

# SYLLABUS

**1. Course name:** BASIC ELECTRONICS

**2. Course code:** BAEL340662

**3. Credits:** 4 (4/0/8)

Lesson plan: 15 weeks (4 academic periods + 0\*2 practical periods + 8 self-study periods/ week)

**4. Instructors:**

- 1- Assoc. Prof. PhD. Tran Thu Ha
- 2- PhD. Nguyen Thi Luong
- 3- M.Eng. Truong Thi Bich Nga
- 4- M.Eng. Bui Thi Tuyet Dan
- 5- PhD. Le Hoang Minh
- 6- M.Eng. Duong Thi Cam Tu
- 7- M.Eng. Phu Thi Ngoc Hieu

**5. Course conditions**

Prerequisites: Electrical Circuits.

**6. Course description**

This course provides the learner with knowledge of electronic components, presents the structure and principles of operation of the electronic components, analyze and explain the principle of operation of simple electronic circuits, analyze the frequency response of the amplifier circuit, analyze and design the audio power amplifier circuits, distinguish the type of feedback, analyze and design application circuits used Op\_Amp, analyze the principle of operation of the oscillator circuits, analyze and design the simple DC sources provide electronic circuits.

**7. Course Goals**

Goals (G)	Goal description	Outcome (ELOs)
<b>G1</b>	Represent fundamental knowledge about semiconductor material, electronic devices and circuit theory.	1.1, 1.2
<b>G2</b>	Analyze and design basic electronic circuits.	2.2
<b>G3</b>	Use electronic technical documents in English.	3.3
<b>G4</b>	Select tools and methods to analyze and design basic electronic circuits.	4.4

**\*Notes: High: H; Medium: M; Low: L**

## 8. Course Learning Outcomes (CLOs)

CLOs		Description (After completing this course, students can have:)	Outcome
G1	G1.1	Represent about structure and characteristics of semiconductor material and P-N junction.	1.1, 1.2
	G1.2	Represent about structure and characteristics of diode, transistor, thyristor.	1.1, 1.2
	G1.3	Apply the applications of diode circuit	1.1, 1.2
	G1.4	Apply the small signal and power amplifier	1.1, 1.2
	G1.5	Apply the feedback form in the amplifiers.	1.1, 1.2
	G1.6	Apply the oscillator circuits, active filter circuits and source circuits (having voltage regulator)	1.1, 1.2
G2	G2.1	Analyze and design the application circuits of diode.	2.2
	G2.2	Analyze and design the amplifier circuits	2.2
	G2.3	Analyze and design the oscillator circuits, active filters, AC to DC power conversion in source circuits.	2.2
G3	G3.1	Explain the datasheets of electronic devices.	3.3
	G3.2	Use English terms and read lectures in English for electronic circuits.	3.3
G4	G4.1	Select tools and methods to analyze and design basic electronic circuits.	4.4

## 9. Study materials

### -Textbooks:

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

### - References:

- [1] Robert Boylestad, Louis Nashelsky, *Electronic devices & circuit theory*, Prentice Hall, 2015.
- [2] Donald A. Neamen, *Electronic Circuit Analysis & Design*, Mc-Graw Hill, 2001
- [3] Thomas L.Floyd, *Electronic Devices*, Prentice Hall, 2012.
- [4] Albert Malvino, *Electronic Principle*, Mc Graw Hill, 2015
- [5] F.H. Mitchell JR., F.H. Mitchell SR, *Introduction to electronics devices and circuits*, Prentice Hall, 1988.
- [6] Le Tien Thuong, *Mach dien tu 1, 2*, Dai hoc Bach Khoa TP.HCM.
- [7] Le Phi Yen, *Ky Thuat dien Tu*, DHQG TP.HCM, 2005.
- [8] Theodore F.Bogart, JR., *Electronic devices & circuits*, Maxwell Macmilan, 1991.
- [9] 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 (%)
<b>Midterms</b>					<b>50</b>
Quick test	Work at class	Weeks 1-15	Paper munite, think-pair-share, E3..	G1.1, G1.3, G1.4, G1.5, G1.6.	10%
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%
1 <sup>st</sup> Mid term	1 <sup>st</sup> Mid term: - Diode and the aplycation. - 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%
2 <sup>nd</sup> Mid term	- Analyze for electronics circuit and solve electrical and electronic matters: amplifiers, Opamp. Realize the roles and responsibility of engineers and social circumstance which has impacts on the technical activities of electrical and electronic industry.	Week 14	Exam	G1.2, G1.4, G1.5, G2.2, G4.1	25%
<b>Final Term</b>					<b>50</b>
	- Test the overall course's learning outcomes. - Time at least 90 minutes.		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
1	<b>Chapter 1: &lt;SEMICONDUCTOR&gt; (4/0/8)</b>	
	<b>A/ Contents and teaching methods: (4)</b> <b>Contents:</b> <ul style="list-style-type: none"> <li>1.1. Semiconductor</li> <li>1.2. P-N Junction</li> <li>1.3. Schottky Junction</li> <li>1.4. Exercise.</li> </ul> <b>Teaching methods:</b> <ul style="list-style-type: none"> <li>+ Lecture + Problem solving + Discuss.</li> <li>+ Teamwork</li> </ul>	G1.1 G3.2
	<b>B/ Self- study contents: (8)</b> <ul style="list-style-type: none"> <li>+ Review.</li> <li>+ Do the quizz test on LMS.</li> <li>+ Prepare the next lesson - Diode.</li> </ul>	G1.1 G3.2
2	<b>Chapter 2: &lt;DIODE AND THE APPLICATION CIRCUITS&gt; (4/0/8)</b>	
	<b>A/ Contents and teaching methods: (4)</b> <b>Contents:</b> <ul style="list-style-type: none"> <li>2.1. General</li> <li>2.2. Types of Diodes</li> <li>2.3. Constructing the Diode circuits.</li> </ul> <b>Teaching methods:</b> <ul style="list-style-type: none"> <li>+ Lecture + Problem solving + Discuss.</li> <li>+ Teamwork.</li> </ul>	G1.1 G1.2 G3.2
	<b>B/ Self- study contents: (8)</b> <ul style="list-style-type: none"> <li>+ Review.</li> <li>+ Do the quizz test.</li> </ul>	G1.2 G3.1
3	<b>Chapter 2: &lt;DIODE AND THE APPLICATION CIRCUITS&gt; (4/0/8)</b>	G2.1
	<b>A/ Contents and teaching methods: (4)</b> <b>Contents:</b> <ul style="list-style-type: none"> <li>2.4. Application of Diodes.</li> <li>2.5. Exercise.</li> </ul> <b>Teaching methods:</b> <ul style="list-style-type: none"> <li>+ Lecture + Problem solving + Discuss.</li> <li>+ Teamwork.</li> </ul>	
	<b>B/ Self- study contents: (8)</b> <ul style="list-style-type: none"> <li>+ Review.</li> <li>+ Do the quizz test on LMS</li> </ul>	G1.2 G2.1

	+ Prepare for the next lesson - BJT.	
4	<b>Chapter 3: &lt;BIPOLAR JUNCTION TRANSISTOR – BJT&gt;</b> <b>Chapter 4: &lt;BJT BIASING&gt; (4/0/8)</b>	
	<b>A/ Contents and teaching methods: (4)</b> <b>Contents:</b> <b>Chapter 3: Bipolar Junction Transistor - BJT</b> 3.1. Genaral. 3.2. Structure of BJT. 3.3. Principle the operation of BJT. 3.4. V-I curve of BJT. <b>Chapter 4: BJT Biasing</b> 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. <b>Teaching methods:</b> + Lecture + Problem solving + Disscuss. + Teamwork	G1.2 G1.4 G2.2 G3.2
	<b>B/ Self- study contents: (8)</b> + Review. + Do the quizz test on LMS. + Prepare for the next lesson – FET.	G1.4 G2.2 G3.1
5	<b>Chapter 5: &lt;FIELD EFFECT TRANSISTOR (FET)&gt;</b> <b>Chapter 6: &lt;FET BIASING&gt; (4/0/8)</b>	
	<b>A/ Contents and teaching methods: (4)</b> <b>Contents:</b> <b>Chapter 5: FET</b> 5.1. General 5.2. JFET 5.3. MOSFET 5.4. Compare the BJT and FET. <b>Chapter 6: FET Biasing</b> 6.1. General. 6.2. JFET biasing. 6.3. MOSFET biasing. 6.4. Exercise. <b>Teaching methods:</b> + Lecture + Problem solving + Disscuss. + Teamwork	G1.2 G1.4 G2.2 G3.2

	<p><b>B/ Self- study contents: (8)</b>  + Review.  + Do the quizz test on LMS.  + Prepare for the next lesson – Small signal Amplifier.</p>	<p>G1.4  G2.2  G3.1</p>
6	<p><b>Chapter 7: &lt;SMALL SIGNAL AMPLIFIER&gt; (4/0/8)</b></p>	
	<p><b>A/ Contents and teaching methods: (4)</b>  <b>Contents:</b>  7.1. General  7.2. Small-signal amplifier of BJT.  7.3. Analyze the Small-signal amplifier of BJT.  <b>Teaching methods:</b>  + Lecture + Problem solving + Disscuss.  + Teamwork</p>	<p>G1.4  G2.2  G3.2</p>
	<p><b>B/ Self- study contents: (8)</b>  + Review.  + Do homework.  + Compare CE, CC and CB.</p>	<p>G1.4  G2.2</p>
7	<p><b>Chapter 7: &lt;SMALL SIGNAL AMPLIFIER&gt; (4/0/8)</b></p>	
	<p><b>A/ Contents and teaching methods: (4)</b>  <b>Contents:</b>  7.4. Small-signal amplifier of FET.  7.5. Frequency response of amplifiers.  <b>Teaching methods:</b>  + Lecture + Problem solving + Disscuss.  + Teamwork</p>	<p>G1.4  G2.2  G3.2</p>
	<p><b>B/ Self- study contents: (8)</b>  + Review.  + Do the quizz test on LMS  + Prepare for the next lesson – Multi – Stage Amlifier</p>	<p>G1.4  G2.2</p>
8	<p><b>Chapter 8: &lt;MULTI – STAGE AMPLIFIERS&gt; (4/0/12)</b></p>	
	<p><b>A/ Contents and teaching methods: (4)</b>  <b>Contents:</b>  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.</p>	<p>G1.4  G2.2  G3.2  G4.1</p>

	<p>8.8. Exercise.</p> <p><b>Teaching methods:</b></p> <ul style="list-style-type: none"> <li>+ Lecture + Problem solving + Discuss.</li> <li>+ Teamwork</li> </ul>	
	<p><b>B/ Self- study contents: (8)</b></p> <ul style="list-style-type: none"> <li>+ Review.</li> <li>+ Do the quizz test on LMS.</li> <li>+ Prepare for the next lesson – Feedback Amplifiers.</li> </ul>	<p>G1.4</p> <p>G2.2</p> <p>G4.1</p>
	<p><b>Chapter 9: &lt;FEEDBACK AMPLIFIERS&gt; (4/0/8)</b></p>	
9	<p><b>A/ Contents and teaching methods: (4)</b></p> <p><b>Contents:</b></p> <ul style="list-style-type: none"> <li>9.1. General</li> <li>9.2. The advantage and disadvantage.</li> <li>9.3. Basic principle.</li> <li>9.4. The parameters.</li> <li>9.5. The compare of types of feedback amplifier.</li> <li>9.6. Researching other feedback amplifier.</li> <li>9.7. Exercise.</li> </ul> <p><b>Teaching methods:</b></p> <ul style="list-style-type: none"> <li>+ Lecture + Problem solving + Discuss.</li> <li>+ Teamwork</li> </ul>	<p>G1.4</p> <p>G1.5</p> <p>G2.2</p> <p>G3.2</p> <p>G4.1</p>
	<p><b>B/ Self- study contents: (8)</b></p> <ul style="list-style-type: none"> <li>+ Review.</li> <li>+ Do the quizz test on LMS.</li> <li>+ Prepare the next lesson - OPAMP.</li> </ul>	<p>G1.4</p> <p>G1.5</p> <p>G2.2</p>
	<p><b>Chapter 10: &lt;OPERATION AMPLIFIER- OPAMP&gt; (4/0/8)</b></p>	
10	<p><b>A/ Contents and teaching methods: (4)</b></p> <p><b>Contents:</b></p> <ul style="list-style-type: none"> <li>10.1. General</li> <li>10.2. Types of OPAMP’s application.</li> <li>10.3. Practical characteristic.</li> <li>10.4. Application in the linear circuits.</li> </ul> <p><b>Teaching methods:</b></p> <ul style="list-style-type: none"> <li>+ Lecture + Problem solving + Discuss.</li> <li>+ Teamwork</li> </ul>	<p>G1.4</p> <p>G1.5</p> <p>G2.2</p> <p>G3.2</p> <p>G4.1</p>
	<p><b>B/ Self- study contents: (8)</b></p> <ul style="list-style-type: none"> <li>+ Review.</li> <li>+ Do homework.</li> </ul>	<p>G1.4</p> <p>G2.2</p>
11	<p><b>Chapter 10: &lt;OPERATION AMPLIFIER- OPAMP&gt; (4/0/8)</b></p>	

	<p><b>A/ Contents and teaching methods: (4)</b></p> <p><b>Contents:</b></p> <p>10.5. Application in the non-linear circuits.</p> <p>10.6. Exercise.</p> <p><b>Teaching methods:</b></p> <p>+ Lecture + Problem solving + Discuss.</p> <p>+ Teamwork</p>	<p>G1.4</p> <p>G1.5</p> <p>G2.2</p> <p>G3.2</p> <p>G4.1</p>
	<p><b>B/ Self- study contents: (8)</b></p> <p>+ Review.</p> <p>+ Do the quizz test on LMS.</p> <p>+ Prepare the next lesson – Power Amplifier.</p>	<p>G1.4</p> <p>G2.2</p>
	<p><b>Chapter 11: &lt;POWER AMPLIFIER&gt; (4/0/8)</b></p>	
12	<p><b>A/ Contents and teaching methods: (4)</b></p> <p><b>Contents:</b></p> <p>11.1 The ideal amplifier.</p> <p>11.2 Power amplifier’s characteristic.</p> <p>11.3 Class A amplifier.</p> <p>11.4 Class B amplifier.</p> <p>11.5 Class AB amplifier.</p> <p>11.6 Class C amplifier.</p> <p>11.7 Class D amplifier.</p> <p>11.8 Exercise</p> <p><b>Teaching methods:</b></p> <p>+ Lecture + Problem solving + Discuss.</p> <p>+ Teamwork</p>	<p>G1.4</p> <p>G2.2</p> <p>G3.2</p> <p>G4.1</p>
	<p><b>B/ Self- study contents: (8)</b></p> <p>+ Review.</p> <p>+ Do the quizz test on LMS</p> <p>+ Prepare for the next lesson - Oscillator.</p>	<p>G1.4</p> <p>G2.2</p> <p>G4.1</p>
	<p><b>Chapter 12: &lt;OSCILLATOR&gt;</b></p> <p><b>Chapter 13: &lt;RESONANCE AMPLIFIER&gt; (4/0/8)</b></p>	
13	<p><b>A/ Contents and teaching methods: (4)</b></p> <p><b>Contents:</b></p> <p><b>Chapter 12: Oscillator</b></p> <p>12.1. Sin - wave Oscillator</p> <p>12.2. Pluse – wave Oscillator (square, triangle)</p> <p>12.3. Assignment</p> <p><b>Chapter 13: Resonance Amplifier</b></p> <p>13.1. General</p> <p>13.2. Characteristics and parameters.</p> <p>13.3. Resonance Amplifiers use Discrete componet.</p>	<p>G1.4</p> <p>G1.5</p> <p>G1.6</p> <p>G2.2</p> <p>G2.3</p> <p>G3.2</p> <p>G4.1</p>



	<p>13.4. Active filter 13.5. Exercise.</p> <p><b>Teaching methods:</b> + Lecture + Problem solving + Discuss. + Teamwork</p>	
	<p><b>B/ Self- study contents: (8)</b> + Review. + Do the quizz test on LMS + Prepare the next lesson - Thyristor.</p>	<p>G1.4 G1.5 G1.6 G2.2 G2.3</p>
	<p><b>Chapter 14: &lt;THYRISTOR AND PHOTO ELECTRONICS COMPONENTS&gt; (4/0/8)</b></p>	
14	<p><b>A/ Contents and teaching methods: (4)</b> <b>Contents:</b> 14.1. Types of Thyristor 14.2. UJT 14.3. Photo electronics components 14.4. Exercise. <b>Teaching methods:</b> + Lecture + Problem solving + Discuss. + Teamwork</p>	<p>G1.1 G1.2 G3.2</p>
	<p><b>B/ Self- study contents: (8)</b> + Review. + Do the quizz test on LMS. + Prepare for the next lesson – DC power supply.</p>	<p>G1.2</p>
	<p><b>Chapter 15: &lt;DC POWER SUPPLY AND REGULATOR&gt; (4/0/8)</b></p>	
15	<p><b>A/ Contents and teaching methods: (4)</b> <b>Contents:</b> 15.1. General. 15.2. Rectifier 15.3. Filter 15.4. Regulator 15.5. Exercise. 15.6. Review whole contents of course. <b>Teaching methods:</b> + Lecture + Problem solving + Discuss. + Teamwork</p>	<p>G1.2 G1.3 G1.6 G2.1 G2.3 G4.1</p>
	<p><b>B/ Self- study contents: (8)</b> + Review. + Do homework.</p>	<p>G1.2, G1.3 G1.6, G2.1 G2.3, G4.1</p>



**12. Learning ethics:**

Assignments and homework have to do with students' work and not copied or plagiarized from any course. If have, they will be got zero (0 mark) in the mid term and final term.

**13. First approved date:**

**14. Approval level:**

<b>Dean</b>	<b>Department</b>	<b>Instructor</b>
<b>Assoc.Prof. PhD. Nguyen Minh Tam</b>	<b>Assoc.Prof. PhD. Tran Thu Ha</b>	<b>PhD. Nguyen Thi Luong</b>

**15. Syllabus updated process**

<b>1<sup>st</sup> time:</b> Updated content dated	Instructors
<b>2<sup>st</sup> time:</b> Updated content dated	Head of department