

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 <i>(This course provides students:)</i>	ELOs
G1	Basic knowledge and techniques to perform the experiments	01(L)
G2	The ability to measure electronic devices and assemble application electronic circuits.	02 (M)
G3	The ability to use modern technology tools to build and simulate electronic circuits.	03(H)
G4	The ability to read and understand technical documents in English on the basic electronic components.	05(L)

G5	Teamwork skills and communication.	06(L)
G6	The ability to assemble, analyze and measure basic electronic circuits.	10(H)
G7	Thinking skills to design, solve the problems that arise when designing the basic electronic circuits.	11 (M)

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

8. Course Learning Outcomes (CLOs)

CLOs		Description (After completing this course, students can have:)	Outcome
	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
	G2.1	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
	G3.1	The ability to simulate the operation of electronic circuits: rectifier, clipping circuit, amplifier, switch circuit, oscillator using Proteus software.	03
	G3.2	The ability to simulate application electronic circuits: light sensor and sine wave oscillator	03
G4	G4.1	The ability to read the datasheet of electronic components.	05
G5	G5.1	Teamwork skills to practice, report and create the circuit board.	06
	G6.1	The ability to assemble and measure the parameters the basic electronic circuits: rectifier, clipping circuit, amplifier, switch circuit, oscillator...	10
	G6.2	The ability to explain, analyze, test the operation and collected data of the electronic circuit.	10
	G7.1	The ability to read electronic circuit diagrams in practice	11

	G7.2	The ability to calculate, design and create the circuit board: power supply circuit and amplifier...and solve the problem that arise when designing.	11
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9. Study materials

-Textbooks:

[1]. ThS Trương Thị Bích Ngà, *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 G6.1 G6.2	20
KT#1	Look up Diode 1N4007 datasheet. Design, assemble and measure data of rectifier	Week 3	Paper assessment in class	G4.1 G6.1 G6.2 G7.2	4
KT#2	Look up Transistor C1815, A1013, B564, D468, K30A datasheet. Design, assemble and measure data of transistor bias circuit.	Week 6	Paper assessment in class	G4.1 G6.1 G6.2 G7.2	4
KT#3	Design, assemble and measure data of amplifier circuit using BJT/FET.	Week 8	Paper assessment in class	G4.1 G6.1 G6.2 G7.2	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	G4.1 G6.1 G6.2 G7.2	4
	Simulate the operation of electronic circuits: rectifier, clipping circuit, amplifier, switch circuit, oscillator	Week 4 to 14	Paper assessment	G3.1	4
	Design and create the circuit board: power supply circuit or other circuit	Week 10	Product scoring	G3.2 G7.2	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 G6.1 G6.2	

11. Course details:

Weeks	Weeks	CLOs
	<i>Lesson 1:<BASIC ELECTRONIC PRACTICE KIT INSTRUCTION> (0/6/12)</i>	
	<i>A/ Contents and teaching methods:: (6)</i> 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
	<i>B/ Self-study contents: (12)</i>	G1.1 G1.2

	<ol style="list-style-type: none"> 1. Report the practice results, answer questions at the end of each lesson. 2. Prepare the next lesson 3. Read Diode 1N4007 datasheet 	G4.1
	Lesson 2: < DIODE AND RECTIFIERS> (0/6/12)	
	A/ Contents and teaching methods: (6) Contents: 2.1. Introduce to diode 1N4007 2.2. Survey half-wave rectifiers 2.3. Survey full-wave rectifiers 2.4. Assignment Teaching methods: + Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary.	G1.2 G2.1 G2.2 G6.1
	B/ Self-study contents: (12) <ol style="list-style-type: none"> 1. Learn the different types of Diode and applications. 2. Report the practice results, answer questions at the end of each lesson. 3. Simulate rectifiers by using the Proteus software. 4. Prepare the next lesson. 	G3.1 G6.2
	Lesson 3: < DIODE APPLICATIONS > (0/6/12)	
	A/ Contents and teaching methods: (6) Contents: 3.1. Serial clippers 3.2. Parallel clippers 3.3. Logic gate circuits 3.4. Clampers 3.5. Assignment Teaching methods: +Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary.	G2.1 G2.2
	B/ Self-study contents: (12) <ol style="list-style-type: none"> 1. Simulate, design the voltage tripler rectifier. 2. Report the practice results, answer questions at the end of each lesson. 3. Prepare the next lesson. 4. Read the transistor C1815 datasheet 	G3.1 G4.1 G6.2
	Lesson 4: < CHARACTERISTIC AND BJT BIASING> (0/6/12)	
	A/ Contents and teaching methods: (6) Contents: 4.1.Introduction	G2.1

	4.2.Characteristic of transistor C1815 4.3.Bias circuits 4.4.Assignment Teaching methods: + Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary.	G2.2
	B/ Self-study contents: (12) 1. Design and simulate bias circuits using transistor pnp 2. Report the practice results, answer questions at the end of each lesson. 3. Prepare the next lesson.	G3.1 G6.2
	Bài 5: < AMPLIFIERS USING BJT> (0/6/12)	
	A/ Contents and teaching methods: (6) Content: 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 Teaching methods: + Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary.	G6.1
	B/ Self-study contents: (12) 1. Learn the applications of the CE, CB, CC amplifier in reality 2. Design and simulate amplifier circuits using BJT pnp 3. Report the practice results, answer questions at the end of each lesson. 4. Prepare the next lesson.	G2.2 G3.1 G6.2
	Bài 6: < CHARACTERISTIC, BIASING AND AMPLIFIER OF FET > (0/6/12)	
	A/ Contents and teaching methods: (6) Content: 6.1. Survey JFET 6.2. JFET bias circuits 6.3. CS amplifier 6.4. CG amplifier 6.5.Assignment Teaching methods:	G2.1 G2.2 G6.1

	+ Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary.	
	B/ Self-study contents: (12) <ol style="list-style-type: none"> 1. Learn the applications of MOSFET 2. Simulate MOSFET amplifier in reality 3. Report the practice results, answer questions at the end of each lesson. 4. Prepare the next lesson. 	G2.2 G3.1 G6.2
	Bài 7: < MULTI-STAGE AMPLIFIERS> (0/6/12)	
	A/ Contents and teaching methods: (6) Content: <ol style="list-style-type: none"> 7.1. RC coupled amplifier 7.2. Differential amplifier 7.3. Assignment Teaching methods: + Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary.	G6.1
	B/ Self-study contents: (12) <ol style="list-style-type: none"> 1. Learn and simulate the applications of multistage amplifier in reality 2. Report the practice results, answer questions at the end of each lesson. 3. Prepare the next lesson. 	G2.2 G3.1 G6.2
	Bài 8: < TRANSISTOR SWITCHING CIRCUITS > (0/6/12)	
	A/ Contents and teaching methods: (6) Content: <ol style="list-style-type: none"> 8.1. Logic gates using transistor 8.2. Multi-vibrator 8.3. Assignment Teaching methods: + Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary.	G6.1
	B/ Self-study contents: (12) <ol style="list-style-type: none"> 1. Learn the 3-led astable multivibrator 2. Learn and simulate the logic gates in reality 3. Report the practice results, answer questions at the end of each lesson. 4. Prepare the next lesson. 	G2.2 G3.1

		G6.2
	Bài 9: < REGULATOR> (0/6/12)	
	A/ Contents and teaching methods: (6) Content: 9.1. Parallel regulator 9.2. Serial regulator 9.3. Regulator using IC 9.4. Create the PCB of power supply circuit 9.5. Assignment Teaching methods: + Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary.	G4.1 G6.1 G7.2
	B/ Self-study contents: (12) 1. Design and create the PCB of power supply circuit 2. Learn the IC LM337 3. Report the practice results, answer questions at the end of each lesson. 4. Prepare the next lesson.	G4.1 G7.1 G7.2
	Bài 10: < OPERATIONAL AMPLIFIER> (0/6/12)	
	A/ Contents and teaching methods: (6) Content: 10.1. Operational amplifier 10.2. Linear application 10.3. Non-linear application 10.4. Assignment Teaching methods: + Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary.	G1.2 G4.1 G6.1
	B/ Self-study contents: (12) 1. Learn the Op-amps in reality 2. Report the practice results, answer questions at the end of each lesson. 3. Prepare the next lesson.	G6.2
	Bài 11: : < SINUSOIDAL OSCILLATORS > (0/6/12)	

	A/ Contents and teaching methods: (6) Content: 11.1. Phase-shift oscillator 11.2. Wien bridge oscillator 11.3. Quartz oscillator circuit 11.4. Application circuit: wireless microphone 11.5. Assignment Teaching methods: + Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary.	G2.2 G6.1
	B Self-study contents: (12) 1. Learn and simulate the square/triangle wave oscillator, with requirement frequency 2. Report the practice results, answer questions at the end of each lesson 3. Prepare the next lesson	G3.2 G6.2
	Bài 12: < SMALL POWER AUDIO FREQUENCY AMPLIFIER CIRCUIT> (0/12/24)	
	A/ Contents and teaching methods: (6) Content: 12.1. OTL amplifier 12.2. OCL amplifier 12.3. Amplifier using IC LA4440 12.4. Create the PCB of small power amplifier 12.5. Assignment Teaching methods: + Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary.	G4.1 G6.1 G7.2
	B/ Self-study contents: (6) 1. Learn the power amplifiers in reality 2. Report the practice results, answer questions at the end of each lesson. 3. Prepare the next lesson.	G2.2 G6.2 G7.1
	Bài 13: < SCR – TRIAC – LDR APPLICATION CIRCUIT > (0/6/12)	
	A/ Contents and teaching methods: (6) Content: 13.1. Thyristor (SCR) 13.2. Triac 13.3. Light-dependent resistor (LDR) 13.4. Create the PCB of light sensor circuit.	G2.1 G6.1 G7.2

	13.5.Assignment Teaching methods: + Present the requirement practice by using the traditional lectures + Make a sample + Observe students practice + Check + Summary.	
	B/ Self-study contents: (12) 1. Learn the SCR application 2. Simulate the light sensor circuit to on-off lamp 3. Report the practice results, answer questions at the end of each lesson. 4. Review for final test	G3.2 G7.1
15	<FINAL TEST >	

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

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