BIO-ELECTROCHEMISTRY

PROF. MAINAK DAS
Department of Biological Sciences & Bioengineering
IIT Kanpur

PRE-REQUISITES : 10,+2 in science
INDUSTRIES APPLICABLE TO : Biosensor industry, Bio-electrochemical process industry, MEMS fabrication industry working towards biosensor development

COURSE OUTLINE :
Bio-electro-chemistry is an interdisciplinary subject which falls at the cross-road of basic electrochemistry and its application in biochemistry, analytical chemistry, medicinal chemistry, bio-energy devices and biosensors. The subject has a broad horizon and myriad of applications; yet the governing principles are the basic laws of electrochemistry. Here we will be discussing the basic principles of electrochemistry and the myriad of applications of these principals in biology with special reference to bio-sensors, bio-fuel cells and diagnostics.

ABOUT INSTRUCTOR :
Prof.Mainak Das is a faculty of IIT Kanpur India in the department of biological sciences & bioengineering since April 26 2010. He did his bachelors degree (1989-1994) in agriculture from College of Agriculture Indore. Thereafter he did his post graduate degree (1994-1997) in animal physiology from National Dairy Research Institute Karnal India. Following his post graduate studies, he worked as researcher in IISc Bangalore India (1997-1999), University of Neuchatel, Switzerland (1999-2000), University of Clemson, USA (2000-2004) and in University of Central Florida, USA (2004-2010). He did his doctoral studies from College of Medicine of University of Central Florida (2004-2008), while working as a full time employee of the university. He introduced the regular physiology course for the PG students in IIT Kanpur in 2011. He has wide interest in physiology, sensors, energy and bioelectronics and maintains an active research team at IT Kanpur, India. Prof. Das has been working on cell culture technologies, serum free medium development and defined cell culture systems for last 20 years. He has expertise in long term culturing of excitable cells. His doctoral thesis is a complex problem of modern cell culture technology, titled:‘Tissue Engineering The Motoneuron To Muscle Segment Of The Stretch Reflex Arc Circuit Utilizing Micro-fabrication,Interface Design And Defined Medium Formulation’.

COURSE PLAN :

Week 1**:** Fundamentals of electrochemistry with special references to bio-electrochemistry

Week 2**:** Electrodes & potentiometry

Week 3**:** Redox titrations

Week 4**:** Electro-analytical techniques