SYLLABUS

1. **Course name:** ELECTRICAL EQUIPMENT and PNEUMATIC
2. **Course code:** EEPN320746
3. **Credits:** 2 (2/0/4)
   Duration: 15 weeks (30h main course and 60h self-study)
4. **Instructors:**
   1- Assoc. Prof. PhD. Le Chi Kien
   2- M.Eng. Nguyen Tan Doi
   3- M.Eng. Ta Van Phuong
5. **Course conditions**
   Prerequisites: Power Electronics, Electric Machines
   Corequisites: N/A
6. **Course description**

The course provides students the knowlegde of electrical equipments, pneumatics, inverters, servo motors. Students know how to design a hardwired system, including power and control circuits, electrical pneumatic circuits. And students can set parameters of inverters, servo motors to control a automatic system.

7. **Course Goals**

Goals	***Goal description*** *(This course provides students:)*	ELOs
G1	An ability to understand components and operation of electrical and pneumatic circuits	1.1, 1.2
G2	An ability to read and understand English document	2.1, 3.2
G3	An ability to analyse and design power and control circuits for a system	2.2, 4.4

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

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

CLOs		***Description*** *(After completing this course, students can:)*	Outcome
G1	G1.1	Represent the structures and specifications of electrical and pneumatic devices	1.1, 1.2
	G1.2	Select electrical and pneumatic devices for a hardwired system	1.1, 1.2
G2	G2.1	Read English user manual of devices	2.1, 3.2
G3	G3.1	Design a power and control circuit for a system	2.2, 4.4
	G3.2	Diagnose and troubleshoot an inverter, servo motor system	2.2

9. Study materials

- Textbooks:

[1] He thong dieu khien tu dong khi nen, Nguyen Ngoc Phuong, Nguyen Truong Thinh, NXB Khoa hoc và Ky thuat, 2012

[2] Industrial servo control systems: fundamentals and applications, George W. Younkin, 2nd Edition, New York: Marcel Dekker, 2003

- References:

[1] Hydraulics and Pneumatics: A Technician's and Engineer's Guide, Andrew Parr, 3rd Edition Butterworth-Heinemann, 2011

[2] Servo Motors and Industrial Control Theory, Riazollah Firoozian, Springer, 2009 Edition, 2008

10. Sudent Assessments

- Grading points: 10

- Planning for students assessment is followed:

Type	Contents	Linetime	Assessment techniques	ELOs	Rate (%)
Midterms					**50**
Exercise 1	- Select devices - Design electrical circuits	Week 5	Writing	G1.1, G1.2	20
Exercise 2	- Select devices - Design pneumatic circuits	Week 10	Writing	G1.3, G1.4	20
Exercise 3	- Select devices - Design electrical and pneumatic circuits - Inverter and servo motors system	Week 12	Online	G1.1,G1.2 G3.1,G3.2	10
Final Exam					**50**
Final Exam	- Design electrical and pneumatic circuits - Design inverter, servo motor system		Writing	G2.1, G2.2	50

11. Course details:

Weeks	Contents	ELOs
1,2,3,4,5	***Chapter 1: <Hardwired System>*** *(10/0/20)*	
	A/* Contents and teaching methods: (10)* **Contents:** 1.1 Structure, Operation of electrical equipments 1.2 Power circuits 1.3 Control circuits 1.4 Design hardwired system	G1.1 G1.2 G2.1 G3.1

	Teaching methods: - Presentation. - Video clips - Manual guide - Simulation - Group discussion.	
	***B/* Self-study contents**: *(20)* - Using simulation software CADe - Draw and simulate the circuits - Read user manual	
6,7,8,9,10	***Chapter 2: <Electrical and Pneumatic Circuits>*** *(10/0/20)*	
	A/* Contents and teaching methods: (10)* **Contents:** 2.1 Pneumatic system 2.2 Components of a pneumatic system 2.3 Structure and Operation of a pneumatic system 2.4 Electrical and pneumatic system 2.5 Design an electrical and pneumatic system **Teaching methods**: - Presentation. - Video clips - Manual guide - Simulation - Group discussion.	G1.1 G1.2 G2.1 G3.1
	***B/* Self-study contents**: *(20)* - Using simulation software CADe, FluidSIM - Draw and simulate the circuits - Read user manual	
11,12,13	***Chapter 3: <Inverter and Applications>*** *(6/0/12)*	
	A/* Contents and teaching methods:(6)* **Contents:** 3.1 Structure and Operation of Inverter 3.2 Power circuit 3.3 Control circuit 3.4 Setting parameters 3.5 Control inverter by External terminals and BOP 3.6 Diagnose and Troubleshooting 3.7 Applicaions **Teaching methods**: - Presentation. - Video clips - Manual guide - Group discussion.	G2.1 G3.1 G3.2

	***B/* Self- study contents**: *(12)* - Read user manual of inverter: Siemens, Mitsubishi, Allen Bradley - Design a system using inverter and PLC	
14,15	***Chapter 4: <Servo System>*** *(4/0/8)*	
	A/* Contents and teaching methods: (4)* **Contents:** 4.1 Introduction to servo system 4.2 Components of a servo system 4.3 Wiring Power circuit 4.4 Wiring Control circuit 4.5 Setting parameters of servo driver 4.6 Diagnose and Troubleshooting 4.7 Servo driver and PLC **Teaching methods**: - Presentation. - Video clips - Manual guide - Group discussion.	G2.1 G3.1 G3.2
	***B/* Self- study contents**: *(8)* - Read user manual of servo motor: Siemens, Mitsubishi, Omron - Design a system using servo motor and PLC	

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 2017

14. Approval level:

Dean	Department	Instructor
Assoc. Prof. PhD. Nguyen Minh Tam	**Assoc. Prof. PhD. Truong Dinh Nhon**	**Assoc. Prof. PhD. Le Chi Kien**

15. Syllabus updated process

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