

**BT409 BIOSENSORS & BIOELECTRONICS  
(ELECTIVE - IV)**

**Course Descriptions and Objectives:**

*This course deals with the basics and applications of Biosensors. This course helps to understand the use of biomolecules as recognition elements for detection of a particular analyte and the use of biological elements such as proteins in place of silicon chips.*

**Course Outcomes:**

1. Students will be able to understand various transducers and their applications
2. They will be able to develop low cost biosensors for various purposes
3. They will understand the design and applications of enzyme electrodes
4. They will understand the potential advantages of a biocomputer
5. They will understand the basics of bimolecular photonic computer

**Unit I: Introduction:**

Biosensors- Advantages and limitations, various components of biosensors Biocatalysis based biosensors, Bioaffinity based biosensors & Microorganisms based biosensors, Biologically active material and analyte. Types of membranes used in biosensor constructions.

**Unit II: Transducers In Biosensors:**

Various types of transducers; principles and applications - Calorimetric, Optical, Potentiometric / Amperometric, Conductometric / Resistometric, Piezoelectric, Semiconductor, Impedimetric, Chemiluminiscene - based Biosensors.

**Unit III: Application And Uses of Biosensors:**

Biosensors in clinical chemistry, medicine and health care, biosensors for veterinary, agriculture and food Low cost - biosensor for industrial processes for online monitoring; biosensors for environmental monitoring. Application of enzymes in analysis; design of enzyme electrodes and their application as biosensors in industry, healthcare, food and environment.

**Unit IV: Bioelectronics :**

Potential advantages & Developments towards a biomolecular computer, development of molecular arrays as memory stores; molecular wires and switches; mechanisms of unit assembly.

**Unit V: Design for A Biomolecular Photonic Computer:**

Assembly of photonic biomolecular memory store; Information processing; commercial prospects for biomolecular computing systems.

**Text Books:**

1. Brian R Eggins - Biosensors an Introduction , First edition, John Wiley & Sons Publishers, 1996.
2. Loic J Blum, Pierre R Coulet - Biosensors Principles and Applications, First edition, Marcel Dekker, Inc, 1991.

**Reference Books :**

1. Elizabeth A Hall - Biosensors, First Edition, Open University, Milton Keynes, 1990.
2. Graham Ramsay - Commercial Biosensors, First edition, John Wiley & Sons, Inc. 1998.
3. Tran Minh Canh - Sensor Physics & Technology - Biosensors , First Edition, Chapman & Hall, 1993.
4. Donald G. Buerk - Biosensors Theory and Applications, First Edition Technomic Publishing. Co, Inc, 1993. Reference Books: