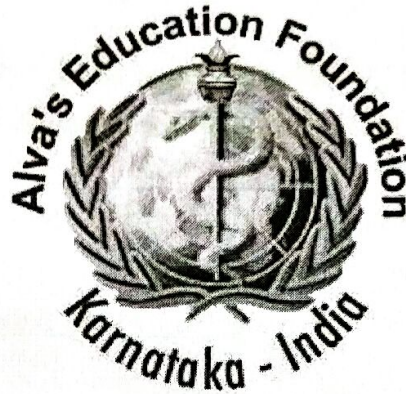


**ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY**

Shobhavana Campus, Mijar – 574225, Moodbidri.

Dakshina Kannada Karnataka, India.



**Department of Mechanical Engineering**

**CERTIFICATION COURSE**

On

**“Hydraulic and Pneumatic”**

**FOR THE ACADEMIC YEAR**

**2014-15**





# ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY

Shobhavana Campus, Mijar, Moodbidri - 574 225

Phone: 08258-262725 Fax: 08258-262726

## DEPARTMENT OF MECHANICAL ENGINEERING

Date: 08/11/2015

### APPROVAL LETTER

To,

The Principal,  
AIET, Moodbidri

Respected Sir,

**Sub: - Approval for Organizing the Students Certification/Training Program on "Hydraulics and Pneumatics Systems"-Reg.**

With reference to the subject cited above, I would like to bring to your kind notice that, the Department is planning to host a **Five day's** Student Training Program/ hands on workshop on "**Hydraulics and Pneumatics**" from "**20<sup>th</sup> January 2015**" to "**24<sup>th</sup> January 2015**".

Kindly consider the above request and approve the same for further proceedings.

Thanking you Sir.

  
**Coordinator:**

**Mr. Hemanth S**

  
**Head of the Department:**

**Prof. K. V. Suresh**  
Dept. Of Mechanical Engineering  
Alva's Institute of Engg. & Technology  
Mijar, MOODBIDRI - 574 225

  
**Principal:**

**PRINCIPAL**

**Alva's Institute of Engg. & Technology,  
Mijar, MOODBIDRI - 574 225, D.K**

Place: AIET, Moodbidri.





# ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY

Shobhavana Campus, Mijar, Moodbidri - 574 225


Phone: 08258-262725 Fax: 08258-262726

## DEPARTMENT OF MECHANICAL ENGINEERING

Date: 15/1/2015

### CIRCULAR

All the students are hereby informed that there is a certification course on Hydraulics and Pneumatics which is scheduled from 20.01.2015 to 24.01.2015, which is conducted by Mr. Suresh P S & Mr. Ganesh M R, AIET, Dept of mechanical engineering, moodbidri. Interested students kindly register your names on or before 10.01.2015.

  
**Head of the Department:**  
**Dept. Of Mechanical Engineering**  
**Alva's Institute of Engg. & Technology**  
**Mijar, MOODBIDRI - 574 225**



# ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

Shobhavana Campus, Mijar, Moodbidri, D.K - 574225

Phone: 08258-262725, Fax: 08258-262726

## DEPARTMENT OF MECHANICAL ENGINEERING

### H & P WORKSHOP-- ATTENDANCE REPORT-2014-15

SLN	USN	NAME(Caps Only)	20-01		21-01		22-01		23-01		24-01	
			FN	AN	FN	AN	FN	AN	FN	AN	FN	AN
1.	4AL09ME045	Renjith R Kurup	✓	✓	A	✓	✓	✓	✓	A	✓	✓
2.	4AL10ME007	Akshathshetty S	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3.	4AL10ME009	Akshay S	✓	✓	✓	A	✓	✓	A	✓	✓	A
4.	4AL10ME051	Libin George	A	✓	✓	✓	✓	✓	✓	✓	✓	✓
5.	4AL10ME060	Martin Jose Mandy	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6.	4AL10ME063	Mohammed B	✓	A	A	A	✓	✓	✓	✓	✓	✓
7.	4AL10ME074	Prajwal G Shetty	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
8.	4AL10ME097	ShettySushantSudhakar	✓	✓	✓	✓	A	✓	✓	✓	✓	A
9.	4AL10ME116	Vikyath U	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
10.	4AL11ME002	AbhijithVijayakumar	✓	A	A	✓	✓	A	✓	✓	✓	A
11.	4AL11ME004	Abhishek.S.Suvarna	A	A	A	✓	✓	A	✓	✓	A	A
12.	4AL11ME005	Achyutha Desai	✓	✓	✓	✓	✓	A	✓	✓	A	A
13.	4AL11ME006	Adithya G Udupa	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
14.	4AL11ME007	Agnimahadev	A	✓	✓	A	✓	✓	✓	✓	✓	A
15.	4AL11ME010	Akash K	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
16.	4AL11ME011	AkhileshMadhavan	✓	✓	✓	A	A	A	A	✓	✓	✓
17.	4AL11ME012	Alex Antony	✓	A	A	A	✓	✓	✓	✓	✓	✓
18.	4AL11ME013	Alwin K.V	✓	✓	✓	A	✓	✓	✓	A	✓	✓
19.	4AL11ME014	AnandKrishnan.A.M	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
20.	4AL11ME015	Anil J	✓	✓	A	✓	✓	A	✓	✓	✓	A
21.	4AL11ME018	Arjunapawar H.K	✓	✓	✓	A	A	✓	✓	✓	✓	A
22.	4AL11ME019	AshikKumar.K	A	A	A	✓	✓	✓	✓	✓	✓	✓
23.	4AL11ME021	AvishekKoirala	✓	✓	✓	✓	✓	✓	✓	✓	A	✓
24.	4AL11ME022	Balukrishnan	✓	✓	✓	✓	A	A	A	✓	✓	✓

  
Coordinator

  
HoB



25.	4AL11ME024	Baskhara	✓	A	✓	✓	✓	A	✓	✓	✓	✓
26.	4AL11ME026	Chris Roy	✓	✓	✓	A	A	A	✓	✓	✓	✓
27.	4AL11ME027	D. Sreehari	✓	A	A	✓	✓	✓	✓	✓	✓	✓
28.	4AL11ME029	Deekshith Kumar	A	A	✓	✓	✓	A	✓	A	✓	✓
29.	4AL11ME030	DeronIrol Rodrigues	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
30.	4AL11ME032	D Souza Clepen Albert	✓	A	A	A	✓	✓	✓	✓	✓	✓
31.	4AL11ME033	Ebenezer Jijo Johnson	✓	A	✓	✓	A	A	✓	✓	A	A
32.	4AL11ME034	Ganesh	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
33.	4AL11ME035	Ganesh Nathu	✓	A	A	✓	✓	✓	✓	✓	A	✓
34.	4AL11ME036	Gautham Krishna	✓	A	A	✓	A	A	✓	A	✓	✓
35.	4AL11ME037	Girisha B	✓	✓	✓	✓	✓	A	A	✓	✓	A
36.	4AL11ME038	GuruprasadShenoy B	A	A	A	A	A	A	A	A	A	A
37.	4AL11ME039	Gururaja.G	✓	✓	✓	✓	✓	A	✓	✓	A	✓
38.	4AL11ME040	Hariprasad	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
39.	4AL11ME042	HemantAirsang	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
40.	4AL11ME043	Jackson Pasanna	✓	✓	✓	A	✓	✓	✓	✓	✓	✓
41.	4AL11ME044	Jamsheer.N	A	✓	✓	✓	✓	A	A	✓	✓	✓
42.	4AL11ME045	Jayakrishnan J. Nambiar	✓	✓	✓	✓	✓	✓	A	A	A	✓
43.	4AL11ME047	JithinEappen Philip	✓	A	A	A	✓	✓	✓	A	✓	✓
44.	4AL11ME049	Keshava Karla	✓	A	✓	✓	✓	✓	✓	✓	✓	✓
45.	4AL11ME050	KhalndarSaif	✓	A	A	✓	✓	A	✓	✓	✓	✓
46.	4AL11ME051	Kiran.P	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
47.	4AL11ME052	Kirana	✓	✓	✓	A	A	✓	✓	A	✓	✓
48.	4AL11ME054	Lijin Jose	A	✓	✓	A	✓	✓	A	✓	✓	A
49.	4AL11ME055	Mahesh Shankar Poojary	✓	✓	✓	✓	✓	✓	✓	✓	A	✓
50.	4AL11ME057	Manish Devadiga	✓	A	A	✓	✓	✓	✓	✓	✓	✓

  
Coordinator

HoD



# ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

Shobhavana Campus, Mijar, Moodbidri, D.K - 574225

Phone: 08258-262725, Fax: 08258-262726

## DEPARTMENT OF MECHANICAL ENGINEERING

51.	4AL11ME058	Manjunath N.K	✓	✓	✓	✓	✓	✓	✓	A	✓	✓	✓
52.	4AL11ME059	Manoj Kumar	✓	✓	A	✓	✓	✓	✓	✓	✓	✓	✓
53.	4AL11ME060	Melton AstrinePrathap	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
54.	4AL11ME062	Mohammed A	A	✓	✓	✓	✓	A	✓	✓	✓	✓	✓
55.	4AL11ME063	MuhammedFarooq	✓	✓	✓	✓	✓	✓	A	A	✓	✓	A
56.	4AL11ME064	Nagesha	✓	✓	✓	✓	✓	✓	✓	A	A	✓	✓
57.	4AL11ME065	Naveena	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
58.	4AL11ME066	Nitin N Naik	A	A	A	✓	✓	✓	✓	✓	✓	✓	✓
59.	4AL11ME067	ParashuramPrakashToli	✓	✓	✓	✓	✓	✓	A	A	A	✓	✓
60.	4AL11ME068	PavanShetty	✓	✓	✓	✓	✓	✓	✓	A	✓	✓	✓
61.	4AL11ME069	Pavanraj K	A	A	✓	✓	✓	✓	✓	✓	✓	A	✓
62.	4AL11ME070	Prajun.K	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
63.	4AL11ME071	Prashantha Kumar	A	A	A	✓	A	✓	✓	✓	A	✓	✓
64.	4AL11ME072	PremchandraRai N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
65.	4AL11ME073	PrithunPalayat	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
66.	4AL11ME074	RaghavendraKumbar	✓	A	✓	✓	✓	✓	✓	✓	A	✓	✓
67.	4AL11ME075	Raghavendra V.G	A	A	✓	✓	✓	✓	✓	✓	✓	✓	✓
68.	4AL11ME076	RaiBalajiChandrashekhar	✓	✓	✓	✓	✓	✓	✓	✓	A	✓	✓
69.	4AL11ME077	Rajesh Nayak	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
70.	4AL09ME045	Renjith R Kurup	A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

11/6

HoD






# ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

Shobhavana Campus, Mijar, Moodbidri, D.K - 574225  
Phone: 08258-262725, Fax: 08258-262726

## DEPARTMENT OF MECHANICAL ENGINEERING

H & P COURSE				
SLN	USN	NAME(Caps Only)	Marks scored	
			Max Marks[20]	Obtained Marks
1.	4AL09ME045	Renjith R Kurup	20	0
2.	4AL10ME007	Akshathshetty S	20	0
3.	4AL10ME009	Akshay S	20	0
4.	4AL10ME051	Libin George	20	0
5.	4AL10ME060	Martin Jose Mandy	20	0
6.	4AL10ME063	Mohammed BasithBasheer	20	0
7.	4AL10ME074	Prajwal G Shetty	20	0
8.	4AL10ME097	ShettySushantSudhakar	20	0
9.	4AL10ME116	Vikyath U	20	0
10.	4AL11ME002	AbhijithVijayakumar	20	0
11.	4AL11ME004	Abhishek.S.Suvarna	20	0
12.	4AL11ME005	Achyutha Desai	20	0
13.	4AL11ME006	Adithya G Udupa	20	0
14.	4AL11ME007	Agnimahadev	20	0
15.	4AL11ME010	Akash K	20	0
16.	4AL11ME011	AkhileshMadhavan	20	0
17.	4AL11ME012	Alex Antony	20	0
18.	4AL11ME013	Alwin K.V	20	0
19.	4AL11ME014	AnandKrishnan.A.M	20	0
20.	4AL11ME015	Anil J	20	0
21.	4AL11ME018	Arjunapawar H.K	20	0
22.	4AL11ME019	AshikKumar.K	20	0

  
Coordinator

  
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# ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

Shobhavana Campus, Mijar, Moodbidri, D.K - 574225

Phone: 08258-262725, Fax: 08258-262726

## DEPARTMENT OF MECHANICAL ENGINEERING

23.	4AL11ME021	AvishekKoirala	20	Q
24.	4AL11ME022	Balukrishnan	20	Q
25.	4AL11ME024	Baskhara	20	Q
26.	4AL11ME026	Chris Roy	20	Q
27.	4AL11ME027	D. Sreehari	20	Q
28.	4AL11ME029	Deekshith Kumar	20	Q
29.	4AL11ME030	DeronIrol Rodrigues	20	Q
30.	4AL11ME032	D Souza Clepen Albert	20	Q
31.	4AL11ME033	Ebenezer Jijo Johnson	20	Q
32.	4AL11ME034	Ganesh	20	Q
33.	4AL11ME035	Ganesh Nathu	20	Q
34.	4AL11ME036	Gautham Krishna	20	Q
35.	4AL11ME037	Girisha B	20	Q
36.	4AL11ME038	GuruprasadShenoy B	20	Q
37.	4AL11ME039	Gururaja.G	20	Q
38.	4AL11ME040	Hariprasad	20	Q
39.	4AL11ME042	HemantAirsang	20	Q
40.	4AL11ME043	Jackson Pasanna	20	Q
41.	4AL11ME044	Jamsheer.N	20	Q
42.	4AL11ME045	Jayakrishnan J. Nambiar	20	Q
43.	4AL11ME047	JithinEappen Philip	20	Q
44.	4AL11ME048	Jithin P. Nair	20	Q
45.	4AL11ME049	Keshava Karla	20	Q
46.	4AL11ME050	KhalndarSaif	20	Q

Coordinator

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Phone: 08258-262725, Fax: 08258-262726

## DEPARTMENT OF MECHANICAL ENGINEERING

47.	4AL11ME051	Kiran.P	20	⓪
48.	4AL11ME052	Kirana	20	⓪
49.	4AL11ME054	Lijin Jose	20	⓪
50.	4AL11ME055	Mahesh Shankar Poojary	20	⓪
51.	4AL11ME057	Manish Devadiga	20	⓪
52.	4AL11ME058	Manjunath N.K	20	⓪
53.	4AL11ME059	Manoj Kumar	20	⓪
54.	4AL11ME060	Melton AstrinePrathap	20	⓪
55.	4AL11ME062	Mohammed Asarudheen.C.N	20	⓪
56.	4AL11ME063	MuhammedFarooq	20	⓪
57.	4AL11ME064	Nagesha	20	⓪
58.	4AL11ME065	Naveena	20	⓪
59.	4AL11ME066	Nitin N Naik	20	⓪
60.	4AL11ME067	ParashuramPrakashToli	20	⓪
61.	4AL11ME068	PavanShetty	20	⓪
62.	4AL11ME069	Pavanraj K	20	⓪
63.	4AL11ME070	Prajun.K	20	⓪
64.	4AL11ME071	Prashantha Kumar	20	⓪
65.	4AL11ME072	PremchandraRai N	20	⓪
66.	4AL11ME073	PrithunPalayat	20	⓪
67.	4AL11ME074	RaghavendraKumbar	20	⓪
68.	4AL11ME075	Raghavendra V.G	20	⓪
69.	4AL11ME076	RaiBalajiChandrashekhar	20	⓪
70.	4AL11ME077	Rajesh Nayak	20	⓪

  
Coordinator

  
HoD





# ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY

Shobhavana Campus, Mijar, Moodbidri - 574 225

Phone: 08258-262725 Fax: 08258-262726

DEPARTMENT OF MECHANICAL ENGINEERING

## FEEDBACK FORM

Five days Students Training Program

On

### "Hydraulics and Pneumatics Systems"

For the following areas, please indicate your rating from 1 to 5:

1=strongly Disagree 2=Disagree 3=neither agree nor disagree 4=Agree 5=strongly Agree

SN	Topics	1	2	3	4	5
A.	Content					
1	Understood the basics of Hydraulics and Pneumatics Systems					✓
2	Understood the fundamental					✓
3	Able to apply the Hydraulics and Pneumatics Systems techniques for the problems at the hand.					✓
4	Understood the fundamentals of test document writing.					✓
5	Able to write effective test documents.					✓
B	Presentation					
6	Instructor's knowledge					✓
7	Instructor's presentation style					✓
8	Instructor covered material clearly					✓
9	Instructor responded well to questions					✓
10	Instructor facilitated interactions among participants well					✓

C. How could this workshop be improved? *hard on instructor*

D. Any other comments or suggestions?

E. Overall, how would you rate this workshop?

<input type="checkbox"/>	Poor	<input type="checkbox"/>	Good
<input type="checkbox"/>	Neither Good Nor Poor	<input checked="" type="checkbox"/>	Excellent





Quiz on Hydraulic and Pneumatics Course

1. Fluid power circuits use schematic drawings to:
  - a) simplify component function details.
  - b) make it so only trained persons can understand the functions.
  - c) make the drawing look impressive.
2. A pneumatic symbol is:
  - a) different from a hydraulic symbol used for the same function.
  - b) the same as a hydraulic symbol used for the same function.
  - c) not to be compared to a hydraulic symbol used for the same function.
3. Pneumatic systems usually do not exceed:
  - a) 1 hp.
  - b) 1 to 2 hp.
  - c) 2 to 3 hp.
4. Most hydraulic circuits:
  - a) operate from a central hydraulic power unit.
  - b) use air-over-oil power units.
  - c) have a dedicated power unit.
5. Hydraulic and pneumatic circuits:
  - a) perform the same way for all functions.
  - b) perform differently for all functions.
  - c) perform the same with some exceptions.
6. The lubricator in a pneumatic circuit is the:
  - a) first element in line.
  - b) second element in line.
  - c) last element in line.
7. Series circuits work on both hydraulic and pneumatic actuators.
  - a) True
  - b) False
8. When comparing first cost of hydraulic systems to pneumatic systems, generally they are:
  - a) more expensive to purchase.
  - b) less expensive to purchase.
  - c) cost about the same.
9. When comparing operating cost of hydraulic systems to pneumatic systems, generally they are.
  - a) more expensive to operate.
  - b) less expensive to operate.
  - c) cost about the same to operate
10. The most common hydraulic fluid is:
  - a) mineral oil.
  - b) synthetic fluid.
  - c) water.
11. Which fluid is used in hydraulic power systems?
  - a. water
  - b. oil
  - c. non-compressible fluid
  - d. all of the above
12. Pressure of 1 bar is equal to
  - a. 14.5 psi
  - b. 145 psi
  - c. 12.5 psi
  - d.  $145 \times 10^{-6}$  psi





# ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY

Shobhavana Campus, Mijar, Moodbidri - 574 225

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## DEPARTMENT OF MECHANICAL ENGINEERING

### Quiz on Hydraulic and Pneumatics Course

13. Why is fluid power preferred in mobile vehicles?
- Power can be transmitted without any delay
  - When overloaded, fluid power systems stop without damaging the components
  - Speed variation cannot be achieved
  - Fluid is non-compressible
14. What effect does overloading have on fluid power and electrical systems?
- electrical components get damaged in electrical systems
  - fluid power system stops working without damaging the components
  - both a. and b.
  - none of the above
15. How is power transmitted in fluid power systems?
- power is transmitted instantaneously
  - power is transmitted gradually
  - both a. and b.
  - none of the above
16. Can all hydraulic fluids be compressed when extremely large pressure is applied?
- Yes
  - No
17. The resistance offered to the flow of fluid inside a piston develops into
- pressure
  - force
  - stress
  - all of the above
18. At low pressures, liquids are
- compressible
  - non-compressible
  - unpredictable
19. Rotary motion in a hydraulic power unit is achieved by using
- hydraulic cylinder
  - pneumatic cylinder
  - both hydraulic and pneumatic cylinder
  - none of the above
20. What is the relation between speed and flow rate for fixed displacement vane pump?
- flow rate increases with increase in speed of rotor
  - flow rate decreases with increase in speed of rotor
  - flow rate is constant and does not change with change in speed
  - none of the above





# ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY MOODBIDRI

A Unit of Alva's Education Foundation®  
(Affiliated to VTU, Belagavi and Approved by A.I.C.T.E., New Delhi)  
Shobhavana Campus, Mijar, Moodbidri DK Karnataka-574225

DEPARTMENT MECHANICAL ENGINEERING

## Certificate

*This is to certify that Mr./Ms.....bearing the  
USN ..... from ..... has attended  
the Students Training Program on "Hydraulic and  
Pneumatics " from 20<sup>th</sup> January 2015 to 24<sup>th</sup> January 2015.*

Mr. Hemanth S  
Coordinator

Prof. K V Suresh  
Head of the Department  
Mechanical Engineering

Dr. Peter Fernandes  
Principal  
AIET Moodbidri





# ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

Shobhavana Campus, Mijar, Moodbidri, D.K - 574225

Phone: 08258-262725, Fax: 08258-262726

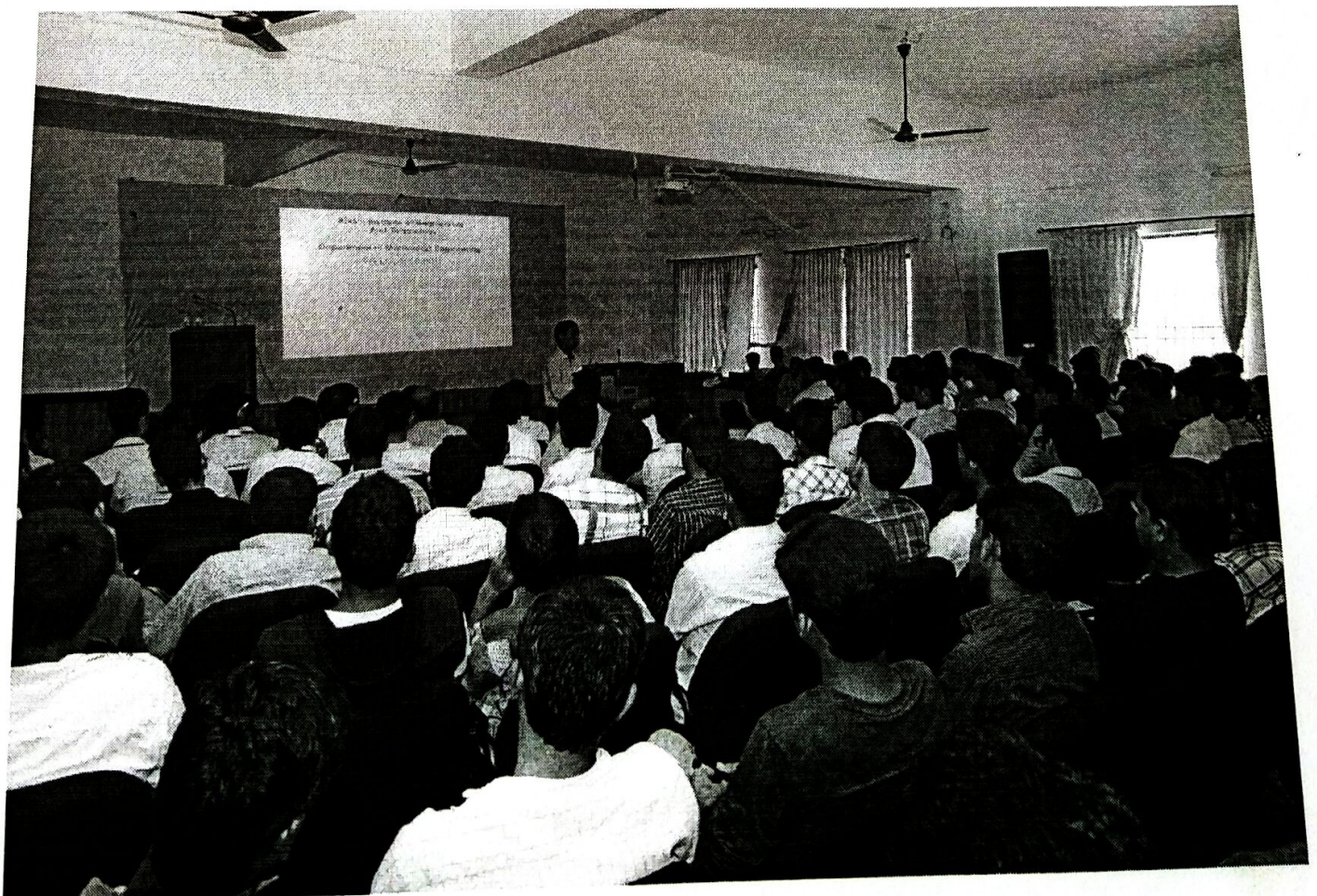
## DEPARTMENT OF MECHANICAL ENGINEERING

### Report on Hydraulic and Pneumatics

The department of ME conducted a Five Days hands on students training program for the students of ME from 20-01-2015 to 24-01-2015 on "Hydraulic and Pneumatic" at AIET Moodbidri.

Mr. Suresh P S & Mr. Ganesh M R Assistant Professor, Department of Mechanical Engineering AIET, Moodbidri delivered a comprehensive and in depth information about the Fundamentals of Hydraulic and Pneumatics, H & P Principles, Techniques, Applications. Seventy participants have enthusiastically participated and learnt the application building.

Photo







# ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY

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## DEPARTMENT OF MECHANICAL ENGINEERING

ACADEMIC YEAR: 2014-15

### CERTIFICATE PROGRAM ON HYDRAULICS AND PNEUMATICS SYSTEMS

SL. No	Topic
1	Hydraulic Power: Definition of hydraulic system, advantages, limitations, applications, Pascal's law, structure of hydraulic control system, problems on Pascal's law. The source of Hydraulic Power: Pumps, cylinder and hydraulic motors, Linear Hydraulic Actuators [cylinders], single and double acting cylinder, Mechanics of Hydraulic Cylinder Loading, mounting arrangements, cushioning, special types of cylinders, problems on cylinder
2	Acting Hydraulic Cylinder, Regenerative circuit, Pump Unloading Circuit, Double Pump Hydraulic System, Counter balance Valve Application, Hydraulic Cylinder Sequencing Circuits, Automatic cylinder reciprocating system, Locked Cylinder using Pilot check Valve, Cylinder synchronizing circuit using different methods, factors affecting synchronization, Hydraulic circuit for force multiplication, Speed Control of Hydraulic Cylinder, Speed Control of Hydraulic Motors, Safety circuit, Accumulators, types, construction and applications with circuits
3	Hydraulic Oils - Desirable properties, general type of Fluids, Sealing Devices, Reservoir System, Filters and Strainers, wear of Moving Parts due to solid -particle Contamination, temperature control (heat exchangers), Pressure switches, trouble shooting.
4	Introduction to Pneumatic Control: Definition of pneumatic system, advantages, limitations, applications, Choice of working medium. Characteristic of compressed air. Structure of Pneumatic control System, fluid conditioners and FRL unit. Pneumatic Actuators: Linear cylinder - Types, Conventional type of cylinder- working, End position cushioning, seals, mounting arrangements- Applications. Rod - Less cylinders types, working, advantages, Rotary cylinders- types construction and application, symbols.

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