

MRSPTU B.SC. (HONS.) AGRICULTURE SYLLABUS 2021 BATCH ONWARDS

Total Contact Hours= (28+2***)/(27+2***)**

Total Marks=1200

Total Credits=21

SEMESTER WISE COURSE DISTRIBUTION

First Semester								
Sr. No.	Subject Code	Name of the Subject	Contact Hours		Marks Distribution			Credits
			Theory	Practical	Internal	External	Total	
1.	BAGRS1-151	Agricultural Heritage	1	0	40	60	100	1
2.	BAGRS1-152	Rural Sociology and Educational Psychology	2	0	40	60	100	2
3.	BAGRS1-153	Fundamentals of Soil Science	2	0	40	60	100	2
4.	BAGRS1-154	Fundamentals of Agronomy	3	0	40	60	100	3
5.	BAGRS1-155	Fundamentals of Plant Biochemistry	2	0	40	60	100	2
6.	BAGRS1-156	Introduction to Forestry	1	0	40	60	100	1
7.	BAGRS1-157	Fundamentals of Horticulture	1	0	40	60	100	1
8.	BAGRS1-158 BAGRS1-169	Introductory Biology* / Introductory Mathematics**	1	0	20	30	50	1
			2	0	40	60	100	2
9.	BAGRS1-159	Fundamentals of Soil Science Lab	0	2	20	30	50	1
10.	BAGRS1-160	Fundamentals of Agronomy Lab	0	2	20	30	50	1
11.	BAGRS1-161	Fundamentals of Plant biochemistry Lab	0	2	20	30	50	1
12.	BAGRS1-162	Introduction to Forestry Lab	0	2	20	30	50	1
13.	BAGRS1-163	Fundamentals of Horticulture Lab	0	2	20	30	50	1
14.	BAGRS1-164	Introductory Biology Lab	0	2	20	30	50	1
15.	BAGRS1-165	Comprehension and Communication Skills in English	1	0	40	60	100	1
16.	BAGRS1-166	Comprehension and Communication Skills in English Lab	0	2	20	30	50	1
17.	BAGRS1-167	Human Value & Ethics (Non-gradual)	1***	0***	Satisfactory/Unsatisfactory	-	Non-credit	-
18.	BAGRS1-168	NSS/NCC/Physical Education & Yoga Practices(Non-gradual)	0***	1***	Satisfactory/Unsatisfactory	-	Non-credit	-
		Total	15+1***	12+1***	520	780	1300	23

*Remedial Course for Non-Medical Students

**Remedial Course for Medical Students

SEMESTER I

AGRICULTURAL HERITAGE

Subject Code: BAGRS1-151

L P C
1 0 1

Duration: 15 Hrs.

SECTION-A (4 Hours)

Introduction of Indian agricultural heritage; Ancient agricultural practices, Relevance of heritage to present day agriculture;

SECTION-B (4 Hours)

Past and present status of agriculture and farmers in society; Journey of Indian agriculture and its development from past to modern era; Plant production and protection through indigenous traditional knowledge;

SECTION-C (4 Hours)

Crop voyage in India and world; Agriculture scope; Importance of agriculture and agricultural resources available in India; Crop significance and classifications;

SECTION-D (4 Hours)

National agriculture setup in India; Current scenario of Indian agriculture; Indian agricultural concerns and future prospects.

References: (1) Md. Hedayetullah and UtpalGiri (2020) Text Book of Agricultural Heritage.
(2)Dr. Om Prakashand Subodh Kumar (2020) Agricultural Heritage
(3) M.M. Adhikary (2020) Text Book of Agricultural Heritage.
(4) R.C.Saxena, S.L. Choudhary and Y.L. Naine (2020) Textbook on Ancient History of Indian Agriculture

RURAL SOCIOLOGY & EDUCATIONAL PSYCHOLOGY

Subject Code: BAGRS1-152

LPC
202

Duration: 30 Hrs.

Section-A (7 Hours)

Sociology and Rural sociology: Definition and scope, its significance in agriculture extension.

Section-B (8 hours)

Social Ecology; Rural society, Social Groups, Social Stratification, Culture concept, Social Institution, Social Change & Development.

Section-C(8 Hours)

Educational psychology: Meaning & its importance in agriculture extension. Behaviour: Cognitive, affective, psychomotor domain.

Section-D(7 Hours)

Personality, Learning, Motivation, Theories of Motivation, Intelligence.

References: (1) Chandra, S., Kumar,S. and Kailash (2020) An Introduction to Agricultural Social Science.

(2) R. Velusamy (2020) Textbook on Rural Sociology and Educational Psychology

- (3) Sagar Mondal (2020) Textbook on Rural Sociology and Educational Psychology
(4) Dr. S.S. Khandave (2020) Textbook on Rural Sociology and Educational Psychology

FUNDAMENTALS OF SOIL SCIENCE

Subject Code: BAGRS1-153

**LPC
202**

Duration: 30 Hrs.

SECTION-A (8 hours)

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;

SECTION-B (7 hours)

Soil physical properties: soil-texture, structure, density and porosity, soil colour, consistence and plasticity; Elementary knowledge of soil taxonomy classification; soils of India; Soil water retention, movement and availability;

SECTION-C (7 Hours)

Soil air, composition, gaseous exchange, problem and plant growth; source, amount and flow of heat in soil; soil temperature and plant growth; Soil reaction-pH, soil acidity and alkalinity, buffering, effect of pH on nutrient availability;

SECTION-D (8 hours)

Soil colloids - inorganic and organic; silicate clays: constitution and properties; sources of charge; ion exchange; cation exchange capacity; base saturation; soil organic matter: composition, properties and its influence on soil properties; humic substances- nature and properties; soil organisms: macro and micro organisms, their beneficial and harmful effects; Soil pollution – behavior of pesticides and inorganic contaminants, prevention and mitigation of soil pollution.

References:

- (1) V.N. Sahai (2016) Fundamental of Soil Science
- (2) Shivan and Tolanur (2018) Fundamental of Soil Science
- (3) Donald Cronin (2018) Soil Science conservation and Nutrients managements
- (4) R.L. Arya and Khalil Khan (2020) Fundamental of Soil Science

FUNDAMENTALS OF AGRONOMY

Subject Code: BAGRS1-154

**LPC
303**

Duration: 45 Hrs.

SECTION-A (10 hours)

Agronomy and its scope, seeds and sowing, tillage and tilth, crop density and geometry, Crop nutrition, manures and fertilizers, nutrient use efficiency.

SECTION-B (11 Hours)

Water resources, soil plant water relationship, crop water requirement, water use efficiency, irrigation-scheduling criteria and methods, quality of irrigation water, water logging.

SECTION-C (12 Hours)

Weeds- importance, classification, crop weed competition, concepts of weed management principles and methods, herbicides- classification, selectivity and resistance, allelopathy.

SECTION-D (12 Hours)

Growth and development of crops, factors affecting growth and development, plant ideo types, crop rotation and its principles, adaptation and distribution of crops, crop management technologies in problematic areas, harvesting and threshing of crops.

References: (1) A.K. Vyash and Rishi Raj (2009) Introduction to Agriculture
(2) Arun Katyan (2018)Fundamental of Agriculture (Volume-I & II)
(3) S.R. Ready (2019) Principles of Agronomy
(4) B.S. Lalitha, M. Sannagoudar and G. Ready (2019))Fundamental of Agronomy

FUNDAMENTALS OF PLANT BIOCHEMISTRY

Subject Code: BAGRS1-155

**L P C
2 0 2**

Duration: 30 Hrs.

SECTION-A (8 Hours)

Importance of Biochemistry. Properties of Water, pH and Buffer.

SECTION-B (7 Hours)

Carbohydrate: Importance and classification. Structures of Monosaccharides, Reducing and oxidizing properties of Monosachharides, Mutarotation; Structure of Disaccharides and Polysaccharides.

SECTION-C (7 Hours)

Lipid: Importance and classification. Proteins: Importance of proteins and classification; Structure and properties of fatty acids; storage lipids and membrane lipids.Structures, titration and zwitter ions, nature of amino acids; Structural organization of proteins. Enzymes: General properties; Classification; Mechanism of action.

SECTION-D (8 Hours)

Nucleic acids: Importance and classification; Structure of Nucleotides, A, B & Z DNA; RNA: Types and Secondary & Tertiary structure. Metabolism of carbohydrates: Glycolysis, TCA cycle, Electron transport chain. Metabolism of lipids: Beta oxidation, Biosynthesis of fatty acids.

References: (1) S. Chand (2015) Fundamental of Biochemistry
(2) Dr. V. Arun Kumar and Dr. K. Senthil Kumar(2018)Fundamental Plant Biochemistry
(3) RanjanKatoch (2018)Fundamental Plant Biochemistry and Biotechnology
(4) Dr. B.K. Yadav and Dr. Lalu Singh (2018)Fundamental Plant Biochemistry and Biotechnology

INTRODUCTION TO FORESTRY

Subject Code: BAGRS1-156

**LPC
101**

Duration: 15 Hrs.

SECTION-A (4 Hours)

Introduction – definitions of basic terms related to forestry, objectives of silviculture, forest classification, salient features of Indian Forest Policies. Forest regeneration, Natural regeneration- natural regeneration from seed and vegetative parts, coppicing, pollarding, root suckers;

SECTION-B (3 Hours)

Artificial regeneration – objectives, choice between natural and artificial regeneration, essential preliminary considerations. Crown classification. Tending operations – weeding, cleaning, thinning – mechanical, ordinary, crown and advance thinning. Forest mensuration – objectives, diameter

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measurement, instruments used in diameter measurement; Non instrumental methods of height measurement - shadow and single pole method;

SECTION-C (4 Hours)

Instrumental methods of height measurement - geometric and trigonometric principles, instruments used in height measurement; tree stem form, form factor, form quotient, measurement of volume of felled and standing trees, age determination of trees.

SECTION-D (4 Hours)

Agroforestry – definitions, importance, criteria of selection of trees in agroforestry, different agroforestry systems prevalent in the country, shifting cultivation, taungya, alley cropping, windbreaks and shelter belts, home gardens. Cultivation practices of two important fast growing tree species of the region.

References: (1) A.P. Dwivedi (2017) Agroforestry Principles and Practices
(2) K. Maniknanda and S. Prabhu (2018) Indian Forestry
(3) S.R. Ready and C. Nagamani (2019) Introduction to Forestry
(4) ST. Praveen Dhar (2016) Introduction to Forestry

FUNDAMENTALS OF HORTICULTURE

Subject Code: BAGRS1-157

**LPC
101**

Duration: 15 Hrs.

SECTION-A (4 Hours)

Horticulture - Its definition and branches, importance and scope; horticultural and botanical classification; principles of orchard establishment; climate and soil for horticultural crops;

SECTION-B (4 Hours)

Plant propagation-methods and propagating structures; Seed dormancy, Seed germination,

SECTION-C (4 Hours)

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

SECTION-D (3 Hours)

Importance of plant bio-regulators in horticulture. Irrigation – methods, Fertilizer application in horticultural crops.

References: (1) Dr. N. Kumar (2016) Introductory of Horticulture
(2) Rajaneesh Singh and B.K.Singh(2020)Textbook on Horticulture
(3) V.M. Prashad, S.B. Lal and P.K.Karahana(2018)Fundamental of Horticulture
(4) Jitendra Singh (2017) Basic Horticulture

INTRODUCTORY BIOLOGY

Subject Code: BAGRS1-158

**LPC
101**

Duration: 15 Hrs.

Section-A (4 Hours)

Introduction to the living world, diversity and characteristics of life.

Section-B (3 Hours)

Origin of life, Evolution and Eugenics. Binomial nomenclature and classification Cell and cell division.

Section-C (4 Hours)

Morphology of flowering plants. Seed and seed germination.

Section-D (4 Hours)

Plant systematic- viz; Brassicaceae, Fabaceae and Poaceae. Role of animals in agriculture.

- References:**
- (1) Arihant(2017) Handbook of Biology
 - (2) M.P. Pendarvis and J.L. Craley (2017) Exploring Biology
 - (3) J. E. Bidlack (2019) Plant Biology
 - (4) J. E. Bidlack and S.H Jamely(2013) Introductory Plant Biology

INTRODUCTORY MATHEMATICS

Subject Code: BAGRS1-169

**LPC
202**

Duration: 30 Hrs.

SECTION-A (5 Hours)

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.

SECTION—B (8 Hours)

Intercept form of equation of line, Normal form of equation of line, General form of equation of line, Point of intersection of two straight lines, Angles between two straight lines, Parallel lines, perpendicular lines, Angle of bisectors between two lines, Area of triangle and quadrilateral.

SECTION—C (7 Hours)

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 a given point (Simple Problems), Conditions of tangency of a line, $y = mx + c$ to the given circle $x^2 + y^2 = a^2$

SECTION—D (10 Hours)

Definition of function, limit and continuity (of algebraic functions); Simple problems on limit, Simple Problems on Continuity.

Differential Calculus: Differentiation of algebraic functions, exponential functions and logarithmic differentiation (excluding trigonometric functions). Derivative of sum, difference, product and quotient of two functions. Differentiation of functions (simple problems based on it), logarithmic differentiation (simple problems based on it), differentiation by substitution method and simple problems based on it, Differentiation of Inverse Trigonometric functions. Maxim and Minima of the functions of the form, $y = f(x)$ (simple problems based on it).

Integral Calculus: Integration of simple functions; Integration of Product of two functions, Integration by substitution method, Definite Integrals (of algebraic functions). Area under simple well known curves (simple problems based on it).

Matrix: Definition of Matrices, Addition, Subtraction, Multiplication, Transpose of matrix up to 3rd order.

Determinants: Properties of determinants and their evaluation, Inverse of matrix up to 3rd order. Matrix method.

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- References:** (1) V. Govorov, N. Miroschin, P. Dybov (2016) Problems in Mathematics
(2) Arihant (2019) Handbook of Mathematics
(3) G. Smith (2012) Introductory Mathematics: Algebra and Analysis
(4) S.K. Goyal (2018) Problem Books in Mathematics

FUNDAMENTALS OF SOIL SCIENCE LAB

Subject Code: BAGRS1-159

**LP C
0 2 1**

Duration: 30 Hrs.

Practical:

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

FUNDAMENTALS OF AGRONOMY LAB

Subject Code: BAGRS1-160

**LPC
021**

Duration: 30 Hrs.

Practical:

Identification of crops, seeds, fertilizers, pesticides and tillage implements, Study of Agro-climatic zones of India. Effect of sowing depth on germination and seedling vigour, Identification of weeds in crops, Methods of herbicide and fertilizer application, Study of yield contributing characters and yield estimation, Seed germination and viability test, Numerical exercises on fertilizer requirement, plant population, herbicides and water requirement, Use of tillage implements-reversible plough, one way plough, harrow, leveller, seed drill, Study of soil moisture measuring devices, Measurement of field capacity, bulk density and infiltration rate, Measurement of irrigation water.

FUNDAMENTALS OF PLANT BIOCHEMISTRY LAB

Subject Code: BAGRS1-161

**LP C
0 2 1**

Duration: 30 Hrs.

Practical

Preparation of solution, pH & buffers, Qualitative tests of carbohydrates, amino acids and proteins. Paper chromatography, Sterilization techniques. Quantitative estimation of glucose/proteins. Titration methods for estimation of amino acids/lipids, Effect of pH, temperature and substrate concentration on enzyme action, paper chromatography/ TLC demonstration for separation of amino acids/Monosachhrides, sterilization techniques. Composition of various tissue culture media and preparation of stock solutions for MS nutrient medium. Callus induction from various explants, micropropagation hardening and acclimitization. Demonstration on isolation of DNA. Demonstration of gel electrophoresis techniques and DNA finger printing.

INTRODUCTION TO FORESTRY LAB

Subject Code: BAGRS1-162

**LP C
0 2 1**

Duration: 30 Hrs.

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

FUNDAMENTALS OF HORTICULTURE LAB

Subject Code: BAGRS1-163

**LP C
0 2 1**

Duration: 30 Hrs.

Practical

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

INTRODUCTORY BIOLOGY LAB

Subject Code: BAGRS1-164

**LP C
0 2 1**

Duration: 30 Hrs.

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

COMPREHENSION AND COMMUNICATION SKILLS IN ENGLISH

Subject Code: BAGRS1-165

**LPC
101**

Duration: 15 Hrs.

Selected Short Stories of eminent writers from India and abroad: Rabindranath Tagore, Mulk Raj Anand, Premchand, R K Narayan, Isaac Asimov (Science Fiction), Sudha Murthy, Leo Tolstoy, O Henry, Anton Chekhov, Guy De Maupassant, K A Abbas Basic Grammar: Articles, Prepositions, Concord, Transformation, Synthesis, Reported Speech, Active- Passive Voice

References: (1) Varinder Kumar and Bodh Raj (2019) Comprehension and Communication Skills in English

(2) P.N. Khare and V. Gandhi (2019) Communication Skills in English

(3) Dr. Neeta Chakraborty (2012) Communication Skills in English

(4) Sanjay Kumar and PushpLata(2018) Communication Skills

COMPREHENSION AND COMMUNICATION SKILLS IN ENGLISH (PRACTICAL)

Subject Code: BAGRS1-166

**LP C
0 2 1**

Duration: 30 Hrs.

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

HUMAN VALUES & ETHICS

Subject Code: BAGRS1-167

**L P C
1 0 0**

Duration: 15 Hrs.

Section-A (4 Hours)

Values and Ethics-An Introduction. Goal and Mission of Life.

Section-B (3 Hours)

Vision of Life. Principles and Philosophy. Self-Exploration. Self-Awareness. Self-Satisfaction.

Section-C (4 Hours)

Decision Making Motivation. Sensitivity. Success. Selfless Service. Positive Spirit.

Section-D (4 Hours)

Case Study of Ethical Lives. Body, Mind and Soul. Attachment and Detachment. Spirituality Quotient. Examination

References: (1) T. Shukla, A. Yadav and G.S. Chauhan (2020) Human Value and Professional Ethics

(2) S. Chand and J. Suresh (2005) Human Value and Professional Ethics

(3) (2) S. K. Chakraborty and D. Chakraborty (2018) Human Value and Ethics

(4) A.N. Tripathi(2018) Human Value

NSS / NCC / PHYSICAL EDUCATION AND YOGA PRACTICES

Subject Code: BAGRS1-168

**LP C
0 1 0**

Duration: 15 Hrs.

Teaching of skills of Football/basketball/kabaddi/badminton/table tennis/yoga – demonstration, practice of the skills, correction, involvement in game situation, teaching of rules of the game (For girls teaching of Tennikoit) Teaching – Meaning, Scope and importance of Physical Education Teaching – Definition, Type of Tournaments Teaching – Physical Fitness and Health Education Construction and laying out of the track and field (*The girls will have Tennikoit and Throw Ball

References: (1) Dr. NeerajPratap Singh (2020) Health, Physical Educations and Yoga

(2) P.K. Sharma (2015) NCC/NSS/Physical Educations and Yoga Practices

(3) Kapil Sharma (2018) Yoga and Exercises

(4) Sanjiv Nair (2019) Health, Yoga and Physical Education