

## Tamkang University Academic Year 102, 1st Semester Course Syllabus

Course Title	COMMUNICATION SYSTEMS	Instructor	YIH-GUANG JAN
Course Class	TETBB3A DIVISION OF ELECTRONICS AND COMMUNICATIONS ENGINEERING, DEPARTMENT OF ELECTRICAL ENGINEERING, 3A	Details	<ul style="list-style-type: none"> <li>◆ Required</li> <li>◆ One Semester</li> <li>◆ 3 Credits</li> </ul>
D e p a r t m e n t a l   t e a c h i n g   o b j e c t i v e s			
<p>I . To educate students to have knowledge in mathematics, science to solve electrical engineering problems.</p> <p>II. To educate students to become an electrical engineer with team-working discipline to independently complete their assignments.</p> <p>III. To develop global competitiveness skills for students to compete with the challenge in today's diversified professional fields.</p>			
D e p a r t m e n t a l   c o r e   c o m p e t e n c e s			
<p>A. To have the capability to use mathematical tools in coupling with scientific process to solve electrical engineering problems.</p> <p>B. To have the capability to design and execute electrical engineering experiments and to analyze and discuss the resulting experimental data.</p> <p>C. To have the knowledge, techniques in executing electrical engineering projects and to have the capability in operating equipment.</p> <p>D. To have the electrical system design concept and to have the capability to read and prepare professional report.</p> <p>E. To have the capability in project plan and management, communication skill and team working discipline.</p> <p>F. To have the capability to find, analyze, identify and solve electrical engineering problems.</p> <p>G. To have the capability to catch on the time varying international affairs and to acknowledge the continuous and persistent learning.</p> <p>H. To acknowledge the social responsibility of an engineer, his professional ethics and the adherence to the intellectual property.</p>			

Course Introduction	In the design of a communication system, the system designer works with mathematical models that statistically characterize the signal distortion encountered on physical channels. In this course, we first introduce the fundamental ideas of analog signal and system in time domain, and through the Fourier series and transform we could study them in the frequency domain. With this principle, we are able to look more insight to the characteristics of channel and learn how various modulation technologies work for particular channel.
------------------------	---

**The Relevance among Teaching Objectives, Objective Levels and Departmental core competences**

I. Objective Levels (select applicable ones) :

- (i) Cognitive Domain : C1-Remembering, C2-Understanding, C3-Applying, C4-Analyzing, C5-Evaluating, C6-Creating
- (ii) Psychomotor Domain : P1-Imitation, P2-Mechanism, P3-Independent Operation, P4-Linked Operation, P5-Automation, P6-Origination
- (iii) Affective Domain : A1-Receiving, A2-Responding, A3-Valuing, A4-Organizing, A5-Charaterizing, A6-Implementing

II. The Relevance among Teaching Objectives, Objective Levels and Departmental core competences :

- (i) Determine the objective level(s) in any one of the three learning domains (cognitive, psychomotor, and affective) corresponding to the teaching objective. Each objective should correspond to the objective level(s) of ONLY ONE of the three domains.
- (ii) If more than one objective levels are applicable for each learning domain, select the highest one only. (For example, if the objective levels for Cognitive domain include C3,C5,and C6, select C6 only and fill it in the boxes below. The same rule applies to Psychomotor Domain and Affective Domain.)
- (iii) Determine the Departmental core competences that correspond to each teaching objective. Each objective may correspond to one or more Departmental core competences at a time. (For example, if one objective corresponds to three Departmental core competences: A,AD, and BEF, list all of the three in the box.)

No.	Teaching Objectives	Relevance	
		Objective Levels	Departmental core competences
1	From this course students can learn the fundamental concepts of communication systems, including various properties of signals and systems, and distinguish the advantage of different modulation techniques.	C2	ABCDEFGH

**Teaching Objectives, Teaching Methods and Assessment**

No.	Teaching Objectives	Teaching Methods	Assessment

1	From this course students can learn the fundamental concepts of communication systems, including various properties of signals and systems, and distinguish the advantage of different modulation techniques.	Lecture, Simulation	Written test, Participation
---	---	---------------------	-----------------------------

This course has been designed to cultivate the following essential qualities in TKU students

Essential Qualities of TKU Students	Description
◆ A global perspective	Helping students develop a broader perspective from which to understand international affairs and global development.
◆ Information literacy	Becoming adept at using information technology and learning the proper way to process information.
◇ A vision for the future	Understanding self-growth, social change, and technological development so as to gain the skills necessary to bring about one's future vision.
◇ Moral integrity	Learning how to interact with others, practicing empathy and caring for others, and constructing moral principles with which to solve ethical problems.
◆ Independent thinking	Encouraging students to keenly observe and seek out the source of their problems, and to think logically and critically.
◆ A cheerful attitude and healthy lifestyle	Raising an awareness of the fine balance between one's body and soul and the environment; helping students live a meaningful life.
◇ A spirit of teamwork and dedication	Improving one's ability to communicate and cooperate so as to integrate resources, collaborate with others, and solve problems.
◆ A sense of aesthetic appreciation	Equipping students with the ability to sense and appreciate aesthetic beauty, to express themselves clearly, and to enjoy the creative process.

#### Course Schedule

Week	Date	Subject/Topics	Note
1	102/09/16 ~ 102/09/22	Overview of communication systems; historical background and applications.	Chapter 1
2	102/09/23 ~ 102/09/29	Overview of communication systems; primary resources and operational requirements, basic ideas of analog signals and systems	Chapter 1 and 2
3	102/09/30 ~ 102/10/06	Analog signals and systems; Fourier transform and its properties, the relationship between time and frequency, and singular functions.	Chapter 2
4	102/10/07 ~ 102/10/13	Analog signals and systems; Fourier transforms of periodic signals, transmission of signal through linear systems e.g., convolution.	Chapter 2
5	102/10/14 ~ 102/10/20	Analog signals and systems; ideal lowpass filters, correlation function and spectral densities.	Chapter 2

6	102/10/21 ~ 102/10/27	Introduction of basic analog modulation techniques; amplitude and angle modulations	Chapter 3
7	102/10/28 ~ 102/11/03	Amplitude modulations; amplitude modulation, virtues, limitations, and modifications of amplitude modulation	Chapter 3
8	102/11/04 ~ 102/11/10	Amplitude modulations; double sideband-suppressed carrier modulation, Costas receiver	Chapter 3
9	102/11/11 ~ 102/11/17	Amplitude modulations; vestigial sideband modulation, baseband representation of modulated waves	Chapter 3
10	102/11/18 ~ 102/11/24	Midterm Exam Week	
11	102/11/25 ~ 102/12/01	Amplitude modulations; vestigial sideband modulation, baseband representation of modulated waves	Chapter 3
12	102/12/02 ~ 102/12/08	Angle modulations; basic definition, properties of angle-modulated waves, relationship between PM and FM	Chapter 4
13	102/12/09 ~ 102/12/15	Angle modulations; transmission bandwidth of FM, generation of narrowband FM	Chapter 4
14	102/12/16 ~ 102/12/22	Angle modulations; transmission bandwidth of FM, generation of narrowband FM	Chapter 4
15	102/12/23 ~ 102/12/29	Pulse modulation; sampling process, pulse-amplitude and pulse-position modulation	Chapter 5
16	102/12/30 ~ 103/01/05	Pulse modulation; sampling process, pulse-amplitude and pulse-position modulation	Chapter 5
17	103/01/06 ~ 103/01/12	Pulse modulation; analog-to-digital (A/D) converter, and pulse-code modulation (PCM)	Chapter 5
18	103/01/13 ~ 103/01/19	Final Exam Week	
Requirement			
Teaching Facility		Computer, Projector	
Textbook(s)		Simon Haykin and Michael Moher, Introduction to Analog and Digital Communications, Second Edition, 2007 John Wiley & Sons, Inc.	
Reference(s)		John Proakis and Masoud Salehi, Communication Systems Engineering, 2nd Edition 2002, Prentice Hall. R. E. Ziemer and W. H. Tranter, Principles of Communications Systems, Modulation, and Noise, 6th Edition, 2010, John Wiley & Sons. Leon W. Couch, II, Digital and Analog Communication Systems, Sixth Edition 2001, Prentice-Hall, Inc.	

Number of Assignment(s)	(Filled in by assignment instructor only)
Grading Policy	◆ Attendance :            %    ◆ Mark of Usual : 30.0 %    ◆ Midterm Exam : 30.0 % ◆ Final Exam :    40.0 % ◆ Other (   ) :            %
Note	This syllabus may be uploaded at the website of Course Syllabus Management System at <a href="http://info.ais.tku.edu.tw/csp">http://info.ais.tku.edu.tw/csp</a> or through the link of Course Syllabus Upload posted on the home page of TKU Office of Academic Affairs at <a href="http://www.acad.tku.edu.tw/CS/main.php">http://www.acad.tku.edu.tw/CS/main.php</a> . <b>※ Unauthorized photocopying is illegal. Using original textbooks is advised. It is a crime to improperly photocopy others' publications.</b>