



TRANSPORT PHENOMENA IN BIOLOGICAL SYSTEMS

PROF. G. K. SURAIISKUMAR

Department of Biotechnology & Bioengineering
IIT Madras

PRE-REQUISITES : Undergraduate engineering mathematics

INTENDED AUDIENCE : Any biological engineering/biological sciences student or practitioner.

INDUSTRIES SUPPORT : Biotechnology and other industries

COURSE OUTLINE :

This course aims to fill the need for a comprehensive introduction to the analysis of biological systems in the continuum regime, in the context of transport (forces and fluxes). It aims to provide the student with the required skills to think-out-of-the-box in novelty requiring situations at one end, to a full appreciation of the relevant principles and their interconnections, at the other end. All the needed mathematical steps will be completely worked out to minimize the enormous time the students normally spend to understand the mathematical steps.

ABOUT INSTRUCTOR :

Prof. G. K. Suraishkumar is a Professor in the Department of Biotechnology, Indian Institute of Technology Madras (IITM). He has been at IITM as a Professor since May 2004, and was earlier a faculty member in the Department of Chemical Engineering at the Indian Institute of Technology Bombay (IITB) from April 1993 until mid-May 2004. He was also an Associate Faculty member in the erstwhile Centre for Biotechnology, which is now the Department of Biosciences and Bioengineering, at IITB, between 1995 and 2004.

COURSE PLAN :

Week 1: Introduction; Mass conservation principle

Week 2: Mass flux

Week 3: Mass flux contd.; Review

Week 4: Momentum flux

Week 5: Momentum flux (cont'd)

Week 6: Momentum flux (cont'd)

Week 7: Momentum flux (cont'd)

Week 8: Energy (heat) flux (cont'd); Review

Week 9: Charge flux; Review

Week 10: Fluxes under simultaneous, multiple driving forces

Week 11: Fluxes under simultaneous, multiple driving forces (cont'd)

Week 12: Fluxes under simultaneous, multiple driving forces (cont'd)