



# Kamla Nehru Institute of Physical & Social Sciences, Sultanpur (UP)-228118

संकायक सं० १

(An Autonomous Institute)

'NAAC - 'A' Grade'

Structure of syllabus for the program

B.Sc. : Subject- Agriculture (Dept. of Biochemistry & Crop Physiology)

Syllabus developed/proposed by

S.No.	Name	Designation	Department	College/University/Address
1.	Dr. Sarita Devi Gupta	Convenor	Biochemistry	K.N.I.P.S.S., Sultanpur
2.	Dr. R.P. Singh	Member (Nominee Academic Council)	Biochemistry	A.N.D.U.A.T., Kumarganj, Ayodhya
3.	Dr. R.K. Yadav	Member (Nominee Academic Council)	Crop Physiology	A.N.D.U.A.T., Kumarganj, Ayodhya
4.	Dr. Pratibha Singh	Member (Nominee V.C., Dr. RMLAU)	Biochemistry	A.N.D.U.A.T., Kumarganj, Ayodhya
5.	Sri Baldev Singh (Industrialist)	Member (Nominated Principal)	NA	Punjabi Colony, Kurwara Naka, Sultanpur
6.	Sri Jagjeet Singh (Ex-student)	Member (Nominated Principal)	NA	Near Vijay Delux, Laldiggi, Sultanpur

As per syllabus development guidelines of Higher Education for UG Course-

(Dr. R.P. Singh)

Member (Nominee Academic Council)  
A.N.D.U.A.T., Kumarganj, Ayodhya

(Dr. Pratibha Singh)

Member (Nominee V.C., Dr. RMLAU)  
A.N.D.U.A.T., Kumarganj, Ayodhya

(Sri Jagjeet Singh)

Ex-student  
Member (Nominated Principal)  
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कमला नेहरू भौतिक एवं सामाजिक विज्ञान संस्थान, सुलतानपुर-228118

KAMLA NEHRU INSTITUTE OF PHYSICAL & SOCIAL SCIENCES SULTANPUR-228118

(FACULTY OF AGRICULTURE, SULTANPUR U.P.)

**UNDER GRADUATE CURRICULAR & SYLLABUS**

**B.Sc. (Hons.) Agriculture**

Semester System as per ICAR V<sup>th</sup> Deans Committee Report

**DEPARTMENT OF BIOCHEMISTRY & CROP PHYSIOLOGY**

Course Code	Course Title	Credit Hours
AG-201	Fundamentals of Crop Physiology	3(2+1)
AG-202	Fundamentals of Plant Biochemistry	3(2+1)
AG-308	Environmental Studies and Disaster Management	2(1+1)
AG-110	Introductory Biology	2(1+1)

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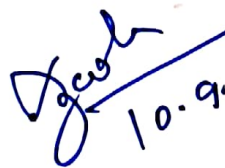
**Theory**

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

**Practical**

Study of plant cells, structure and distribution of stomata, imbibitions, osmosis, plasmolysis, measurement of root pressure, rate of transpiration, Separation of photosynthetic pigments through paper chromatography, Rate of transpiration, photosynthesis, respiration, tissue test for mineral nutrients, estimation of relative water content, Measurement of photosynthetic CO<sub>2</sub> assimilation by Infra Red Gas Analyser (IRGA).

  
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**Theory:**

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

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

**Enzymes:** General properties; Classification; Mechanism of action, Factors affecting enzyme activity.

**Nucleic acids:** Importance and classification; Structure of Nucleotides; A, B & Z DNA; Watson-Crick model of DNA double helix; RNA: Types.

**Metabolism of carbohydrates:** Glycolysis, TCA cycle, Glyoxylate cycle.

**Metabolism of lipids:** Beta oxidation, Biosynthesis of fatty acids.

**Practical:**

Preparation of solution, pH & buffers; Qualitative tests of carbohydrates and amino acids. Quantitative estimation of glucose/ proteins. Titration methods for estimation of amino acids/lipids, Effect of pH, temperature and substrate concentration on enzyme action, Estimation of Acid value, Saponification number and Iodine number of fats and oils; Estimation of reducing and non reducing sugar in cane sugar juice.

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## Theory

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

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global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, dies, Wasteland reclamation, Consumerism and waste products. Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and control of Pollution) Act. Wildlife Protection Act. Forest Conservation Act. Issues involved in enforcement of environmental legislation. Public awareness. Human Population and the Environment: population growth, variation among nations, population explosion, Family Welfare Programme . Environment and human health: Human Rights, Value Education. HIV/AIDS. Women and Child Welfare. Role of Information Technology in Environment and human health.

### **Disaster Management**

Natural Disasters- Meaning and nature of natural disasters, their types and effects. Floods, drought, cyclone, earthquakes, landslides, avalanches, volcanic eruptions, Heat and cold waves, Climatic change: global warming, ozone depletion. Man Made Disasters- Nuclear disasters, chemical disasters, biological disasters. building fire, coal fire, forest fire, oil fire, air pollution, water pollution, deforestation, industrial waste, water pollution. Disaster Management- Effect to migrate natural disaster at national and global levels. International strategy for disaster reduction. Concept of disaster management, national disaster management framework; financial arrangements; role of N(it)s, community - based organizations and media. Central, state, district and local administration.

### **Practical**

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

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## 1. Introductory Biology

2(1+1) AG-110

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

**Practical** 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.

  
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