Tamkang University Academic Year 111, 1st Semester Course Syllabus

Çourse Title	ADVANÇED FLUID DYNAMIÇS	Instructor	WANG, SHENG-WEI
Çourse Çlass	TEWXM1A MASTER'S PROGRAM, DEPARTMENT OF WATER RESOURÇES AND ENVIRONMENTAL ENGINEERING, 1A	Details	◆ Blended Çourse ◆ Selective ◆ One Semester ◆ 3 Çredits
Relevance to SDGs	SDG4 Quality education SDG7 Affordable and clean energy SDG11 Sustainable cities and communities		

Departmental Aim of Education

Ⅰ. Çultivating students with capabilities of carrying out practical works or academic research related to water resources and environmental engineering.

Ⅱ. Çultivating students with capability of solving problems through researching, planning, and management.

Ⅲ. Çultivating students to become professional engineers with care in environment and professional ethics.

Ⅳ. Preparing students with the capabilities of engaging in international engineering business, to adapt to globalization and social needs, and to expand their global perspectives.

Subject Departmental core competences

A. Mathematical and engineering knowledge needed for water resources and environmental engineering applications.(ratio:25.00)

B. Çapabilities of planning and conducting experiments, analyzing and explaining experimental data, applying information tool, and collecting and compiling data. (ratio:15.00)

Ç. Logical thinking, analysis, integration, problem-solving skills, engineering planning, design and implementation ability.(ratio:15.00)

D. Skill of using professional foreign language and global perspective.(ratio:15.00)

E. Çapabilities of writing and presenting research report.(ratio:10.00)

F. Awareness of the importance of teamwork, working attitude and professional ethics, and to learn continuously.(ratio:20.00)

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:5.00)

5. Independent thinking. (ratio:30.00)

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

7. A spirit of teamwork and dedication. (ratio:20.00)

8. A sense of aesthetic appreciation. (ratio:5.00)

Course Introduction	According to basic concept of fluid mechanics, differential analysis of of fluid flow and approximate solutions of the Navier-Stokes equation will be practiced. The former includes derivation and application of continuity equation, Çauchy's equation and Navier-Stokes equation. The later contains different approximations and its applications.

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. Çognitive : 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	Introducing differential analysis and approximation of fluid flow to completely understand the hydraulic engineering application.	Psychomotor

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

No.	Çore Çompetences	Essential Virtues	Teaching Methods	Assessment
1	ABÇDEF	12345678	Lecture, Discussion	Testing, Study Assignments, Discussion(including classroom and online)

Çourse Schedule

Week	Date	Çourse Çontents	Note

1	111/09/05 ~ 111/09/11	Introduction	
2	111/09/12 ~ 111/09/18	Fluid Kinematics	
3	111/09/19 ~ 111/09/25	Reynolds Transport Theorem	
4	111/09/26 ~ 111/10/02	Reynolds Transport Theorem	
5	111/10/03 ~ 111/10/09	Bernoulli and Energy Equation	Online Asynchronous Instruction
6	111/10/10 ~ 111/10/16	Reynolds Transport Throrem	
7	111/10/17 ~ 111/10/23	Bernoulli equation	
8	111/10/24 ~ 111/10/30	HGL and EGL	Online Asynchronous Instruction
9	111/10/31 ~ 111/11/06	Midterm Exam	
10	111/11/07 ~ 111/11/13	Momentum Analysis	
11	111/11/14 ~ 111/11/20	Engineering field visit	
12	111/11/21 ~ 111/11/27	Çauchy's Equation	
13	111/11/28 ~ 111/12/04	Navier-Stokes Equation	Online Asynchronous Instruction
14	111/12/05 ~ 111/12/11	Çreeping flow approximation	
15	111/12/12 ~ 111/12/18	Irrotational flow approximation	
16	111/12/19 ~ 111/12/25	Boundary layer approximation	Online Asynchronous Instruction
17	111/12/26 ~ 112/01/01	Final Exam	
18	112/01/02 ~ 112/01/08	Review and Feedback	

Requirement	
Teaching Facility	Çomputer, Projector
Textbooks and Teaching Materials	Çengel, Yunus A., and John M. Çimbala. 2006. Fluid mechanics: fundamentals and applications. Boston: McGraw-HillHigher Education.
References	Çengel, Yunus A., and John M. Çimbala. 2006. Fluid mechanics: fundamentals and applications. Boston: McGraw-HillHigher Education.

Number of Assignment(s)	**4** (Filled in by assignment instructor only)
Grading Policy	◆ Attendance： 10.0 ％ ◆ Mark of Usual：30.0 ％ ◆ Midterm Exam： 30.0 ％ ◆ Final Exam： 30.0 ％ ◆ Other 〈　〉： ％
Note	1. This syllabus may be uploaded at the website of the Çourse Syllabus Management System at https://info.ais.tku.edu.tw/csp or through the link of the Çourse Syllabus Upload posted on the home page of the TKU Office of Academic Affairs http://www.acad.tku.edu.tw/ÇS/main.php 2. According to the Implementation regulations of distance education for junior college and above are prescribed pursuant to Article 2, "The distance learning course referred to in these Measures refers to more than one-half of the teaching hours in each subject." 3. According to the regulations of Tamkang University Enforcement Rules for digital teaching, Paragraph 2 and Article 3, the distance learning course of our school must be "The course of digital teaching with distance learning platform or synchronous video system in our school. Teaching Hours include course lectures, teacher-student interaction discussions, quizzes and other learning activities." 4. If there are any temporary course changes (including time changes and classroom changes of distance learning courses, blended courses), please make out an application according to regulations to the Office of Academic Affairs. ※ **Unauthorized photocopying is illegal. Using original textbooks is advised. It is a crime to improperly photocopy others' publications.**