
SYLLABUS

Date/ Revision	23 March 2017 / Rev.1
Faculty	Engineering
Approval	Dean of Engineering Faculty

SUBJECT : PNEUMATICS AND HYDRAULICS 2

1. Identification of Subject:

Name of Subject	: Pneumatics and Hydraulics 1
Code of Subject	: PNEU-3102
SKS	: 2
Semester	: 6
Study Program	: MTE
Lecturer	: To be announced

2. Competency

After having the course, students are expected able to:

- Identify pump types and regulator components for hydraulic system.
- Identify and install proper piping and connectors for hydraulic system.
- Utilize schematics to construct electro-hydraulic circuits.
- Maintain a hydraulic system.
- Diagnose Fault and apply maintenance procedure of hydraulic and electro hydraulic component and system.
- design and analyse of hydraulic and electro hydraulic circuit application

3. Description of Subject:

The Pneumatics and Hydraulics 2 course is focusing on hydraulic and electro-hydraulic system as a part of an actuator in a mechatronic system. The course will emphasize basic theory, components sizing, construction and function, how to read fluid power circuit diagrams using the correct symbols and troubleshooting techniques. The controls of hydraulic system is controlled by electrical (electro-hydraulics) are introduced. During the semester the students will have the opportunity to get practical workshop in PT. FESTO Indonesia located in Technopark-BSD City to exercise pneumatics and electro-pneumatics-systems.

4. Learning Approach

Approach	: Combination of Expository - inquiry and collaborative
Method	: Discussion, question answer, sample problem, group work
Student Task	: Home work, presentation
Media	: LCD projector, film.

5. Evaluation

- a) Absence maximum : 25%
- b) Participation in discussion : 5 points
- c) Homework, Classwork : 5 points
- d) Presentation, Simulation : 10 points
- e) Daily Quiz : 20 points
- f) Final Examination : 60 points

Total : 100 points

6. Contents/ Topics of Lecturing:

Week	Content/ Topics of Lecturing	Text Book Chapter	Remark
1-2	Fundamental of Hydraulic: <ul style="list-style-type: none"> • History of Power Fluid: Characteristic and application of hydraulic , stationary and mobile hydraulic • Physical law of Hydraulic: Pascal's Law and Fluid flow equation, laminar flow turbulent flow, pressure losses, cavitation, throttle point • Hydraulic symbol: Symbol of various hydraulic component 		
3	Hydraulic Fluid: <ul style="list-style-type: none"> • Characteristic of hydraulic fluid • Viscosity, temperature , density characteristic 		Quiz-1
4-5	Hydraulic Component: <ul style="list-style-type: none"> • Power Supply section: Characteristic of hydraulic pump , Characteristic of filter , coupling reservoir , cooler and heater • Distribution system: Piping system characteristic • Actuator and output Device: SAC, DAC, motor construction and characteristic of cylinder • Valve and control Valve: Directional control valve, pressure control valve, solenoid valve 		Quiz-2
6-7	Hydraulic Component: <ul style="list-style-type: none"> • Actuator and output Device: SAC, DAC, motor construction and characteristic of cylinder • Valve and control Valve: Directional control valve, pressure control valve, solenoid valve • Sensor: Type and characteristic of sensor , application in electro hydraulics • Control system in pneumatic, Position control, Speed control, time delay 		
8	MIDSEMESTER BREAK		
9-10	Design Procedure of Hydraulic <ul style="list-style-type: none"> • Method of development • Control in Hydraulic , No Load Circuits, speed and position control, synchronous and locking circuit, Free fall preventing circuits, Load responsive circuit , closing circuit 		

	<ul style="list-style-type: none"> • Software using in Hydraulic design 		
11-13	<p>Example and application of Hydraulic and Electro Hydraulic System:</p> <ul style="list-style-type: none"> • Characteristic of Hydraulic • Single-acting cylinder • Double-acting cylinder • Valve control • Accumulator • Automatic lathe, Package lifting device, Drawing press • Cylinder feeding device, Hardening furnace • Furnace door control • Conveyor tensioning device, Painting booth, Rotary machining station • Cold-store door. 		Quiz-3
14-15	<p>Fault Diagnoses, Trouble-shooting and maintenance of Hydraulic system :</p> <ul style="list-style-type: none"> • Documentation of Pneumatic Systems: Function diagram, Circuit diagram, operating instruction, data sheets • Effect of malfunction: Quality of hydraulic-oil, wear and tear, blocking, leakages, seizure, breakages, pressure drop • Fault Diagnosis: External and internal failure • Fault Finding: Fault elimination by operating and maintenance operator, Through costumer service • Maintenance: Preventive and corrective maintenance 		Quiz-4
16	Final Examination		

7. Book Reference:

Text Book:

- D.Waller & H Werner ,“Hydraulic Basic level”, **Publisher:** FESTO–AG Germany.
- D.Waller & H Werner , “ Electro Hydraulic”, **Publisher:** FESTO–AG Germany.

[Subject to change / MaS/Rev.01]