

1. Subject Code: **EP-307**

2. Contact Hours :

3. Examination Duration (Hrs.) :

4. Relative Weight :

5. Credits :

6. Semester :

7. Subject Area :

Course Title: **Biophysics**

L : 3 T : 1 P : 0

Theory : 3 Practical : 0

CWS : 25 PRS : 0 MTE : 25 ETE : 50 PRE : 0

4

ODD

DEC-1

S. No.	Contents	Contact Hours
1.	Background of membrane biophysics, Basic structure and composition of membrane, Donnan equilibrium, GHK, Ion transport system overview, Whole cell behavior: cardiac, Integration: from channels to whole cell, Whole cell behavior: currents, gating, kinetics, control, Measurement approaches, Automaticity and pacemakers, Excitation contraction coupling (cardiac and neuro), Cardiac EC coupling, structure and function, NMJ	10
2.	Ion channel structure and gating function, Common elements organized to make specific function, Protein structure, pore formation, charge field, Control of channel function, voltage activation, ligand activation, signaling, gating kinetics, Ion selectivity, Ion channel types and characterization, Channel types, structure, function, Same channels in different cell types, Molecular biology in ion channels, Sample channelopathies	10
3.	Modeling and simulation of channels, Stochastic processes, State transition mechanics and modeling, Examples of disease modeling, Whole cell behavior: neuron, Integration, Propagation, saltatory conduction, Neuron synapse, synaptic plasticity, Structure of the synapse, Electrochemical transduction, Postsynaptic integration and information processing.	10
4.	Modeling and simulation of whole cell EP, Review of HH formalism; modern extensions, Mathematical formulation, numerical implementation, examples of software, Strengths and limitations of simulation, Cardiac cell-to-cell communication, Gap junction structure, function	12
	Total	42

8. Pre-requisite :

Nil

9. Objective :

The student will be able to enhance the basic understanding of Bio-Physics

10. Details of Course :

11. Suggested Books:

DRAFT SCHEME OF STUDY
(Year 2,3,4 B. Tech Program)