Detailed Course Scheme

Bachelor of Science (Hons.)

Agriculture

Semester- I

(2023- 27)

DOC202306080038

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 for (July-December) Odd Semester 2023 along with examination pattern is as follows:

Course Scheme

Semester –I

S.No.	Course Code	Course Name	L	T	P	Credits
1.	20023400	Fundamentals of Agronomy	2	1	0	3
2.	20023500	Fundamentals of Agronomy Lab	0	0	2	1
3.	20023600	Fundamentals of Soil Science	2	0	0	2
4.	20023700	Fundamentals of Soil Science Lab	0	0	2	1
5.	20026600	Fundamentals of Plant Biochemistry and Biotechnology	2	0	0	2
6.	20026700	Fundamentals of Plant Biochemistry and Biotechnology Lab	0	0	2	1
7.	20024000	a. Introductory Biology*/ b. Elementary Mathematics*	1	0	2	2
	20025100		2	0	0	
8.	20024100	Fundamentals of Horticulture	1	0	0	1
9.	20024200	Fundamentals of Horticulture Lab	0	0	2	1
10 .	20025500	Rural Sociology and Educational Psychology	2	0	0	2
11.	99002200	Business Communication	3	1	0	4
12.	20001100	Ability and Skill Enhancement - I	2	0	0	2
13.	99003300	Workshops & Seminars/ Human Values & SocialService/NCC/NSS	-	-	-	1
	Total		**17**	**2**	**10**	**23**

* Remedial course : any one to be taken based on subject not learnt in 12th Standard

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.

1. Vision

Vision of School of Agriculture is to be established as advanced studies and research and skill-based centre for students and scholars.

2. Mission

Mission of School of Agriculture is to cultivate a scholarly mindset and analytical abilities in students, as well as train them in agricultural sphere, to reach the profession's daunting needs by providing dynamic knowledge in the field of agriculture.

3. Program Educational Objectives (PEOs)

After successful completion of the program, the graduates will be

AGPEO 1: Able to apply concepts of basic and applied sciences to Agriculture

AGPEO 2: Able to design and develop interdisciplinary and innovative systems.

AGPEO 3: Able to inculcate effective communication skills, team work, ethics, leadership in preparation for a successful career in agriculture and R&D organizations.

4. Program Outcomes (POs)

Students graduating with the B.Sc. (Hons.) Agriculture degree should be able to:

PO1. Agriculture knowledge: Apply the knowledge of basic and applied sciences to agriculture, agriculture fundamentals and agriculture specialization to the solution of complex agriculture problems. Apply the knowledge of regenerative agriculture with a conservation and rehabilitation approach to food and farming systems.

PO2. Problem analysis: Identify, formulate, review research literature, and analyze complex agriculture problems reaching substantiated conclusions using first principles of basic and applied sciences. Understand rapid appraisal of agricultural innovation systems, a diagnostic tool that can guide the analysis of complex agricultural problems and innovation capacity of the agricultural system towards futuristic agriculture.

PO3. Design/development of solutions: Design solutions for complex agriculture problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, social, and environmental considerations.

PO4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern agriculture and IT tools including prediction and modelling to complex agriculture activities with an understanding of the limitations. Learning use of GIS, IoT, Automation, Intelligent Systems in Farming & Agriculture development & trading.

PO6. The agriculture graduate and society: Apply reasoning informed by the contextual knowledge to assess social, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional agriculture practices. Recognize, analyze, and evaluate the critical human and social factors impacting agriculture. Understand the social dimensions of agriculture and its connections with food and environmental systems.

PO7. Environment and sustainability: Understand the impact of the professional agriculture solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development.

PO8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the agriculture practice.

PO9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10. Communication: Communicate effectively on complex agriculture activities with the agriculture community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11. Project management and finance: Demonstrate knowledge and understanding of the agriculture and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. Able to design, launch and run a new business, to create job and not to seek for job. Also capable with an effective mix of knowledge, skills, and personal attitudes to be employed initially and function successfully in the required roles.

PO12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

5. Program Specific Outcomes (PSOs)

At the end of the program, the student will be able to:

PSO 1. Clearly understand the concepts and applications in the field of agriculture. Apply the knowledge of crop cultivation, crop improvement, soil and crop management for sustainable organic agricultural production and development.

PSO 2. Associate the learning from the courses related to agriculture to arrive at solutions to real world problems. Analyze and identifying complex agricultural problems and formulating ethical solutions using the principles of agricultural science, and business.

PSO 3. Have the capability to comprehend the technological advancements in the usage of modern design tools to analyze and design subsystems/processes for a variety of applications. Develop innovative processes, products, and technologies to meet the challenges in agriculture and farming practices

PSO 4. Possess the skills to communicate in both oral and written forms, the work already done and the future plans with necessary road maps, demonstrating the practice of professional ethics and the concerns for social and environmental wellbeing.

Course Outcomes (COs):

Course	Course outcomes: - After completion of these courses students should be able to
6.1 Semester – I	
20023400 Fundamentals of Agronomy	**CO1:** What is agronomy and its scope as well as seed and sowing, Tillage and tilth, Crop density and geometry, and crop nutrition. **CO2:** Outline weeds of different crops and classify weeds **CO3:** Experiment with nutrient use efficiency, soil-plant-water relationship, crop water requirement, water use efficiency. **CO4:** Analyse crop weed competition and function various methods of weed management and categorize herbicides. **CO5:** Assess herbicide selectivity, it's resistance and allelopathy effect. Design crop management technologies in problematic areas, formulate harvesting and threshing of crops.
20023500 Fundamentals of Agronomy Lab	**CO1:** What are crops, seeds, fertilizers, pesticides and tillage implement. What are the agro-climatic zones of India. **CO2:** Classify weeds in crops explain Methods of herbicide and fertilizer application. **CO3:** Model yield contributing characters and yield estimation, experiment with Seed germination and viability test **CO4:** Distinguish the use of tillage implements-reversible plough, One way plough, harrow, leveller, seed drill. **CO5:** Measure field capacity, bulk density and infiltration rate and irrigation water.
20023600 Fundamentals of Soil Science	**CO1:** What is processes and factors of soil formation. **CO2:** Explain Soil Profile, components of soil; Soil physical properties: **CO3:** Identify soil-texture, structure. **CO4:** Classify soils of India. **CO5:** Determine Soil reaction-pH, soil acidity and alkalinity.
20023700 Fundamentals of Soil Science Lab	**CO1:** What is soil sampling tools, **CO2:** Explain collection of soil sample, its processing and storage. **CO3:** Identify soil forming rocks and minerals. **CO4:** Analyse of organic matter content of soil. **CO5:** Determination of soil pH and electrical conductivity.
20026600 Fundamentals of Plant Biochemistry and Biotechnology	**CO1:** Define the chemistry of carbohydrates, lipids, proteins and amino acids **CO2:** Explain the invitro propagation and maintenance. **CO3:** Identify the significance of Biochemistry **CO4:** Determine the classification and structural organization of proteins

	CO5: Discuss the importance of plant diversity
20026700 Fundamentals of Plant Biochemistry and Biotechnology Lab	**CO1:** Compare of various tissue culture media and preparation of stock solutions for MS nutrient medium. **CO2:** Interpret the micro-propagation, hardening and acclimatization. **CO3:** Show the gel electrophoresis techniques and DNA finger printing. **CO4:** Develop different concentrated solution and buffers solution. **CO5:** Formulate qualitative tests of carbohydrates, amino acids and protein.
20024000 Introductory Biology	**CO1:** Show the importance of Introductory Biology in agriculture science. **CO2:** Demonstrate internal structure of root, stem and leaf, cell division stages etc. **CO3:** Simplify the knowledge of description of plants-Brassicaceae, Fabaceae and Poaceae **CO4:** Interpret the knowledge of the living world, diversity and characteristics of life, origin of life, Evolution and Eugenics. **CO5:** Elaborate morphology of flowering plants, binomial nomenclature and classification.
20025100 Elementary Mathematics	**CO1:** Find out the definitions about straight lines, Parallel lines, Perpendicular lines and Intercept form of equation of line. **CO2:** Explain the Equation of circle passing through three given points. **CO3:** Make use of Differential Calculus and Integral Calculus in agriculture branch's fields. **CO4:** What about the Matrices and Determinants. **CO5:** Simplify of properties of determinants up to 3rd order and their evaluation of Matrix.
20024100 Fundamentals of Horticulture	**CO1:** Select the basic horticulture, biology, taxonomy, and morphology of fruits and vegetables. **CO2:** Summarize the different methods of propagation and it's use in horticulture. **CO3:** Build the various principles and methods of training, pruning, kitchen gardening, basic principles of orchard establishment and unfruitfulness. **CO4:** Analyse the information related to horticulture as being scientifically based or opinion and contribute to the knowledge based information. **CO5:** Explain the method of seed germination, causes of seed dormancy and breaking method of dormancy breaking.
20024200 Fundamentals of Horticulture Lab	**CO1:** Explain to sexual and asexual methods of propagation including micro-propagation of horticultural crops. **CO2:** Solve the problems about quantity of Fertilizer application in different crops. **CO3:** Build seed bed/nursery bed for different crops. **CO4:** Construct a potting mixture for ornamental crops.

	CO5: Why used Training and pruning of fruit trees.
20025500 Rural Sociology and Educational Psychology	**CO1:** How develop communication skill with farmer and easily implement the agricultural policies. **CO2:** Explain the concepts of rural sociology and educational psychology. **CO3:** Develop the personality for professional world, self-assessment, learn rectification and improvement. **CO4:** Discover the evaluative thinking on need of soft skills (self motivation, learning attitude, positive attitude, aspiring thoughts) while improvising one self. Analyzing attitude on rural society, nature and structure of rural society and components of rural society. **CO5:** Perceive the importance of rural sociology and educational psychology in the field of agriculture.
99002200 Business Communication	**CO1:** Explain historical background and the development of communication; Importance and role of communication in everyday life. **CO2:** Understand Mechanics behind the communication process, difficulties experienced in communication. Different types of communication, impedance due to extraneous factors called "barriers" **CO3:** Apply different types of communication, impedance due to extraneous factors called "barriers". **CO4:** Analyse the Important non-verbal parameters in communication. So to make communication effective and attractive. **CO5:** Apply the appropriate body language for making presentation more effective
20001100 Ability and Skill Enhancement - I	**CO1:** Understand the relevance and method of writing impactful and structured resume. **CO2:** Explain the need for right etiquettes to be followed in the professional world. **CO3:** Develop confidence in public speaking and expressing their opinions and ideas clearly and effectively. **CO4:** Build employability skills like critical thinking, team work, conflict management and leadership skills. **CO5:** Communicate effectively in English
99003300-Workshops/ Seminars/ Human Values/ Social Service/ NCC/ NSS	**CO1:** Relate to the concept of cognitive development and Big Five personality characteristics. Explain the basic fundamentals of Emotional Intelligence. **CO2:** Develop ability to practice new problem-solving skills in a group and use these skills in personal life. Build coping strategies and adapt balanced self- determined behaviour. **CO3:** Find about the working and mechanism of human nature. Classify and explain group behavior at organizational level and individual level. **CO4:** Organize and plan organizational change and stress management practices. Discover various human values and their importance in real world.

	CO5: Create leadership skills to be effective leader and evaluate the hierarchy of human values.

6.2 Mapping: Semester – I

20023400	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	3	2	2	3	2	3	3	2	3	3	2
CO2	3	3	2	3	2	3	2	2	3	3	3	2
CO3	3	2	3	2	2	2	3	3	3	2	3	3
CO4	2	2	3	3	3	3	3	3	2	2	2	2
CO5	2	3	3	2	2	3	2	2	2	3	3	2

20023500	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3	2	3	2	2	3	2	3	3	2	3
CO2	2	3	3	2	2	2	3	2	3	3	2	3
CO3	3	2	3	2	3	3	2	3	2	2	3	2
CO4	2	2	2	3	3	2	3	3	3	3	3	2
CO5	2	3	2	3	2	3	3	2	2	3	2	3

20023600	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	3	2	2	2	2	3	2	2	3
CO2	3	1	3	3	2	2	3	2	3	3	2	3
CO3	2	3	2	2	3	2	2	1	2	3	3	2
CO4	3	3	2	3	3	2	2	3	3	2	2	3
CO5	3	2	3	2	2	3	3	2	2	2	2	2

20023700	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	3	2	2	2	2	3	2	2	3
CO2	2	1	3	3	2	2	3	2	3	3	2	3
CO3	3	3	2	3	2	2	2	1	3	2	3	2

CO4	2	3	2	2	3	3	2	3	2	2	2	2
CO5	3	2	3	2	2	3	3	2	2	2	2	3

20026600	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		2	3	2	2	3	2	2		2	2	2
CO2	2		2		2	2	3	2	2	1	3	2
CO3	2	2	2	2	3	1		2		3	2	
CO4	3	2	1	3		2	2	2	2	2		2
CO5	2	2	2	2	2		2		3		2	3

20026700	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		2	3	2	3	3	2	2		1	2	2
CO2	3		2		2	2	2	2	2	2	3	2
CO3	2	2	1	1	3	1		2		3	2	
CO4	3	2	2	3		2	2	2	2	2		2
CO5	2	2	2	2	2		2		3		2	3

20024000	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	1				1	3	3	3	2	1	1
CO2	2		1		3	3	1		2	2	2	3
CO3	3	3	3	3	3	2	3	2	2	3	3	2
CO4	2	3	3	3	3	2	2	3	1	2	2	2
CO5	1	3	3	3	1	2	1	2	2	1	2	2

20025100	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2		2	3	2	2	2	2	1	3
CO2	3	3		2			1	2	1	2		3

CO3	3	2		3	3	2	2	3	3	3	3	
CO4	2	2	2	3	2	2	2	2	2	2		2
CO5	2	1	2		3	2	2	2	2	1	2	

20024100	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2		2				2	2	2
CO2	2	3	2	3	2			2				2
CO3	3	2	3	3	2	2	2				2	
CO4	2	2	2					2				1
CO5	2	2	2	3	3	3	2	2		3		3

20024200	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	1			2		2	1	3	2
CO2	3	2	3	2		3	2	3	2	2	3	2
CO3	1			3	3	2			2	3	2	
CO4	2	2	2	3	3	2	2	2	3	3	3	2
CO5	3	2	3	3	2	2	2	3		3	3	3

20025500	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	2		2		2	2	2		2
CO2	2	3	3	3			2	2		2		
CO3	3	3	2	2	2	2			2		3	3
CO4	3	2	3		2	2	2				2	
CO5	2	2		3	2			2		2	3	3

99002200	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	2	2	3		1	3	3	1	3

CO2	3	2	2	2	2	2		2	2	3	2	3
CO3	1				1	3		3	2	3	3	3
CO4	2	2	2	2	3	3		3	2	3	3	3
CO5	3	2	3	2	2	2		2	3	2	3	3

20001100	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2		3	3	3			3		3		2
CO2	2		3	3	3			3	3	3	3	3
CO3					2	3		3	3	3	3	2
CO4	2		3	3	3	3	3	3		3	3	2
CO5	3	3	2	2		2	3	2		2		2

99003300	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	3		3		3		3	3	3	3	3
CO2	2	2	3	3	3	2		2		3	2	
CO3	2	3			1	2		3	2	3		3
CO4	3		2	2	3	2		3	2	3	2	3
CO5	3	3	3	3	3	3		3	3	3	3	3

CURRICULUM

Course Name: Fundamental of Agronomy

Course Code: 20023400

Course Outline

Unit I

Agronomy and its scope, seeds and sowing, tillage and tilth, 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, 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.

Course Name: Fundamental of Agronomy Lab

Course Code: 20023500

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.
12. Measurement of irrigation water.

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, NewDelhi
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: Fundamentals of Soil Science

Course Code: 20023600

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; humid substances - nature and properties; soil organisms: macro and microorganisms, their beneficial and harmful effects; Soil pollution - behavior 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: Fundamentals of Soil Science Lab

Course Code: 20023700

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: Fundamentals of Plant Biochemistry and Biotechnology

Course Code: 20026600

Course Outline

Unit I

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 Polysaccharides. 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.

Unit II

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 & Z DNA; 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.

Unit III

Concepts and applications of plant biotechnology: Scope, organ culture, embryo culture, cell suspension culture, callus culture, anther culture, pollen culture and ovule culture and their applications; Micro-propagation methods; organogenesis and embryogenesis, Synthetic seeds and their significance; Embryo rescue and its significance; somatic hybridization and cybrids.

Unit IV

Somaclonal variation and its use in crop improvement; cryo-preservation; Introduction to recombinant DNA methods: physical (Gene gun method), chemical (PEG mediated) and Agrobacterium mediated gene transfer methods; Transgenics and its importance in crop improvement; PCR techniques and its applications; RFLP, RAPD, SSR; Marker Assisted Breeding in crop improvement; Biotechnology regulations.

Course Name: Fundamentals of Plant Biochemistry and Biotechnology Lab

Course Code: 20026700

Practical

1.Preparation of solution, pH & buffers,
2. Qualitative tests of carbohydrates and amino acids.
3. Quantitative estimation of glucose/ proteins.
4. Titration methods for estimation of amino acids/lipids,
5. Effect of pH, temperature and substrate concentration on enzyme action,
6. Paper chromatography/ TLC demonstration for separation of amino acids/ Monosaccharides.
7. Sterilization techniques.
8. Composition of various tissue culture media and preparation of stock solutions for MS nutrient medium.
9. Callus induction from various explants.
10. Micro-propagation, hardening and acclimatization.
11. Demonstration on isolation of DNA.
12. Demonstration of gel electrophoresis techniques and DNA finger printing.

Suggested Readings:

1. Plant Biochemistry- V. Arun Kumar, N. Senthil Kumar and K. Siva Kumar, 2010, APH Publishing Corporation, New Delhi.
2. Biotechnolgy-Expanding Horizons, B.D. Singh, 2014, Kalyani Publishers, Ludhiana.
3. Principles and Techniqes of Biochemistry and Molecular Biology, Eds. Keith Wilson and John Walker, 7th Edition, 2010, Cambridge University Press.
4. A Textbook of Biotechnology, Revised Edtion, 2014, R.C. Dubey, S. Chand Publishing Company, New Delhi.
5. Lehninger Principles of Biochemistry by Albert Lehninger, David Nelson and Michael Cox,
Seventh Edition, 2017 Macmillan Publishers.

Course Name: Introductory Biology

Course Code: 20024000

Course Outline

Unit I

Introduction to the living world, diversity and characteristics of life, origin of life, Evolution and Eugenics. Binomial nomenclature and classification Cell and cell division.

Unit II

Morphology of flowing plants. Seed and seed germination. Plant systematic- viz; Brassicaceae, Fabaceae and Poaceae. Role of animals in agriculture.

1.Morphology of flowering plants – root, stem and leaf and their modifications.
2. Inflorescence
3. Flower and fruits.
4. Cell, tissues.
5. Cell division.
6. Internal structure of root, stem and leaf.
7. Study of specimens and slides.
8. Description of plants - Brassicaceae, Fabaceae and Poaceae.

Suggested Readings:

1. Bendre, A. and Kumar, A. 2012. A Text Book of Practical Botany. Vol. I and II. Rastogi Publiation, Meerut.
2. Kaushik, M. P. 2003. Modern Text Book of Botany. Prakash Publication, Muzaffer Nagar, UP.
3. Pandey, B. P. 2001. Plant Anatomy. S. Chand & Company Ltd., New Delhi.
4. Rastogi, V. B. Oragnic Evolution. Rastogi Publication, Meerut.
5. Saxena and Sarabhai.1989. Text Book of Botany. Rastogi Publication, Meerut.

Course Name: Elementary Mathematics

Course Code: 20025100

Course Outline

Unit I

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 centre and radius is known, General equation of a circle, Equation of circle passing through three given points, Equation of circle whose diameters is line joining two points (x_1, y_1) & (x_2,y_2), Tangent and Normal to a given circle at given point (Simple problems), Condition of tangency of a line $y = mx + c$ to the given circle $x^2 + y^2 = a^2$.

Unit II

Differential Calculus : Definition of function, limit and continuity, Simple problems on limit, Simple problems on continuity, Differentiation of x^n , e^x , 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 y=f (x) (Simple problems based on it).

Unit III

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).

Unit IV

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**.**

Suggested Readings:

1. Krishi Ganita by Gokhroo and Jain
2. Differential Calculus by Gokhroo.
3. Integral Calculus by Gokhroo.

Course Name: Fundamentals of Horticulture

Course Code: 20024100

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: Fundamentals of Horticulture Lab

Course Code: 20024200

Course Outline

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

Course Name: Rural Sociology and Educational Psychology

Course Code: 20025500

Course Outline

Unit I

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.

Unit II

Educational psychology: Meaning & its importance in agriculture extension. Behavior: Cognitive, affective, psychomotor domain, Personality, Learning, Motivation, Theories of Motivation, Intelligence.

Suggested Readings

1. Chitambar, J.B. 1973. Introductory rural sociology. New York, John Wilex and Sons.
2. Desai, A.R. 1978. Rural sociology in India. Bombay, Popular Prakashan, 5th Rev. ed.
3. Doshi, S.L. 2007. Rural sociology. Rawat Publishers, Delhi.
4. Jayapalan, N. 2002. Rural sociology. Altanic Publishers, New Delhi.
5. Sharma, K.L. 1997. Rural society in India. Rawat Publishers, Delhi.
6. Bhatia, H.R. 1965. A Text Book of Educational Psychology, Asia Publishing House, New Delhi.
7. Pujari, D. 2002. Educational Psychology in Agriculture, Agrotech Publishing Academy, Udaipur (Raj.)
8. Bhushan, V. and Sachdeva, D.R. 2010. An introduction to Sociology, Kitab Mahal , New Delhi.
9. Rao, C.N.S. 2015. Sociology, S.Chand & Company, New Delhi.
10. Mondal, S. 2014. Text Book of Rural Sociology and Educational Psychology. Kalyani Publishers, New Delhi.
11. Sharma O. P. and Somani L. L. 2012. Fundamentals of Rural Sociology and Educational Psychology. Agrotech Pub. Co., Udaipur.

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.

6.3 Lesson Plan: Semester – I

20023400 Fundamentals of Agronomy

Unit	Particulars	Class No.	Pedagogy of Class
Unit 1	Agronomy and its scope ; seed, seed rate and sowing methods	C1	Lecture
Unit 1	Tillage, tilth, objective and types of tillage	C2	Lecture
Unit 1	Crop stand establishment, Factors affecting plant population	C3	Lecture
Unit 1	Plant geometry	C4	Lecture
Unit 1	Crop nutrition, Criteria for essentiality of nutrient, Nutrient use efficiency, Manures and fertilizers	C5	Lecture
Unit 1	Advantage of green manuring, Characteristics of green manure crops, Classification of Fertilizers, Application of Fertilizers	C6	Lecture
Unit 1	Application of Fertilizer in Liquid Form, Brown manuring, Biofertilizers, Types of Biofertilizers	C7	Lecture
	Clarification Class	C8	Clarification Class
	Classroom assignment	C9	Classroom assignment
Unit 1	Field applications liquid biofertilizers & Bio NPK consortium, INM, time of irrigation, irrigation methods	C10	Lecture
Unit 1	Sub-surface irrigation, pressurized or modern irrigation systems	C11	Lecture
Unit 1	Drainage, Water Resources, Classification of Water	C12	Lecture
	Water Use Efficiency of Crops, Factors affecting crop water use efficiency	C13	Lecture
Unit-1	Crop water requirement, Factors affecting crop water requirement, Irrigation requirement, Irrigation interval, Irrigation period	C14	Lecture

Unit-1	Irrigation scheduling and types of its approach	C15	Lecture
Unit-2	Crop-weed association	C16	Lecture
Unit-2	Crop weed competition	C17	Lecture
Unit-2	Allelopathy, Factors influencing allelopathy	C18	Lecture
Unit-2	Effect of weed competition on crop growth and yield	C19	Lecture
Unit-2	Losses Caused by Weeds	C20	Lecture
Unit-2	Mechanical weed control	C21	Lecture
Unit-2	Cultural weed control	C22	Lecture
Unit-2	Classification of herbicides	C23	Lecture
Unit-2	Formulations, methods of application, benefits of herbicides	C24	Lecture
Unit-2	Biological control, bio-herbicides/ mycoherbicides	C25	Lecture
Unit-2	Growth, development, ideotype, harvesting, method of harvesting,	C26	Lecture
Unit-2	Adaptation and principle of plant distribution	C27	Lecture
	IInd Assignment	C28	IInd Assignment
	Presentation	C29	Presentation
	Clarification Class	C30	Clarification Class

20023500 Fundamentals of Agronomy Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	Identification of seed, crops, manure and oil cake	P1	Practical
2	Study of agro climatic zone of india and identification of weeds	P2	Practical
3	Methods of herbicides & fertilizer application	P3	Practical
4	Identification of weeds in crops	P4	Practical
5	Methods of herbicide and fertilizer application	P5	Practical
6	Identification of crops, seeds, fertilizers, pesticides and tillage implements	P6	Practical
7	Study of yield contributing characters and yield estimation	P7	Practical
8	Seed germination and viability test	P8	Practical
9	Numerical exercises on fertilizer requirement, plant population, herbicides and water requirement	P9	Practical
10	Use of tillage implements-reversible plough	P10	Practical
11	One way plough, harrow, leveler, seed drill	P11	Practical
12	Study of soil moisture measuring devices	P12	Practical
13	Measurement of field capacity, bulk density and infiltration rate	P13	Practical
14	Study the yield contributing characters and yield estimation	P14	Practical
15	Measurement of irrigation water	P15	Practical

20023600 –Fundamentals of Soil Science

Unit	Particulars	Class No.	Pedagogy of Class
UNIT-I	Soil as a natural body, Pedological and edaphological concepts of soil	C-1	Lecture
Unit-I	Soil genesis: soil forming rocks and minerals	C-2	Lecture
Unit-I	Soil genesis: soil forming rocks and minerals	C-3	Lecture
Unit-I	Weathering, processes and factors of soil formation; Soil Profile, components of soil	C-4	Lecture
Unit-I	Soil physical properties: soil-texture, structure, density and porosity, soil colour, consistence and plasticity	C-5	Lecture
Unit-I	Soil physical properties: soil-texture, structure, density and porosity, soil colour, consistence and plasticity	C-6	Lecture
	Clarification class	C-7	Clarification Class
Unit-II	Elementary knowledge of soil taxonomy classification and soils of India	C-8	Lecture
Unit-II	Soil water retention, movement and availability	C-9	Lecture
	Class room assignment	C-10	Class assignment
Unit-II	Soil air, composition, gaseous exchange, problem and plant growth, Soil temperature	C-11	Lecture
Unit-II	Soil air, composition, gaseous exchange, problem and plant growth	C-12	Lecture
Unit-II	Soil temperature; source, amount and flow of heat in soil	C-13	Lecture
Unit-II	Effect on plant growth	C-14	Lecture
Unit-II	Soil reaction-pH, soil acidity and alkalinity	C-15	Lecture
Unit-II	Buffering, effect of pH on nutrient availability	C-16	Lecture
Unit-II	Soil colloids - inorganic and organic	C-17	Lecture
Unit-II	Silicate clays: constitution and properties	C-18	Lecture

Unit-II	Sources of charge; ion exchange, cation exchange capacity, base saturation	C-19	Lecture
	Clarification class	C-20	Lecture
Unit-III	Soil organic matter: composition, properties and its influence on soil properties	C-21	Lecture
Unit-III	Humic substances - nature and properties	C-22	Lecture
	Quiz	C-23	Quiz
Unit-III	Soil organisms: macro and microorganisms, their beneficial and harmful effects	C-24	Lecture
Unit-III	Soil organisms: macro and microorganisms, their beneficial and harmful effects	C-25	Lecture
Unit-III	Soil pollution - behaviour of pesticides and inorganic contaminants, prevention and mitigation of soil pollution	C-26	Lecture
	Clarification class	C-27	Clarification Class
	Quiz	C-28	Quiz
	Class room assignment-II	C-29	Class Assignment
	Presentation	C-30	Presentation

20023700 – Fundamentals of Soil Science Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	Study of soil profile in field	P1	Practical
2	Study of soil sampling tools	P2	Practical
3	Collection of representative soil sample, its processing and storage	P3	Practical
4	Collection of representative soil sample, its processing and storage	P4	Practical
5	Study of soil forming rocks and minerals	P5	Practical
6	Determination of soil density, moisture content and porosity	P6	Practical
7	Determination of soil texture by feel and Bouyoucos Methods	P7	Practical
8	Studies of capillary rise phenomenon of water in soil column and water movement in soil	P8	Practical
9	Studies of capillary rise phenomenon of water in soil column and water movement in soil	P9	Practical
10	Determination of soil pH and electrical conductivity	P10	Practical
11	Determination of cation exchange capacity of soil. Study of soil map	P11	Practical
12	Determination of cation exchange capacity of soil. Study of soil map	P12	Practical
13	Determination of soil colour	P13	Practical
14	Demonstration of heat transfer in soil	P14	Practical
15	Estimation of organic matter content of soil	P15	Practical

20026600 –Fundamentals of Plant Biochemistry and Biotechnology

Unit	Particulars	Class No.	Pedagogy of Class
UNIT-I	Importance of Biochemistry. Carbohydrate: Importance and classification	C-1	Lecture
Unit-I	Properties of Water, pH and Buffer	C-2	Lecture
Unit-I	Structures of Monosaccharides, Reducing and oxidizing properties of Monosaccharides, Mutarotation	C-3	Lecture
Unit-I	Structure of Disaccharides and Polysaccharides	C-4	Lecture
Unit-I	Lipid: Importance and classification; Structures and properties of fatty acids; storage lipids and membrane lipids.	C-5	Lecture
Unit-I	Proteins: Importance of proteins and classification; Structures, titration and zwitterions nature of amino acids; Structural organization of proteins.	C-6	Lecture
	Clarification class	C-7	Clarification Class
Unit-II	Enzymes: General properties; Classification	C-8	Lecture
Unit-II	Mechanism of action; Michaelis & Menten and Line Weaver Burk equation & plots	C-9	Lecture
	Class room assignment	C-10	Class assignment
Unit-II	Introduction to allosteric enzymes. Nucleic acids: Importance and classification	C-11	Lecture
Unit-II	Structure of Nucleotides, A, B & Z DNA; RNA: Types and Secondary & Tertiary structure	C-12	Lecture
Unit-II	Metabolism of carbohydrates: Glycolysis, TCA cycle, Glyoxylate cycle, Electron transport chain	C-13	Lecture
Unit-II	Metabolism of lipids: Beta oxidation, Biosynthesis of fatty acids	C-14	Lecture

Unit-III	Concepts and applications of plant biotechnology: Scope, organ culture	C-15	Lecture
Unit-III	Embryo culture, cell suspension culture, callus culture	C-16	Lecture
Unit-III	Anther culture, pollen culture and ovule culture and their applications	C-17	Lecture
Unit-III	Micro-propagation methods; organogenesis and embryogenesis	C-18	Lecture
Unit-III	Synthetic seeds and their significance	C-19	Lecture
Unit-III	Embryo rescue and its significance; somatic hybridization and cybrids	C-20	Lecture
Unit-IV	Somaclonal variation and its use in crop improvement; cryo-preservation	C-21	Lecture
Unit-IV	Introduction to recombinant DNA methods: physical (Gene gun method), chemical (PEG mediated) and Agrobacterium mediated gene transfer methods	C-22	Lecture
	Quiz	C-23	Quiz
Unit-IV	Transgenics and its importance in crop improvement	C-24	Lecture
Unit-IV	PCR techniques and its applications; RFLP, RAPD, SSR; Marker	C-25	Lecture
Unit-IV	Assisted Breeding in crop improvement; Biotechnology regulations	C-26	Lecture
	Clarification class	C-27	Clarification Class
	Quiz	C-28	Quiz
	Class room assignment-II	C-29	Class Assignment
	Presentation	C-30	Presentation

20026700 – Fundamentals of Plant Biochemistry and Biotechnology Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	Preparation of solution, pH & buffers	P1	Practical
2	Qualitative tests of carbohydrates and amino acids	P2	Practical
3	Quantitative estimation of glucose	P3	Practical
4	Quantitative estimation of proteins	P4	Practical
5	Titration methods for estimation of amino acids	P5	Practical
6	Titration methods for estimation of lipids	P6	Practical
7	Effect of pH, temperature and substrate concentration on enzyme action	P7	Practical
8	Paper chromatography/ TLC demonstration for separation of amino acids/ Monosaccharides	P8	Practical
9	Sterilization techniques	P9	Practical
10	Composition of various tissue culture media	P10	Practical
11	Preparation of stock solutions for MS nutrient medium.	P11	Practical
12	Callus induction from various explants.	P12	Practical
13	Micro-propagation, hardening and acclimatization	P13	Practical
14	Demonstration on isolation of DNA	P14	Practical
15	Demonstration of gel electrophoresis techniques and DNA finger printing	P15	Practical

20024000 Introductory Biology

Unit	Particulars	Class No.	Pedagogy of Class
Unit-1	Introduction to the living world	C1	Lecture
Unit-1	Diversity and characteristics of life	C2	Lecture
Unit-1	origin of life	C3	Lecture
Unit-1	Evolution	C4	Lecture
Unit-1	Eugenics	C5	Lecture
Unit-1	Binomial nomenclature and classification	C6	Lecture
Unit-1	Cell and cell division	C7	Lecture
Unit-1	Morphology of flowing plants	C8	Lecture
Unit-1	Seed and seed germination	C9	Lecture
Unit-1	Plant systematic, Brassicaceae	C10	Lecture
Unit-1	Fabaceae and Poaceae	C11	Lecture
Unit-1	Role of animals in agriculture	C12	Lecture
Unit-1	Class Room Assignment	C13	Class Room Assignment
Unit-1	Class Room Assignment	C14	Class Room Assignment
Unit-1	Class Room Assignment	C15	Class Room Assignment

20024000 Introductory Biology Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	Morphology of flowering plants – root and its modifications	P1	Practical
2	Morphology of flowering plants – stem and its modifications	P2	Practical
3	Morphology of flowering plants – leaf and its modifications	P3	Practical
4	Morphology of flowering plants - inflorescence	P4	Practical
5	Morphology of flowering plants - flower	P5	Practical
6	Morphology of flowering plants - fruits	P6	Practical
7	Cell, tissues	P7	Practical
8	Cell division	P8	Practical
9	Internal structure of root	P9	Practical
10	Internal structure of stem	P10	Practical
11	Internal structure of leaf	P11	Practical
12	Study of specimens and slides	P12	Practical
13	Description of plants - Brassicaceae	P13	Practical
14	Description of plants - Fabaceae	P14	Practical
15	Description of plants - Poaceae	P15	Practical

20025100 Elementary Mathematics

Unit	Particulars	Class No.	Pedagogy of Class
UNIT-I	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	C-1	Lecture
Unit-I	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	C-2	Lecture
Unit-I	Normal form of equation of line, General form of equation of line, Point of intersection of two st. lines	C-3	Lecture
Unit-I	Angles between two st. lines, Parallel lines, Perpendicular lines, Angle of bisectors between two lines	C-4	Lecture
Unit-I	Area of triangle and quadrilateral. Circle: Equation of circle whose centre and radius is known, General equation of a circle, Equation of circle passing through three given points	C-5	Lecture
Unit-I	Equation of circle whose diameters is line joining two points (x1, y1) & (x2, y2), Tangent and Normal to a given circle at given point (Simple problems), Condition of tangency of a line $y = mx + c$ to the given circle $x^2 + y^2 = a^2$	C-6	Lecture
	Clarification class	C-7	Clarification Class
Unit-II	Differential Calculus : Definition of function, limit and continuity	C-8	Lecture
Unit-II	Simple problems on limit, Simple problems on continuity	C-9	Lecture
	Class room assignment	C-10	Class assignment
Unit-II	Differentiation of x^n , e^x , sin x & cos x from first principle, Derivatives of sum, difference, product and quotient of two functions	C-11	Lecture
Unit-II	Differentiation of functions of functions (Simple problem based on it), Logarithmic differentiation (Simple problem based on it)	C-12	Lecture

Unit-II	Differentiation by substitution method and simple problems based on it, Differentiation of Inverse Trigonometric functions	C-13	Lecture
Unit-II	Maxima and Minima of the functions of the form y=f (x) (Simple problems based on it)	C-14	Lecture
Unit-III	Integral Calculus	C-15	Lecture
Unit-III	Integration of simple functions	C-16	Lecture
Unit-III	Integration of Product of two functions	C-17	Lecture
Unit-III	Integration by substitution method	C-18	Lecture
Unit-III	Definite Integral (simple problems based on it)	C-19	Lecture
Unit-III	Area under simple well-known curves (simple problems based on it)	C-20	Lecture
Unit-IV	Matrices and Determinants	C-21	Lecture
Unit-IV	Definition of Matrices, Addition	C-22	Lecture
	Quiz	C-23	Quiz
Unit-IV	Subtraction, Multiplication	C-24	Lecture
Unit-IV	Transpose and Inverse up to 3rd order	C-25	Lecture
Unit-IV	Properties of determinants up to 3rd order and their evaluation	C-26	Lecture
	Clarification class	C-27	Clarification Class
	Quiz	C-28	Quiz
	Class room assignment-II	C-29	Class Assignment
	Presentation	C-30	Presentation

20024100 Fundamentals of Horticulture

S. No.	Particulars	Class No.	Pedagogy of Class
1	Hort-Definition Importance & Scope	1	Lecture
2	Botanical Class of Hort	1	Lecture
3	Soil & Climate	1	Lecture
4	Nursery	1	Lecture
5	Revision	1	Lecture
6	Propagation	1	Lecture
7	Principles of orchard estabt & Layout	1	Lecture
8	Types of Orchard	1	Lecture
9	Orchard Management	1	Lecture
10	Revision		Activity
11	Water Req & Irrigation Methods for Hort Crops	1	Lecture
12	Seed dormancy	1	Lecture
13	REVISION	REVISION	Activity
14	Principles and methods of training	1	Lecture
15	Principles and methods of pruning	1	Lecture
16	juvenility and flower bud differentiation	1	Lecture
17	Unfruitfulness, Pollination, pollinizers and pollinators	1	Lecture
18	Fertilization and parthenocarpy	1	Lecture
19	Medicinal and Aromatic plants	1	Lecture
20	Importance of plant bio-regulatores in horticulture	1	Lecture
21	Irrigation methods	1	Lecture
22	Fertilizer application in horticulture crops	1	Lecture
23	Revision	1	Activity
24	Home Assignment	2	Activity

20024200 Fundamentals of Horticulture Lab

S. No.	Particulars	Class No.	Pedagogy of Class
1	Identification of Horticultural Crops	1	Practical
2	Identification of garden tools	1	Practical
3	Preparation of seed bed/ nursery bed	1	Practical
4	Propagation Through Cutting and Layering	1	Practical
5	Propagation Through Budding and Grafting	1	Practical
6	Planning, Layout and Planting of Horticultural Crops	1	Practical
7	Training and Pruning of Fruit Crops	1	Practical
8	Preparation of potting mixture	1	Practical
9	Fertilizer application in different crops	1	Practical
10	Visits to commercial nurseries/ orchard	1	Practical

20025500 Rural Sociology and Educational Psychology

Unit	Particulars	Class No.	Pedagogy of Class

Unit I	Sociology and Rural sociology- Meaning, Definition, scope, importance of rural sociology in agricultural extension and interrelationship between rural and urban societies	C1-C2	Lecture
Unit I	Indian rural society, important characteristics, differences and relationship between rural and urban societies	C3	Lecture
Unit I	Social groups- Meaning, Definition, Classification, Factors considered in formation and organization of groups	C4	Lecture
Unit I	Social Stratification-Meaning, Definition, Functions and forms of social stratification	C5	Lecture
	Clarification class	C6	Clarification class
Unit II	Cultural Concepts-Culture, customs, folkways, mores, taboos, rituals and traditions-Meaning, Definition and their role in Agriculture Extension	C7-C8	Lecture
Unit II	Social Values- Meaning, Definition, types and role in Agriculture extension	C9	Lecture
Unit II	Class room Assignment 1 Attitude-Meaning, Definition, types and role in Agriculture extension	C10-C11	Lecture
Unit II	Social institutions- Meaning, Definition, major institutions in rural society, functions	C12-C13	Lecture
Unit II	Social Control-Meaning, Definition, Need and means of social control	C14	Lecture
	Group Discussion-1	C15	Group Discussion
Unit II	Social Change- Meaning, Definition, nature and factors of social change	C16	Lecture
Unit II	Leadership- Meaning, Definition, Classification, role of leaders, mode of selection of leaders	C17-C18	Lecture
	Clarification class	C19	Clarification class
	Test	C20	Test
	Presentation	C21-C24	Presentation
	Quiz-1	C25	Quiz-1

Unit III	Psychology and educational psychology-meaning, definition, scope and importance of educational psychology in agriculture extension	C26-C27	Lecture
Unit III	Intelligence-meaning, definition, types, factors affecting intelligence	C28	Lecture
Unit III	Personality-meaning, definition, types, factors influencing personality and roles of personality in agriculture extension	C29-C30	Lecture
	classroom assignment -2	C31	class assignment
Unit III	Teaching learning process- meaning, definition of teaching, learning, learning experience and learning situation	C32-C33	Lecture
	Group Discussion-2	C34	Group Discussion
Unit III	Elements of learning situation and its characteristics	C35	Lecture
	Clarification Class	C36	Clarification Class
	Quiz-2	C37	Quiz-2
	Presentation	C38-C45	Presentation

99002200 – Business Communication

Unit	Particulars	Class No.	Pedagogy of Class
Unit I	Syllabus, Teaching Pedagogy Reference Books and Text Books	C1	Lecture
Unit I	Introduction: Theory of Communication, Types and modes of Communication	C2	Lecture
Unit I	Fundamentals of Communication: Communication defined, Models of Communication,	C3	Lecture
Unit I	Fundamentals of Communication: Communication defined, Models of Communication,	C4	Lecture
Unit I	Barriers in communication,	C5	Lecture
Unit I	Perception and communication,	C6	Lecture
Unit I	Essentials of good communication.	C7	Lecture
	Clarification Class	C8	Clarification Class
	Activity	C9	Activity
Unit II	Language of Communication: Verbal and Non-verbal (Spoken and Written) Personal,	C10	Lecture
Unit II	Social and Business Barriers and Strategies Intra-personal, Inter-personal and Group communication	C11	Lecture
Unit II	Modes of human communication: Basic differences in the principal	C12	Lecture
Unit II	Webinar	C13	Webinar
Unit II	modes of human communication – reading, writing, listening, speaking and non-verbal	C14	Lecture
Unit II	Activity	C15	Activity
Unit II	Spoken communication: Importance of spoken communication,	C16	Lecture
Unit II	Letter writing	C17	Activity
	Activity	C18	Activity
Unit II	Class Room Assignment	C19	Class Assignment
Unit II	designing receiver-oriented messages, comprehending cultural dimension. Speaking	C20	Lecture

Unit II	Skills Monologue Dialogue Group Discussion Effective Communication/ Miscommunication	C21	Lecture
Unit II	Presentations	C22	Presentation
Unit II	Presentations	C23	Presentation
	Clarification Class	C24	Clarification Class
Unit III	Making Oral presentations: Functions of presentations, defining objective,	C25	Lecture
Unit III	audience analysis, collection of materials, organization of materials,	C26	Lecture
	Activity	C27	Activity
Unit III	body language, effective delivery techniques.	C28	Lecture
	Class Room Assignment	C29	Class Assignment
Unit III	Reading and Understanding Close Reading Comprehension Writing	C30	Lecture
	Webinar	C31	Webinar
	Quiz- Unit-II based (Oral Test)	C32	Quiz
Unit III	Summary Paraphrasing Analysis and Interpretation Translation (from Indian language to English and vice-versa)	C33	Lecture
Unit III	Literary/Knowledge Texts Writing Skills Documenting Report	C34	Lecture
Unit III	Writing Making notes Letter writing.	C35	Lecture
	Presentation	C36	Presentation
	Guest Lecture	C37	Guest Lecture
	Activity	C38	Activity
Unit III	Class Room Assignment	C39	Class Assignment
	Video Lecture	C40	Lecture
	Presentation	C41	Presentation
Unit III	Clarification Class	C42	Clarification Class

UNIT IV	Fundamental of technical writing: Special features of technical writing, the word choice,	C43	Lecture
UNIT IV	Fundamental of technical writing: Special features of technical writing, the word choice,	C44	Lecture
UNIT IV	developing clarity and conciseness, Report writing, Business letters, Applications and resumes	C45	Lecture
UNIT IV	Report Writing	C46	Lecture
UNIT IV	Transactional Analysis: Three human ego states, 4 life positions, different types of transactions	C47	Lecture
UNIT IV	Clarification Class	C48	Clarification Class
UNIT IV	Activity	C49	Activity
	quiz- Unit-III & IV based (Oral Test)	C50	Quiz
Unit V	The significance of communication in a business organization: Channels of communication – Downwards, Upwards, Horizontal, Consensus, and Grapevine.	C51	Lecture
Unit V	The significance of communication in a business organization: Channels of communication – Downwards, Upwards, Horizontal, Consensus, and Grapevine.	C52	Lecture
Unit V	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.	C53	Lecture
Unit V	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.	C54	Lecture
Unit V	Class Room Assignment	C55	Class Assignment
Unit V	Clarification Class	C56	Clarification Class
	Unit-I	C57	Lecture
	Unit-II	C58	Lecture
	Unit-III	C59	Lecture
	Unit-IV & V	C60	Lecture

20001100 – Ability and Skill Enhancement

Unit	Particulars	Class No.	Pedagogy of Class
UNIT I	Ice Breaking Session & Recap of Language Skills	C-1	Activity
UNIT I	Ice Breaking Session& Recap of language	C-2	Lecture
UNIT I	Phrases, clause, sentence	C-3	Lecture
UNIT I	Phrases, clause, sentence	C-4	Lecture
UNIT I	Word Classes (part of Speech)	C-5	Lecture
UNIT I	Word Classes (part of Speech)	C-6	Lecture
UNIT I	Clarification class	C-7	Clarification Class
UNIT I	Tenses	C-8	Lecture
UNIT I	home Assignment		Home Assignment
UNIT II	Recap of Language Skills		
Unit II	Class Room Assignment	C-9	Class Room Assignment
Unit II	Modals	C-10	Lecture
UNITII	Articles	C-11	Lecture
Unit II	Clarification class/activity	C-12	Clarification Class
Unit II	Activity	C-13	Activity
	Home Assignment		Home Assignment
Unit III	Importance of Reading	C-14	Activity/comprehension
Unit III	comprehension/Reading news	C-15	Lecture
Unit III	Reading News	C-16	Activity
Unit III	Writing Skills generating ideas	C-17	Lecture
Unit III	Activity	C-18	Activity
Unit III	Clarification class	C-19	Clarification Class
	Presentation	C-20	Presentation
Unit IV	Email-writing/Note taking	C-21	Lecture

Unit IV	Proof Reading / Story writing	C-22	Lecture
Unit IV	Clarification class	C-23	Lecture
Unit IV	Dialogue writing short and Debate	C-24	Lecture
Unit-IV	Listening to inspirational movies/Clips	C-25	Presentation
Unit-IV	Techniques to improve speaking skill introduce yourself	C-26	Lecture
UNIT IV	Seminar	C-27	Seminar
Unit-IV	Webinar	C-28	Webinar
Unit -IV	Guest Lecture	C-29	Guest lecture
Unit-IV	Clarification class	C-30	Clarification Class

Note:

This is a tentative lesson plan. The same may change from faculty to faculty as per the teaching pedagogy adopted by the faculty.

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