

**SARDAR PATEL UNIVERSITY**  
**Programme: MSC (Integrated Biotechnology)**  
**Semester: VI**  
**Syllabus with effect from: December 2012**

<b>Paper Code:</b> PS06CIGB04	<b>Total Credits: 3</b>
<b>Title Of Paper:</b> Biosensor and Bio-crystallography	

Unit	Description in detail	Weightage (%)
<b>1</b>	<b>Sensors and its Operating Principles:</b> Introduction of Sensors and Transducers. Importance of Sensors, Transduction Principles, Classification, Characteristics- Static and Dynamic, Parameters- Environmental Parameters – Characterization-Electrical, Mechanical and Thermal, Operating principle of Electrodes, Conductimetric, Amperometric and Potentiometric Sensors.	
<b>2</b>	<b>Biosensors and its Construction:</b> Definition, Principle, Types, Advantages and Generations of Biosensors, Choice of Bioreceptor & Transducer, Immobilization of bioreceptors, Applications of Biosensors as Glucose Biosensors, Urea Biosensor, Biochip, Glutamine measurement, Choline measurement and Environmental control.	
<b>3</b>	<b>Growth and Structure of Biological molecules:</b> Structure of atoms, molecules and molecular complexes, General properties of organic compounds, Nature of biological material, Crystal and crystal growth, Conditions for macro molecular crystallization.	
<b>4</b>	<b>X-ray Crystallography of Biomolecules:</b> Introduction of X-rays, unit cell and Lattice of crystals, X-ray diffraction, Bragg's Law, Methods of X-ray diffraction (Laue, Rotation, Powder and Weissenberg.), X-ray diffraction for crystals of Proteins and Nucleic acids.	
	<b>Practical:</b>	
	<ul style="list-style-type: none"> <li>• Glucose meter</li> <li>• Determination of sensitivity of Thermocouple</li> <li>• Determination of sensitivity of Thermister</li> <li>• Determination of sensitivity of RTD</li> <li>• Fabrication of electrode by screen printing method</li> <li>• Demonstration of ultrasonography</li> <li>• Demonstration of MRI</li> <li>• Demonstration of X-ray crystallography</li> <li>• Formation of crystal</li> <li>• Microscopic study of crystals</li> <li>• Study of crystal photograph by Laue, Weissenberg, Rotation and Powder</li> </ul>	

**Basic Text & Reference Books:**

- Sensors and Transducers, D.Patranabis, Prentice hall of India, 2<sup>nd</sup> eds. 2007. (ISBN -978-81-203-2198-4)
- Biosensors: An Introduction, Brain Eggins, Wiley Teuinee
- Advances in Biosensors, Editor Anthony P.F. Turner, Supplement 1: 1993 Chemical Sensors for In Vivo Monitoring, Jai Press Ltd. Greenwich, Connecticut
- Biosensors, Tran Minh Canh, Chapman and Hall



- Commercial Biosensors: Grabah Ramsay, John Wiley & Son, Inc. 1998. (ISBN -0-471-58505-X (cloth:alk.paper)).
- Introduction to instrumental analysis, Robert D. Braun, Aditya Art Printers, Hyderabad. (ISBN – 81-88449-15-6)
- Instrumental Methods of Anlaysis: Willard, Merritt, Dean and Settle, CBS Publishers & Distributors. (ISBN 81-239-0943-8).
- Instrumental methods of chemical analysis: Chatwal and Anand, Himalaya Publishing House Pvt. Ltd. 5<sup>th</sup> eds. (ISBN 978-81-8318-802-9)

