**NITTE MEENAKSHI INSTITUTE OF TECHNOLOGY**

(AN AUTONOMOUS INSTITUTION UNDER VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELGAUM)

YELAHANKA, BENGALURU– 560 064

**DEPARTMENT OF MECHANICAL ENGINEERING**



**CERTIFICATE**

This is to certify that the report entitled **“pneumatic system”** carried out by

& **YASHWANTH ARADHYA H R**(1NT15ME201) a group of students of Nitte Meenakshi Institute of Technology as a part of “**HYDROULICS AND PNEUMATICS”** subject in partial fulfilment of Bachelor of Engineering in **Mechanical Engineering** of the **Visvesvaraya Technological University**, Belgaum during the academic year 2018-19 as per the Autonomous scheme of Nitte Meenakshi Institute of Technology, for the said Degree.

Name and signature of the guide Name and signature of HOD Mr. Mahadev prasad Dr.Sudheer Reddy

Assistant Professor Professor and Head

**--------------------------------- ---------------------------**

Signature of the Principal Dr.H C Nagaraj

-----------------------------------

Name of Examiner Signature with Date

1.

2.

# ACKNOWLEDGMENT

I would express our gratitude to our principal **Dr. H C Nagaraj** for doing the seminar.

I would express our gratitude to our **HOD Dr. Sudheer Reddy** for his valuable support without which the seminar would not have been successful.

I would express our gratitude to our Asst. prof **Mr. MAHADEV PRASAD** for doing the seminar.

I would like to mention a special thanks to staff of ME department, NMIT for their support.

contents

**1 Pneumatic systems** **3**

(a) The advantages of pneumatic systems 3

(i) High effectiveness 3

(ii) High durability and reliability 3

(iii) Simple design 3

(iv) High adaptability to harsh environment 4

(v) Safety 4

(vi) Easy selection of speed and pressure 4

(vii) Environmental friendly 4

(viii) Economical 4

(b) Limitations of pneumatic systems 4

(i) Relatively low accuracy 4

(ii) Low loading 5

(iii) Processing required before use 5

(iv) Uneven moving speed 5

(v) Noise 5

(c) Main pneumatic components 5

**2 The production and transportation of compressed air** **5**

(a) Compressor 5

(b) Pressure regulating component 6

**3 The consumption of compressed air** **7**

(a) Execution component 7

(i) Single acting cylinder 7

(ii) Double acting cylinder 8

(b) Directional control valve 8

(i) 2/2 Directional control valve 9

(ii) 3/2 Directional control valve 9

(iii) 5/2 Directional control valve 10

(c) Control valve 10

(i) Non-return valve 10

(ii) Flow control valve 11

(iii) Shuttle valve 11

**4 Principles of pneumatic control** **12**

(a) Pneumatic circuit 12

(b) Pneumatic circuit diagram 12

(i) Basic rules 12

(ii) Basic principles 13

(iii) The setting of circuit diagrams 14

**5 Different kinds of basic circuits** **16**

(a) Flow amplification 16

(b) Signal inversion 16

(c) Memory Function 17

(d) Delay function 17

(i) ON-signal delay 17

(ii) OFF-signal Delay 18

 1 

# 

(e) Single acting cylinder control 18

(i) Direct control and speed control 18

(ii) OR Function 19

(iii) AND Function 19

(iv) NOT Function 20

(f) Double acting cylinder 20

(i) Direct control 20

(ii) Single control 21

**6 The application of pneumatic systems** **21**

(a) Transport system 21

(b) Vehicle door operation system 22

**7 Safety measures when using pneumatic control systems** **23**

**Appendix: Pneumatic components** **24**

# ACKNOWLEDGMENT

## The satisfaction and euphoria that accompany the successful completion of any task would be but incomplete without the meaning of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

I would express our gratitude to our principal **Dr.H C Nagaraj** for doing the seminar.

I would express our gratitude to our **HOD Dr.Sudheer Reddy** for his valuable support without which the seminar would not have been successful.

I would express our gratitude to our Asst.prof **Mr.Shiv Pratap Singh**

## for doing the seminar.

I would like to mention a special thanks to staff of ME department, NMIT for their support.

**CONTENTS:**

1. Introduction to Intellectual property rights in India 01
2. Intellectual Property rights -Systems in India 02
3. Enforcing IP rights in India 04
4. Avoiding Problems 06
5. Where to get Intellectual property help in India 06
6. Noteworthy Achievements during 2016-17 07
7. Trends in IPR 08
8. Public Service delivery -Efficiency & Transparency 12
9. References 20