Tamkang University Academic Year 108, 1st Semester Course Syllabus

Course Title	VISCOUS FLUID FLOW	Instructor	KANG SHUNG-WEN
Course Class	TEBXM1A MASTER'S PROGRM, DEPARTMENT OF MECHANICAL AND ELECTRO-MECHANICAL ENGINEERING, 1A	Details	◆ General Course ◆ Selective ◆ One Semester

Departmental Aim of Education

Ⅰ. To prepare students who have a comprehensive understanding of the principles of applied sciences and engineering to be innovators in the field of mechanical and electromechanical engineering.

Ⅱ. To train emerging professionals who possess a high level of expertise and ethical standards who will become independent research and development leaders in the industry.

Ⅲ. To motivate students who will pursue continuing education as a means to stay on the cutting edge of global competiveness and meet changes in their careers and the workplace with confidence and ease.

Subject Departmental core competences

A. Head: Knowledge of mechanical and electromechanical engineering.(ratio:60.00)

C. Heart: Love of learning and innovation.(ratio:20.00)

D. Eye: Vision of progress and improvements.(ratio:20.00)

Subject Schoolwide essential virtues

1. A global perspective. (ratio:20.00)

2. Information literacy. (ratio:10.00)

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

5. Independent thinking. (ratio:60.00)

Course Introduction	THE CONTENT OF THE COURSE INCLUDE THE FOLLOWING: VECTOR AND TENSOR CALCULUS,INTRODUCTION TO THE CONTINUUM FLUID,CONSERVATION LAWS,STATIC EQUILIBRIUM OF FLUIDS AND INTERFACES,THE NAVIER-STOKES EQUATIONS, UNIDIRECTIONAL FLOWS, APPROXIMATE METHODS, LAMINAR BOUNDARY LAYER FLOWS.

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	The educational purpose of the course is two-fold: (a) to develop and rationalize the mathematics of viscous fluid flow using basic principles, such as mass, momentum conservation, and constitutive equations; and (b) to exhibit the systematic application of these principles to flows occurring in fluid processing and other applications.	Cognitive

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

No.	Core Competences	Essential Virtues	Teaching Methods	Assessment
1	ACD	1235	Lecture, Discussion	Testing, Study Assignments, Discussion(including classroom and online), Activity Participation

Course Schedule

Week	Date	Course Contents	Note
1	108/09/09 ~ 108/09/15	INTRODUCTION	
2	108/09/16 ~ 108/09/22	DIFFERENTIAL EQ' S OF MOTION	
3	108/09/23 ~ 108/09/29	VORTICITY, STREAM FUNCTION	
4	108/09/30 ~ 108/10/06	EXACT SOL. OF N-S EQUATIONS	
5	108/10/07 ~ 108/10/13	SIMILARITY SOLUTIONS	
6	108/10/14 ~ 108/10/20	COMPRESSIBLE COUETTE FLOW	
7	108/10/21 ~ 108/10/27	POTENTIAL FLOW	
8	108/10/28 ~ 108/11/03	MIDTERM TEST	
9	108/11/04 ~ 108/11/10	CONFORMAL TRANFORMATIONS	

10	108/11/11～ 108/11/17	AXISYMMETRIC POTENTIAL FLOW	
11	108/11/18～ 108/11/24	LAMINAR BOUNDARY LAYERS	
12	108/11/25～ 108/12/01	SIMILARITY SOLUTIONS	
13	108/12/02～ 108/12/08	INTEGRAL B.L. TECHNIQUES	
14	108/12/09～ 108/12/15	QUIZ & DISCUSSION	
15	108/12/16～ 108/12/22	UNIDIRECTIONAL FLOWS	
16	108/12/23～ 108/12/29	APPROXIMATE METHODS	
17	108/12/30～ 109/01/05	AXISYMMETRIC B.L.' S	
18	109/01/06～ 109/01/12	FINAL TEST	

Requirement	需先修流體力學
Teaching Facility	Computer, Projector
Textbooks and Teaching Materials	"Introduction to Fluid Mechanics" -Robert W. Fox, Alan T. McDonald
References	"Fluid Mechanics" -Frank M. White
Number of Assignment(s)	8 (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	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.**