

FACULTY OF AGRICULTURAL SCIENCES

University of the Punjab, Lahore

Programme	B.Sc. (Hons.) Agriculture	Course Code	Agro-311	Credit Hours	3(2-1)
Course Title	Agri-informatics				
Course Introduction					
<p>This course is designed to provide a comprehensive understanding of bioinformatics in agriculture. It is essential to enhance and optimize agricultural processes using information and communication technologies. The agri-informatics are vital as they It aims to improve productivity, efficiency, and sustainability in farming practices by integrating data-driven approaches, precision agriculture, and decision support systems. Its goals include maximizing crop yield, minimizing resource wastage, and enabling farmers to make informed decisions based on real-time data and analytics..</p>					
Learning Outcomes					
<p>Upon completing the course, students will:</p> <ol style="list-style-type: none"> 1. Understand the basic concept and application of computer in Agriculture. 2. Apply of e-Agriculture for increasing farm income. 3. Develop knowledge of Agricultural database management system. 					
Course Content				Assignments/Readings	
Week 1	Unit-I				
	1.1 Introduction to Computers 1.2 Definitions				
	1.3 Memory Concepts				
Week 2	Unit-II				
	2.1 MS Office				
	2.2 Introduction				
Week 3	Unit-III				
	3.1 Data Presentation using MS Office				
	3.2 Introduction to Statistical Analysis				
	3.3 Database and its Concepts				
Week 4	Unit-IV				
	4.1 Introduction to Data Sciences				
	4.2 Application of Data Sciences in Horticulture				
Week 5	Unit-V				
	5.1 Introduction to Programming Languages				
	5.2 Fundamentals of R-Programming				

Week 6	Unit-VI	
	6.1 Data Visualization using R	
Week 7	Unit-VII	
	7.1 Introduction to Python 7.2. Data Visualization using Python	
Week 8	Unit-VIII	
	8.1 Introduction to Agricultural Genomics	
	8.2 Fundamentals of Genomics 8.3 Basic Concepts of Molecular Biology	
Week 9	Unit-IX	
	9.1 Phylogenetics	
	9.2 Genes and Gene Regulation Factors.	
	9.3 Protein Expression and Localization. 9.4 Protein-Protein Interactions	
Week 10	Unit-X	
	10.1 Introduction to Transcriptomics 10.2 Incorporation of Genomics and Transcriptomics	
Week 11	Unit-XI	
	11.1 Introduction to machine learning and AI 11.2 Applications of ML and AI in agriculture (e.g., yield prediction, disease detection)	
Week 12	Unit-XII	
	12.1 Introduction to precision agriculture	
	12.2 GPS and GIS applications in agriculture 12.3 Sensor technologies and data integration	
Week 13	Unit-XIII	
	13.1 Introduction to geospatial analysis	
Week 14	Unit-XIV	
	14.1 Applications of geospatial analysis in agriculture (e.g., crop monitoring, soil mapping)	
Week 15	Unit-XV	

	15.1 Case studies of Agri-informatics applications	
Week 16	Unit-XVI 16.1 Project development and presentation (individual or group)	
PRACTICAL		
Week 1	Study of Computer Components and accessories	
Week 2	Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific Document	
Week 3	MS-EXCEL - Creating a spreadsheet, use of statistical tools, writing expressions, creating graphs, analysis of scientific data, handling macros	
Week 4	MS-ACCESS - Creating Database, preparing queries and reports, demonstration of Agri-information system	
Week 5	R and RStudio	
Week 6	Data Visualization using RStudio	
Week 7	Data Visualization using Python	
Week 8	Introduction to Genomic Databases	
Week 9	Introduction to TBtools	
Week 10	Introduction to MEGA and related Tools	
Week 11	Dealing with different File Formats (FASTA, FASTQ, MEGA)	
Week 12	Introduction to Geospatial Analysis Tools	
Week 13	GPS and GIS Basics - Hands-on training with GPS devices and GIS software (e.g., QGIS)	
Week 14	Sensor Technologies - Experiment with soil moisture sensors, temperature sensors, and other precision agriculture sensors	
Week 15	Satellite Imagery Analysis - Analyze satellite imagery for agricultural applications (e.g., crop monitoring, land use classification)	
Week 16	Project Development - Develop individual or group projects applying Agri-informatics concepts and tools to real-world agricultural problems.	

Textbooks and Reading Material

1. John Walkenbach, Herb Tyson, Michael R.Groh, Faithe Wempen, Microsoft Office 2010 Bible
2. Bangia, Learning Ms Office 2010
3. Prof. Satish Jain and M.Geetha, MS-Office 2010 Training Guide
4. Johnson, Microsoft Office 2010.....on Demand
5. Kate Shoup, Microsoft Office 2010
6. Melanie Gass, It's All about You! Office 2010
7. Nancy Conner and Matthew MacDonald, Office 2010: The Missing Manual
8. Introductory Agr-Informatics, Subrat Kumar Mahapatra (Jain Brothers)

Teaching Learning Strategies

1. Lectures
2. Discussions
3. Presentations
4. Quiz
5. Assignments

Assignments: Types and Number with Calendar

Develop a GIS model to optimize agricultural land use in a region. Consider factors like soil type, water availability, climate, and proximity to markets.

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Sr. No.	Elements	Weightage	Details
1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2.	Formative Assessment	25%	Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.

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