

SYLLABUS

1. **Course name:** Basic Electronics Lab

2. **Course code:** ELPR320762

3. **Credits:** 2 (0/6/12)

Duration: 15 weeks (90hrs main course and 180hrs self-study)

4. **Instructors:**

1- Truong Thi Bich Nga, MEng

2- Le Hoang Minh, MEng

3- Nguyen Thi Luong, PhD

4- Bui Thi Tuyet Dan, MEng

5- Phu Thi Ngoc Hieu, MEng

6- Duong Thi Cam Tu, MEng

7- Vu Thi Ngoc Thu, MEng

8- Le Thanh Dao, MEng

5. **Course conditions**

Prerequisites: Basic electronics

Corequisites: Basic Electronics

6. **Course description**

This course guides students to practice basic electronic circuits such as rectifiers, clipping circuits, DC power supply circuits, small signal amplifier circuits, audio power amplifier circuits, transistor switching circuits, sinusoidal and square waveform oscillators, control circuits using SCR, TRIAC, DIAC, LDR, Op-to and other application circuits.

7. **Course Goals**

Goals	Goal description (This course provides students:)	ELOs
G1	Basic knowledge and techniques to perform the experiments.	01 (H)
G2	The ability to measure electronic devices and assemble application electronic circuits.	02 (H)
G3	The ability to read and understand technical documents in English on the basic electronic components for modern technology tools to build and simulate electronic circuits.	05 (M)
G4	The ability to learn how to assemble, analyze and measure basic electronic circuits.	07 (H)

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

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

CLOs		Description (After completing this course, students can have:)	Outcome
G1	G1.1	The ability to use and assemble on the basic electronic practice kit.	01
	G1.2	The ability to present the symbols, principles of operation and Volt-Ampere characteristics of basic electronic components: Diode, LED, BJT, FET, OPAMP, SCR.	01
G2	G2.1	The ability to identify, classify, check the status of operation of basic electronic components: resistors, capacitors, diode, LED, BJT, FET, OPAMP, SCR.	02
	G2.2	The ability to understand how to build electronic circuits in fact, the form of electronic circuits and explain the principle of operation.	02
G3	G3.1	The ability to read the datasheet of electronic components.	05
G4	G4.1	The ability to assemble and measure the parameters the basic electronic circuits: rectifier, clipping circuit, amplifier, switch circuit, oscillator, ...	07
	G4.2	The ability to explain, analyze, test the operation and collected data of the electronic circuit.	07

9. Study materials

-Textbooks:

[1]. ThS Trương Thị Bích Nga, *Thực tập Điện tử cơ bản*, ĐH SPKT TP.HCM 2012.

- References:

[1] PGS.TS. Trần Thu Hà, *Điện tử cơ bản*, ĐH SPKT TP.HCM 2012.

[2] Robert Boylestad, *Electronic Devices & Circuit Theory*, Prentice Hall.

[3] Thomas L. Floyd, *Electronic Devices seventh edition*, Prentice Hall.

10. Student Assessments

Grading points: 10

Planning for students assessment is followed:

Type	Contents	Linetime	Assessment techniques	CLOs	Rates (%)
Midterms					50
	Practice report.	Week 1 to 15	Report	G1.1, G1.2 G2.1, G2.2 G4.1, G4.2	20
KT#1	Look up Diode 1N4007 datasheet. Design, assemble and measure data of rectifier.	Week 3	Paper assessment in class	G3.1, G4.1 G4.2	4
KT#2	Look up Transistor C1815, A1013, B564, D468, K30A datasheet.	Week 6	Paper assessment in class	G3.1, G4.1 G4.2,	4

	Design, assemble and measure data of transistor bias circuit.				
KT#3	Design, assemble and measure data of amplifier circuit using BJT/FET.	Week 8	Paper assessment in class	G3.1, G4.1 G4.2	4
KT#4	Look up IC 741 datasheet Tra cứu datasheet của IC 741. Design, assemble and measure data of amplifier circuit using Op-amp.	Week 12	Paper assessment in class	G3.1, G4.1 G4.2	4
	Simulate the operation of electronic circuits: rectifier, clipping circuit, amplifier, switch circuit, oscillator.	Week 4 to 14	Paper assessment	G2.1	4
	Design and create the circuit board: power supply circuit or other circuit.	Week 10	Product scoring	G2.2,	10
Final exam					50
	Design and assemble circuit on basic electronic practice kit.	Week 15	Test on basic electronic practice kit	G1.1, G1.2 G2.1, G2.2 G4.1, G4.2	

11. Course details:

Weeks	Weeks	CLOs
1	Lesson 1: <BASIC ELECTRONIC PRACTICE KIT INSTRUCTION> (0/6/12)	
	A/ Contents and teaching methods: (6) Contents: 1.1 Introduce to basic electronic practice kit. 1.2 Survey electronic components block, power supply block and IC block. 1.3 Assignment, reporting guideline. Teaching methods: + Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary.	G1.1 G1.2
	B/ Self-study contents: (12) + Report the practice results, answer questions at the end of each lesson. + Prepare the next lesson. + Read Diode 1N4007 datasheet.	G1.1 G1.2 G3.1
2	Lesson 2: < DIODE AND RECTIFIERS> (0/6/12)	
	A/ Contents and teaching methods: (6) Contents: 2.1 Introduce to diode 1N4007.	G1.2 G2.1 G2.2 G4.1

	<p>2.2 Survey half-wave rectifiers.</p> <p>2.3 Survey full-wave rectifiers.</p> <p>2.4 Assignment.</p> <p>Teaching methods:</p> <p>+ Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary.</p>	
	<p>B/ Self-study contents: (12)</p> <p>+ Learn the different types of Diode and applications.</p> <p>+ Report the practice results, answer questions at the end of each lesson.</p> <p>+ Simulate rectifiers by using the Proteus software.</p> <p>+ Prepare the next lesson.</p>	<p>G2.1 G4.2</p>
3	<p>Lesson 3: <DIODE APPLICATIONS> (0/6/12)</p>	
	<p>A/ Contents and teaching methods: (6)</p> <p>Contents:</p> <p>3.1 Serial clippers.</p> <p>3.2 Parallel clippers.</p> <p>3.3 Logic gate circuits.</p> <p>3.4 Clampers.</p> <p>3.5 Assignment.</p> <p>Teaching methods:</p> <p>+ Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary.</p>	<p>G2.1 G2.2</p>
	<p>B/ Self-study contents: (12)</p> <p>+ Simulate, design the voltage tripler rectifier.</p> <p>+ Report the practice results, answer questions at the end of each lesson.</p> <p>+ Prepare the next lesson.</p> <p>+ Read the transistor C1815 datasheet.</p>	<p>G2.1 G3.1 G4.2</p>
4	<p>Lesson 4: <CHARACTERISTIC AND BJT BIASING> (0/6/12)</p>	
	<p>A/ Contents and teaching methods: (6)</p> <p>Contents:</p> <p>4.1 Introduction.</p> <p>4.2 Characteristic of transistor C1815.</p> <p>4.3 Bias circuits.</p> <p>4.4 Assignment.</p> <p>Teaching methods:</p> <p>+ Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary.</p>	<p>G2.1 G2.2</p>
	<p>B/ Self-study contents: (12)</p> <p>+ Design and simulate bias circuits using transistor pnp.</p>	<p>G2.1 G4.2</p>

	<ul style="list-style-type: none"> + Report the practice results, answer questions at the end of each lesson. + Prepare the next lesson. 	
5	<p>Bài 5: <AMPLIFIERS USING BJT> (0/6/12)</p> <p>A/ Contents and teaching methods: (6)</p> <p>Content:</p> <ul style="list-style-type: none"> 5.1 CE Amplifier – Fixed-bias circuit. 5.2 CE Amplifier – Voltage divider bias circuit. 5.3 CB Amplifier. 5.4 CC Amplifier. 5.5 Conclusions about the basic parameters of the small signal amplifiers. 5.6 Assignment. <p>Teaching methods:</p> <ul style="list-style-type: none"> + Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary. 	G4.1
	<p>B/ Self-study contents: (12)</p> <ul style="list-style-type: none"> + Learn the applications of the CE, CB, CC amplifier in reality. + Design and simulate amplifier circuits using BJT pnp. + Report the practice results, answer questions at the end of each lesson. + Prepare the next lesson. 	G2.2 G1.1 G4.2
6	<p>Bài 6: <CHARACTERISTIC, BIASING AND AMPLIFIER OF FET> (0/6/12)</p> <p>A/ Contents and teaching methods: (6)</p> <p>Content:</p> <ul style="list-style-type: none"> 6.1 Survey JFET. 6.2 JFET bias circuits. 6.3 CS amplifier. 6.4 CG amplifier. 6.5 Assignment. <p>Teaching methods:</p> <ul style="list-style-type: none"> + Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary. 	G2.1 G2.2 G4.1
	<p>B/ Self-study contents: (12)</p> <ul style="list-style-type: none"> + Learn the applications of MOSFET. + Simulate MOSFET amplifier in reality. + Report the practice results, answer questions at the end of each lesson. + Prepare the next lesson. 	G2.2 G1.1 G4.2
7	<p>Bài 7: <MULTI-STAGE AMPLIFIERS> (0/6/12)</p>	

	<p>A/ Contents and teaching methods: (6)</p> <p>Content:</p> <p>7.1 RC coupled amplifier.</p> <p>7.2 Differential amplifier.</p> <p>7.3 Assignment.</p> <p>Teaching methods:</p> <p>+ Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary.</p>	G4.1
	<p>B/ Self-study contents: (12)</p> <p>+ Learn and simulate the applications of multistage amplifier in reality.</p> <p>+ Report the practice results, answer questions at the end of each lesson.</p> <p>+ Prepare the next lesson.</p>	G2.2 G2.1 G4.2
8	<p>Bài 8: <TRANSISTOR SWITCHING CIRCUITS> (0/6/12)</p>	
	<p>A/ Contents and teaching methods: (6)</p> <p>Content:</p> <p>8.1 Logic gates using transistor.</p> <p>8.2 Multi-vibrator.</p> <p>8.3 Assignment.</p> <p>Teaching methods:</p> <p>+ Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary.</p>	G4.1
	<p>B/ Self-study contents: (12)</p> <p>+ Learn the 3-led astable multivibrator.</p> <p>+ Learn and simulate the logic gates in reality.</p> <p>+ Report the practice results, answer questions at the end of each lesson.</p> <p>+ Prepare the next lesson.</p>	G2.2 G2.1 G4.2
9	<p>Bài 9: <REGULATOR> (0/6/12)</p>	
	<p>A/ Contents and teaching methods: (6)</p> <p>Content:</p> <p>9.1 Parallel regulator.</p> <p>9.2 Serial regulator.</p> <p>9.3 Regulator using IC.</p> <p>9.4 Create the PCB of power supply circuit.</p> <p>9.5 Assignment.</p> <p>Teaching methods:</p> <p>+ Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary.</p>	G3.1 G4.1
	<p>B/ Self-study contents: (12)</p> <p>+ Design and create the PCB of power supply circuit.</p>	G3.1

	<ul style="list-style-type: none"> + Learn the IC LM337. + Report the practice results, answer questions at the end of each lesson. + Prepare the next lesson. 	
10	<p>Bài 10: <OPERATIONAL AMPLIFIER> (0/6/12)</p> <p>A/ Contents and teaching methods: (6)</p> <p>Content:</p> <ul style="list-style-type: none"> 10.1 Operational amplifier. 10.2 Linear application. 10.3 Non-linear application. 10.4 Assignment. <p>Teaching methods:</p> <ul style="list-style-type: none"> + Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary. 	G1.2 G3.1 G4.1
	<p>B/ Self-study contents: (12)</p> <ul style="list-style-type: none"> + Learn the Op-amps in reality. + Report the practice results, answer questions at the end of each lesson. + Prepare the next lesson. 	G4.2
11	<p>Bài 11: : <SINUSOIDAL OSCILLATORS> (0/6/12)</p> <p>A/ Contents and teaching methods: (6)</p> <p>Content:</p> <ul style="list-style-type: none"> 11.1 Phase-shift oscillator. 11.2 Wien bridge oscillator. 11.3 Quartz oscillator circuit. 11.4 Application circuit: wireless microphone. 11.5 Assignment. <p>Teaching methods:</p> <ul style="list-style-type: none"> + Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary. 	G2.2 G4.1
	<p>B Self-study contents: (12)</p> <ul style="list-style-type: none"> + Learn and simulate the square/triangle wave oscillator, with requirement frequency. + Report the practice results, answer questions at the end of each lesson. + Prepare the next lesson. 	G2.2 G4.2
12, 13	<p>Bài 12: <SMALL POWER AUDIO FREQUENCY AMPLIFIER CIRCUIT> (0/12/24)</p> <p>A/ Contents and teaching methods: (6)</p> <p>Content:</p> <ul style="list-style-type: none"> 12.1 OTL amplifier. 12.2 OCL amplifier. 	G3.1 G4.1

	<p>12.3 Amplifier using IC LA4440. 12.4 Create the PCB of small power amplifier. 12.5 Assignment.</p> <p>Teaching methods:</p> <ul style="list-style-type: none"> + Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary. 	
	<p>B/ Self-study contents: (6)</p> <ul style="list-style-type: none"> + Learn the power amplifiers in reality. + Report the practice results, answer questions at the end of each lesson. + Prepare the next lesson. 	<p>G2.2 G4.2</p>
	<p>Bài 13: <SCR – TRIAC – LDR APPLICATION CIRCUIT> (0/6/12)</p>	
	<p>A/ Contents and teaching methods: (6)</p> <p>Content:</p> <p>13.1 Thyristor (SCR). 13.2 Triac. 13.3 Light-dependent resistor (LDR). 13.4 Create the PCB of light sensor circuit. 13.5 Assignment.</p> <p>Teaching methods:</p> <ul style="list-style-type: none"> + Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary. 	<p>G2.1 G4.1</p>
14	<p>B/ Self-study contents: (12)</p> <ul style="list-style-type: none"> + Learn the SCR application. + Simulate the light sensor circuit to on-off lamp. + Report the practice results, answer questions at the end of each lesson. + Review for final test. 	<p>G2.2</p>
15	<p><FINAL TEST></p>	

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:

14. Approval level:

Dean

Department

Instructor

15. Syllabus updated process

1st time: Updated content dated	Instructors
2st time: Updated content dated	Head of department