Tamkang University Academic Year 114, 1st Semester Course Syllabus

Course Title	SPECTRAL ANALYSIS	Instructor	CHIEH-HSUN WU
Course Class	TECXM1A MASTER'S PROGRAM, DEPARTMENT OF CIVIL ENGINEERING, 1A	Details	◆ General Course ◆ Selective ◆ One Semester ◆ 2 Credits
Relevance to SDGs	SDG4 Quality education		

Departmental Aim of Education

Ⅰ. Develop students' ability and knowledge of civil engineering to meet the requirements of employability and further education.

Ⅱ. Equip students with the ability to integrate engineering profession and information technology to strengthen their competitiveness.

Ⅲ. Enable students to understand the international trends, and to activate a lifelong learning concept.

Subject Departmental core competences

A. Each student should have the advanced professional knowledge of engineering design and analysis.(ratio:30.00)

B. Each student should have the ability to integrate interdisciplinary knowledge and information technology.(ratio:20.00)

C. Each student should have independent thinking and ability of research conducting and dissertation writing.(ratio:25.00)

D. Each student should have the ability of effective communication, team work integration and leadership.(ratio:10.00)

E. Each student should the concept of lifelong learning and international sustainability. (ratio:15.00)

Subject Schoolwide essential virtues

1. A global perspective. (ratio:10.00)
2. Information literacy. (ratio:20.00)
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:5.00)

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

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

Course Introduction	This course is designed to give students a basic understanding of Fourier spectral analysis and its applications. The theory of the Fourier transform is introduced, which is followed by applications in wind spectral analyses, structural responses in the spectral domain, and applications in particle image velocimetry. Other applications are welcome on the students' discussion.

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	As described in the course introduction.	Cognitive

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

No.	Core Competences	Essential Virtues	Teaching Methods	Assessment
1	ABCDE	12345678	Lecture, Discussion	Study Assignments, Discussion(including classroom and online), Report(including oral and written)

Course Schedule

Week	Date	Course Contents	Note
1	114/09/15 ~ 114/09/21	Theory of the Fourier transform	
2	114/09/22 ~ 114/09/28	Theory of the Fourier transform	
3	114/09/29 ~ 114/10/05	Theory of the Fourier transform	

4	114/10/06 ~ 114/10/12	Theory of the Fourier transform	
5	114/10/13 ~ 114/10/19	Application to wind velocity turbulent spectra	
6	114/10/20 ~ 114/10/26	Application to wind velocity turbulent spectra	
7	114/10/27 ~ 114/11/02	Application to wind velocity turbulent spectra	
8	114/11/03 ~ 114/11/09	Application to wind velocity turbulent spectra	
9	114/11/10 ~ 114/11/16	Application to wind velocity turbulent spectra	
10	114/11/17 ~ 114/11/23	Structural responses in Spectral domain	
11	114/11/24 ~ 114/11/30	Structural responses in Spectral domain	
12	114/12/01 ~ 114/12/07	Structural responses in Spectral domain	
13	114/12/08 ~ 114/12/14	Structural responses in Spectral domain	
14	114/12/15 ~ 114/12/21	Applications to particle image velocimetry	
15	114/12/22 ~ 114/12/28	Applications to particle image velocimetry	
16	114/12/29 ~ 115/01/04	Applications to particle image velocimetry	
17	115/01/05 ~ 115/01/11	Final exam	
18	115/01/12 ~ 115/01/18	Final exam	

Key capabilities	self-directed learning International mobility Information Technology Problem solving Interdisciplinary
Interdisciplinary	
Distinctive teaching	
Course Content	Computer programming or Computer language (students have hands-on experience in related projects) Logical Thinking AI application

Requirement	Being engaged, involved & inspired!
Textbooks and Teaching Materials	Self-made teaching materials:Presentations, Handouts
References	
Grading Policy	◆ Attendance： 10.0 % ◆ Mark of Usual：10.0 % ◆ Midterm Exam： 40.0 % ◆ Final Exam： 40.0 % ◆ Other〈 〉： %
Note	This syllabus may be uploaded at the website of Course Syllabus Management System at https://web2.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. ※"Adhere to the concept of intellectual property rights" and "Do not illegally photocopy, download, or distribute." Using original textbooks is advised. It is a crime to improperly photocopy others' publications.