

Detailed Course Scheme
Bachelor of Science (Hons.)
Agriculture

Semester- VI
(2020- 21)

DOC202003040002



RNB GLOBAL UNIVERSITY

RNB Global City, Ganganagar Road,
Bikaner, Rajasthan 334601

OVERVIEW

RNB Global University follows Semester System along with Choice Based Credit System as per latest guidelines of University Grants Commission (UGC). Accordingly, each academic year is divided into two semesters, **Odd (July-December) and Even (January-June)**. Also, the university follows a system of continuous evaluation along with regular updating in course curricula and teaching pedagogy.

The Curriculum for B. Sc Agriculture Program along with examination pattern is as follows:

Course Scheme

Semester -VI

S. No.	Course Code	Course Name	L	T	P	Credits
1.	20019300	Rainfed Agriculture & Watershed Management	1	0	0	1
2.	20019400	Rainfed Agriculture & Watershed Management lab	0	0	2	1
3.	20019500	Protected Cultivation and Secondary Agriculture	1	0	0	1
4.	20019600	Protected Cultivation and Secondary Agriculture lab	0	0	2	1
5.	20019700	Diseases of Field and Horticultural Crops and their Management-II	2	0	0	2
6.	20019800	Diseases of Field and Horticultural Crops and their Management-II Lab	0	0	2	1
7.	20019900	Post-harvest Management and Value Addition of Fruits and Vegetables	1	0	0	1
8.	20020000	Post-harvest Management and Value Addition of Fruits and Vegetables lab	0	0	2	1
9.	20020100	Management of Beneficial Insects	1	0	0	1
10.	20020200	Management of Beneficial Insects lab	0	0	2	1
11.	20020300	Crop Improvement-II (Rabi crops)	1	0	0	1
12.	20020400	Crop Improvement-II (Rabi crops) Lab	0	0	2	1
13.	20020500	Practical Crop Production -II (Rabi crops)	0	0	4	2
14.	20020600	Principles of Organic Farming	1	0	0	1
15.	20020700	Principles of Organic Farming lab	0	0	2	1
16.	20020800	Farm Management, Production & Resource Economics	1	0	0	1
17.	20020900	Farm Management, Production & Resource Economics Lab	0	0	2	1
18.	20021000	Principles of Food Science and Nutrition	2	0	0	2

19.	-	Elective III	2	0	0	2
20.	-	Elective III Lab	0	0	2	1
21.	20021100	Ability and Skill Enhancement VI	2	0	0	2
22.	99002800	Workshops & Seminars	-	-	-	1
23.	99002700	Human Values & Social Service/NCC/NSS	-	-	-	1
Total			15	0	22	28

Electives

Elective	Course Code	Course Name
Elective III	20021200	Hi-tech. Horticulture
	20021300	Hi-tech. Horticulture Lab
	20021400	Protected Cultivation
	20021500	Protected Cultivation Lab
	20021600	System Simulation and Agro-advisory
	20021700	System Simulation and Agro-advisory Lab
	20021800	Agricultural Journalism
	20021900	Agricultural Journalism Lab

EVALUATION SCHEME - THEORY

The evaluation of the theory paper of B.Sc. Agriculture program would be based on Internal and External Assessments. Internal Assessment would consist of 50% of the marks (50 marks) and external assessment (in form of End Term Exam) would consist of remaining 50% marks (50 marks). Detailed scheme of Internal and External Assessments as follows:

Internal Assessment

The distribution of Internal Assessment Marks is as follows:

Type	Details	Marks
Mid Term	Two Mid-term Sessional of 15 marks each (15+15)	30
Marks obtained in various Tests, Assignments,	Average of marks obtained	15

Presentations, Quiz, Tutorials, etc.		
Attendance	75%+ : 5 marks	5
TOTAL	50	

External Assessment

Type	Marks
Theory	50

EVALUATION SCHEME - PRACTICAL

The evaluation of the practical paper of B.Sc. Agriculture program would be based on Internal and External Assessments. Internal Assessment would consist of 50% of the marks (50 marks) and external assessment (in form of End Term Exam) would consist of remaining 50% marks (50 marks). Detailed scheme of Internal and External Assessment is as follows:

Internal Assessment

Type	Details	Marks
Marks obtained in various manuals, practical file, participation, any model prepared, output of practical	Average of marks obtained	45
Attendance	75%+ : 5 marks	5
TOTAL	50	

External Assessment

Type	Marks
Practical	50

EVALUATION SCHEME- WORKSHOPS & SEMINARS & NCC/NSS

1. NCC/NSS will be completed from Semester I – Semester IV. It will be evaluated internally by the institute. The credit for this will be given at the end of Semester.
2. The students have to join club/clubs with the active participation in different activities of club. The students would be continuously assessed from Semester-I to Semester-IV and credits and marks would be given after the end of Semester.

CURRICULUM

Course Name: Rainfed Agriculture & Watershed Management

Course Code: 20019300

Course Outline

Rainfed agriculture: Introduction, types, History of rainfed agriculture and watershed in India; Problems and prospects of rainfed agriculture in India ; Soil and climatic conditions prevalent in rainfed areas; Soil and water conservation techniques, Drought: types, effect of water deficit on physio-morphological characteristics of the plants, Crop adaptation and mitigation to drought; 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.

Course Name: Rainfed Agriculture & Watershed Management Lab

Course Code: 20019400

Course Outline

1. Studies on climate classification, studies on rainfall pattern in rainfed areas of the country and pattern of onset and withdrawal of monsoons.
2. Studies on cropping pattern of different rainfed areas in the country and demarcation of rainfed area on map of India.
3. Interpretation of meteorological data and scheduling of supplemental irrigation on the basis of evapo-transpiration demand of crops.
4. Critical analysis of rainfall and possible drought period in the country, effective rainfall and its calculation.
5. Studies on cultural practices for mitigating moisture stress.
6. Characterization and delineation of model watershed.
7. Field demonstration on soil & moisture conservation measures.

8. Field demonstration on construction of water harvesting structures. Visit to rainfed research station/watershed.

Course Name: Protected Cultivation and Secondary Agriculture

Course Code: 20019500

Course Outline

Green house technology: Introduction, Types of Green Houses; Plant response to Green house environment, Planning and design of greenhouses, Design criteria of green house for cooling and heating purposes. Green house equipments, materials of construction for traditional and low cost green houses. Irrigation systems used in greenhouses, typical applications, passive solar green house, hot air green house heating systems, green house 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, flat bed dryer, tray dryer, fluidized bed dryer, recirculatory dryer and solar dryer). Material handling equipment; conveyer and elevators, their principle, working and selection.

Course Name: Protected Cultivation and Secondary Agriculture Lab

Course Code: 20019600

Course Outline

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

**Course Name: Diseases of Field and Horticultural Crops and their
Management-II**

Course Code: 20019700

Course Outline

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 leaf spot 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

Course Name: Diseases of Field and Horticultural Crops and their Management-II Lab

Course Code: 20019800

Course Outline

1. Identification and histopathological studies of selected diseases of field and horticultural crops covered in theory.
2. Field visit for the diagnosis of field problems.
3. Collection and preservation of plant diseased specimens for Herbarium;

Note: Students should submit 50 pressed and well mounted Specimens.

Course Name: Post-harvest Management and Value Addition of Fruits and Vegetables

Course Code: 20019900

Course Outline

Unit I

Importance of Postharvest Technology in horticultural crops. Maturity indices, harvesting, handling, grading of fruits, vegetables, cut flowers, plantation crops, spices, medicinal and aromatic plants. Pre-harvest factors affecting quality, factors responsible for deterioration of horticultural produce, physiological and bio-chemical changes, hardening and delaying ripening process. Postharvest treatments of horticultural crops.

Unit II

Quality parameters and specifications. Structure of fruits, vegetables and cut flowers related to physiological changes after harvest. Methods of storage for local market and export. Pre-harvest treatment and pre-cooling, prestorage treatments. Different systems of storage, packaging methods and types of packages, recent advances in packaging. Types of containers and cushioning materials, vacuum packaging, cold storage, poly shrink packaging, grape guard packing treatments. Modes of transport.

Course Name: Post-harvest Management and Value Addition of Fruits and Vegetables Lab

Course Code: 20020000

Course Outline

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

Course Name: Management of Beneficial Insects

Course Code:20020100

Course Outline

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 silkworm, 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.

Course Name: Management of Beneficial Insects Lab

Course Code: 20020200

Course Outline

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

Course Name: Crop Improvement-II (Rabi crops)

Course Code: 20020300

Course Outline

Unit I

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;

Unit II

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. Ideotype concept and climate resilient crop varieties for future.

Course Name: Crop Improvement-II (Rabi crops) Lab

Course Code: 20020400

Course Outline

1. Floral biology, emasculation and hybridization techniques in different crop species namely Wheat, Oat, Barley, Chickpea, Lentil, Field pea, Rajma, Horse gram, Rapeseed Mustard, Sunflower, Safflower, Potato, Berseem. Sugarcane, Tomato, Chilli, Onion;
2. Handling of germ plasm and segregating populations by different methods like pedigree, bulk and single seed decent methods;
3. Study of field techniques for seed production and hybrid seeds production in Rabi crops;

4. Estimation of heterosis, inbreeding depression and heritability;
5. Layout of field experiments; Study of quality characters, study of donor parents for different characters;
6. Visit to seed production plots; Visit to AICRP plots of different field crops

Course Name: Practical Crop Production –II (Rabi crops)

Course Code: 20020500

Course Outline

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.

Course Name: Principles of Organic Farming

Course Code: 20020600

Course Outline

Organic farming, principles and its scope in India; Initiatives taken by Government (central/state), NGOs and other organizations for promotion of organic agriculture; Organic ecosystem and their concepts; 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; Operational structure of NPOP; Certification process and standards of organic farming; Processing, leveling, economic considerations and viability, marketing and export potential of organic products.

Course Name: Principles of Organic Farming Lab

Course Code: 20020700

Course Outline

1. Visit of organic farms to study the various components and their utilization;
2. Preparation of enrich compost, vermicompost, bio-fertilizers/bio-inoculants and their quality analysis;

3. Indigenous technology knowledge (ITK) for nutrient, insect, pest disease and weed management;
4. Cost of organic production system; Post harvest management; Quality aspect, grading, packaging and handling.

Course Name: Farm Management, Production & Resource Economics

Course Code: 20020800

Course Outline

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, selection of crops and livestock's enterprises. Concept of risk and uncertainty occurs in agriculture production, nature and sources of risks and its management strategies, Crop/livestock/machinery insurance- weather based crop insurance, features, determinants of compensation. Concepts of resource economics, differences between NRE and agricultural economics, unique properties of natural resources. Positive and negative externalities in agriculture, Inefficiency and welfare loss, solutions, Important issues in economics and management of common property resources of land, water, pasture and forest resources etc.

**Course Name: Farm Management, Production & Resource Economics
Lab**

Course Code: 20020900

Course Outline

1. Preparation of farm layout.
2. Determination of cost of fencing of a farm.
3. Computation of depreciation cost of farm assets.
4. Application of equi-marginal returns/opportunity cost principle in allocation of farm resources.

5. Determination of most profitable level of inputs use in a farm production process. Determination of least cost combination of inputs.
6. Selection of most profitable enterprise combination.
7. Application of cost principles including CACP concepts in the estimation of cost of crop and livestock enterprises.
8. Preparation of farm plan and budget, farm records and accounts and profit & loss accounts. Collection and analysis of data on various resources in India.

Course Name: Principles of Food Science and Nutrition

Course Code: 20021000

Course Outline

Unit I

Concepts of Food Science (definitions, measurements, density, phase change, pH, osmosis, surface tension, colloidal systems etc.); Food composition and chemistry (water, carbohydrates, proteins, fats, vitamins, minerals, flavours, colours, miscellaneous bioactives, important reactions);

Unit II

Food microbiology (bacteria, yeast, moulds, spoilage of fresh & processed foods, Production offermented foods); Principles and methods of food processing and preservation (use of heat, low temperature, chemicals, radiation, drying etc.); Food and nutrition, Malnutrition (over and under nutrition), nutritional disorders; Energy metabolism (carbohydrate, fat, proteins); Balanced/modified diets, Menu planning, New trends in food science and nutrition.

Course Name: Hi-tech. Horticulture

Course Code:20021200

Course Outline

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.

Course Name: Hi-tech. Horticulture Lab

Course Code:20021300

Course Outline

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

Course Name: Protected Cultivation

Course Code:20021400

Course Outline

Protected cultivation- importance and scope, Status of protected cultivation 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, liliun, 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.

Course Name: Protected Cultivation Lab

Course Code:20021500

Course Outline

Raising of seedlings and saplings under protected conditions, use of protrays 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.

Course Name: System Simulation and Agro-advisory

Course Code:20021600

Course Outline

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.

Course Name: System Simulation and Agro-advisory Lab

Course Code: 20021700

Course Outline

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

Course Name: Agricultural Journalism

Course Code: 20021800

Course Outline

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 outting.

Course Name: Agricultural Journalism Lab

Course Code:20021900

Course Outline

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

Course Name: Ability and Skill Enhancement VI

Course Code:20021100

Course Outline – Final Assessment – Report/Presentation

Unit I: Verbal Reasoning & English Aptitude

Logical Sequence of Words, Verbal Analogy, Classification, Blood Relation Test, Syllogism, Reading Comprehension.

Unit II: Winning Attitude

Attitude is the most important thing for success, how to develop a winning attitude, what is it, when we need it, what is mindset, how to have a winning and positive mindset, how to win in difficult situations, Positive thinking, passion, dedication, confidence, well preparation, focus, hard work, planning, never give up, etc - some traits that help in developing winning attitude.

Unit III: Understanding the News

Reading Current News, Comparing & Analysing the news, Write an editorial, News Vocabulary, Presentation on any major news (political/social/sports/economics).

Unit IV: Be a Journalist

Chat Show, Panel Discussion, Parliamentary debate, News Inspired Theatrical Performance.

Unit V: Report

Preparing a report on major National/International News – Insights/ review of major newspapers and news channels.