Detailed Course Scheme

Bachelor of Science (Hons.)

Agriculture

Semester- I

(2020- 24)

DOC202012230003

RNB GLOBAL UNIVERSITY

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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 (December - June) and Even (July-November).**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 for (December-June) Odd Semester 2020 along with examination pattern is as follows:

Course Scheme

Semester –I

S.No.	Course Code	Course Name	L	T	P	Credits
1.	20000100	Principles of Agronomy and Meteorology	2	1	0	3
2.	20000200	Principles of Agronomy and Meteorology Lab	0	0	2	1
3.	20000300	Introduction to Soil Science	2	0	0	2
4.	20000400	Introduction to Soil Science Lab	0	0	2	1
5.	20000500	Elementary Genetics	2	0	0	2
6.	20000600	Elementary Genetics Lab	0	0	2	1
7.	20000700	Statistical Methods	2	1	0	3
8.	20000800	Introduction to Horticulture	2	0	0	2
9.	20000900	Introduction to Horticulture Lab	0	0	2	1
10.	20001000	Principles of Agricultural Economics	2	0	0	2
11.	99002200	Business Communication	3	1	0	4
12.	20001100	Ability and Skill Enhancement - I	2	0	0	2
13.	99002800	Workshops & Seminars	-	-	-	1
14.	99002700	Human Values & Social Service/NCC/NSS	-	-	-	1
	Total		**17**	**3**	**8**	**26**

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	One Mid-term Sessional	25
Marks obtained in various Tests, Assignments, Presentations, Quiz, Tutorials, etc.	Average of marks obtained	20
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: Principles of Agronomy and Meteorology

Course Code: 20000100

Course Outline

Unit I

Agronomy and its scope, seeds and sowing, tillage and tillage, crop density and geometry, Crop nutrition, manures and fertilizers, nutrient use efficiency, water resources, soil-plant-water relationship, crop water requirement, water use efficiency, irrigation-scheduling criteria and methods, quality of irrigation water, logging.

Unit II

Weeds- importance, classification, crop weed competition, concepts of weed management principles and methods, herbicides- classification, selectivity and resistance, allelopathy. Growth and development of crops, factors affecting growth and development, plant ideotypes, crop rotation and its principles, adaptation and distribution of crops, crop management technologies in problematic areas, harvesting and threshing of crops.

Unit III

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,

Unit IV

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.

Suggested Readings:

1. De, Gopal Chandra 1989, Fundamentals of Agronomy. Oxford & IBH Publishing Co., New-Delhi
2. ICAR 1989 Handbook of Agriculture, Indian Council of Agricultural Research, New-Delhi
3. Michael, A.M. and Ojha, T.P. 1986. Principles of Agricultural Engineering, Vol.II Jain Brothers, New Delhi.
4. Morachan, Y.B. 1986, Crop production and management, Oxford & IBH Publishing Co., New-Delhi.
5. Porwal, B.L. and Sharma, D.D. 1991. SashyaVigyanKeAdhunicSiddhant (Hindi) Alka Publishers, Ajmer.
6. Darashikoh – Nuskha Dar Fanni – Falahat (The Art of Agriculture). Translated from Persian to English by Razia Akbar (2000) with commentaries by K.L. Mehra,

K.L. Chadhan, J.S. Kanwar and Y.L. Nene. Asian Agri- History Foundation, Secunderabad, Bull No. 3, pp : 136.
7. Murithy, K, and Radha, V. 1995. Practical Manual on Agricultural Meteorology ,Kalyani Publishers, New-Delhi.

Course Name: Principles of Agronomy and Meteorology Lab

Course Code: 20000200

Course Outline

1. Identification of crops, seeds, fertilizers, pesticides and tillage implements.
2. Study of agro climatic zones of India.
3. Identification of weeds in crops.
4. Methods of herbicide and fertilizer application.
5. Study of yield contributing characters and yield estimation.
6. Seed germination and viability test.
7. Numerical exercises on fertilizer requirement, plant population, herbicides and water requirement,
8. Use of tillage implements-reversible plough.
9. One way plough, harrow, leveler, seed drill.
10. Study of soil moisture measuring devices.
11. Measurement of field capacity, bulk density and infiltration rate, Measurement of irrigation water.
12. Visit of Agro meteorological Observatory, site selection of observatory, exposure of instruments and weather data recording.
13. Measurement of total, shortwave and longwave radiation, and its estimation using Planck's intensity law.
14. Measurement of albedo and sunshine duration, computation of Radiation Intensity using BSS.
15. Measurement of maximum and minimum air temperatures, its tabulation, trend and variation analysis.
16. Measurement of soil temperature and computation of soil heat flux. Determination of vapor pressure and relative humidity.
17. Determination of dew point temperature. Measurement of atmospheric pressure and analysis of atmospheric conditions.
18. Measurement of wind speed and wind direction, preparation of wind rose. Measurement, tabulation and analysis of rain.
19. Measurement of open pan evaporation and evapotranspiration

Course Name: Introduction to Soil Science

Course Code: 20000300

Course Outline

Unit I

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.

Unit II

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.

Unit III

Soil organic matter: composition, properties and its influence on soil properties; humic substances - nature and properties; soil organisms: macro and microorganisms, their beneficial and harmful effects; Soil pollution - behaviour of pesticides and inorganic contaminants, prevention and mitigation of soil pollution.

Suggested Readings

1. Sharma, N.L. & Singh, T.B. (1996) Soil Science (Hindi ed.) Rama pub. House, BarotMerrut(U.P).
2. Baver, L.D. Gardener, W.H. and gardener W.R.(1976) Soil Physics Wiley Eastern Ltd, New Delhi.
3. Biswas, T.D. and Mukherjee, S.K. (2006) Text book of soil science. Tata McGraw Hill publishing Co. Ltd, New Delhi.
4. Brady, N.C. and Weil, R.R. (2002) The nature and properties of soils, prentice hall of India Pvt. Ltd, M-97, Connaught Circus, New Delhi.
5. Das, D.K. (2002) Introductory Soil Science, Kalyani publisher, New Delhi.
6. Rai, M.M. (2002) Principal of Soil Science Mac Millan India Ltd, New Delhi
7. Mehra R.K. (2004) Text book of Soil Science, ICAR, New Delhi
8. ISSS (2002) Fundamentals of Soil Science, Div. of Soil Science, IARI, New Delhi
9. Chopra S.L. and Kanwar, J.S. (1991) Analytical Agricultural Chemistry, Kalyani publisher, Ludhiana.
10. Jackson, M.L. (1973) Soil chemical analysis, Prentice Hall of India, Pvt. Ltd New Delhi.

Course Name: Introduction to Soil Science Lab

Course Code: 20000400

Course Outline

1. Study of soil profile in field.
2. Study of soil sampling tools,
3. Collection of representative soil sample, its processing and storage.
4. Study of soil forming rocks and minerals.
5. Determination of soil density, moisture content and porosity.
6. Determination of soil texture by feel and Bouyoucos Methods.
7. Studies of capillary rise phenomenon of water in soil column and water movement in soil.
8. Determination of soil pH and electrical conductivity.
9. Determination of cation exchange capacity of soil. Study of soil map.
10. Determination of soil colour.
11. Demonstration of heat transfer in soil.
12. Estimation of organic matter content of soil.

Course Name: Elementary Genetics

Course Code: 20000500

Course Outline:

Unit I

Pre and Post Mendelian concepts of heredity, Mendelian principles of heredity Architecture of chromosome; chromonemata, chromosome matrix, chromomeres, centromere, Secondary constriction and telomere; 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.

Unit II

Multiple alleles, pleiotropism and pseudoalleles, Sex determination and sex linkage, sex limited and sex influenced traits, Blood group genetics, Linkage and its estimation, crossing over mechanisms, chromosome mapping. Structural and numerical variations in chromosome andtheir implications Use of haploids, dihaploids and doubled haploids in Genetics.

Unit III

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. Genetic disorders.

Unit IV

Nature, structure & replication of genetic material Protein synthesis, Transcription and translational mechanism of genetic material, Gene concept: Gene structure, function and regulation, Lac and Trp operons.

Suggested Readings

1. Gupta P.K.2004. Cytology, Genetics and evolution. Rastogi Publications, Meerut. (Hindi Edition)
2. Kaushik, M.P.2003. A text Book of Modern Botany. Prakash publications, Muzaffarnagar(UP)
3. Klug, W.W.And Cummings, M.R.2005.Concepts of genetics Pearson Education (Singapore) pvt.Ltd., Indian Branch, Pratapganj, New Delhi.
4. Singh, B.D. 2001.Kalyani Publishing House, New Delhi.
5. Strickberger, M.W.2001.Genetics. Prentice Hall of India. Pvt. Ltd., New Delhi.
6. Shekhawat, A.S.and Tripathi, B.K., 2009. A practical manual on Element of Genetics. Publish by College of Agriculture, Bikaner.

Course Name: Elementary Genetics lab

Course Code: 20000600

Course Outline

1. Study of microscope.
2. Study of cell structure.
3. Mitosis and Meiosis cell division.
4. Experiments on monohybrid, dihybrid, trihybrid, test cross and back cross,
5. Experiments on epistatic interactions including test cross and back cross,
6. Practice on mitotic and meiotic cell division,
7. Experiments on probability and Chi-square test.
8. Determination of linkage and cross-over analysis (through two point test cross and three point test cross data).
9. Study on sex linked inheritance in Drosophila.
10. Study of models on DNA and RNA structures.

Course Name: Statistical Methods

Course Code : 20000700

Course Outline:

Unit I

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,

Unit II

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.

Unit III

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

Suggested Readings

1. Chandel, S.R.S. 1998. Handbook of Agril. Statistics. Achal Prakashan Mandir, Kanpur.
2. Gupta S.P. 2002. Statistical Methods.Sultan Chand & Sons, New Delhi.
3. Agarwal B.L. 1991. Basic Statistics Wiley Eastern, New Delhi.

Course Name: Introduction to Horticulture

Course Code: 20000800

Course Outline:

Unit I

Horticulture - Its definition and branches, importance and scope; horticultural and botanical classification; climate and soil for horticultural crops; Plant propagation-methods and propagating structures; Seed dormancy, Seed germination, principles of orchard establishment.

Unit II

Principles and methods of training and pruning, juvenility and flower bud differentiation; unfruitfulness; pollination, pollinizers and pollinators; fertilization and parthenocarpy;

medicinal and aromatic plants; importance of plant bio-regulators in horticulture Irrigation – methods, Fertilizer application in horticultural crops.

Suggested Readings

1. Bose. T.K., Kabir.J.,Das.P. and Joy.P.P.(2000)Tropical Horticulture. Naya Prokash. Calcutta.
2. Singh, Amar (1986) Fruit Physiology and Production. Kalyani Publishers, New Delhi.
3. Singh. S.P. (1997) Commercial Fruits. Kalyani Publishers, New Delhi.
4. Mitra. S.K., Bose. T.K. and RathoreD.S. (1991) Temperate Fruits. Horticulture & Allied Publishers, Calcutta.
5. Parthasvathy. V. A. Chattopadhyay. P.K. and Bose.T.K. (2006).Plantation Crpos.Naya Prokash, Kolkatta.
6. Bal. J.S. (1997) Fruit Growing. Kalyani Publisher, New Delhi.
7. Chandra, Atul and Chandra, Anju. Production and Post harvest technology of Fruits. NBS Publisher & Distributers, Bikaner.

Course Name: Introduction to Horticulture Lab

Course Code: 20000900

Course Outline

1. Identification of garden tools. Identification of horticultural crops.
2. Preparation of seed bed/nursery bed.
3. Practice of sexual and asexual methods of propagation including micro-propagation. Layout and planting of orchard.
4. Training and pruning of fruit trees.
5. Preparation of potting mixture.
6. Fertilizer application in different crops.
7. Visits to commercial nurseries/orchard.

Course Name: Principles of Agriculture Economics

Course Code: 20001000

Course Outline:

Unit I

Economics: Meaning, scope and subject matter, definitions, activities, approaches to economic analysis; micro and macro economics, positive and normative analysis. Nature of economic theory; rationality assumption, concept of equilibrium, economic laws as generalization of human behavior. Basic concepts: Goods and services, desire, want, demand, utility, cost and price, wealth, capital, income and welfare.

Agricultural economics: meaning, definition, characteristics of agriculture, importance and its role in economic development. Agricultural planning and development in the country.

Unit II

Demand: meaning, law of demand, 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:* Cost concepts, short run and long run cost curves. Supply: Stock v/s supply, law of supply, supply schedule, supply curve, determinants of supply, elasticity of supply.

Unit III

Market structure: meaning and types of market, basic features of perfectly competitive and imperfect markets. Price determination under perfect competition; short run and long run equilibrium of firm and industry, shut down and break even points.

Distribution theory: meaning, factor market and pricing of factors of production. Concepts of rent, wage, interest and profit.

Unit IV

National income: Meaning and importance, circular flow, concepts of national income accounting and approaches to measurement, difficulties in measurement. Good and services tax (GST) - meaning, definition, advantage and disadvantages and its implication on Indian economy.

Tax*:* meaning, direct and indirect taxes, agricultural taxation.

Suggested Readings

1. K.K. Dewett and J.D. Verma (1986) Elementary Economic Theory, S.Chand& Company, New Delhi.
2. P.A. Samuelson & W.D. Nordhaus (1987) Economics, McGraw-Hill, Singapore.
3. S.K. Mishra and V.K. Puri (1996) Indian Economy, Himalaya Publishing House, New Delhi.
4. G.B. Jathar and S.G. Beri (1996) Elementary Principles of Economics, Oxford University Press (10th Edition), Delhi.
5. Berkeley Hill (1980) An Introduction to Economics for students of agriculture, Pergaman Press, Oxford.

Course Name: Business Communication

Course Code: 99002200

Course Outline:

Unit I

Introduction: Theory of Communication, Types and modes of Communication Fundamentals of Communication: Communication defined, Models of Communication, barriers in communication, perception and communication, essentials of good communication.

Unit II

Language of Communication: Verbal and Non-verbal (Spoken and Written) Personal, Social and Business Barriers and Strategies Intra-personal, Inter-personal and Group communication Modes of human communication: Basic differences in the principal modes of human communication – reading, writing, listening, speaking and non-verbal communication. Spoken communication: Importance of spoken communication, designing receiver-oriented messages, comprehending cultural dimension. Speaking Skills Monologue Dialogue Group Discussion Effective Communication/ Mis-communication Interview Public Speech

Unit III

Making Oral presentations: Functions of presentations, defining objective, audience analysis, collection of materials, organization of materials, body language, effective delivery techniques.Written communication: Fundamentals of sentence structure, writing as a process. Reading and Understanding Close Reading Comprehension Summary Paraphrasing Analysis and Interpretation Translation (from Indian language to English and vice-versa) Literary/Knowledge Texts Writing Skills Documenting Report Writing Making notes Letter writing.

Unit IV

Fundamental of technical writing: Special features of technical writing, the word choice, developing clarity and conciseness, Report writing, Business letters, Applications and resumes. Transactional Analysis: Three human ego states, 4 life positions, different types of transactions.

Unit V

The significance of communication in a business organization: Channels of communication – Downwards, Upwards, Horizontal, Consensus, and Grapevine .Literary discussions: Analysis and discussion of the novel The Funda of Mix-ology and short stories from the books under the banyan tree and other stories and popular short stories.

Laboratory work:
Audio-visual aids for effective communication: The role of technology in communication, the role of audio-visuals, designing transparencies, computer-aided presentation software, Software-aided activities in developing communication skills: Proper pronunciation, learning to use the correct tense, Business writing, Report writing, connected speech, Building up vocabulary, Awareness about the common errors in the usage of English, etc.Case studies, group discussions, presentations.

Suggested Readings:

1. Sen, L., Communication Skills. Prentice Hall of India (2004).
2. Dhar, M., The Funda of Mixology: What bartending teaches that IIM does not, Srishti Publications (2008).
3. Narayan, R. K., Under the banyan tree and other stories. Penguin Classics. (2007).

Course Name: Ability & Skill Enhancement I

Course Code: 20001100

Course Outline - Final Assessment – Written Paper

Unit I: Ice Breaking Session & Recap of Language Skills
Ice Breaking Session, Phrase, Clause, Sentence, Word Classes (Parts of Speech).

Unit II: Recap of Language Skills
Tenses (Present, Past Future), Modals, Articles (a, an, the).

Unit III: Reading Skills & Fluency Building
Reading Process, Importance & Types of Reading, Techniques of Reading, and Strategies to Improve Reading Abilities, Comprehension, Reading Aloud, Reading News.

Unit IV: Writing Skills
Generating ideas/gathering data, organizing ideas, Note taking, Outlining, drafting, Editing, and Proof Reading, Story Writing (through pictures/videos), Dialogue Writing, Email Writing.

Unit V: Listening & Speaking Skills
Types and Essentials of good listening, Listening Process, Barriers to Listening and Strategies to improve Listening, Listening to Inspirational Movies/Clips, Listening News Techniques of Effective Speaking, Introducing Oneself and others, Extempore, Situational Conversations (Practicing Short Dialogues).

Note: The review of Syllabus happens on periodic basis for the benefit of the students. In case there are changes in curriculum due to review, students would be intimated in writing.

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