

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 and study of model outputs, computation of water and nutrient requirements of crop using CSM and IT 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

1. Choudhary K. R. Fundamentals of Artificial Intelligence. Springer
2. Date, C. J. 2000. Introduction to Database Management System. Addison-Wesley.
3. ITL Educations Solutions Ltd. Introduction to Information Technology. Pearson Education.
4. Kumar, E. 2020. Artificial Intelligence. Wiley.
5. Nilson, N.J. 2001. Principles of Artificial Intelligence. Narosa.
6. Rajaraman, V. and Adabala, N. Fundamentals of Computers. PHI Learning Pvt. Ltd, New Delhi.
7. Russell, Stuart. 2013. Artificial Intelligence: A Modern Approach. Pearson Edition.
8. Sethi, D. P. and Pradhan, M. 2017. Concepts and Techniques of Programming in C. I.K. International Publishing House Pvt. Limited.
9. Vanitha, G. 2023. Agro-Informatics. NIPA, New Delhi.

### NCC- I

1 (0+1)

#### Objective

1. To develop qualities of character, courage, comradeship, discipline, leadership, secular outlook, spirit of adventure and sportsmanship and the ideals of selfless service among the youth to make them useful citizens
2. To create a human resource of organized trained and motivated youth to provide leadership in all walks of life including the Armed Forces and be always available for the service of the nation

### Practical/ Awareness activities

- Aims, objectives, organization of NCC and NCC song. DG's cardinals of discipline.

- Drill- aim, general words of command, attention, stands at ease, stand easy and turning.
- Sizing, numbering, forming in three ranks, open and close order march, and dressing.
- Saluting at the halt, getting on parade, dismissing, and falling out.
- Marching, length of pace, and time of marching in quick/slow time and halt. Side pace, pace forward and to the rear. Turning on the march and wheeling. Saluting on the march.
- Marking time, forward march, and halt. Changing step, formation of squad and squad drill.
- Command and control, organization, badges of rank, honors, and awards
- Nation Building- cultural heritage, religions, traditions, and customs of India. National integration. Values and ethics, perception, communication, motivation, decision making, discipline and duties of good citizens. Leadership traits, types of leadership. Character/ personality development. Civil defense organization, types of emergencies, firefighting, protection. Maintenance of essential services, disaster management, aid during development projects.
- Basics of social service, weaker sections of society and their needs, NGO's and their contribution, contribution of youth towards social welfare and family planning.
- Structure and function of human body, diet and exercise, hygiene and sanitation. Preventable diseases including AIDS, safe blood donation, first aid, physical and mental health. Adventure activities. Basic principles of ecology, environmental conservation, pollution and its control.

**NSS- I****1(0+1)****Objective**

1. Evoking social consciousness among students through various activities, viz., working together, constructive, and creative social work
2. To be skilful in executing democratic leadership, developing skill in program
3. To be able to seek self-employment, reducing gap between educated and uneducated, increasing awareness and desire to help sections of society

**Practical/ Awareness activities**

- Orientation: history, objectives, principles, symbol, badge; regular programs under NSS
- Organizational structure of NSS, Code of conduct for NSS volunteers, points to be considered by NSS volunteers' awareness about health.
- NSS programme activities. Concept of regular activities, special camping, day camps, basis of adoption of village/slums, conducting survey, analyzing guiding financial patterns of scheme, youth programs/ schemes of GOI, coordination with different agencies and maintenance of diary. Understanding youth. Definition, profile, categories, issues and challenges of youth; and opportunities for youth who is agent of the social change.
- Community mobilization. Mapping of community stakeholders, designing the message as per problems and their culture; identifying methods of mobilization involving youth-adult partnership. Social harmony and national integration.
- Indian history and culture, role of youth in nation building, conflict resolution and peace-building. Volunteerism and *shramdaan*. Indian tradition of volunteerism, its need, importance, motivation, and constraints; shaman as part of volunteerism.

- Citizenship, constitution, and human rights. Basic features of constitution of India, fundamental rights and duties, human rights, consumer awareness and rights and rights to information. Family and society. Concept of family, community (PRIs and other community-based organizations) and society.

## Semester II

### Skill Enhancement

**8 (0+8)**

### Objective

To enable the students to acquire basic skills in agricultural engineering so that in case they exit with UG-certificate, they can work as operators and technicians in the fields of farm machinery, micro-irrigation, solar and wind energy or food processing, etc. or can go for self-employment or start their own agro-service centre, agro-processing centre or similar activities. Thus the broad objective of this course is Skill for Employment and Entrepreneurship Development.

### Indicative Modules

- Operation and maintenance of farm machinery
- Repair and maintenance of tractors and power tillers
- Management of agricultural machinery custom hiring and maintenance facilities
- Fabrication, operation and maintenance of renewable energy devices
- Operation and maintenance of drones used for agricultural applications
- Machine vision, sensors and sensors architecture
- Design of solar PV system using softwares
- Installation and maintenance of on-grid and off-grid solar systems
- Design and maintenance of agri-voltaic systems
- Valorization of agri-biomass and organic waste
- Energy audit, energy conservation and energy efficiency
- Repair and maintenance of pumps and irrigation systems
- Installation and maintenance of micro-irrigation systems
- Application of remote sensing and GIS for agricultural water management
- Operation and maintenance of hydro-meteorological instruments
- Geophysical survey and investigations for groundwater exploration and installation of tube well/ bore well
- Installation and maintenance of roof top rain water harvesting systems
- Operation and maintenance of soil conservation structures
- Construction, management and maintenance of protected cultivation structures
- Agro processing methods, equipment operation and maintenance
- Operation and management of multi-commodity agro-processing centre
- Primary processing and value addition and cold chain logistics