**FST-442 Artificial Intelligence in Food Industry          3 (3-0)**

**Educational Objectives**

This course will be able to provide knowledge about Automation which is completely based on artificial intelligence (AI) or machine learning (ML) or deep learning (DL) algorithms. By using the AI-based system, food production and delivery processes can be efficiently handled and also enhance the operational competence of the food industry. Artificial intelligence with data science can improve the quality of all the food related industries including restaurants, cafes, online delivery food chains, hotels, and food outlets by increasing production utilizing different fitting algorithms for sales prediction. AI could significantly improve packaging, increasing shelf life, a combination of the menu by using AI algorithms, and food safety by making a more transparent supply chain management system.

**Course Outcomes**

On the completion of this course student would be able to learn

- Food security management by using image processing and recognition technologies.
- AI in fertilizer management to ensure safe food products
- Mathematical modeling techniques for managing food quality
- Machine learning techniques for increasing the productivity of high-quality food products

**Course Contents:**

- Introduction to AI in Food Industry
- Food security and food waste management systems,
- Food Safety Compliance with an empahsis on food components: diatery assessment , Improving food products using AI,
- AI-based intelligent decision-making systems consist of various tools and methodologies, i.e., high-resolution cameras, laser-technology-based systems,
- X-ray-based systems, and IR spectroscopy.
- The tools and technologies used to analyze each and every aspect of the food products such as fruits and vegetables at the input channel,
- Machine learning, equipment cleaning and maintenance
- For implementing this, various sensors and cameras are deployed to perform tasks,
- Decision making systems for consumers,

- Toxicity predictions and personal health sanitation,
- Predicting consumers' preferences with AI,
- Product sorting and packaging industry,
- Demand-supply chain management and networks: AI manages everything such as price control to inventory management,
- Robotics for the food industry: R&D,
- Future directions and implementation of AI in Food Industries & Resturants

**Recommended Books:**

1. E. R. Davies, 2020, Image processing for the food industry.
2. Penfield, M.P. and Campbell, A.M. 2014. Experimental food science (Food Science and Technology). Academic Press, USA.
3. Daniel Ingo Heft, 2022, Sensing and artificial intelligence solutions for food manufacturing, Routledge, Taylor and Francis