

Tamkang University Academic Year 113, 2nd Semester Course Syllabus

Course Title	SIGNALS AND SYSTEMS	Instructor	TYAN FENG
Course Class	TENXB2P DEPARTMENT OF AEROSPACE ENGINEERING, 2P	Details	<ul style="list-style-type: none"> ◆ General Course ◆ Selective ◆ One Semester ◆ 2 Credits
Relevance to SDGs	SDG4 Quality education SDG10 Reducing inequalities		
Departmental Aim of Education			
I. Apply scientific knowledge and engineering techniques to analyze and solve fundamental aerospace engineering problem. II. Through fundamental theory to design and implement experiments, and be able to analyze experimental data. III. Maintain the spirit of independent thinking, self-elevate, and continuous learning. IV. Uphold the responsible attitude of work ethics and team work. V. Will have access to information, using basic knowledge, diversification, and better ability to adapt to circumstances.			
Subject Departmental core competences			
A. With basic aerospace engineering expertise.(ratio:20.00) B. Able to solve basic engineering problems via fundamental theory.(ratio:30.00) C. Capable of lifelong learning and research capacity for further studies.(ratio:20.00) D. To work with a sense of mission and responsibility.(ratio:10.00) E. Have team spirit and the ability to communicate with each other.(ratio:10.00) F. With an international perspective, have the ability to connect with the world.(ratio:5.00) G. Taking full advantage of information and utilization of computer-assisted problem solving skills.(ratio:5.00)			
Subject Schoolwide essential virtues			
1. A global perspective. (ratio:10.00) 2. Information literacy. (ratio:30.00) 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:5.00)
- 7. A spirit of teamwork and dedication. (ratio:5.00)
- 8. A sense of aesthetic appreciation. (ratio:5.00)

Course Introduction

The course presents and integrates the basic concepts for both continuous-time and discrete-time signals and systems. Signal and system representations are developed for both time and frequency domains. These representations are related through the Fourier transform and its generalizations, which are explored in detail. Filtering and filter design, modulation, and sampling for both analog and digital systems, as well as an exposition and demonstration of the basic concepts of feedback systems for both analog and digital systems, are discussed and illustrated.

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. Introduce basic concepts of signals, systems, linear time-invariant systems.	Cognitive
2	2. Understand Laplace transform, related applications and frequency response.	Cognitive
3	3. Introduce digital filters.	Cognitive
4	4. Understand continuous time and discrete time Fourier transform.	Cognitive
5	5. Understand discrete time sampling and spectral analysis.	Cognitive

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

No.	Core Competences	Essential Virtues	Teaching Methods	Assessment

1	ABCDEFGF	12345678	Lecture, Discussion, Practicum	Testing, Study Assignments, Discussion(including classroom and online), Practicum
2	ABCDEFGF	12345678	Lecture, Discussion, Practicum	Testing, Study Assignments, Discussion(including classroom and online), Practicum
3	ABCDEFGF	12345678	Lecture, Discussion, Practicum	Testing, Study Assignments, Discussion(including classroom and online), Practicum
4	ABCDEFGF	12345678	Lecture, Discussion, Practicum	Testing, Study Assignments, Discussion(including classroom and online), Practicum
5	ABCDEFGF	12345678	Lecture, Discussion, Practicum	Testing, Study Assignments, Discussion(including classroom and online), Practicum

Course Schedule

Week	Date	Course Contents	Note
1	114/02/17 ~ 114/02/23	Introduction to signals	
2	114/02/24 ~ 114/03/02	Introduction to systems, Linear, time-invariant systems	
3	114/03/03 ~ 114/03/09	Laplace transform	
4	114/03/10 ~ 114/03/16	Sinusoidal steady state, frequency response	
5	114/03/17 ~ 114/03/23	Signal Processing -- CT filtering	
6	114/03/24 ~ 114/03/30	Stability of feedback systems	
7	114/03/31 ~ 114/04/06	Z transform	
8	114/04/07 ~ 114/04/13	DT filters	
9	114/04/14 ~ 114/04/20	Midterm Exam/Midterm Assessment Week (teachers can adjust the week as needed)	
10	114/04/21 ~ 114/04/27	CT and DT convolution	
11	114/04/28 ~ 114/05/04	Impulse responses, image processing	
12	114/05/05 ~ 114/05/11	CT Fourier transform, CT Fourier series	

13	114/05/12 ~ 114/05/18	Sampling CT signals, Reconstruction of sampled signals	
14	114/05/19 ~ 114/05/25	DT Fourier transform, DT Fourier series	
15	114/05/26 ~ 114/06/01	Modulation, AM broadcast radio	
16	114/06/02 ~ 114/06/08	Speech production and spectral analysis	
17	114/06/09 ~ 114/06/15	Final Exam/Final Assessment Week (teachers can adjust the week as needed)	
18	114/06/16 ~ 114/06/22	Flexible Teaching Week: Generally, no in-person classes; teachers may arrange teaching activities or final assessments, among other options.	
Key capabilities	self-directed learning Problem solving		
Interdisciplinary	STEAM course (S:Science, T:Technology, E:Engineering, M:Math, A field:Integration of Art and Humanist) In addition to teaching content of the teacher's professional field, integrate other subjects or invite experts and scholars in other fields to share knowledge or teaching		
Distinctive teaching	Learning technologies (such as AR/VR,etc.) incorporated to physical courses		
Course Content	Computer programming or Computer language (students have hands-on experience in related projects) Logical Thinking AI application		
Requirement	1. Make yourself be familiar with MATLAB. 2. Work hard. 3. No late homework.		
Textbooks and Teaching Materials	Self-made teaching materials:Presentations, Handouts Using teaching materials from other writers:Textbooks, Presentations, Handouts, Videos, Luis F. Chaparro		
References	1. Luis F. Chaparro and Aydin Akan, " Signals and Systems Using MATLAB 3rd ed" , Academic Press, 2019 2. Oktay Alkin, "Signals and Systems, A MATLAB Integrated Approach," CRC Press, 2014		
Grading Policy	◆ Attendance : % ◆ Mark of Usual : % ◆ Midterm Exam : 35.0 % ◆ Final Exam : 50.0 % ◆ Other 〈Homework〉 : 15.0 %		

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>.

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