General Objective

To provide participants with an introductory understanding of the fundamental principles of cell therapy and tissue engineering, covering the key biological, technological, and clinical concepts involved in the development of regenerative medicine strategies.

Course Program

Part I – Stem Cells and Their Therapeutic Potential

Duration: 45 minutes

Topics:

- Concept and classification of stem cells
- Embryonic and adult stem cells
- Mesenchymal stem cells
- Cellular differentiation potential
- Applications in regenerative medicine

Part II – Introduction to Cell Therapy

Duration: 45 minutes

Topics:

- Concept of cell therapy
- Historical development and evolution of the field
- Types of cells used in cell-based therapies
- Examples of clinical applications

Break

Duration: 30 minutes

Part III – Fundamentals of Tissue Engineering

Duration: 30 minutes

Topics:

- Concept of tissue engineering
- Cell–biomaterial interactions
- Importance of the extracellular matrix
- Cellular microenvironment

Part IV – Biomaterials and Clinical Applications

Duration: 30 minutes

Topics:

- Natural and synthetic biomaterials
- Scaffolds for tissue regeneration
- Examples of tissue engineering applications
- Current research and future perspectives

Interactive Discussion and Q&A Session

Duration: 30 minutes

Participants will have the opportunity to discuss key concepts presented throughout the course, explore current challenges and emerging trends in regenerative medicine, and engage directly with the instructor through an interactive question-and-answer session.

Expected Outcomes

Upon completion of the course, participants will be able to:

- Understand the basic principles of stem cell biology and cell therapy.
- Recognize the role of biomaterials and scaffolds in tissue engineering strategies.
- Identify current and emerging applications of regenerative medicine in clinical practice.
- Develop a foundational understanding of the interdisciplinary approaches that integrate biology, engineering, and medicine in tissue regeneration.