

Department of Biotechnology
M.Tech in Biomedical Engineering
Course Outcomes
BT-511 Human anatomy and physiology
1. Analysis of the anatomy and physiology (structure and function) of the human body.
2. Understand Physiological phenomena underlying organ systems
3. Learn the basic components of organ system
4. Analyze interrelationships among molecular, cellular, tissue and organ functions.
5. To gain insight of diagnostics and therapeutics related to human physiology
BT-512 Biomaterials and clinical devices
1. Categorize biomaterials based on their properties and their respective applications.
2. Enlist synthetic and natural biomaterials used to make hydrogels, 3D scaffolds.
3. Identify the specific biomaterials for use in repairing and replacing the diseased.
4. Analyze the importance of Biodegradable and non-biodegradable polymers.
5. Compare and contrast different types of biomaterials.
BT-513 Medical Physics and Biochemistry
1. To describe the fundamentals of physical and chemical principles of biological systems.
2. Interdisciplinary study of biology and physics involved in structure and function of the organ systems,
3. Learn the molecular, biochemical and cellular mechanisms for maintaining homeostasis.
4. Interpretation of biochemical metabolism in human

BT-561 Biomedical Instrumentation, biosensor and transducer

1. Identify the different types of principle of biosensors .
2. Integrate and demonstrate the familiarity with literature and apply it in practical settings
3. Identify the different methodologies of synthesis of nanomaterials
4. Analyze different biosensor mechanisms and their applications
5. Categorize biosensors on the basis of biomolecules utilized

BT-562 Nanobiotechnology and Nanobiomedicine

1. To describe the emerging field of nanomedicine and its applications in medicine and healthcare
2. To apply micromachining technology for development of novel biomems, microfluidic devices, Biochips and nanomedicines
3. To fabricate new bionanomaterials and bionano-devices.
4. Generate interdisciplinary systems engineering approaches in the field of bio and nanotechnology

BT-611 Principle of imaging processing in medicine

1. Identify the different parts of the human visual system, enlist their various functions
2. Enlist the different types of imaging techniques used in medical imaging
3. Analyze and identify the different mathematical operations including Fourier transform
4. Compare the different methods of image enhancement, restoration and reconstruction
5. Identify the type of mathematical operation(s) to be utilized for a particular application in digital image processing.

BT-612: Biophysical system and Signal simulations

1. Identify different types of biomedical signals and sources of variability originating from the human body.
2. Develop input output relationship for linear shift invariant system and understand the signals operator for continuous and discrete time system.
3. Implement spectral analysis and time-frequency analysis to evaluate biomedical signals.
4. Evaluate the operations and applications of feedback systems in model designing.
5. To compare and contrast the different physiological models to the human physiological system

BT-613: Application of Genomics in Medicine

1. To illustrate the structure and variations in genetic material covering basic genetics and genomics
2. To describe the role of genetics in diseases.
3. To elucidate disease mechanisms and the biology in cancer
4. Elucidating genetic basis of cardiovascular disorders and hereditary diseases.

BT-661: Tissue Engineering and Artificial Organs

1. To describe the key technologies used in tissue engineering and regenerative medicine.
2. Enable to design biomaterials, tissue scaffold design, and stem cell research
3. Applications of bioreactors in tissue engineering, and molecular surface modifications
4. Understand conversion of stem cell types into a variety of suitable tissue.

BT-711 Bioethics and IPR

1. Analyze basic ethical principles in context of bioethics
2. Identify the ethical implications of cloning and intellectual property rights and its provisions

3. Judge the implications of biosafety and global regulations related to biosafety

4. Analyse the importance and stages of clinical trials and develop awareness of bioethics

Elective Subjects:

BT- 6621 Immunotherapeutics

1. Characterization of the basic concepts in Immunology
2. To analyze the mechanisms of Immune Regulation
3. Evaluation of immunological and multifactorial diseases and disorders
4. Implementation of technical analysis of development of strategies of Immuno-Diagnostics and Immuno-Therapeutics

BT -6622 Rehabilitation Engineering

1. Description of the rehabilitation engineering principles
2. Designing sensory, auditory and visual prosthetics, prosthetic design and application of new technologies
3. Analysis of quality assurance principles in rehabilitation engineering
4. Awareness of latest advances in technology development in rehabilitation engineering

BT-6633 Hospital Management

1. Develop the role of primary health centre
2. Identify the underlying constraints regarding hospital planning
3. Identifying role of computer and information management in hospitals
4. Devising protocols for service and maintenance of biomedical devices, protocols for personnel training in hospitals

BT-7121 Artificial intelligence

1. Develop a basic understanding of the building blocks of AI as presented in terms of intelligent agents:
2. Develop basic concepts of expert systems, genetic algorithm, hybrid system
3. Implementation of fuzzy control and hardware in medicine.
4. Awareness of application of artificial intelligence in clinical biology.

BT-7122 Bioinformatics

1. Attain basic practical techniques of bioinformatics, biological database and analysing software.

2. Hands on training on strings, various algorithms and multi-sequence alignments, phylogenetic analysis methods.
3. Practical input on bioinformatic tools such as BLAST, ORF finder and genefinder.
4. Theoretical and practical skill developments for different structural determination tools.