

Syllabus for B.Sc. (Hons) Agriculture Year – II (Sem. IV)

Subject Code: 16AS0416

Subject Short Name: Ag. Stat. 4.1

Subject Name: Agricultural Informatics and Artificial Intelligence

Objective:

1. To acquaint student with the basics of computer applications in agriculture, multimedia, database management, application of mobile app and decision- making processes, etc.
2. To provide basic knowledge of computer with applications in Agriculture
3. To make students familiar with Agricultural-Informatics, its components and applications in agriculture

Credits Earned: 3 Credits (2+1)

Course Outcomes: After completion of this course, Students will be able to

- Retain knowledge relevant to computer, operating systems, data base and internet.
- Gain information of e-Agriculture and computer models used in agriculture.
- Get hands on practice on crop simulation models, DSSAT/Crop- Info/Crop Syst/Wofost
- Acquaint excel in using modern day computing techniques and will effectively amalgamate the knowledge to different uses in everyday life.
- Get knowledge about AI base agriculture and application of AI in agriculture

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	Mid Sem (M)	Progressive Assessment (PA)	Viva (V)	Term work (TW)	
2	0	2	3	40	20	20	10	10	100

Theory Content:

Unit	Topics	Contact Hours
1	Introduction to Computers, Anatomy of Computers	1
2	Memory Concepts, Units of Memory	1
3	Operating System: Definition and types, Applications of MS-Office for creating, Editing and Formatting a document, Data presentation, Tabulation and graph creation, Statistical analysis, Mathematical expressions	2

4	Database, concepts and types, creating data base, Uses of DBMS in Agriculture.	1
5	Internet and World Wide Web (WWW): Concepts and components	1
6	Computer programming: General concepts, Introduction general programming concepts. Concepts and standard input/output operations.	1
7	e-Agriculture, Concepts, design and development, Application of innovative ways to use information and communication technologies (IT) in Agriculture.	2
8	Computer Models in Agriculture: Statistical, weather analysis and crop simulation models, concepts, inputs-outputs files, limitation, advantages and application of models for understanding plant processes, sensitivity, verification, calibration and validation,	2
9	IT applications for computation of water and nutrient requirement of crops, Computer-controlled devices (automated systems) for Agri-input management	2
10	Smartphone mobile apps in agriculture for farm advice: Market price, post-harvest management etc.	1
11	Geospatial technology: Concepts, techniques, components and uses for generating valuable agri-information.	1
12	Decision support systems: Concepts, components and applications in Agriculture.	1
13	Agriculture Expert System, Soil Information Systems etc., for supporting farm decisions. Preparation of contingent crop planning and crop calendars using IT tools. Digital India and schemes to promote digitalization of agriculture in India.	2
14	Introduction to artificial intelligence, background and applications, Turing test	1
15	Control strategies, Breadth-first search, Depth-first search	1
16	Heuristics search techniques: Best-first search, A* algorithm, IoT and Big Data	1
17	Use of AI in agriculture for autonomous crop management, and health, monitoring livestock health, intelligent pesticide application, yield mapping and predictive analysis, automatic weeding and harvesting, sorting of produce, and other food processing applications	2
18	Concepts of smart agriculture, use of AI in food and nutrition science etc	1
	Total	24

Practical Content:

Unit	Topics	Contact Hours
1	Study of computer components, accessories, practice of important DoS Commands	2
2	Introduction of different operating systems such as Windows, Unix/Linux, creating files and folders, File Management	2
3	Use of MS-Word and MS Power-point for creating, editing and presenting a scientific document, MS-EXCEL-Creating a spreadsheet, Use of statistical tools, writing expressions, Creating graphs, Analysis of scientific data,	2
4	MS-ACCESS: Creating Database, preparing queries and reports, Demonstration of Agri- information system	2
5	Introduction to World Wide Web (WWW) and its components	2
6	Introduction of programming languages such as Visual Basic, Java, Fortran, C, C++, Hands on practice on Crop Simulation Models (CSM), DSSAT/Crop-Info/Crop Syst/ Wofost	2
7	Preparation of inputs file for CSM and study of model outputs, computation of water and nutrient requirements of crop using CSM and IT tools	2
8	Use of smartphones and other devices in agro-advisory and dissemination of market information	2
9	Introduction of Geospatial technology, AR/ VR demonstration,	2
10	Preparation of contingent crop planning	2
11	India Digital Ecosystem of Agriculture (IDEA)	2
	Total	22

Reference Books:

- Concepts and Techniques of Programming in C by Dhabal Prasad Sethi and Manoranjan, Wiley India. 2020
- Fundamentals of Computer by V. Rajaroman. 2014. 6th Ed., PHI Learning
- Introduction to Information Technology by Pearson. 2012. ITL Education Solutions Ltd.
- Introduction to Database Management System by C. J. Date. 2006. 7th Ed by Pearson.

- Introductory Agri-Informatics by Mahapatra, Subrat K et al, Jain Brothers Publication. 2022

Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process.

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
25%	25%	20%	10%	10%	10%

Instructional Method:

1. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by white board may also use any of tools such as demonstration, role play, quiz, brain storming, MOOCs etc.
2. The internal evaluation will be done on the basis of continuous evaluation of students in the class-rooms.
3. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory/ field.
4. Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.