



# CELL CULTURE TECHNOLOGIES

## PROF. MAINAK DAS

Department of Biological Sciences & Bioengineering  
IIT Kanpur

**PRE-REQUISITES :** Biology at standard 10th (Secondary school examination)

**INTENDED AUDIENCE :** UG and PG students pursuing biology, biotechnology, zoology and bio-engineering

**INDUSTRY SUPPORT :** Biomedical industries, Biotechnology industry, Drug-discovery industry

## COURSE OUTLINE :

The course will be a short primer to understand how 'animal cell culture technologies' have strengthened the bio-medical research from basic research to the modern drug discovery. Animal cell culture was first performed in the very first decade of 19th century. Since then, tremendous development has taken place in this field. The lectures will help the researcher to appreciate the developments during last hundred years and will help them to independently set up cell culture laboratories. For non-biologist, it will be an informal way to demystify the intriguing routes of biomedical research where cell culture is a very 'potent tool'.

## 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:** Introduction & biology of cultured cells

**Week 2:** Equipments, aseptic techniques, safety protocols

**Week 3:** Culture vessels & media development

**Week 4:** Serum-free medium development & sterilization

**Week 5:** Primary culture, secondary culture, cloning & selection

**Week 6:** Cell separation, characterization, differentiation & transformation

**Week 7:** Contamination, cryo-preservation & cyto-toxicity

**Week 8:** Organo-typic culture & specialized cell culture techniques