7th Semester	RBM7D006	**Physiological System Modelling**	**L-T-P** 3-0-0	**3 Credits**

Module-I: **(8 hours)**
Techniques of mathematical modeling, classification of models, characteristics of models. Purpose of physiological modeling and signal analysis, linearization of nonlinear models, Time invariant and time varying systems for physiological modeling;

Module-II: **(9hours)**

Electromotive, resistive and capacitive properties of cell membrane, change in membrane potential with distance, voltage clamp experiment and Hodgkin and Huxley's model of action potential, the voltage dependent membrane constant and simulation of the model, model for strength-duration curve.

Module-III: **(10 hours)**
Electrical analog of blood vessels, model of systematic blood flow, model of coronary circulation, transfer of solutes between physiological compartments by fluid flow, counter current model of urine formation, model of Henle'sloop, and Linearized model of the immune response: Germ, Plasma cell, Antibody, system equation and stability criteria.

Module-IV: **(8 hours)**

Model of the whole neuron. Huxley model of isotonic muscle contraction, modeling of EMG, motor unit firing;

Books:
[1]   Endarle, Blanchard &Bronzino, ***Introductionto Biomedical Engg.,*** Academicpress. 2005
[2]   S. R. Devasahayam, ***Signals & Systems in Biomedical Engineering***, Springer, 2000