SYLLABUS

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

SUBJECT : PNEUMATICS AND HYDRAULICS 1

1. Identification of Subject:

Name of Subject	: Pneumatics and Hydraulics 1
Code of Subject	: PNEU-3101
SKS	: 2
Semester	: 5
Study Program	: MTE
Lecturer	: To be announced

2. Competency

After having the course, students are expected able to:

a) Identify pump types and regulator components.
b) Identify, select and maintain compressors.
c) Identify and install proper piping and connectors.
d) Utilize schematics to construct pneumatic circuits.
e) Maintain a pneumatic system.
f) diagnose Fault and apply maintenance procedure of pneumatic and electro pneumatic component and system such as:
   - pneumatic controls and electro pneumatics control;
   - Linear circuits;
   - Regenerative circuits;
   - Sequencing circuits;
   - Counterbalance circuits;
   - The traverse and feed circuit;
   - Rotary motion circuit.
   - Maintain filtration systems.

a) design and analyse of pneumatic and electro pneumatic circuit application

3. Description of Subject:

The Pneumatics and Hydraulics course is delivered in semester 5 and semester 6. In the fifth semester course the students will learn the fundamentals of industrial fluid power which include vacuum, Pneumatics. 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 pneumatics system controlled by pneumatics and controlled by electrical (electro-pneumatics) 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.

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4. Learning Approach

Approach : Combination of Expository - inquiry and colaborative
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 pneumatic :** • History of Pneumatic • Physical law of pneumatic • Gas law and various process • Development of pneumatic • Characteristic and application of pneumatic • Structure and signal flow of pneumatic system , symbol and standard of component	Ch1	
3-4	**Air Generation and distribution:** • Air quality: Humidity , cleans , pressure , standard air temperature • System for air generation: Compressor , Dryer , Filter , Lubricator • Distribution system: Piping system • SAC, DAC, RC, motor and pneumatic indicator , construction and characteristic of cylinder	Ch2	Quiz-1
5-6	**Pneumatic components:** • Actuator and output Device • Valve and control Valve: Directional control valve, pressure control valve, solenoid valve. • Sensor: Type and characteristic of sensor , application in electro pneumatic	Ch3	Quiz-2
7	**Design Procedure of Pneumatic:** • Method of development • Control in Pneumatic Systems: Single acting, Double acting and multi cylinder actuation, Pneumatic and electro pneumatic simple circuit,	Ch4	

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	Control system in pneumatic, Position control, Speed control, time delay		
8	**MIDSEMESTER BREAK**		
9	• Software using in pneumatic design: Pneumatic circuit and electro pneumatic circuit development using software		
10-13	**Example and application of pneumatic and Electro pneumatic System:** • One Cylinder Control • Parallel motion Control • Two actuator control • Reversing Valve control • Logic control system. • Allocating device, sorting device , edge folding device, Foil welding drum, switching point device • Feed rail separator, Welding machine for thermoplastic, Quarry stone sorter • Compactor for domestic rubbish, clamping camera housing • Input station for laser cuter, partial automation of an internal grinder, Drilling machine • Pneumatic counter	Ch5	Quiz-3
14-15	**Fault Diagnoses, Trouble-shooting and maintenance of Pneumatic system :** • Documentation of Pneumatic Systems: Function diagram, Circuit diagram, operating instruction, data sheets • Effect of malfunction: Quality of air , 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	Ch6	Quiz-4
16	**Final Examination**		

7. Book Reference:

Text Book:

- "Pneumatic Basic Level" , **Authors**: Peter Croseer & Frank Ebel, **Publisher**: FESTO–AG Germany.
- "Electro pneumatic Basic Level", **Author**: G Prede & D. Schloz, **Publisher**: FESTO–AG Germany.
- "99 Example of pneumatic application", **Author**: G Prede & D. Schloz **Publisher**: FESTO–AG Germany.

[Subject to change / MaS/Rev.01]

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