SYLLABUS

1. **Course name:** Basic Electronics
2. **Course code:** BAEL340662
3. **Credits:** 4 (4/0/8)

   Duration: 15 weeks (60h main course and 120h self-study)
4. **Instructors:**

   1- Tran Thu Ha, PhD.

   2- Nguyen Thi Luong, PhD.

   3- Truong Thi Bich Nga, MEng.

   4- Bui Thi Tuyet Dan, MEng.

   5- Le Hoang Minh, MEng.

   6- Duong Thi Cam Tu, MEng.

   7- Phu Thi Ngoc Hieu, MEng.
5. **Course conditions**

   Prerequisites: Electrical Circuits

   Corequisites: N/A
6. **Course description**

This course provides the learner with knowledge of electronic components. In particular, students will learn the structure of the electronic components, analyze and explain the principle of operation of simple electronic circuits, the principle of the oscillator circuits, the simple DC sources. In addition, the course represents the frequency response of the amplifier circuit and how to design the audio power amplifier circuits, distinguish the type of feedback for application circuits using Op_Amp ICs.

7. **Course Goals**

Goals	***Goal description*** *(This course provides students:)*	**ELOs**
G1	Represent fundamental knowledge about semiconductor material, electronic devices and electronic circuits theory.	01 (H)
G2	Analyze and design basic electronic circuits.	02 (H)
G3	Use electronic technical documents in English.	05 (M)
G4	Select tools and methods to analyze and design basic electronic circuits.	07 (H)

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

8. **Course Learning Outcomes (CLOs)**

CLOs		***Description*** *(After completing this course, students can have:)*	**Outcome**
	G1.1	Represent about structure and characteristics of semiconductor material and P-N junction.	01
	G1.2	Represent about structure and characteristics of diode, transistor,	01

G1		thyristor.	
	G1.3	Apply the applications of diode circuit	01 07
	G1.4	Apply the small signal and power amplifier	01 07
	G1.5	Apply the feedback form in the amplifiers.	01 07
	G1.6	Apply the oscillator circuits, active filter circuits and DC source circuits (having voltage regulator)	01 07
	G2.1	Analyze and design the application circuits of diode.	02 07
	G2.2	Analyze and design the amplifier circuits	02 07
	G2.3	Analyze and design the oscillator circuits, active filters, DC source circuits.	02 07
	G3.1	Explain the datasheets of electronic devices.	05
	G3.2	Use English terms and read lectures in English for electronic circuits.	05
G4	**G4.1**	Identify and understand the electronic circuit diagrams that have the amplifier, filter, oscillator, DC power supply block.	07

9. Study materials

- Textbooks:

[1] Tran Thu Ha, *Dien tu co ban*, Nha xuat ban DH Quoc Gia TP.HCM SPKT, 2012.

- References:

[2] Robert Boylestad, Louis Nashelsky, *Electronic devices & circuit theory*, Prentice Hall, 2015.
[3] Donald A. Neamen, *Electronic Circuit Analysis & Design*, Mc-Graw Hill, 2001
[4] Thomas L.Floyd*, Electronic Devices,* Prentice Hall, 2012.
[5] Albert Malvino, *Electronic Principle*, Mc Graw Hill, 2015
[6] F.H. Mitchell JR., F.H. Mitchell SR, *Introduction to electronics devices and circuits*, Prentice Hall, 1988.
[7] Le Tien Thuong, *Mach dien tu 1,2,* Dai hoc Bach Khoa TP.HCM.
[8] Le Phi Yen, *Ky thuat dien tu,* DHQG TP.HCM, 2005.
[9] Theodore F.Bogart, JR., *Electronic devices & circuits,* Maxwell Macmilan, 1991.
[10] Sergio Franco, *Design with operational amplifiers and analog integrated circuits,* Mc-Graw Hill, 1998.

10. Student Assessments

- Grading points: 10

- Planning for students assessment is followed:

Type	Contents	Linetime	Assessment techniques	CLOs	Rates (%)
Midterms					**50**
Quick	Work at class	Weeks 1-15	Paper munite,	G1.1, G1.3,	10%

test			think-pair-share, E3..	G1.4, G1.5, G1.6.	
Online test	Online class in LMS (learning manage system) website.	Weeks 1-15	Online	G1.1, G1.3, G1.4, G1.5, G1.6, G3.1, G3.2.	15%
Exam#01	- Diode and the application. - BJT biasing.	Week 6	Exam	G1.2, G1.3, G2.1, G2.2.	25%
Report	Project	Week 10	Power point Presentation	G1.2, G1.4, G2.2, G3.1, G4.1	25%
Exam#02	- Feedback amplifier circuit. - Power amplifier. - Application of opamp in the linear circuits.	Week 14	Exam	G1.2, G1.4, G1.5, G2.2, G4.1	25%
Final term					**50**
Final Exam	- The exam covers all contents related to the expected learning outcomes of the course.		Quizz and exam.	G1.1, G1.2, G1.3, G1.4, G1.5, G1.6, G2.1, G2.2, G2.3, G4.1	

11. Course details:

Weeks	Contents	CLOs
	Chapter 1: **<SEMICONDUCTOR>** ***(4/0/8)***	
	A/ **Contents and teaching methods***: (4)* **Contents:** 1.1. Semiconductor 1.2. P-N Junction 1.3. Schottky Junction 1.4. Exercise. **Teaching methods**: + Lecture + Problem solving + Disscuss.	G1.1 G3.2

	+ Teamwork	
	***B/* Self-study contents**: *(6)* + Review. + Do the quizz test on LMS. + Prepare the next lesson - Diode.	G1.1 G3.2
	Chapter 2:* <DIODE AND THE APPLICATION CIRCUITS> *(4/0/8)	
	***A/* Contents and teaching methods**: *(3)* **Contents:** 2.1. General 2.2. Types of Diodes 2.3. Constructing the Diode circuits. **Teaching methods**: + Lecture + Problem solving + Disscuss. + Teamwork.	G1.1 G1.2 G3.2
	***B/* Self-study contents**: *(6)* + Review. + Do homework. + Do the quizz test.	G1.2 G3.1
	***Chapter 2:* <DIODE AND THE APPLICATION CIRCUITS>** *(4/0/8)*	
	***A/* Contents and teaching methods**:*(3)* **Contents:** 2.4. Application of Diodes. 2.5. Exercise. **Teaching methods**: + Lecture + Problem solving + Disscuss. + Teamwork.	G2.1
	***B/* Self- study contents**: *(6)* + Review. + Do the quizz test on LMS + Prepare for the next lesson - BJT.	G1.2 G2.1
	Chapter 3:* <BIPOLAR JUNCTION TRANSISTOR – BJT>** ***Chapter 4:* <BJT BIASING> *(4/0/8)	
	***A/* Contents and teaching methods**: *(3)* **Contents:** **Chapter 3: Bipolar Junction Transistor - BJT** 3.1. Genaral. 3.2. Structure of BJT. 3.3. Principle the operation of BJT. 3.4. V-I curve of BJT. **Chapter 4: BJT Biasing**	G1.2 G1.4 G2.2 G3.2

	4.1. Introduction the quiscent point. 4.2. Stability. 4.3. Types of BJT Biasing circuits. 4.4. DCLL and ACLL 4.5. Construct types of BJT biasing circuits. 4.5. Exercise. **Teaching methods**: + Lecture + Problem solving + Disscuss. + Teamwork	
	***B/* Self- study contents**: *(6)* + Review. + Do homework. + Do the quizz test on LMS. + Prepare for the next lesson – FET.	G1.4 G2.2 G3.1
	***Chapter 5:* <FIELD EFFECT TRANSISTOR (FET)>** ***Chapter 6:* <FET BIASING>** *(4/0/8)*	
	A/* Contents and teaching methods: (3)* **Contents:** **Chapter 5: FET** 5.1. General 5.2. JFET 5.3. MOSFET 5.4. Compare the BJT and FET. **Chapter 6: FET Biasing** 6.1. General. 6.2. JFET biasing. 6.3. MOSFET biasing. **Teaching methods**: + Lecture + Problem solving + Disscuss. + Teamwork	G1.2 G1.4 G2.2 G3.2
	***B/* Self- study contents**: *(6)* + Review. + Do the quizz test on LMS. + Prepare for the next lesson – Small signal Amplifier.	G1.4 G2.2 G3.1
	***Chapter 7:*< SMALL SIGNAL AMPLIFIER>** *(4/0/8)*	
	A/* Contents and teaching methods: (3)* **Contents:** 7.1. General 7.2. Small-signal amplifier of BJT. 7.3. Analyze the Small-signal amplifier of BJT. **Teaching methods**: + Lecture + Problem solving + Disscuss. + Teamwork	G1.4 G2.2 G3.2

	***B/* Self- study contents**: *(6)* + Review. + Do homework. + Compare CE, CC and CB.	G1.4 G2.2
	***Chapter 7:* <SMALL SIGNAL AMPLIFIER>** *(4/0/8)*	
	A/* Contents and teaching methods: (3)* **Contents:** 7.4. Small-signal amplifier of FET. 7.5. Frequency response of amplifiers. **Teaching methods**: + Lecture + Problem solving + Disscuss. + Teamwork	G1.4 G2.2 G3.2
	***B/* Self- study contents**: *(6)* + Review. + Do the quizz test on LMS + Prepare for the next lesson – Multi – Stage Amlifier	G1.4 G2.2
	***Chapter 8:* <MULTI – STAGE AMPLIFIERS>** *(4/0/12)*	
	A/* Contents and teaching methods: (3)* **Contents:** 8.1. General 8.2. RC Multi – stage amplifier. 8.3. Transformer multi – stage amplifier. 8.4. Directly multi – stage amplifier. 8.5. Darlington 8.6. Cascode 8.7. Differential Multi – stage. 8.8. Exercise. **Teaching methods**: + Lecture + Problem solving + Disscuss. + Teamwork	G1.4 G2.2 G3.2 G4.1
	***B/* Self- study contents**: *(6)* + Review. + Do the quizz test on LMS. + Prepare for the next lesson – Feedback Amplifiers.	G1.4 G2.2 G4.1
	Chapter 9:* <FEEDBACK AMPLIFIERS>** ***(4/0/8)	
	A/* Contents and teaching methods: (3)* **Contents:** 9.1. General	G1.4

	9.2. The advantage and disadvantage. 9.3. Basic principle. 9.4. The parameters. 9.5. The compare of types of feedback amplifier. 9.6. Researching other feedback amplifier. 9.7. Exercise. **Teaching methods**: + Lecture + Problem solving + Disscuss. + Teamwork	G1.5 G2.2 G3.2 G4.1
	***B/* Self- study contents**: *(6)* + Review. + Do the quizz test on LMS. + Prepare the next lesson - OPAMP.	G1.4 G1.5 G2.2
	Chapter 10:* <OPERATION AMPLIFIER- OPAMP> *(4/0/8)	
	A/* Contents and teaching methods: (3)*** **Contents:** 10.1. General 10.2. Types of OPAMP's application. 10.3. Practical characteristic. 10.4. Application in the linear circuits. **Teaching methods**: + Lecture + Problem solving + Disscuss. + Teamwork	G1.4 G1.5 G2.2 G3.2 G4.1
	***B/* Self- study contents**: *(6)* + Review. + Do homework.	G1.4 G2.2
	Chapter 10:* <OPERATION AMPLIFIER- OPAMP> *(4/0/8)	
	A/* Contents and teaching methods: (3)*** **Contents:** 10.5. Application in the non-linear circuits. 10.6. Exercise. **Teaching methods**: + Lecture + Problem solving + Disscuss. + Teamwork	G1.4 G1.5 G2.2 G3.2 G4.1
	***B/* Self- study contents**: *(6)* + Review. + Do the quizz test on LMS. + Prepare the next lesson – Power Amplifier.	G1.4 G2.2
	Chapter 11:* <POWER AMPLIFIER> *(4/0/8)	
	A/* Contents and teaching methods: (3)*** **Contents:**	

	11.1 The ideal amplifier. 11.2 Power amplifier's characteristic. 11.3 Class A amplifier. 11.4 Class B amplifier. 11.5 Class AB amplifier. 11.6 Class C amplifier. 11.7 Class D amplifier. 11.8 Exercise **Teaching methods**: + Lecture + Problem solving + Disscuss. + Teamwork	G1.4 G2.2 G3.2 G4.1
	***B/* Self- study contents**: *(6)* + Review. + Do the quizz test on LMS + Prepare for the next lesson - Oscillator.	G1.4 G2.2 G4.1
	Chapter 12:* <OSCILLATOR>** ***Chapter 13:* <RESONANCE AMPLIFIER> *(4/0/8)	
	A/* Contents and teaching methods: (3)*** **Contents:** **Chapter 12: Oscillator** 12.1. Sin - wave Oscillator 12.2. Pluse – wave Oscillator (square, triangle) 12.3. Assignment **Chapter 13: Resonance Amplifier** 13.1. General 13.2. Characteristics and parameters. 13.3. Resonance Amplifiers use Discrete componet. 13.4. Active filter 13.5. Exercise. **Teaching methods**: + Lecture + Problem solving + Disscuss. + Teamwork	G1.4 G1.5 G1.6 G2.2 G2.3 G3.2 G4.1
	***B/* Self- study contents**: *(6)* + Review. + Do the quizz test on LMS + Prepare the next lesson - Thyristor.	G1.4 G1.5 G1.6 G2.2 G2.3
	Chapter 14:* <THYRISTOR AND PHOTO ELECTRONICS COMPONENTS> *(4/0/8)	
	A/* Contents and teaching methods: (3)*** **Contents:**	

	14.1. Types of Thyristor 14.2. UJT 14.3. Photo electronics components 14.4. Exercise. **Teaching methods**: + Lecture + Problem solving + Disscuss. + Teamwork	G1.1 G1.2 G3.2
	***B/* Self- study contents**: *(6)* + Review. + Do the quizz test on LMS. + Prepare for the next lesson – DC power supply.	G1.2
	Chapter 15:* <DC POWER SUPPLY AND REGULATOR> *(4/0/8)	
	A/* Contents and teaching methods: (3)* **Contents:** 15.1. General. 15.2. Rectifier 15.3. Filter 15.4. Regulator 15.5. Exercise. 15.6. Review whole contents of course. **Teaching methods**: + Lecture + Problem solving + Disscuss. + Teamwork	G1.2 G1.3 G1.6 G2.1 G2.3 G4.1
	***B/* Self- study contents**: *(6)* + Reinforce the knowledge learned + Do homework.	G1.2 G1.3 G1.6 G2.1 G2.3 G4.1

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: August 01 2012

14. Approval level:

Dean	Department	Instructor

15. Syllabus updated process

1st time: Updated content dated	Instructors

2st time: Updated content dated	Head of department