Tamkang University Academic Year 113, 2nd Semester Course Syllabus

Course Title	ADVANCED CHEMICAL ENGINEERING THERMODYNAMICS	Instructor	HSIEH, HSIAO-CHI
Course Class	TEDXM1A MASTER'S PROGRAM, DEPARTMENT OF CHEMICAL AND MATERIALS ENGINEERING, 1A	Details	◆ General Course ◆ Selective ◆ One Semester ◆ 3 Credits
Relevance to SDGs	SDG4 Quality education		

Departmental Aim of Education

Education Objectives: Cultivation of chemical/materials engineering experts with professional knowledge and high research-and-development capability.

Subject Departmental core competences

A. Possess the advanced knowledge of chemical/material engineering and to be able to use it. (ratio:40.00)

B. Capable to plan and execute the chemical/material engineering projects.(ratio:5.00)

C. Capable of writing professional papers.(ratio:5.00)

D. Capable of creative thinking and solving problem independently.(ratio:30.00)

E. Capable to coordinate and integrate interdisciplinary cooperation.(ratio:5.00)

F. Possess global vision.(ratio:5.00)

G. Qualified capability for leadership, management and planning.(ratio:5.00)

H. Capable of self-learning and self-growth.(ratio:5.00)

Subject Schoolwide essential virtues

1. A global perspective. (ratio:10.00)

2. Information literacy. (ratio:10.00)

3. A vision for the future. (ratio:10.00)

4. Moral integrity. (ratio:10.00)

5. Independent thinking. (ratio:30.00)

6. A cheerful attitude and healthy lifestyle. (ratio:10.00)

7. A spirit of teamwork and dedication. (ratio:10.00)

8. A sense of aesthetic appreciation. (ratio:10.00)

Course Introduction	This course aims at graduate students. The purposes of this course are to review basic first and second laws of thermodynamics and introduce the concept of phase equilibrium and theory and application of solutions. That will help students understand thoroughly about the chemical thermodynamics and learn how to apply knowledge of that to the research theories.

The correspondences between the course's instructional objectives and the cognitive, affective, and psychomotor objectives.

Differentiate the various objective methods among the cognitive, affective and psychomotor domains of the course's instructional objectives.

I. Cognitive : Emphasis upon the study of various kinds of knowledge in the cognition of the course's veracity, conception, procedures, outcomes, etc.
II.Affective : Emphasis upon the study of various kinds of knowledge in the course's appeal, morals, attitude, conviction, values, etc.
III.Psychomotor: Emphasis upon the study of the course's physical activity and technical manipulation.

No.	Teaching Objectives	objective methods
1	Review laws of thermodynamics	Cognitive
2	Cultivate students with professional knowledge of chemical thermodynamics	Cognitive

The correspondences of teaching objectives : core competences, essential virtues, teaching methods, and assessment

No.	Core Competences	Essential Virtues	Teaching Methods	Assessment
1	ABCDEFGH	12345678	Lecture, Discussion	Testing, Report(including oral and written)
2	ABCDEFGH	12345678	Lecture, Discussion	Testing, Report(including oral and written)

Course Schedule

Week	Date	Course Contents	Note
1	114/02/17 ~ 114/02/23	Introduction	
2	114/02/24 ~ 114/03/02	Review of First Law and Other Basic Concepts	
3	114/03/03 ~ 114/03/09	Review of First Law and Other Basic Concepts	
4	114/03/10 ~ 114/03/16	Review of Second Law of Thermodynamics	

5	114/03/17 ~ 114/03/23	Review of Second Law of Thermodynamics	
6	114/03/24 ~ 114/03/30	Applications of Thermodynamics to Flow Processes	
7	114/03/31 ~ 114/04/06	Applications of Thermodynamics to Flow Processes	Holiday
8	114/04/07 ~ 114/04/13	Production of Power from Heat	
9	114/04/14 ~ 114/04/20	Midterm	
10	114/04/21 ~ 114/04/27	Refrigeration and Liquefaction	
11	114/04/28 ~ 114/05/04	The Framework of Solution Thermodynamics	
12	114/05/05 ~ 114/05/11	Mixing Processes	
13	114/05/12 ~ 114/05/18	Phase Equilibrium: Introduction	
14	114/05/19 ~ 114/05/25	Thermodynamic Formulations for Vapor/Liquid Equilibrium	
15	114/05/26 ~ 114/06/01	Chemical-Reaction Equilibria	
16	114/06/02 ~ 114/06/08	Topics in Phase Equilibria	
17	114/06/09 ~ 114/06/15	Final Examination	
18	114/06/16 ~ 114/06/22	Thermodynamic Analysis of Processes	

Key capabilities	self-directed learning
Interdisciplinary	
Distinctive teaching	
Course Content	Logical Thinking
Requirement	

Textbooks and Teaching Materials	Self-made teaching materials:Presentations Using teaching materials from other writers:Textbooks Name of teaching materials: Smith, J.M.; "Introduction to Chemical Engineering Thermodynamics", 9th Edition, Mc Graw Hill
References	
Grading Policy	◆ Attendance： % ◆ Mark of Usual： % ◆ Midterm Exam： 45.0 % ◆ Final Exam： 45.0 % ◆ Other〈Attendance〉：10.0 %
Note	This syllabus may be uploaded at the website of Course Syllabus Management System at http://info.ais.tku.edu.tw/csp or through the link of Course Syllabus Upload posted on the home page of TKU Office of Academic Affairs at http://www.acad.tku.edu.tw/CS/main.php . **※ Unauthorized photocopying is illegal. Using original textbooks is advised. It is a crime to improperly photocopy others' publications.**