

DISCIPLINE SPECIFIC ELECTIVE COURSE -4 (DSE-4)
VI.5.3. Technology based solutions of societal issues

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Technology based solutions of societal issues, DSE-4, VI.5.3.	4	0	0	4	12 th pass	Programming Fundamentals, Basic knowledge of biology.

#This course will also be available to the students in semester IV

Learning Objectives

This course is designed for students to give them hands-on experience of working on interdisciplinary research problems, which may have direct impact or relevance for the linkage of society and technology. This will broaden their horizon regarding the identification of an issue and then step by step way of solving the same, either theoretically or experimentally by acquiring the required technology-based skill-sets.

Learning outcomes

After completing this course, student should be able to;

- Identify a research problem related to a societal issue, which may be solved using technology
- Acquire the required technical skill-sets, which will be needed for solving such problems
- Get the hands-on training for working on real societal issues requiring technology-based interventions, so that students can become more sensitive and responsible for solving such issues

Syllabus

**Practicals –
hours)**

(120

- Developing an understanding related to societal issues specifically in the sectors of water, food, electricity, textiles, housing, energy, defense and human health etc., which may require a technology-based intervention
- Identification of a problem as per interest of the student, and solving it using innovative and interdisciplinary approaches

- Working on problems based on artificial intelligence-based biosensors, Electrochemical biosensors, wearable biosensors etc. for various applications related to society
- Building machine learning models on various datasets specially related to health issues for the identification, diagnosis or prediction of the disease
- Computational modeling/ simulation of nanoparticles and their usage in drug delivery applications for various diseases. Examples can be like neuro-simulation of drug-loaded nanoparticles for understanding the pathway for diseases like mental depressive disorders.

Essential/recommended readings

- Sensing and Artificial Intelligence Solutions for Food Manufacturing; Editors: Charles Oluwaseun Adetunji, Daniel Hefft, CRC Press
- Mathematical Modeling of Biosensors by Romas Baronas, Felikas Ivanauskas, Juozas Kulys, (2021); Springer International publishing
- Biosensors and Nanotechnology: Applications in Health Care Diagnostics (2017), Editor: Zeynep Altintas; Wiley Publishers
- Research papers/ Reviews from peer reviewed reputed journals, related to the identified problem/ issue

DISCIPLINE SPECIFIC ELECTIVE COURSE -4 (DSE-4) VI.5.4. Medical Imaging Techniques

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical/ Practice		
Medical Imaging Techniques#, DSE-4, VI.5.4	4	0	0	4	12 th Pass	Basic knowledge of python

#This course will also be available to the students in semester IV

Learning Objectives

This practical paper is designed to provide hands on experience to build data driven module for computer vision, with applications in medical image analysis. This practical paper enables the students to build deep learning architecture, such as filters, activation functions, loss functions; regularization techniques such as e.g. batch normalization and dropout. Student can implement different non-linear optimization algorithms that are used when training the medical imaging networks on different imaging tools.