



TISSUE ENGINEERING

PROF. VIGNESH MUTHUVIJAYAN

Department of Biotechnology
IIT Madras

PRE-REQUISITES : Understanding of basic cell biology would be helpful

INDUSTRIES APPLICABLE TO : Companies that are involved in regenerative medicine and related technologies

INTENDED AUDIENCE : Masters/Doctoral students and faculty interested in teaching Tissue Engineering

COURSE OUTLINE

The course will introduce principles and applications of tissue engineering. The course will provide an understanding of the applications of engineering and life science principles in the field of tissue engineering. As an upcoming interdisciplinary domain of research, the course will be designed based on current literature.

ABOUT INSTRUCTOR

Prof. Vignesh Muthuvijayan is a Chemical Engineer by training. He received his B.Tech in Chemical Engineering from A. C. Tech, Anna University, India. He went on to pursue his Master's degree in Chemical and Biochemical Engineering at University of Maryland, Baltimore County and his PhD in Chemical Engineering at Oklahoma State University. He also worked as a post-doc at Johns Hopkins University. After spending about 8 years in the United States, he moved back to India to join the Department of Biotechnology at IIT Madras in 2010. His research interests are in the area of biomaterials and their applications.

COURSE PLAN

Week 1: Introduction to tissue engineering

Week 2: Scaffolds: extracellular matrix, natural and synthetic polymers

Week 3: Hydrogels, bioceramics, scaffold fabrication

Week 4: Material characterization

Week 5: Cell source, isolation, growth, differentiation

Week 6: Cell adhesion, migration, signaling, bioreactors and challenges in tissue engineering

Week 7: Host integration, bioethics, Applications: Skin tissue engineering

Week 8: Applications: Bone tissue engineering, Vascular tissue engineering, and Corneal tissue engineering