Tamkang University Academic Year 111, 1st Semester Course Syllabus

Course Title	ADVANCED PROCESS ANALYSIS AND SIMULATION	Instructor	HO, CHII-DONG
Course Class	TEDXM1A MASTER'S PROGRAM, DEPARTMENT OF CHEMICAL AND MATERIALS ENGINEERING, 1A	Details	◆ General Course ◆ Selective ◆ One Semester
Relevance to SDGs	SDG4 Quality education SDG6 Clean water and sanitation SDG7 Affordable and clean energy SDG8 Decent work and economic growth		

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:35.00)

B. Capable to plan and execute the chemical/material engineering projects.(ratio:20.00)

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

D. Capable of creative thinking and solving problem independently.(ratio:20.00)

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	The objectives of this course are twofold. First, an introduction to the principles of model building and skills needed for the application of mathematical models. Secondly, numerical analysis for solving system equations of mathematical models in science and engineering will be introduced.

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	1.To bring the students into contact with the efficient computation tools that are available today to develop physical phenomena, such as fluid flow, mass transfer, heat transfer and kinetics.	Psychomotor
2	2.To solve the resultant equations from the modeling systems.	Psychomotor
3	3.To improve the English ability for students in Chemical Engineering.	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	Discussion, Practicum, Imitation	Testing, Discussion(including classroom and online), Report(including oral and written)
2	ABCDEFGH	12345678	Discussion, Practicum, Experience, Imitation	Discussion(including classroom and online), Report(including oral and written)
3	ABCDEFGH	12345678	Discussion, Practicum, Experience, Imitation	Discussion(including classroom and online), Report(including oral and written)

Course Schedule			
Week	Date	Course Contents	Note
1	111/09/05 ~ 111/09/11	Introduction to Mathematical Modeling	
2	111/09/12 ~ 111/09/18	Models Based on Transport Phenomena Principles	
3	111/09/19 ~ 111/09/25	Material and Energy Balance	
4	111/09/26 ~ 111/10/02	Material and Energy Balance	
5	111/10/03 ~ 111/10/09	Alternate Classification of Transport Phenomena Models	T.B.A.
6	111/10/10 ~ 111/10/16	Basic Modeling	
7	111/10/17 ~ 111/10/23	Distributed Systems	
8	111/10/24 ~ 111/10/30	Mapping and Numerical Integration	
9	111/10/31 ~ 111/11/06	General Form for a linear and Nonlinear System	
10	111/11/07 ~ 111/11/13	Midterm Examination	
11	111/11/14 ~ 111/11/20	I.V.P. for O.D.E.	
12	111/11/21 ~ 111/11/27	B.V.P. for O.D.E. – F.E. methods	
13	111/11/28 ~ 111/12/04	Zone Melting	
14	111/12/05 ~ 111/12/11	Thermal-Diffusion	
15	111/12/12 ~ 111/12/18	Solar Distiller	
16	111/12/19 ~ 111/12/25	Solar Air Heater	
17	111/12/26 ~ 112/01/01	Solar Air Heater	
18	112/01/02 ~ 112/01/08	Final Examination(research report)	

Requirement	
Teaching Facility	Computer, Projector
Textbooks and Teaching Materials	B.W. Bequette, "Process Dynamics, Modeling, Analysis and Simulation"
References	D.M. Himmeblblau and K.B. Bischoff, "Process Analysis and Simulation"

Number of Assignment(s)	(Filled in by assignment instructor only)
Grading Policy	◆ Attendance： % ◆ Mark of Usual：20.0 % ◆ Midterm Exam： 30.0 % ◆ Final Exam： 30.0 % ◆ Other〈口頭報告〉：20.0 %
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.**