



Module PMRF-ISSS009

Cell Mechanics

Name of the PMRF student

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Bangalore

Course Relevant To

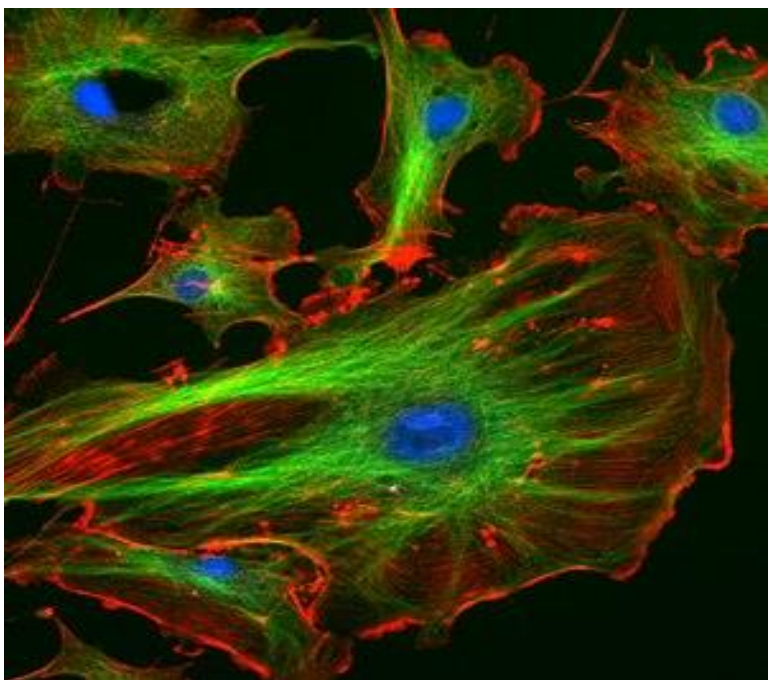
Undergraduate and Postgraduate students
in Biology, Biotechnology and Mechanical
Engineering

Faculty coordinator

Dr. Lakshmi S., Associate Professor in the
Department of Electronics and
Communication, MSRIT, Bangalore

Online session coordinator

Amit Tanwar, Ph.D. student at Tyndall
National Institute, Ireland



Details of the content of the module

Cells can sense and respond to mechanical forces. Mechanical cues can influence cellular processes like differentiation, proliferation, migration and cellular functions. This course will introduce students to the field of biomechanics, a new and exciting field, which has many applications, particularly, in disease diagnosis. The following topics will be covered in this module:

➤ Introduction to Cell Mechanics

What is Cell Mechanics? How do cells sense and induce mechanical forces? Discuss the role of mechanical cues in different cellular processes and the mechanical properties of cells.

➤ Introduction to Cell Biology

A brief overview of the different parts of the cell involved in sensing and responding to mechanical cues, particularly the cytoskeleton.

➤ Mechanotransduction

What is mechanotransduction? Briefly explain the cell – extracellular matrix cross-talk. Discuss important signalling pathways involved in mechanotransduction.

➤ Approach to Modelling Mechanics

Kinematics, constitutive relationships and force balance laws. Solve some examples.

➤ Techniques used in Cell Mechanics

Atomic Force Microscopy, Traction Force Microscopy, Micropipette Aspiration and Optical Tweezers.

The module consists of lectures and problem-solving sessions.

Schedule of the module

Starting date of the module: 7th June, 2021

Ending date of the module: 30th August, 2021 (12 weeks)

Timing: 5:00 PM – 6:30 PM IST, every Monday

Meeting link: <https://tinyurl.com/28v6zebx>

(Lectures will be held on Microsoft Teams)

Contact email ID: iss.forum@gmail.com

Registration link:

<https://docs.google.com/forms/d/1L0445JWChWnBWDidfBiIC181CtosWabeVH1Am3yQQIU/edit?usp=sharing>