The Hong Kong University of Science and Technology

UG Course Syllabus

Course Title: Rate and Transport Processes in Biological Systems
Course Code: BIEN 3250

Course credits: 3, 2*1.5 hours lecture, 1 hour recitation.

Prerequisite: BIEN 2320/PHYS1112

Instructor: I-Ming HSING, **Email:** kehsing@ust.hk

Course Description

This course introduces the foundational subject of transport phenomena and reaction kinetics to bioengineering students. Different from similar subjects in chemical engineering, this will be a condensed treatment of several related subjects - fluid mechanics, heat and mass transfer, and reaction kinetics -- in one course, and will use examples in biological systems extensively. This course will give students a more quantitative perspective on physiology befitting their engineering training, as well as the toolkit necessary for designing various medical devices and instruments (e.g. bioreactors, biosensors, drug delivery devices, etc).

Assessments:

Assessment Task	Contribution to Overall Course grade (%)
In-class questions (recitation)	15%
Quiz I	25%
Quiz II	25%
Final examination	35%

Recommended Materials

Fournier R.L.: Basic Transport Phenomena in Biomedical Engineering, 4th edition, CRC Press, 2018

Truskey G.A., Yuan F., Katz D.F.: Transport Phenomena in Biological Systems, 2nd edition, Pearson Prentice-Hall, 2009

W. Mark Saltzman: Biomedical Engineering: Bridging Medicine and Technology, 2nd edition, Cambridge University Press, 2015

H. Scott Fogler, Elements of Chemical Reaction Engineering, 6th edition, Pearson, 2020

William M. Deen: Introduction to Chemical Engineering Fluid Mechanics, Cambridge University Press, 2016

Additional Resources

AI co-pilot/assistant, online resources recommended through AI tools.