

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY DESIGN
AND MANUFACTURING (IIITDM) KANCHEEPURAM

INTRODUCTION OF NEW COURSE

Course Title	Sensors in Healthcare	Course Code	BM6XXX			
Dept./ Specialization	Sciences and Humanities	Structure (LTPC)	3	1	0	4
To be offered for	DD and PhD	Status	Core <input type="checkbox"/>	Elective <input checked="" type="checkbox"/>		
Faculty Proposing the course	Dr. A. Gowri	Type	New <input checked="" type="checkbox"/>	Modification <input type="checkbox"/>		
Recommendation from the DAC		Date of DAC				
External Expert(s)	Dr. V V Raghavendra Sai, Associate Professor, Applied Mechanics, IITM Dr. Renu John, Professor, Biomedical Engineering, IITH					
Pre-requisite	CoT	Submitted for approval			47 th Senate	
Learning Objectives	<p>This course is intended</p> <ul style="list-style-type: none"> To describe the concept of biosensors for development of point of care diagnostic techniques. To explain the various components of biosensors, types and their working principles. To visualize the choice of bioreceptors, transduction mechanisms and data analysis for the biosensor design. 					
Learning Outcomes	<p>On successful completion of the course, the students will be able to:</p> <ul style="list-style-type: none"> Classify the biosensors based on the bioreceptors and transduction techniques. Appraise the working principle of the commercial biosensors such as blood glucose monitors and lateral flow assays. Design the various components of biosensors to apply in the field of healthcare, environment, food and pharmaceuticals. 					
*** See rationale at the end Contents of the course (With approximate break-up of hours for L/T/P)	<p>Fundamentals of Biosensors: Introduction to biosensors, Review of biosensor characteristics, Differentiation of biosensors from physical and chemical sensors, Biological inspiration: natural and synthetic bioreceptors (L8 + T3)</p> <p>Components of biosensors: Biomolecule immobilization techniques and kinetics, Surface functionalization in biosensors, Biorecognition events: Bioaffinity and Biocatalytic (L8+T3)</p> <p>Transduction techniques: Optical fiber based techniques: fiber optics, gratings, interferometry and evanescent wave. Chemical: colorimetry and fluorescence. Electrochemical: Amperometric, Impedimetric and Voltametric. Mechanical: Microcantilevers. Introduction to Bio-MEMS (L10 + T3)</p> <p>Nanobiosensors: Biofunctionalization of nanomaterials, Nanomaterials for signal amplification and transducer fabrication(L8 + T3)</p> <p>Recent advances: Wearable and Microfluidics (LoC) integrated point of care biosensors, Commercial biosensors and market analysis(L8 + T2)</p>					
Textbooks	<ol style="list-style-type: none"> “Introduction to Biosensors: From Electric Circuits to Immunosensors, Second edition” Jeong-Yeol Yoon, 978-3-319-27411-9, Springer publishers (2016). “Handbook of Biosensors and Biochips” Robert S. Marks, Christopher R. Lowe, David C. Cullen, Howard H. Weetall, Isao Karube, 978-0-470-01905-4, John Wiley & sons, Inc. (2007). 					
Reference Books	<ol style="list-style-type: none"> “Recognition Receptors in Biosensors, First edition” Mohammed Zourob, 978-1-4419-0918-3, Springer- New York (2010). “Biosensors and Nanotechnology: Applications in Health Care Diagnostics, First edition” Zeynep Altintas, 978-1-119-06501-2, Wiley (2017). 					