

RAJIV GANDHI PROUDYOGIKI VISHVAVIDYALAYA (DIPLOMA WING)

BHOPAL P05 DIPLOMA IN PRODUCTION ENGINEERING

PART A:- PROCESS OF CURRICULUM DEVELOPMENT

LIST OF IDENTIFIED PROFESSIONAL ROLES

1. To apply knowledge of mathematics, science, and engineering.
2. To design and conduct experiments, as well as to analyze and interpret data.
3. To design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
4. To function on multidisciplinary teams.
5. To identify, formulate, and solve engineering problems.
6. To understand professional and ethical responsibility.
7. To communicate effectively.
8. To understand the impact of engineering solutions in a global, economic, environmental, and societal context.
9. To engage in lifelong learning.
10. To use the techniques, skills, and modern engineering tools necessary for engineering practice.

CO GROUPING AND COURSE FORMATION

COURSE NAME: PNEUMATIC HYDRAULIC CONTROL AND INSTRUMENTATION (603)

(Total 100 Hrs. , Total 100 Marks)

LIST OF COs:-

CO1: Understand the properties of fluid and production of compressed air. **(20 Hrs, 20 marks)**

CO2: Identify pneumatic components and its symbol and usage. **(20 Hrs, 20 marks)**

CO3: Identify hydraulic components and its symbol and usage. **(20 Hrs, 20 marks)**

CO4: Explain maintenance and trouble shooting of hydraulic and pneumatic system. **(20 Hrs, 20 marks)**

CO5: Explain the characteristics of instrumentation and measuring instruments **(20 Hrs, 20 marks)**

LOs FORMATION

COURSE NAME: - PNEUMATIC HYDRAULIC CONTROL AND INSTRUMENTATION (603)
(Total 100 Hrs. , Total 100 Marks)

List of COs and LOs

CO1: Understand the properties of fluid and production of compressed air. (20 Hrs, 20 marks)

LO1: To explain the properties and dynamics of fluid. (10 Hrs., 10 Marks)

LO2: To explain the production of compressed air and their characteristics. (10 Hrs., 10Marks)

CO2: Identify pneumatic components and its symbol and usage. (20 Hrs, 20 marks)

LO1: To explain the pneumatic components. (10 Hrs., 10 Marks)

LO2: To understand the symbol and usage of pneumatic system. (10 Hrs., 10 Marks)

CO3: Identify hydraulic components and its symbol and usage. (20 Hrs, 20 marks)

LO1: To explain the hydraulic components. (12 Hrs., 12 Marks)

LO2: To understand the symbol and usage of hydraulic system (8 Hrs., 8 Marks)

CO4: Explain maintenance and trouble shooting of hydraulic and pneumatic system. (20 Hrs, 20 marks)

LO1: To know maintenance and trouble shooting of hydraulic system. (10 Hrs., 10 Marks)

LO2: To know maintenance and trouble shooting of pneumatic system. (10 Hrs., 10 Marks)

CO5: Explain the characteristics of instrumentation and measuring instruments (20 Hrs, 20 marks)

LO1: To know about the characteristics of instrumentation. (10 Hrs., 10 Marks)

LO2: To know about measuring instruments. (10 Hrs., 10 Marks)

PART B:- CURRICULUM OF PRODUCTION ENGINEERING

RGPV (Diploma Wing) Bhopal			COURSE PLAN				Format -2	Sheet No. 1/2	
Course Name		PNEUMATIC HYDRAULIC CONTROL AND INSTRUMENTATION				Semester		SIXTH	
Branch	PRODUCTION ENGINEERING		Course Code	603	No. of COs	05	No. of LOs	11	
Total Hrs. of Teaching Learning	100	Total Marks	100	Total no. of Assessments		Types of Assessments		No. of External Assessments	
DESCRIPTION OF OUTCOMES							T-L Hrs.	Max. Marks	
CO 1	P056031	Understand the properties of fluid and production of compressed air.					20	20	
Los	PO560311	To explain the properties and dynamics of fluid					10	10	
	PO560312	To explain the production of compressed air and their characteristics.					10	10	
CO 2	P056032	Identify pneumatic components and its symbol and usage.					20	20	
Los	PO56031	To explain the pneumatic components.					10	10	
	PO560322	To understand the symbol and usage of pneumatic system.					10	10	
CO 3	P056033	Identify hydraulic components and its symbol and usage.					20	20	
Los	PO560331	To explain the hydraulic components					12	12	
	PO560332	To understand the symbol and usage of hydraulic system					8	8	
CO 4	P056034	Explain maintenance and trouble shooting of hydraulic and pneumatic system.					20	20	
Los	PO560341	To know maintenance and trouble shooting of hydraulic system					10	10	
	PO560342	To know maintenance and trouble shooting of pneumatic system.					10	10	
CO 5	P056035	Explain the characteristics of instrumentation and measuring instruments					20	20	

Los	PO560351	To know about the characteristics of instrumentation.	10	10
	PO560352	To know about measuring instruments	10	10

RGPV (DIPLOMA WING) BHOPAL		OCB CURRICULUM FOR THE COURSE		FORMAT-3	Sheet No. 1/3
Branch	PRODUCTION ENGINEERING		Semester	SIXTH	
Course Code	603	Course Name	PNEUMATIC HYDRAULIC CONTROL AND INSTRUMENTATION		
Course Outcome 1	Understand the properties of fluid and production of compressed air			Teach Hrs	Mark s
Learning Outcome 1	To explain the properties and dynamics of fluid.			10	10
CONTENT	Properties of fluid viz. mass density, weight density, specific volume, specific gravity, viscosity, surface tension and dynamic of fluid.				
Method of Assessment	Paper pen test				
Learning Outcome 2	To explain the production of compressed air and their characteristics.			10	10
CONTENT	Generation of compressed air. Need & Characteristics of compressed air. Types of air compressors. Selection criteria for compressors.				
Method of Assessment	Paper pen test				
Course Outcome 2	Identify pneumatic components and its symbol and usage.				
Learning Outcome 1	To explain the pneumatic components..			10	10
CONTENT	Pneumatic components viz. pneumatic cylinders, pneumatic valves, FRL unit, air motor, air filters and its symbol and usage.				
Method of Assessment	Paper pen test/ Practical assessment				
Learning Outcome 2	To understand the symbol and usage of pneumatic system..			10	10
CONTENT	Symbols, pneumatic circuit diagram e.g., meter –in-method, meter–out-method and application of pneumatic system.				
Method of Assessment	Paper pen test/ Practical assessment				

Course Outcome 3	Identify hydraulic components and its symbol and usage..		
Learning Outcome 1	To explain the hydraulic components.	12	12
CONTENT	Basic system, Hydraulic cylinders viz. single acting and double acting cylinder, valves and Hydraulic pumps e.g. Gear pump, vane pump, centrifugal pump and reciprocating pump. Power pack, Hydraulic accumulator.		
Method of Assessment	Paper pen test/ Practical assessment		
Learning Outcome 2	To understand the symbol and usage of hydraulic system.	8	8
CONTENT	Hydraulic Symbols, Hydraulic circuit diagram and application of hydraulic system.		
Method of Assessment	Paper pen test/ Practical assessment		
Course Outcome 4	Explain maintenance and trouble shooting of hydraulic and pneumatic system.		
Learning Outcome 1	To know maintenance and trouble shooting of hydraulic system	10	10
CONTENT	Maintenance need of hydraulic system, common problems in hydraulic system, maintenance schedule of hydraulic system, Trouble Shooting and Maintenance of air compressor.		
Method of Assessment	Paper pen test		
Learning Outcome 2	To know maintenance and trouble shooting of pneumatic system..	10	10
CONTENT	Maintenance need of Pneumatic system, common problems in Pneumatic system, maintenance schedule of Pneumatic system, Trouble Shooting and Maintenance of air compressor.		

Method of Assessment	Paper pen test/ Practical assessment		
Course Outcome 5	Explain the characteristics of instrumentation and measuring instruments		
Learning Outcome 1	To know about the characteristics of instrumentation	10	10
CONTENT	Static characteristics and dynamics characteristics of instruments.		
Method of Assessment	Paper pen test/ Practical assessment		
Learning Outcome 2	To know about measuring instruments..	10	10
CONTENT	Pressure flow and temperature measuring instruments.		
Method of Assessment	Paper pen test/ Practical assessment		

CO1:LO1

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME		Branch Code P05	Course Code 603	CO Code 01	LO Code 01	Format No. 4
COURSE NAME		PNEUMATIC HYDRAULIC CONTROL AND INSTRUMENTATION						
CO Description		Understand the properties of fluid and production of compressed air.						
LO Description		To explain the properties and dynamics of fluid.						
SCHEME OF STUDY								
S. No.	Learning Content	Teaching– Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks	
1	Properties of fluid viz. mass density, weight density, specific volume, specific gravity, viscosity, surface tension and dynamic of fluid.	Traditional Lecture method + Assignment	Teacher will explain the contents so that students understand the importance of maintenance in Work Shop/ Industry. Teacher will conduct Progressive test/ give assignment.	10	-	Handout, Book		
SCHEME OF ASSESSMENT								
S. No	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal			
1	Paper pen test	For the given learning content, Students write answer of questions.	10	Progressive test/ End semester exam	Internal /External			
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)								

CO1:LO2

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME		Branch Code P05	Course Code 603	CO Code 01	LO Code 02	Format No. 4
COURSE NAME		PNEUMATIC HYDRAULIC CONTROL AND INSTRUMENTATION						
CO Description		Understand the properties of fluid and production of compressed air.						
LO Description		To explain the production of compressed air and their characteristics.						
SCHEME OF STUDY								
S. No.	Learning Content	Teaching– Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks	
1	Generation of compressed air. Need & Characteristics of compressed air. Types of air compressors. Selection criteria for compressors.	Traditional Lecture method + Practical (Work Shop/ Industry Visit)	Teacher will explain the content so that students explain the scope and functions of maintenance department in an industry. Teacher will conduct Progressive test/ give assignment. Students will visit work shop/ Industry to understand the maintenance procedure.	10	-	Handout, Book, Work Shop		
SCHEME OF ASSESSMENT								
S. No	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal			
1	Paper pen test	For the given learning content, Students write answer of questions and face Practical Viva	10	Practical file/Progressive test/ End semester exam	Internal /External			
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)								

CO2:LO1

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME		Branch Code P05	Course Code 603	CO Code 02	LO Code 01	Format No. 4
COURSE NAME		PNEUMATIC HYDRAULIC CONTROL AND INSTRUMENTATION						
CO Description		Identify pneumatic components and its symbol and usage..						
LO Description		To explain the pneumatic components.						
SCHEME OF STUDY								
S. No.	Learning Content	Teaching– Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks	
1	Pneumatic components viz. pneumatic cylinders, pneumatic valves, FRL unit, air motor, air filter and its symbol and usage.	Traditional Lecture method + Assignment	Teacher will explain the contents to students so that students explain different types of maintenance. Teacher will conduct Progressive test/ give assignment.	5	5	Handout, Book		
SCHEME OF ASSESSMENT								
S. No	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal			
1	Paper pen test	For the given learning content, Students write answer of questions.	10	Progressive Test paper/ End semester exam	Internal /External			
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)								
List of Practical								
1. Assemble a Pneumatic circuit with a 3/2 way manually operated valve in line with a pilot operated 3/2 way valve to control a single acting cylinder.								

CO2:LO2

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME		Branch Code P05	Course Code 603	CO Code 02	LO Code 02	Format No. 4
COURSE NAME		PNEUMATIC HYDRAULIC CONTROL AND INSTRUMENTATION						
CO Description		Identify pneumatic components and its symbol and usage.						
LO Description		To understand the symbol and usage of pneumatic system..						
SCHEME OF STUDY								
S. No.	Learning Content	Teaching– Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks	
1	Symbols, pneumatic circuit diagram e.g., meter –in-method, meter–out-method and application of pneumatic system.	Traditional Lecture method + Assignment	Teacher will explain the contents to students so that students know about the concept of fault tracing. Teacher will conduct Progressive test/ give assignment.	5	5	Handout, Book		
SCHEME OF ASSESSMENT								
S. No	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal			
1	Paper pen test	For the given learning content, Students write answer of questions.	10	Progressive Test paper/ End semester exam	Internal /External			
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)								
List of Practical								
1 Design a pneumatic circuits through 4/2 way valve for double acting cylinder.								

CO3:LO1

RGPV (Diploma Wing) Bhopal	SCHEME FOR LEARNING OUTCOME	Branch Code P05	Course Code 603	CO Code 03	LO Code 01	Format No. 4	
COURSE NAME	PNEUMATIC HYDRAULIC CONTROL AND INSTRUMENTATION						
CO Description	Identify hydraulic components and its symbol and usage.						
LO Description	To explain the hydraulic components.						
SCHEME OF STUDY							
S. No.	Learning Content	Teaching– Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Rema rks
1	Basic system, Hydraulic cylinders viz. single acting and double acting cylinder, valves and Hydraulic pumps e.g. Gear pump, vane pump, centrifugal pump and reciprocating pump. Power pack, Hydraulic accumulator.	Traditional Lecture method + Assignment	Teacher will explain the contents to students so that students understands the concept of maintainability. Teacher will conduct Progressive test/assignment.	6	6	Handout, Book	
SCHEME OF ASSESSMENT							
S. No	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal		
1	Paper pen test	For the given learning content, Students write answer of questions.	12	Progressive Test paper/ Assignment /End semester exam	Internal /External		
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)							
List of Practical							
1 Setting up of a Power pack for hydraulic control circuits operation.							

CO3:LO2

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME	Branch Code P05	Course Code 603	CO Code 03	LO Code 02	Format No. 4
COURSE NAME		PNEUMATIC HYDRAULIC CONTROL AND INSTRUMENTATION					
CO Description		Identify hydraulic components and its symbol and usage.					
LO Description		To understand the symbol and usage of hydraulic system					
SCHEME OF STUDY							
S. No.	Learning Content	Teaching– Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Rema rks
1	Hydraulic Symbols, Hydraulic circuit diagram and application of hydraulic system.	Traditional Lecture method + Assignment	Teacher will explain the contents to students so that students will learn about the components of maintenance cost. Teacher will conduct Progressive test/ give assignment.	4	4	Handout, Book	
SCHEME OF ASSESSMENT							
S. No	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal		
1	Paper pen test	For the given learning content, Students write answer of questions,	8	Progressive Test paper/ Assignment /End semester exam	Internal /External		
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)							
List of Practical							
1. Design a simple hydraulic control circuits using single acting cylinder.							

CO4:LO1

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME	Branch Code P05	Course Code 603	CO Code 04	LO Code 01	Format No. 4
COURSE NAME		PNEUMATIC HYDRAULIC CONTROL AND INSTRUMENTATION					
CO Description		Explain maintenance and trouble shooting of hydraulic and pneumatic system.					
LO Description		To know maintenance and trouble shooting of hydraulic system.					
SCHEME OF STUDY							
S. No.	Learning Content	Teaching– Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Rema rks
1	Maintenance need of hydraulic system, common problems in hydraulic system, maintenance schedule of hydraulic system, Trouble Shooting and Maintenance of air compressor.	Traditional Lecture method + Practical (Work Shop)	Teacher will explain the contents. Teacher will conduct Progressive test/ give Assignment so that students know about possible defects in casting along with their causes and remedies	10	-	Handout, Book, Work Shop	
SCHEME OF ASSESSMENT							
S. No	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal		
1	Paper pen test	For the given learning content, Students write answer of questions and face Practical Viva.	10	Practical file/Progressive Test paper/ End semester exam	Internal /External		
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)							

CO4:LO2

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME	Branch Code P05	Course Code 603	CO Code 04	LO Code 02	Format No. 4
COURSE NAME		PNEUMATIC HYDRAULIC CONTROL AND INSTRUMENTATION					
CO Description		Explain maintenance and trouble shooting of hydraulic and pneumatic system.					
LO Description		To know maintenance and trouble shooting of pneumatic system.					
SCHEME OF STUDY							
S. No.	Learning Content	Teaching– Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Rema rks
1	Maintenance need of Pneumatic system, common problems in Pneumatic system, maintenance schedule of Pneumatic system, Trouble Shooting and Maintenance of air compressor.	Traditional Lecture method + Practical (Work Shop / Industry)	Teacher will explain the contents. Teacher will conduct Progressive test/ give Assignment so that students know about the concept and importance of lubrication in an industry. Students will visit Work Shop / Industry to know the lubrication plans and procedures.	10	-	Handout, Book, Work Shop	
SCHEME OF ASSESSMENT							
S. No	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal		
1	Paper pen test	For the given learning content, Students write answer of questions and face Practical Viva.	10	Practical file/Progressive Test paper/ End semester exam	Internal /External		
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)							

CO5:LO1

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME	Branch Code P05	Course Code 603	CO Code 05	LO Code 01	Format No. 4
COURSE NAME		PNEUMATIC HYDRAULIC CONTROL AND INSTRUMENTATION					
CO Description		Explain the characteristics of instrumentation and measuring instruments					
LO Description		To know about the characteristics of instrumentation.					
SCHEME OF STUDY							
S. No.	Learning Content	Teaching– Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Rema rks
1	Static characteristics and dynamics characteristics of instruments.	Traditional Lecture method + Practical (Work Shop / Industry)	Teacher will explain the contents to students so that students know about the possible defects in welded joints along with their causes and remedies	5	5	Handout, Book, Work Shop	
SCHEME OF ASSESSMENT							
S. No	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal		
1	Paper pen test / Practical assessment	For the given learning content, Students write answer of questions and face Practical Viva.	10	Progressive Test paper/ End semester exam	Internal /External		
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)							
List of Practical							
1. Study of Static characteristics and dynamics characteristics of instruments.							

CO5:LO2

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME		Branch Code P05	Course Code 603	CO Code 05	LO Code 02	Format No. 4
COURSE NAME		PNEUMATIC HYDRAULIC CONTROL AND INSTRUMENTATION						
CO Description		Explain the characteristics of instrumentation and measuring instruments						
LO Description		To know about measuring instruments.						
SCHEME OF STUDY								
S. No.	Learning Content	Teaching– Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks	
1	Pressure flow and temperature measuring instruments.	Traditional Lecture method/ Industry Visit	Teacher will explain the contents to students so that students know about safety measures taken in an industry. Students will visit industry to know about safety practices.	5	5	Handout, Book		
SCHEME OF ASSESSMENT								
S. No	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal			
1	Paper pen test / Practical assessment	For the given learning content, Students write answer of questions and face Practical Viva.	10	Progressive Test paper/End semester exam	Internal /External			
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)								
List of Practical								
1. Study of Pressure flow and temperature measuring instruments.								

Reference Books:

- 1 Ramamritham. S, "Fluid Mechanics, Hydraulics and Fluid Machines", DhanpatRai&Sons,Delhi, 2004.
2. Kumar. K.L., "Engineering Fluid Mechanics", 7th Edition, Eurasia Publishing House PrivateLimited, New Delhi, 1995.
3. P. N Modi and S. M. Seth, "Hydraulics and Fluid Mechanics Including Hydraulics Machines", 19th Edition, Standard Book House, 2013
- 4 Bansal R. K, "Strength of Materials",Laxmi Publications, New Delhi, 2012.
5. Oil Hydraulic Systems- Majumdar, S.R. -Tata McGraw-Hill Publication, 3/e, 2013
6. Hydraulic and Pneumatic Controls- Srinivasan, R.- Vijay Nicole Imprints Private Limited, 2/e, 2008
7. Pneumatic And Pneumatics Controls -Understanding Made Easy K.S.Sundaram,- S.chand Company Delhi
8. Pneumatic Systems - Majumdar, S.R. -Tata McGraw-Hill Publication, 3/e, 20
