and LEISA and its techniques, Integrated farming system, components of IFS and its advantages, Site specific development of IFS model for different agro-climatic zones, resource use efficiency and optimization techniques, Resource cycling and flow of energy in different farming system, farming system and environment.

Practical

Tools for determining productions and efficiencies in cropping and farming system. Indicators of sustainability of cropping and farming systems. Site specific development of IFS models for different agro-climatic zones. Visit of IFS models in different agroclimatic zone of nearby universities/institutes and farmer's field.

MAA Pateswari University, Balarampur, U.P

GENETICS AND PLANT BREEDING

Crop Improvement -II (Rabi) AG-602-2(1+1)

Theory

Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds; fodder crops and cash crops; vegetable and horticultural crops; Plant genetic resources, its utilization and conservation; study of genetics of qualitative and quantitative characters; Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional); Hybrid seed production technology of rabi crops.

Practical

Floral biology, emasculation and hybridization techniques in different crop species namely Wheat, Oat, Chickpea, Field pea, Horse gram, Rapeseed Mustard, Sunflower, Potato, Sugarcane, Tomato, Handling of germplasm and segregating populations by different methods like pedigree, bulk and single seed decent methods; Study of field techniques for seed production and hybrid seeds production in Rabi crops; Estimation of heterosis, inbreeding depression and heritability; Layout of field experiments; Study of quality characters, study of donor parents for different characters; Visit to seed production plots; Visit to AICRP plots of different field crops.

MAA Pateswari University, Balarampur, U.P

SOIL SCIENCE & AGRICULTURAL CHEMISTRY

Manures, Fertilizers and Soil Fertility Management AG-603-3(2+1)

Theory

Introduction and importance of organic manures, properties and methods of preparation of bulky and concentrated manures. Green/leaf manuring. Fertilizer recommendation approaches. Integrated nutrient management. Chemical fertilizers: classification, composition and properties of major nitrogenous, phosphatic, potassic fertilizers, secondary & micronutrient fertilizers, Complex fertilizers, nano fertilizers Soil amendments, Fertilizer Storage, Fertilizer Control Order. History of soil fertility and plant nutrition. criteria of essentiality. role, deficiency and toxicity symptoms of essential plant nutrients, Mechanisms of nutrient transport to plants, factors affecting nutrient availability to plants. Chemistry of soil nitrogen, phosphorus, potassium, calcium, magnesium, Sulphur and micronutrients. Soil fertility evaluation, Soil testing. Critical levels of different nutrients in soil. Forms of nutrients in soil, plant analysis, rapid plant tissue tests. Indicator plants. Methods of fertilizer recommendations to crops. Factor influencing nutrient use efficiency (NUE), methods of application under rainfed and irrigated conditions.

Practical

Introduction of analytical instruments and their principles, calibration and applications, Colorimetry and flame photometry. Estimation of soil organic carbon, Estimation of alkaline hydrolysable N in soils. Estimation of soil extractable P in soils. Estimation of exchangeable K; Ca and Mg in soils. Estimation of soil extractable S in soils. Estimation of DTPA extractable Zn in soils. Estimation of N in plants. Estimation of P in plants. Estimation of K. in plants. Estimation of S in plants.

MAA Pateswari University, Balarampur, U.P

AGRICULTURAL ECONOMICS

Farm Management, Production and Resource Economics AG-604-2(1+1)

Theory

Meaning and concept of farm management, objectives and relationship with other sciences. Meaning and definition of farms, its types and characteristics, factor determining types and size of farms. Principles of farm management: concept of production function and its type, use of production function in decision-making on a farm, factor-product, factor-factor and product-product relationship, law of equi-marginal/or principles of opportunity cost and law of comparative advantage. Meaning and concept of cost, types of costs and their interrelationship, importance of cost in managing farm business and estimation of gross farm income, net farm income, family labour income and farm business income. Farm business analysis: meaning and concept of farm income and profitability, technical and economic efficiency measures in crop and livestock enterprises. Importance of farm records and accounts in managing a farm, various types of farm records needed to maintain on farm, farm inventory, balance sheet, profit and loss accounts. Meaning and importance of farm planning and budgeting, partial and complete budgeting, steps in farm planning and budgeting-linear programming, appraisal of farm resources. Crop/livestock/machinery insurance features, determinants of compensation.

Practical

Preparation of farm layout. Determination of cost of fencing of a farm. Computation of depreciation cost of farm assets. Application of equi-marginal returns/opportunity cost principle in allocation of farm resources. Determination of least cost combination of inputs. Preparation of farm plan and budget, farm records and accounts and profit & loss accounts. Collection and analysis of data on various resources in India.

MAA Pateswari University, Balarampur, U.P

PLANT PATHOLOGY

Diseases of Field & Horticultural Crops & their Management-II AG-605-3(2+1)

Theory

Symptoms, etiology, disease cycle and management of following diseases: Field Crops: Wheat: rusts, loose smut, karnal bunt, powdery mildew, Alternaria blight, and ear cockle; Sugarcane: red rot, smut, wilt, grassy shoot, ratoon stunting and Pokkah Boeng; Sunflower: Sclerotinia stem rot and Alternaria blight; Mustard: Alternaria blight,white rust, downy mildew and Sclerotinia stem rot; Gram: wilt, grey mould and Ascochyta blight; Lentil: rust and wilt; Cotton: anthracnose, vascular wilt, and black arm; Pea: downy mildew, powdery mildew and rust. Horticultural Crops: Mango: anthracnose, malformation, bacterial blight and powdery mildew; Citrus: canker and gummosis; Grape vine: downy mildew, Powdery mildew and anthracnose; Apple: scab, powdery mildew, fire blight and crown gall; Peach: leaf curl. Strawberry: leafspot Potato: early and late blight, black scurf, leaf roll, and mosaic; Cucurbits: downy mildew, powdery mildew, wilt; Onion and garlic: purple blotch, and Stemphylium blight; Chillies: anthracnose and fruit rot, wilt and leaf curl; Turmeric: leaf spot Coriander: stem gall Marigold: Botrytis blight; Rose: dieback, powdery mildew and black leaf spot.

Practical

Identification and histopathological studies of selected diseases of field and horticultural crops covered in theory. Field visit for the diagnosis of field problems. Collection and preservation of plant diseased specimens for herbarium. Note: Students should submit 50 pressed and well-mounted specimens.

MAA Pateswari University, Balarampur, U.P

HORTICULTURE

Post-harvest Management and Value Addition of Fruits and Vegetables AG-606-2(1+1)

Theory

Importance of post-harvest processing of fruits and vegetables, extent and possible causes of post-harvest losses; Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening; Respiration and factors affecting respiration rate; Harvesting and field handling; Storage (ZECC, cold storage, CA, MA, and hypobaric); Value addition concept; Principles and methods of preservation; Intermediate moisture food- Jam, jelly, marmalade, preserve, candy Concepts and Standards; Fermented and non-fermented beverages. Tomato products- Concepts and Standards; Drying/Dehydration of fruits and vegetables- Concept and methods, osmotic drying. Canning-Concepts and Standards, packaging of products.

Practical

Applications of different types of packaging, containers for shelf-life extension. Effect of temperature on shelf life and quality of produce. Demonstration of chilling and freezing injury in vegetables and fruits. Extraction and preservation of pulps and juices. Preparation of jam, jelly, RTS, nectar, squash, osmotically dried products, fruit bar and candy and tomato products, canned products. Quality evaluation of products-physico-chemical and sensory. Visit to processing unit/ industry.

MAA Pateswari University, Balarampur, U.P

SOIL SCIENCE & AGRICULTURAL CHEMISTRY Watershed and Wasteland Management AG-607-2(1+1)

Theory

Watershed management, concept, need, principles and components of watershed management integrated watershed management. Factors effecting watershed management run off and soil loss management in a watershed socio-economic concept of water shed. People's participation in watershed management. Policy, approaches and management plan, problems of watershed management. Wasteland management- definition, concept and types of degraded and waste land. Distribution and extent watershed in India and Uttar Pradesh, factor responsible for land degradation, characteristics of different types of degradation and wasteland problems of degraded land in Uttar Pradesh. Appropriate techniques for management of different types of degraded and waste land.

Practical

characterization and delineation of model watershed. Field demonstration on soil and moisture conservation measures. Field demonstration of construction of water harvesting structures. Visit to rainfed research station/watershed.

MAA Pateswari University, Balarampur, U.P

ENTOMOLOGY

Management of Beneficial Insects AG-608-3(2+1)

Theory

Importance of beneficial Insects, Beekeeping and pollinators, bee biology, commercial methods of rearing, equipment used, seasonal management, bee enemies and disease. Bee pasturage, bee foraging and communication. Insect pests and diseases of honey bee. Role of pollinators in cross pollinated plants. Types of silk worm, voltinism and biology of silkworm. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves. Rearing, mounting and harvesting of cocoons. Pest and diseases of silkworm, management, rearing appliances of mulberry silkworm and methods of disinfection. Species of lac insect, morphology, biology, host plant, lac production - seed lac, button lac, shellac, lac- products. Identification of major parasitoids and predators commonly being used in biological control. Insect orders bearing predators and parasitoids used in pest control and their mass multiplication techniques. Important species of pollinator, weed killers and scavengers with their importance.

Practical

Honey bee species, castes of bees. Beekeeping appliances and seasonal management, bee enemies and disease. Bee pasturage, bee foraging and communication. Types of silk worm, voltinism and biology of silkworm. Mulberry cultivation, mulberry varieties and methods of harvesting and preservation of leaves. Species of lac insect, host plant identification. Identification of other important pollinators, weed killers and scavengers. Visit to research and training institutions devoted to beekeeping, sericulture, lac culture and natural enemies. Identification and techniques for mass multiplication of natural enemies.

MAA Pateswari University, Balarampur, U.P

ELECTIVE COURSES

Protected Cultivation AG-61-3(2+1)

Theory

Protected cultivation-importance and scope, Status of protected cultivator in India and World types of protected structure based on site and climate. Cladding material involved in greenhouse/poly house. Greenhouse design, environment control, artificial lights, Automation. Soil preparation and management, Substrate management. Types of benches and containers. Irrigation and fertigation management. Propagation and production of quality planting material of horticultural crops. Greenhouse cultivation of important horticultural crops-rose, carnation, chrysanthemum, gerbera, orchid, anthurium, lilium, tulip, tomato, bell pepper, cucumber, strawberry, pot plants, etc. Cultivation of economically important medicinal and aromatic plants. Off-season production of flowers and vegetables. Insect pest and disease management.

Practical

Raising of seedlings and saplings under protected conditions, use of portrays in quality planting material production, Bed preparation and planting of crop for production, Inter cultural operations, Soil EC and pH measurement, Regulation of irrigation and fertilizers through drip, fogging ad misting.

MAA Pateswari University, Balarampur, U.P

ELECTIVE COURSES

Micro propagation Technologies AG-62-3(1+2)

Theory

Introduction, History, Advantages and limitations; Types of cultures (seed, embryo, organ, callus, cell), Stages of micropropagation, Axillary bud proliferation (Shoot tip and meristem culture, bud culture), Organogenesis (callus and direct organ formation), Somatic embryogenesis, cell suspension cultures, Production of secondary metabolites, Soma clonal variation, Cryopreservation.

Practical

Identification and use of equipment in tissue culture Laboratory, Nutrition media composition, sterilization techniques for media, containers and small instruments, sterilization techniques for explants, Preparation of stocks and working solution, Preparation of working medium, Culturing of explants: Seeds, shoot tip and single node, Callus induction, Induction of somatic embryos regeneration of whole plants from different explants, Hardening procedures.

MAA Pateswari University, Balarampur, U.P

ELECTIVE COURSES

Hi-tech. Horticulture AG-63-3(2+1)

Theory

Introduction & importance; Nursery management and mechanization; micro propagation of horticultural crops; Modern field preparation and planting methods, Protected cultivation: advantages, controlled conditions, method and techniques, Micro irrigation. Systems and its components: EC. pH-based fertilizer scheduling, canopy management, high density orcharding, Components of precision farming: Remote sensing, Geographical Information System (GIS), Differential Geo-positioning System (DGPS), Variable Rate applicator (VRA), application of precision farming in horticultural crops (fruits, vegetables and ornamental crops); mechanized harvesting of produce.

Practical

Types of polyhouses and shade net houses, Intercultural operations, tools and equipment identification and application, Micro propagation, Nursery-portrays, micro--irrigation, EC, pH-based fertilizer scheduling, canopy management, visit to hi-tech orchard/nursery.

MAA Pateswari University, Balarampur, U.P

ELECTIVE COURSES

Weed Management AG-64-3(2+1)

Theory

Introduction to weeds, characteristics of weeds their harmful and beneficial effects on ecosystem. Classification, reproduction and dissemination of weeds. Herbicide classification, concept of adjuvant, surfactant, herbicide formulation and their use. Introduction to mode of action of herbicides and selectivity. Allelopathy and its application for weed management. Bio-herbicides and their application in agriculture. Concept of herbicide mixture and utility in agriculture. Herbicide compatibility with agro-chemicals and their application. Integration of herbicides with non-chemical methods of weed management. Herbicide Resistance and its management.

Practical

Techniques of weed preservation. Weed identification and their losses study. Biology of important weeds. Study of herbicide formulations and mixture of herbicide. Herbicide and agrochemicals study. Shift of weed flora study in long term experiments. Study of methods of herbicide application, spraying equipment. Calculations of herbicide doses and weed control efficiency and weed index.

MAA Pateswari University, Balarampur, U.P

ELECTIVE COURSES

System Simulation and Agro-advisory AG-65-3(2+1)

Theory

System Approach for representing soil-plant-atmospheric continuum, system boundaries, Crop models, concepts & techniques, types of crop models, data requirements, relational diagrams. Evaluation of crop responses to weather elements; Elementary crop growth models; calibration, validation, verification and sensitivity analysis. Potential and achievable crop production-concept and modelling techniques for their estimation. Crop production in moisture and nutrients limited conditions; components of soil water and nutrients balance. Weather forecasting, types, methods, tools & techniques, forecast verification; Value added weather forecast, ITK for weather forecast and its validity; Crop-Weather Calendars; Preparation of agro-advisory bulletin based on weather forecast. Use ‘of crop simulation model for preparation of Agro-advisory and its effective dissemination.

Practical

Preparation of crop weather calendars. Preparation of agro-advisories based on weather forecast using various approaches and synoptic charts. Working with statistical and simulation models for crop growth. Potential & achievable production; yield forecasting, insect & disease forecasting models. Simulation with limitations of water and nutrient management options. Sensitivity analysis of varying weather and crop management practices. Use of statistical approaches in data analysis and preparation of historical, past and present meteorological data for medium range weather forecast, Feedback from farmers about the agro-advisory.

MAA Pateswari University, Balarampur, U.P

ELECTIVE COURSES

Agricultural Journalism AG-66-3(2+1)

Theory

Agricultural Journalism: The nature and scope of agricultural journalism characteristics and training of the agricultural journalist, how agricultural journalism is similar to and different from other types of journalism. Newspapers and magazines as communication media: Characteristics; kinds and functions of newspapers and magazines, characteristics of newspaper and magazine readers. Form and content of newspapers and magazines: Style and language of newspapers and magazines, parts of newspapers and magazines. The agricultural story: Types of agricultural stories, subject matter of the agricultural story, structure of the agricultural story. Gathering agricultural information: Sources of agricultural information, interviews, coverage of events, abstracting from research and scientific materials, wire services, other agricultural news sources. Writing the story: Organizing the material, treatment of the story, writing the news lead and the body, readability measures. Illustrating agricultural stories: Use of photographs, use of artwork (graphs, charts, maps, etc.), writing the captions. Editorial mechanics: Copy reading, headline and title writing, proofreading, lay outing.

Practical

Practice in interviewing. Covering agricultural events. Abstracting stories from research and scientific materials and from wire services. Writing different types of agricultural stories. Selecting pictures and artwork for the agricultural story. Practice in editing, copy reading, headline and title writing, proofreading, lay outing. Testing copy with a readability formula. Visit to a publishing office.

MAA Pateswari University, Balarampur, U.P

Semester-wise distribution of B.Sc. (Ag.) courses VII Semester

Rural Agricultural Work Experience and Agro-industrial Attachment (RAWE &AIA)

S. No.	Activities	No. of weeks	Credit Hours	R.A.W.E AND
1.	General orientation & on campus training by different faculties	**1**	**14**	**A.I.A is Absolutely Practical (External) of 100 Marks**
2.	Village attachment	**8**		
3.	Unit attachment in University/College. KVK/ Research Station Attachment	**5**		
4.	Plant clinic	**2**	**2**	
	Agro-Industrial Attachment	**3**	**4**	No Midterm And Theory
	Project Report Preparation, Presentation and Evaluation	**1**	**0**	
	Total weeks for RAWE & AIA 20, 20	**20**	**20**	

RAWE Component –II

Agro Industrial Attachment	
1.	Students shall be placed in Agro-and Cottage industries and Commodities Boards for 03 weeks
2.	Industries include Seed/Sapling production, Pesticides-insecticides, Post harvest-processing value addition, Agri-finance institutions, etc.
Activities and Tasks during Agro-Industrial Attachment Program	
1.	Acquaintance with industry and staff
2.	Study of structure, functioning, objective and mandates of the industry
3.	Study of various processing units and hands-on trainings under supervision of industry staff
4.	Ethics of industry
5.	Employment generated by the industry
6.	Contribution of the industry promoting environment
7.	Learning business network including outlets of the industry,
8.	Skill development in all crucial tasks of the industry
9.	Documentation of the activities and task performed by the students
10.	Performance evaluation, appraisal and ranking of students

Note- Passing marks in particular paper is 50%
Grade = Marks obtained in particular course divided by 10
The minimum grade point average (GPA) must be 5.0 in every semester

Pass : **5.0-5.99**
Second Division : **6.0-6.99**
First Division :**7.0-7.99**
First division with distinction : **8.0 and above**

MAA Pateswari University, Balarampur, U.P

Semester-wise distribution of B.Sc. (Ag.) courses VIII semester

Modules for Skill Development and Entrepreneurship: A student has to register 20 credits opting for two modules of (0+10) credits each (total 20 credits) from the package of modules in the VIII Semester

S.No.	Title of the module	Credit	
1	Production Technology for Bioagents and Biofertilizer	**(0+10)**	**(Select any two module from this table)**
2	Seed Production and Technology	**(0+10)**	
3	Mushroom Cultivation Technology	**(0+10)**	
4	Soil, Plant, Water and Seed Testing	**(0+10)**	
5	Commercial Beekeeping	**(0+10)**	
6	Poultry Production Technology	**(0+10)**	
7	Commercial Horticulture	**(0+10)**	
8	Floriculture and Landscaping	**(0+10)**	
9	Food Processing	**(0+10)**	**There will be two Practical Exam (External) Each of 100 marks**
10	Agriculture Waste Management	**(0+10)**	
11	Organic Production Technology	**(0+10)**	
12	Commercial Sericulture	**(0+10)**	

Evaluation of Experiential Learning Programme/ HOT

S.No.	Parameters	Max. Marks
1	Project Planning and Writing	**10**
2	Presentation	**10**
3	Regularity	**10**
4	Monthly Assessment	**10**
5	Output delivery	**10**
6	Technical Skill Development	**10**
7	Entrepreneurship skills	**10**
8	Business networking skills	**10**
9	Report Writing Skills	**10**
10	Final Presentation	**10**
	TOTAL MARKS	**100**

Note- Passing marks in particular paper is 50%
Grade = Marks obtained in particular course divided by 10
The minimum grade point average (GPA) must be 5.0 in every semester

Pass : **5.0-5.99**
Second Division : **6.0-6.99**
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MAA Pateswari University, Balarampur, U.P

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