

Instructor:

Associate Professor Dr. Satok Chaikunchuensakun [before Midterm Exam]

Room 612/1, Engineering Laboratory and Research Building, and the Office of
the Information Processing Institute for Education and Development

Tel. 02 564 4444 Ext. 1951 or 3122

E-mail: csatok@engr.tu.ac.th

Mr. Prodpran T. Siritheerasas [after Midterm Exam]

Room 611/8, Engineering Laboratory and Research Building, and the Office of
the Information Processing Institute for Education and Development

Tel. 02 564 4444 Ext. 1950 or 3130

E-mail: sprod@tu.ac.th

Web page of the course:

<http://prodpran.che.engr.tu.ac.th/AE335/AE335.html>

Lecture Hours and Venue:

Tuesdays: 13.30-16.30

Room 703, Engineering Administration Building

Examination Dates and Times:

- Midterm: 9th March 2016 AD (2559 BE); 14.30-16.30
- Final: 31st May 2016 AD (2559 BE); 09.00-12.00

(It is advised that students follow official announcement(s) from the TEP/TEPE office, regarding the EXACT examination schedule, closely)

Office Hours:

Both instructors will NOT have specific office hours. However, if you have any questions and/or concerns regarding the course, please feel free to drop by our offices, as long as we are in the offices. You may also ask your questions and/or express your concerns *via* e-mail or phone.

Pre-requisite:

AE 205 Material and Energy Balances

The courses that require this course (AE 335) as their pre-requisite:

- AE 473 Chemical Process Design and Economic Evaluation
- AE 482 Chemical Engineering Laboratory II
- This course is used as a part (among many other courses) to determine if students are eligible for registering the AE 596 Research for Undergraduates I or AE 598 Preparation for Co-operative Education in Chemical Engineering

Textbooks:**Main textbook:**

Wankat, P.C., Separation Process Engineering, 3rd Edition, Prentice Hall, 2011.

Recommended textbooks:

Seader, J.D., and Henley, E.J., Separation Process Principles, 3rd Edition, Wiley, 2010.

Evaluation:

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|-----------------------|--------|
| • Midterm Examination | 40-45% |
| • Final Examination | 55-60% |

All examinations are **closed-book exams**, but all necessary formulae and constants, as well as charts and tables, will be given. In either exam, all kinds of calculators (whether or not they are programmable) are permitted.

Please also be informed that the evaluation and marking of exam papers will **focus mainly on the process of how you can arrive at the final answer**, rather than the final answer itself. Hence, you are strongly encouraged to **give explanations and/or make any assumptions pertaining/supporting your answers as much as possible**.

Tentative Course Schedule

Week #	Topics
1-2	<ul style="list-style-type: none">• Course Introduction and Orientation• Introduction to Separation Process Engineering• Flash Distillation<ul style="list-style-type: none">○ Basic method of flash distillation○ Form and sources of equilibrium data○ Graphical representation of binary vapour-liquid equilibrium (VLE)○ Binary flash distillation○ Multi-component VLE○ Multi-component flash distillation
3-4	<ul style="list-style-type: none">• Introduction to Column Distillation<ul style="list-style-type: none">○ Developing a distillation cascade○ Distillation equipment○ Specifications○ External column balances
5-7	<ul style="list-style-type: none">• Column Distillation: Internal Stage-by-Stage Balances<ul style="list-style-type: none">○ Internal balances○ Binary stage-by-stage solution methods○ McCabe-Thiele method and analysis procedure○ Modifications of basic distillation column situations○ Limiting operating conditions○ Sub-cooled reflux and superheated boil-up○ Efficiencies
8	❖ Midterm Examination
9-11	<ul style="list-style-type: none">• Introduction to Multi-component Distillation• Appropriate Shortcut Methods for Multi-component Distillation<ul style="list-style-type: none">○ Total reflux case: Fenske equation○ Minimum reflux case: Underwood equations○ Gilliland correlation for number of stages at finite reflux ratio• Batch Distillation<ul style="list-style-type: none">○ Binary-mixture batch distillation○ Simple binary batch distillation: Rayleigh equation○ Constant-level batch distillation○ Multi-stage batch distillation

Tentative Course Schedule (cont.)

Week #	Topics
12-13	<ul style="list-style-type: none">• Absorption and Stripping<ul style="list-style-type: none">○ Absorption and stripping equilibria○ Operating lines for absorption○ Stripping analysis○ Dilute multi-solute absorbers and strippers
14-15	<ul style="list-style-type: none">• Liquid-liquid extraction (LLE)<ul style="list-style-type: none">○ Equipment for LLE○ McCabe-Thiele diagram for dilute extraction systems○ Immiscible single-stage and cross-flow extraction○ Concentrated immiscible extraction○ Extraction for partially systems
16	❖ Final Examination