

COLUMBIA UNIVERSITY  
IN THE CITY OF NEW YORK  
DEPARTMENT OF CHEMICAL ENGINEERING

16 Jun 2021

MEMORANDUM FOR: Chemical Engineers of CHEN E4001 and CHEN E4002

SUBJECT: CHEN E4001x and E4002x Essentials A and B Course Syllabus

Welcome to CHEN E4001 and CHEN E4002, Essentials of Chemical Engineering A & B. These two courses will cover essential material from the undergraduate chemical engineering curriculum in a program especially designed for students with a BS in chemistry or a related field, such as biochemistry, polymer science, or mathematics.

Each course consists of four modules, with each module taught by a different member of the Chemical Engineering faculty, and covering essential elements of one undergraduate course.

Here is a list of the modules to be covered, including the faculty members who will teach the modules:

CHEN E4001x

1. Math – Prof. West
2. Thermodynamics I – Prof. Moment
3. Thermodynamics II – Prof. Kumar
4. Reaction Kinetics & Reactor Design – Prof. McNeill

CHEN E4002x

1. Introduction to Chemical Engineering and Process Control – Prof. Bozic
2. Transport Phenomena I – Prof. Durinn
3. Transport Phenomena II – Prof. Bishop
4. Chemical & Biochemical Separations – Prof. Banta

Each module will consist of lectures, recitation classes, and homework assignments, all within approximately a three-week period. These courses assume you have a working knowledge of multivariable calculus and ordinary differential equations.

You will need to purchase a total of 5 textbooks for the two courses. While that may appear excessive, these books will be useful to you throughout your chemical engineering career. The required textbooks are as follows:

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**CHEN E4001x**

Koretsky, M.D. *Engineering and Chemical Thermodynamics, 2<sup>nd</sup> Edition* Wiley, New York 2012.  
ISBN-13: 978-0470259610

Folger, H.S. *Elements of Chemical Reaction Engineering 5<sup>th</sup> Edition*, Prentice Hall, Upper  
Saddle River, N.J. 2016 . ISBN-9780133887518

**CHEN E4002x**

Seborg, D.E. Mellichamp, D.A, Edgar, T. F., and Doyle III, F.J. *Process Dynamics and Control, 3<sup>rd</sup> Edition*, Wiley, New York 201. ISBN-13: 978-0470128671

Bird, R.B. Stewart, W.E. and Lightfoot, E. N., *Transport Phenomena, 2<sup>nd</sup> edition*, Wiley, New  
York, 2007. ISBN-13: 978-0-470-11539-8

Seader, J.D., Henley, E.J, and Roper, D.K., *Separation Process Principles, 3<sup>rd</sup> Edition*, Wiley,  
New York, 2010. ISBN-13: 978-0470481837

While not required, a nice reference for “Intro to ChE” (i.e. Mass and Energy Balances) is  
Felder, R. M., Rousseau, R.W. and Lisa G. Bullard *Elementary Principles of Chemical  
Processes, 4<sup>th</sup> Edition*, Wiley, New York, 2015. ISBN-13: 978-0470616291