## SEMESTER S7

# FOOD INFORMATICS

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|---|---|---|---|
| **Course Code** | **PEFTT741** | **CIE Marks** | 40 |
| **Teaching Hours/Week (L: T:P: R)** | 3:0:0:0 | **ESE Marks** | 60 |
| **Credits** | 3 | **Exam Hours** | 2 Hrs. 30 Min. |
| **Prerequisites (if any)** | None | **Course Type** | Theory |

**Course Objectives:**

1. To define and explain the scope, importance, and applications of food informatics in various sectors of the food industry.
2. To apply fundamental data analytics techniques, including descriptive, predictive, and prescriptive methods, using industry-specific tools and software.
3. To analyze the role and implementation of information systems in the food industry, focusing on ERP, supply chain management, and their impact on food safety and quality.
4. To understand and apply food safety management systems, standards, and regulations, emphasizing microorganism detection and the use of informatics in compliance and certification processes.
5. To explore and evaluate the application of emerging technologies such as block chain, IoT, sensor technologies, and AI in enhancing food traceability, quality, safety, and personalized nutrition.

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## SYLLABUS

| Module No. | Syllabus Description | Contact Hours |
|---|---|---|
| 1 | Overview of Food Informatics- definition, scope, importance and application of various food industry, Data Sources in Food Informatics- Sources of data in food production, processing, and distribution, challenges in data collection and integration, errors in data representation, Information Systems in Food Industry, Enterprise Resource Planning, Supply chain management, Role of information systems in food safety and quality assurance. | 9 |

| | | |
|---|---|---|
| **2** | Fundamentals of Data Analytics, different data analysis techniques(descriptive, predictive, prescriptive), Tools and software for data analysis in the food industry, Big data in food industries, role and its application in food production and supply chain management, Challenges and ethical considerations in data analytics for food systems. Data representation errors and detection and troubleshooting procedures. | **9** |
| **3** | Food Safety and Traceability, Food Safety Management Systems, food safety standards and regulations, Microorganism detection and analysis: Emerging Foodborne Pathogens, Investigation of food borne illnesses outbreaks, Pathogen Detection Methods, Role of informatics in compliance and certification processes, Traceability in Food Supply Chains, Using informatics to identify and mitigate risks in food production and distribution. | **9** |
| **4** | Emerging technologies (block chain, IoT) enabling traceability in food supply chains, cloud computing, Sensor Technologies, Applications of IoT and sensors in monitoring food quality and safety, Artificial Intelligence in Food Informatics: food processing, packaging, and distribution, AI-driven decision support systems, Emerging trends such as precision agriculture and personalized nutrition, Merits and demerits of incorporation of AI in Food industries. | **9** |

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**Course Assessment Method**
**(CIE: 40 marks, ESE: 60 marks)**

**Continuous Internal Evaluation Marks (CIE):**

| Attendance | Assignment/ Microproject | Internal Examination-1 (Written) | Internal Examination- 2 (Written) | Total |
|---|---|---|---|---|
| **5** | **15** | **10** | **10** | **40** |

**End Semester Examination Marks (ESE)**

*In Part A, all questions need to be answered and in Part B, each student can choose any one full question out of two questions*

| Part A | Part B | Total |
|---|---|---|
| • 2 Questions from each module.<br>• Total of 8 Questions, each carrying 3 marks<br><br>**(8x3 =24marks)** | • Each question carries 9 marks.<br>• Two questions will be given from each module, out of which 1 question should be answered.<br>• Each question can have a maximum of 3 sub divisions.<br>**(4x9 = 36 marks)** | **60** |

**Course Outcomes (COs)**

At the end of the course students should be able to:

| Course Outcome | | Bloom's Knowledge Level (KL) |
|---|---|---|
| **CO1** | Demonstrate comprehensive understanding and applications of food informatics across various sectors of the food industry | **K2** |
| **CO2** | Analyze different sources of data in food production and supply chains, identify challenges in data collection and integration | **K3** |
| **CO3** | Applying descriptive, predictive, and prescriptive analytics techniques to analyze food industry data using relevant software tools, with an emphasis on addressing data representation errors and troubleshooting procedures. | **K3** |
| **CO4** | Evaluate the role of informatics in implementing and managing Food Safety Management Systems (FSMS) | **K5** |
| **CO5** | Explore the emerging technologies and their implications in food industries | **K3** |

Note*: K1- Remember, K2- Understand, K3- Apply, K4- Analyse, K5- Evaluate, K6- Create*

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**CO-PO Mapping Table:**

| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | 2 | | | | 2 | | | | | | | 3 |
| **CO2** | 2 | 3 | | | 3 | | | | | | | 3 |
| **CO3** | 3 | 3 | 2 | 2 | 3 | | | | | | | 3 |
| **CO4** | 3 | 2 | | | 3 | 2 | | | | | | 3 |
| **CO5** | 2 | 2 | 2 | 3 | 3 | 3 | | | | | | 3 |

| **Text Books** | | | | |
|---|---|---|---|---|
| **Sl. No** | **Title of the Book** | **Name of the Author/s** | **Name of the Publisher** | **Edition and Year** |
| **1** | Food Supply Chain Management and Logistics: From Farm to Fork | Samir Dani | Kogan Page | 1st edition, 3 June 2015 |
| **2** | Fundamental Food Microbiology | B. Ray. | CRC Press 2005. | 3rd edition, 2005 |
| **3** | Operations and Supply Chain Management Essentials You Always Wanted To Know (Self Learning management Series) | Ashley McDonough | Vibrant Publishers | 2020 |
| **4** | Perspectives of Artificial Intelligence in Agriculture | Dr. Harvinder Kaur Sidhu | Gyan Geeta Prakashan | 2023 |
| **5** | Big Data and Business Analytics | Jay Liebowitz | Auerbach Publications; | 1st edition, 23 April 2013 |

| **Reference Books** | | | | |
|---|---|---|---|---|
| **Sl. No** | **Title of the Book** | **Name of the Author/s** | **Name of the Publisher** | **Edition and Year** |
| **1** | Management Information System | C. Laudon Kenneth and P. Laudon Jane | Peasrson Education | 2018 |

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| Video Links (NPTEL, SWAYAM…) | |
|---|---|
| **Module No.** | **Link ID** |
| **1** | https://archive.nptel.ac.in/courses/106/104/106104189/ |
| **2** | https://onlinecourses.swayam2.ac.in/cec20_ag06/preview |
| **3** | https://onlinecourses.swayam2.ac.in/cec20_ag06/preview |
| **4** | https://onlinecourses.nptel.ac.in/noc22_cs44/preview |

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