

SYLLABUS

1. **Course name:** Electronic Communications
2. **Course code:** COEL330264E
3. **Credits:** 3 credits (3/0/6) (3 theoretical credits, 0 practical credit).
Duration: 15 weeks (3 main periods and 6 self-study periods)/week).
4. **Instructors:**
 - a. Primary instructor: Pham Hong Lien, Assoc. Prof
 - b. Secondary instructors:
 - Nguyen Ngo Lam, M.Eng
 - Nguyen Van Phuc, M.Eng
5. **Course conditions:**
 - a. Prerequisites: N/A.
 - b. Corequisites: Signals and Systems, Basic Eletronic

6. Course Description:

This course provides fundamental knowledge of electronic communication systems such as RF amplifier, filters, impedance matching, modulation and demodulation circuits in analog communication systems.

7. Course Goals:

Goals	Goal description <i>This course provides students:</i>	ELOs
G1	Background knowledge of electronic circuits in communication systems.	01 (H)
G2	Ability to analyze, explain and solve technical problems of analog communication systems.	02 (M)
G3	The ability to calculate, design basic circuits in the actual analog communication systems.	07 (M)

* Note: H: *High*; M: *Medium*; L: *Low*

8. Course Learning Outcomes - CLOs:

CLOs	Description <i>After completing this course, students can have:</i>	ELOs
G1	G1.1 Present block diagram of analog communication systems.	01
	G1.2 Present the characteristics of filter circuits, functions of impedance matching circuits, principles of oscillating circuits and phase locked loop.	01
	G1.3 Present the characteristics of the analog modulation techniques in communication systems.	01
	G1.4 Classify receivers and transmitters in analog communication systems.	01, 07
	G1.5 Present the technical requirements of the blocks in the analog transceivers.	01, 07
G2	G2.1 Select the appropriate filter circuits in the communication system.	02, 07
	G2.2 Analyze the pros and cons of analog modulation circuits.	02
	G2.3 Apply oscillating circuits, phase locked loop in analog modulation and demodulation, and frequency synthesis.	02, 07

	G2.4	Explain the principle of analog modulation and demodulation circuits.	02, 07
	G2.5	Explain the principle of class C power amplifier.	02, 07
	G2.6	Analyze the blocks in the analog transceiver.	02, 07
G3	G3.1	Calculate, design analog filters, RC, LC – oscillators.	01, 02, 07
	G3.2	Apply oscillator circuits, phase locked loop and RF power amplifier for frequency synthesis.	01, 02, 07
	G3.3	Design RF power amplifiers, impedance matching circuits in analog transceivers.	01, 02, 07

9. Study materials:

a. Textbooks:

[1] Phạm Hồng Liên, *Điện tử thông tin*, Nhà xuất bản ĐHQG Tp HCM, 2004.

b. References::

[2] Hoàng Đình Chiến, *Mạch điện tử 3*, ĐHBK Tp HCM, 2000.

[3] Louis E. Frenzel, *Communication Electronics*, McGrawHill International, 2001.

[4] Gary M. Miller, *Modern Electronic Communication*, Prentice-Hall International. Inc, 1993.

10. Student Assessments:

a. Grading points: 10

b. Planning for students assessment is followed:

Type	Contents	Line time	Assessment techniques	CLOs	Rates (%)
Midterms					50
H	Knowledge of chapters 1-3	Week 5	Homeworks	G1.2, G2.1, G2.5, G3.1	2.5
H	Knowledge of chapters 4-5	Week 12	Homeworks	G2.2, G2.3, G3.1	2.5
M	Knowledge of chapters 1-3	Week 6	Individual paper test in class	G2.1, G3.1, G3.2	20
M	Knowledge of chapters 4-5	Week 13	Individual paper test in class	G2.2, G2.3, G2.4, G3.1	20
Q	Knowledge of chapters 1-6	Week 15	Individual online test		5
Final exam					50
F	Content includes all output standards of the course.		Individual paper assessment in class		50

* Note: Q: Quiz; H: Homework; P: Project; M: Midterm Exam; F: Final Exam;

11. Course details:

Week	Contents	CLOs
1	Chapter 1. Overview of electronic communication systems (3/0/6)	
	Teaching contents: (3) 1.1 Introduction of electronic communication systems	G1.1 G1.4

	<p>1.2 Concepts in the electronic communication systems</p> <p>1.3 Block diagram of an electronic communication systems</p> <p>1.4 Radio frequency table and bandwidth</p> <p>1.5 Applications of electronic communication technology</p> <p>Teaching methods:</p> <ul style="list-style-type: none"> + Theoretical lectures + Questions and discussion 	
	<p>Self-study contents: (6)</p> <p>1.6 Use of radio frequency range.</p> <p>1.7 The principle of a transceiver system.</p>	
	Chapter 2. Filtered circuits (3/0/6)	
2	<p>Teaching contents: (3)</p> <p>2.1 Introduction and classification of filtered circuits</p> <p>2.2 Transmission function and maximum flat transmission function</p> <p>2.3 Passive filtered circuits.</p> <p>2.4 Active low pass and high pass filters</p> <p>Teaching methods:</p> <ul style="list-style-type: none"> + Theoretical lectures + Thảo luận 	G1.2 G2.1 G3.1
	<p>Self-study contents: (6)</p> <p>2.5 Design active low pass and high pass filters.</p>	
	Chapter 2. Filtered circuits (cont) (3/0/6)	
3	<p>Teaching contents: (3)</p> <p>2.6 Active band-pass and band-stop filters</p> <p>2.7 High-order active filter circuits</p> <p>2.8 Comparison of passive and active filters</p> <p>Teaching methods:</p> <ul style="list-style-type: none"> + Theoretical lectures + Questions and discussion 	G1.2 G2.1 G3.1
	<p>Self-study contents: (6)</p> <p>2.9 Design filtered circuits</p> <p>2.10 Design filtered circuit with dual supply and single supply</p> <p>2.11 Applications of the filters</p>	
	Chapter 3. RF power amplifiers (3/0/6)	
4	<p>Teaching contents: (3)</p> <p>3.1 Introduction and classification of RF power amplifiers</p> <p>3.2 Analysis and calculation of RF power amplifier circuits</p> <p>3.3 Design RF frequency power amplifiers</p> <p>Teaching methods:</p> <ul style="list-style-type: none"> + Theoretical lectures + Questions and discussion 	G2.5 G3.3
	<p>Self-study contents: (6)</p> <p>3.4 Design 3 RF power amplifier circuits</p>	
	Chapter 3. RF power amplifiers (cont) (3/0/6)	
5	<p>Teaching contents: (3)</p> <p>3.5 Exercises</p>	G2.5 G3.2

	<p>3.6 Frequency multipliers</p> <p>Teaching methods:</p> <ul style="list-style-type: none"> + Theoretical lectures + Questions and discussion <hr/> <p>Self-study contents: (6)</p> <p>3.7 Applications of RF power amplifiers</p>	G3.3
	Chapter 4. Oscillator and frequency synthesis (3/0/6)	
6	<p>Teaching contents: (3)</p> <p>4.1 Overview of the oscillator circuits</p> <p>4.2 Principle of oscillators</p> <p><i>Midterm test 1</i></p> <p>Teaching methods:</p> <ul style="list-style-type: none"> + Theoretical lectures + Questions and discussion <hr/> <p>Self-study contents: (6)</p> <p>4.3 RC oscillator circuits</p> <p>4.4 Design RC oscillator circuits</p>	G1.2 G2.3 G3.1 G3.2
	Chapter 4. Oscillator and frequency synthesis (cont) (3/0/6)	
7	<p>Teaching contents: (3)</p> <p>4.5 LC oscillator circuits</p> <p>4.6 Crystal oscillator circuits</p> <p>Teaching methods:</p> <ul style="list-style-type: none"> + Theoretical lectures + Questions and discussion <hr/> <p>Self-study contents: (6)</p> <p>4.7 Design LC oscillator circuits</p> <p>4.8 Comparison of oscillator circuits.</p>	G1.2 G2.3 G3.1 G3.2
	Chapter 4. Oscillator and frequency synthesis (cont) (3/0/6)	
8	<p>Teaching contents: (3)</p> <p>4.9 Introduction and analysis of phase locked loop</p> <p>4.10 Applications of phase locked loop</p> <p>4.11 Frequency synthesis</p> <p>Teaching methods:</p> <ul style="list-style-type: none"> + Theoretical lectures + Questions and discussion <hr/> <p>Self-study contents: (6)</p> <p>4.12 Find and analyze a PLL circuit</p> <p>4.13 PLL IC.</p>	G1.2 G2.3 G3.2
	Chapter 5. Analog modulation and demodulation circuits (3/0/6)	
9	<p>Teaching contents: (3)</p> <p>5.1 Introduction of analog modulation and demodulation</p> <p>5.2 AM DSB modulation circuits</p> <p>5.3 AM SSB modulation methods</p> <p>Teaching methods:</p> <ul style="list-style-type: none"> + Theoretical lectures + Questions and discussion <hr/> <p>Self-study contents: (6)</p>	G1.3 G2.2 G2.3 G2.4

	5.4 ICs are used in AM modulation	
10	Chapter 5 Analog modulation and demodulation circuits (cont) (3/0/6)	
	Teaching contents: (3) 5.5 AM SSB modulation circuits 5.6 AM demodulation circuits Teaching methods: + Theoretical lectures + Questions and discussion	G2.3 G2.4
	Self-study contents: (6) 5.7 AM demodulation ICs	
11	Chapter 5. Analog modulation and demodulation circuits (cont) (3/0/6)	
	Teaching contents: (3) 5.8 FM modulation circuits Teaching methods: + Theoretical lectures + Questions and discussion	G2.3 G2.4
	Self-study contents: (6) 5.9 FM modulation ICs 5.10 Find and analyze an actual FM modulation circuit	
12	Chapter 5. Analog modulation and demodulation circuits (cont) (3/0/6)	
	Teaching contents: (3) 5.11 FM demodulation circuits Teaching methods: + Theoretical lectures + Questions and discussion	G2.3 G2.4
	Self-study contents: (6) 5.12 FM demodulation ICs 5.13 Find and analyze an actual FM demodulation circuit	
13	Chapter 6. Analog transceiver system (3/0/6)	
	Teaching contents: (3) 6.1 Technical requirements of the transmitter and receiver. 6.2 Classification of transmitters 6.3 Impedance matching in transceiver systems 6.4 Block diagram and analysis of AM transceivers Midterm test 2 Teaching methods: + Theoretical lectures + Questions and discussion	G1.1 G1.2 G1.4 G1.5 G2.1 G2.6 G3.3
	Self-study contents: (6) 6.5 FCC specifications of the AM transceiver 6.6 Find and analyze the principle of a simple AM transmitter	
14	Chapter 6: Analog transceiver system (cont) (3/0/6)	
	Teaching contents: (3) 6.7 Block diagram and analysis of FM transmitter 6.8 Block diagram and analysis of FM receiver 6.9 Analysis of a simple transceiver	G1.1 G1.4 G2.1 G2.6

	Teaching methods: + Theoretical lectures + Questions and discussion	
	Self-study contents: (6) 6.10 FCC specifications of the FM transceiver 6.11 Find and analyze the principle of a simple FM receiver	
15	Review	

12 Learning ethics:

Home assignments and projects must be done by the students themselves. Plagiarism found in the assessments will get zero point.

13 First approved date: 01/01/2012

14 Approval level

Dean

Department

Instructor

Nguyen Minh Tam, Ph.D

Nguyen Ngo Lam, M.Eng

Nguyen Van Phuc, M.Eng

15 Syllabus updated process

1st time: Updated content dated: 15/01/2014 <i>Contents:</i>	Instructor: Head of department: Vo Minh Huan, Ph.D
2nd time: Updated content dated: 15/01/2016 <i>Contents:</i>	Instructor: Head of department: Phan Van Ca, Ph.D
3rd time: Updated content dated: 06/05/2017 <i>Contents:</i>	Instructor: Nguyen Van Phuc, M.Eng Head of department: Phan Van Ca, Ph.D