Yeditepe University, Faculty of Engineering

Chemical Engineering Department

2017 Spring Term

ChBE 386 Mathematical Modeling in CHBE

Course objective: Building the mathematical models of chemical and physical processes, as well as developing necessary differential equations and their solutions for the problems of heat & mass transfer and chemical reaction engineering.

Co-requisite: ChBE 331

Instructor: Assist. Prof. M. Oluş Özbek

Assistant: İlayda Acaroğlu Degitz

TOPICS
Introduction & basic concepts in chemical engineering
Mathematical modelling using macroscopic balances
Mathematical modelling using microscopic balances
Equation of motion and equation continuity
Solution techniques of 1^{st} order ODE's for chemical engineering problems
Solution techniques of 2^{nd} order ODE's for chemical engineering problems
Solution techniques of PDE's for chemical engineering problems
Introduction to MATLAB
Applications of numerical methods

Web-page:

http://chbe.yeditepe.edu.tr/courses/386/index.html

Grading:

Homeworks/Projects/Attandence	10%
2 Midterm Exams (25% each)	50%
Final Exam	40%

Attendance: 80% Compulsory !!

Exam Dates: To be announced

Course book: (One of the following)

- Alkis Constantinides, Navid Mostoufi, "Numerical Methods for Chemical Engineers with MATLAB Applications" , Prentice – Hall Inc., 1999

OR

- Mustafa Özilgen, "Handbook of Food Process Modeling and Statistical Quality Control", 2nd ed., CRC Press, 2011.

Additional Resources

- R.B. Bird, W.E. Stewart, E.N. Lightfoot, "Transport Phenomena", Wiley
- Richard G. Rice, Duong D. Do, "Applied Mathematics and Modeling for Chemical Engineers", Wiley
- İ. Tosun, "Modelling in transport phenomena", Elsevier
- Duong D Do and Richard G. Rice, "Applied Mathematics and Modeling for Chemical Engineers", Wiley
- Julian Cleveland Smith and Warren McCabe, "Unit Operations of Chemical Engineering", McGraw Hill