

## **Informatics and Artificial Intelligence 3(2+1)**

### **Objective :-**

1. To acquaint students 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 and to make the students familiar with Agricultural-Informatics, its components and applications in agriculture

### **Theory :-**

Introduction to Computers, Anatomy of Computers, Memory Concepts, Units of Memory, 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, Database, concepts and types, creating database, Uses of DBMS in Agriculture, Internet and World Wide Web (www): Concepts and components. Computer programming: General concepts, Introduction to Visual Basic, Java, Fortran, C/ C++, etc. concepts and standard input/output operations. e-Agriculture, Concepts, design and development; Application of innovative ways to use information and communication technologies (IT) in Agriculture; Computer Models in Agriculture: Statistical, weather analysis and crop simulation models, concepts, structure, inputs/outputs files, limitation, advantages and application of models for understanding plant processes, sensitivity, verification, calibration and validation; IT applications for computation of water and nutrient requirement of crops; Computer-controlled devices (automated systems) for Agri-input management; Smartphone mobile apps in agriculture for farm advice: Market price, postharvest management etc.; Geospatial technology: Concepts, techniques, components and uses for generating valuable agri-information; Decision support systems: Concepts components and applications in agriculture; 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 IndiaIntroduction to artificial intelligence, background and applications, Turing test. Control strategies, Breadth-first search, Depth-first search;Heuristics search techniques: Best-first search, A\* algorithm, IoT and Big Data; 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; Concepts of smart agriculture, use of AI in food and nutrition science etc.

### **Practical :-**

Study of computer components, accessories, practice of important DoS Commands,Introduction of different operating systems such as Windows, Unix/Linux, creating files and folders, File Management. Use of MS-WORD and MS Power-point for creating, editing and presenting a scientific documents, MS-EXCEL - Creating a spreadsheet, Use of statistical tools,Writing expressions, Creating graphs, Analysis of scientific data, Handling macros. MS-ACCESS: Creating Database, preparing queries and reports, Demonstration of Agri- information system, Introduction to World Wide Web (WWW) and its components, 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, Preparation of inputs file for CSM andstudy of model outputs, computation of water and nutrient requirements of crop using CSM andIT tools, Use of smart phones and other devices in agro-advisory and dissemination of market information, Introduction of Geospatial Technology, Hands on practice on preparation of Decision Support System, Preparation of contingent crop planning, India Digital Ecosystem of Agriculture (IDEA)

### **Suggested Readings :-**

- Choudhary K. R. Fundamentals of Artificial Intelligence. Springr.
- Date, C. J. 2000. Introduction to Database Management System. Addison-Wesley.

- ITL Educations Solutions Ltd. Introduction to Information Technology. Pearson Education.
- Kumar, E. 2020. Artificial Intelligence. Wiley.
- Nilson, N.J. 2001. Principles of Artificial Intelligence. Narosa.
- Rajaraman, V. and Adabala, N. Fundamentals of Computers. PHI Learning Pvt. Ltd, New Delhi.
- Russell, Stuart. 2013. Artificial Intelligence: A Modern Approach. Pearson Edition.
- Sethi, D. P. and Pradhan, M. 2017. Concepts and Techniques of Programming in C. I.K.
- International Publishing House Pvt. Limited.
- Vanitha, G. 2023. Agro-Informatics. NIPA, New Delhi.