



# Indra Ganesan

## COLLEGE OF ENGINEERING

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai  
Accredited by NAAC with 'B+' Grade, 2(f) & 12B Status Institution by UGC

IG Valley, Madurai Main Road, Manikandam, Tiruchirappalli - 620012

# NAAC DOCUMENTS

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## QUALITY INDICATOR FRAME WORK

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### CRITERION – 1

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## CURRICULAR ASPECTS

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SUBMITTED BY

**IQAC**

INTERNAL QUALITY ASSURANCE CELL

**INDRA GANESAN COLLEGE OF ENGINEERING**





# Indra Ganesan

## COLLEGE OF ENGINEERING

Madurai Main Road (NH-45B), Manikandam, Tiruchirappalli - 620 012  
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai  
NAAC Accredited, 2(F) Status Institution by UGC



<b>Criteria 1</b>	<b>Curricular Aspects</b>	<b>100</b>
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## 1.1 Curricular Planning and Implementation (20)

**1.1.1 The Institution ensures effective curriculum planning and delivery through a well-planned and documented process including Academic calendar and conduct of continuous internal Assessment**

### Table of Content

S. No	Description
1.	Preface of the Course File
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# INDRA GANESAN COLLEGE OF ENGINEERING

IG Valley, Manikandam, Tiruchirappalli, Tamil Nadu – 620 012, India  
(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)

## DEPARTMENT OF MECHANICAL ENGINEERING

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### PREFACE OF THE COURSE FILE

Batch : 2016-2020

Academic Year : 2020-2021 / EVEN

Program : MECHANICAL ENGINEERING

Year & Semester : 3<sup>rd</sup> Year / 6<sup>th</sup> Semester

Course Code : ME8694

Name of the Course : Hydraulics and Pneumatics

Faculty in-charge : Mr.R. Ganesh, AP/Mechanical

Signature of the Faculty in-charge

HOD / Mechanical

Dr. G. Balakrishnan, M.E., Ph.D.,  
Principal  
Indra Ganesan College of Engineering  
IG Valley, Madurai Main Road  
Manikandam, Trichy-620 012.





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Madurai Main Road (NH-45B) Manikandam, Tiruchirappalli - 620 012  
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Department of Mechanical Engineering

### II Year TimeTable - Even Semester 2020-2021

Year / Sem: IV/ VIII

CC: Mr. R. Ganesh / AP / MECH

Hall No.: LH 301

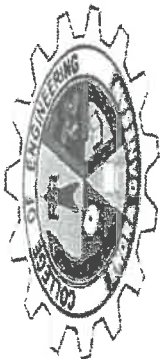
DAY	1	2	3	4	5	6	7	8 (CCA/SCC)
MON	9.15-10.05 TATS	10.05-10.55 CIMS	11.10-12.00 TATS	12.00-12.45 POM	01.20-02.10 PROJECT WORK	02.10-03.00 PROJECT WORK	03.10-04.00 PROJECT WORK	04.00-05.00 CCA/SCC
TUE	POM	CIMS	TATS	PROJECT WORK	PROJECT WORK	PROJECT WORK	PROJECT WORK	CCA/SCC
WED	PROJECT WORK	PROJECT WORK	POM	TATS	CIMS	TATS	TATS	CCA/SCC
THU	PROJECT WORK	PROJECT WORK	PROJECT WORK	PROJECT WORK	PROJECT WORK	PROJECT WORK	PROJECT WORK	CCA/SCC
FRI	PROJECT WORK	PROJECT WORK	PROJECT WORK	PROJECT WORK	POM	CIMS	TATS	CCA/SCC
<b>B R E A K</b>								
<b>L U N C H</b>								
<b>B R E A K</b>								

SUBJECT CODE	COURSE NAME	ERP ID	CREDITS/ HOURS	STAFF IN-CHARGE
MG8591	Principle of Management	IGCE0383	3/45	Mr. K.N. Prabahar, AP/Mech
ME8094	Computer Integrated Manufacturing Systems (Professional Elective-IV)	IGCE0308	3/45	Mr. R. Ramesh Babu, HOD/Mech
ME8811	Project Work	IGCE0308	10/300	Mr. R. Ramesh Babu, HOD/Mech
	CCA / SCC		5 hours/week	
	TATS		7 hours/week	
	TOTAL		16/390	

**Dr. G. Balakrishnan, M.E., Ph.D.,**  
Principal

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Manikandam, Trichy-620 012.

*R. Ganesh*  
HOD/MECH



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Department of Mechanical Engineering

II Year TimeTable - Even Semester 2020-2021

CC: Mr. R. Manickam / AP/ MECH

Year / Sem: III / VI

Hall No.: LH 302

DAY	1 9.15-10.05	2 10.05-10.55	3 11.10-12.00	4 12.00-12.45	5 01.10-02.10	6 02.10-03.00	7 03.10-04.00	8(CCA/SCC) 04.00-05.00
MON	FEA	AE	HMT	H&P	Professional Communication		CAD/CAM	CCA/SCC
TUE	DTS	HMT	AE	FEA	H&P	HMT	DTS	CCA/SCC
WED	AE	FEA	HMT	AE	CAD/CAM	DTS	H&P	CCA/SCC
THU	FEA	CAD/CAM	HMT	CAD/CAM LAB			CAD/CAM LAB	CCA/SCC
FRI	CAD/CAM	DTS	H&P	D&F PROJECT	D&F PROJECT		D&F PROJECT	CCA/SCC

SUBJECT	COURSE NAME	ERP ID	CREDITS/HOURS	STAFF IN-CHARGE
ME8681	Design of Transmission Systems	IGCE0360	3/45	Mr. J. Sebastian Joyal, AP/Mech
ME8682	Computer Aided Design and Manufacturing	IGCE0383	3/45	Mr. K.N. Prabahar, AP/Mech
ME8683	Heat and Mass Transfer	IGCE0411	4/75	Dr. G.P. Arul, Prof./ Mech
ME8684	Finite Element Analysis	IGCE0384	3/45	Mr. R. Ramesh Babu, HOD/Mech
ME8685	Hydraulics and Pneumatics	IGCE0308	3/45	Mr. R. Ganesh, AP/Mech
ME8686	Automobile Engineering	IGCE	3/45	New staff, AP/Mech
ME8687	CAD / CAM Laboratory	IGCE0384	2/60	Mr. R. Ganesh, AP/Mech
ME8688	Design and Fabrication Project	IGCE0308	2/60	Mr. R. Ramesh Babu, HOD/Mech
ME8689	Professional Communication	IGCE	1/30	Ms. Maria Kiruba Priyadarshini, AP/ S&H
CCA / SCC			5/Week	
TOTAL			24/450	

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HOD/MECH



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 Department of Mechanical Engineering

## II Year Time Table - Even Semester 2020-2021

Year/ Sem: II / IV

CC: Mr. J. Sebastin Joyal/AP/MECH

Hall No.: LH 303

DAY	1 8.15-10.05	2 10.05-10.55	3 11.10-12.00	4 12.00-12.45	5 91.20-92.10	6 02.10-03.00	7 03.10-04.00	8 (COURSES) 04.05-05.00
MON	SOM	MT-II	SNM	TE-I	MT-II	EM	KOM	CCA/SCC
TUE	KOM	SNM	TE-I	MT-II LAB	MT-II LAB	MT-II LAB	MT-II LAB	CCA/SCC
WED	SNM	TE-I	SOM	SOM/FMM LAB	SOM/FMM LAB	SOM/FMM LAB	SOM/FMM LAB	CCA/SCC
THU	SOM	EM	KOM	SNM	Adv R&W LAB	Adv R&W LAB	MT-II	CCA/SCC
FRI	EM	SNM	KOM	EM	TE-I	MT-II	SOM	CCA/SCC
<b>B R E A K</b>								
<b>L U N C H</b>								
<b>B R E A K</b>								
SUBJECT CODE	COURSE NAME							
MA8452	Statistics and Numerical Methods							
ME8492	Kinematics of Machinery							
ME8451	Manufacturing Technology - II							
ME8491	Engineering Metallurgy							
CE8395	Strength of Materials for Mechanical Engineering							
ME8493	Thermal Engineering- I							
ME8462	Manufacturing Technology Laboratory - II							
CE8381	Strength of Materials and Fluid Mechanics and Machinery Lab							
HS8461	Advanced Reading and Writing							
	CCA / SCC							
	TOTAL							
	5 Hours / Week							
	24/435							
	STAFF IN-CHARGE							
	Dr. S.Anitha, Prof. /S&H							
	Mr.R.Ganesh, AP/Mech							
	Mr.K.N.Prabakar, AP/Mech							
	New staff, AP/Mech							
	Mr.R. Manickam, AP/Mech							
	Dr. G.P.Arul, Prof./ Mech							
	Mr.K.N.Prabakar, AP/Mech							
	Dr. G.P.Arul, Prof./ Mech							
	Ms. Maria Kiruba Priyadarshini, AP/ S&H							

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Department of Mechanical Engineering

Work Load Allocation - Even Semester 2020-2021

S.NO.	Staff Name	Course Code	Course Name	Semester	Credits	Lecture / week	Total
1	Mr.R.Ramesh Babu HOD/Mech  (2+2)	ME8692	Finite Element Analysis	VI	3	4	32
		ME8094	Computer Integrated Manufacturing Systems	VIII	3	4	
		ME8682	Design and Fabrication Project	VI	2	4	
		ME8811	Project Work	VIII	10	20	
2	Mr.K.N. Prabahar AP/Mech  (3+1)	ME8451	Manufacturing Technology – II	IV	3	4	16
		ME8691	Computer Aided Design and Manufacturing	VI	3	4	
		MG8591	Principles of Management	VIII	3	4	
		ME8462	Manufacturing Technology Laboratory – II	IV	2	4	
3	Mr.R.Manickam AP/Mech (1+1)	CE8395	Strength of Materials	IV	3	4	8
		GE8261	Engineering Practices Laboratory	II	2	4	
4	Dr. G.P. Arul, Prof./Mech  (3+1)	BE8252	Basic Civil and Mechanical Engineering	II	4	5	18
		ME8493	Thermal Engineering- I	IV	3	4	
		ME8693	Heat and Mass Transfer	VI	4	5	
		CE8381	Strength of Materials and Fluid Mechanics and Machinery Lab	IV	2	4	
5	Mr. R. Ganesh AP/Mech  (3+1)	PH8251	Materials Science	II	3	4	16
		ME8492	Kinematics of Machinery	IV	3	4	
		ME8694	Hydraulics and Pneumatics	VI	3	4	
		ME8681	CAD / CAM Laboratory	VI	2	4	
6	Mr.J.Sebastin Joyal AP/Mech (1+0)	ME8651	Design of Transmission Systems	VI	3	4	4
7	New staff AP/Mech  (3+1)	GE8292	Engineering Mechanics	II	4	5	17
		ME8491	Engineering Metallurgy	IV	3	4	
		ME8091	Automobile Engineering	VI	3	4	
		GE8261	Engineering Practices Laboratory	II	2	4	

*P. Prabahar*  
HOD/MECH

*(Signature)*  
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Manikandam, Trichy-620 012.



ME8694

**HYDRAULICS AND PNEUMATICS**

L T P C  
3 0 0 3

**OBJECTIVES:**

- To provide student with knowledge on the application of fluid power in process, construction and manufacturing Industries.
- To provide students with an understanding of the fluids and components utilized in modern industrial fluid power system.
- To develop a measurable degree of competence in the design, construction and operation of fluid power circuits.

**UNIT I FLUID POWER PRINCIPLES AND HYDRAULIC PUMPS 9**

Introduction to Fluid power – Advantages and Applications – Fluid power systems – Types of fluids - Properties of fluids and selection – Basics of Hydraulics – Pascal's Law – Principles of flow – Friction loss – Work, Power and Torque Problems, Sources of Hydraulic power : Pumping Theory – Pump Classification – Construction, Working, Design, Advantages, Disadvantages, Performance, Selection criteria of Linear and Rotary – Fixed and Variable displacement pumps – Problems.

**UNIT II HYDRAULIC ACTUATORS AND CONTROL COMPONENTS 9**

Hydraulic Actuators: Cylinders – Types and construction, Application, Hydraulic cushioning – Hydraulic motors - Control Components : Direction Control, Flow control and pressure control valves – Types, Construction and Operation – Servo and Proportional valves – Applications – Accessories : Reservoirs, Pressure Switches – Applications – Fluid Power ANSI Symbols – Problems.

**UNIT III HYDRAULIC CIRCUITS AND SYSTEMS 9**

Accumulators, Intensifiers, Industrial hydraulic circuits – Regenerative, Pump Unloading, Double-Pump, Pressure Intensifier, Air-over oil, Sequence, Reciprocation, Synchronization, Fail-Safe, Speed Control, Hydrostatic transmission, Electro hydraulic circuits, Mechanical hydraulic servo systems.

**UNIT IV PNEUMATIC AND ELECTRO PNEUMATIC SYSTEMS 9**

Properties of air – Perfect Gas Laws – Compressor – Filters, Regulator, Lubricator, Muffler, Air control Valves, Quick Exhaust Valves, Pneumatic actuators, Design of Pneumatic circuit – Cascade method – Electro Pneumatic System – Elements – Ladder diagram – Problems, Introduction to fluidics and pneumatic logic circuits.

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*R. Ravi*

## UNIT V TROUBLE SHOOTING AND APPLICATIONS

9

Installation, Selection, Maintenance, Trouble Shooting and Remedies in Hydraulic and Pneumatic systems, Design of hydraulic circuits for Drilling, Planning, Shaping, Surface grinding, Press and Forklift applications. Design of Pneumatic circuits for Pick and Place applications and tool handling in CNC Machine tools – Low cost Automation – Hydraulic and Pneumatic power packs.

**TOTAL:45 PERIODS**

### OUTCOMES:

**Upon the completion of this course the students will be able to**

- CO1 Explain the Fluid power and operation of different types of pumps.
- CO2 Summarize the features and functions of Hydraulic motors, actuators and Flow control valves
- CO3 Explain the different types of Hydraulic circuits and systems
- CO4 Explain the working of different pneumatic circuits and systems
- CO5 Summarize the various trouble shooting methods of hydraulic and pneumatic systems
- CO6 Explain the applications of Hydraulic and Pneumatic systems.

### TEXT BOOKS:

1. Anthony Esposito, "Fluid Power with Applications", Pearson Education 2005.
2. Majumdar S.R., "Oil Hydraulics Systems- Principles and Maintenance", Tata McGraw-Hill, 2001.

### REFERENCES:

1. Anthony Lal, "Oil hydraulics in the service of industry", Allied publishers, 1982.
2. Dudelyt, A. Pease and John T. Pippenger, "Basic Fluid Power", Prentice Hall, 1987.
3. Majumdar S.R., "Pneumatic systems – Principles and maintenance", Tata McGraw Hill, 1995
4. Michael J, Prinches and Ashby J. G, "Power Hydraulics", Prentice Hall, 1989.
5. Shanmugasundaram.K, "Hydraulic and Pneumatic controls", Chand & Co, 2006.

  
Hd/Mech

  
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**DEPARTMENT OF MECHANICAL ENGINEERING**

**Lecture Schedule**

Degree/Program: **B.E / MECHANICAL**      Course code &Name: ME8694-Hydraulics and Pneumatics  
 Duration: **Dec 2020 - Apr 2021**      Semester: **IV** Faculty: **Mr. R. Ganesh**

**AIM:**

To expose the students to basics Fluid power systems, Pumps and its Classification, Hydraulic motors, Speed Control system, Pneumatic actuators and CNC Machine tools.

**OBJECTIVES:**

To impart knowledge on

- (i) To provide student with knowledge on the application of fluid power in process, construction and manufacturing Industries.
- (ii) To provide students with an understanding of the fluids and components utilized in modern industrial fluid power system.
- (iii) To develop a measurable degree of competence in the design, construction and operation of fluid power circuits.

**PREREQUISITES:** Hydraulics and Pneumatics

**COURSE OUTCOMES:**

After the course, the student should be able to:

CO	Course Outcomes	POs	PSOs
CO313.1	Explain the Fluid power and operation of different types of pumps.	1,2,4,8	1,2,3
CO313.2	Summarize the features and functions of Hydraulic motors, actuators and Flow control valves	1,2,8	1,2,3
CO313.3	Explain the different types of Hydraulic circuits and systems	1,2,8	1,2,3
CO313.4	Explain the working of different pneumatic circuits and systems	1,2,4,8	1,2,3
CO313.5	Summarize the various trouble shooting methods and applications of hydraulic and pneumatic systems.	1,2,4,8	1,2,3
CO313.6	Identify and application of Low cost Automation	1,2,4,8	1,2,3

S.No	Date	Period	Topics to be Covered	Book & Page No.
<b>UNIT -I - FLUID POWER PRINICIPLES AND HYDRAULIC PUMPS</b>				<b>Target periods :09</b>
1	19.02.21	3	Introduction to Fluid power	T1
2	22.02.21	4	Advantages and Applications	T1
3	23.02.21	5	Fluid power systems, Types of fluids	T1
4	24.02.21	7	Properties of fluids and selection, Basics of Hydraulics	T1
5	26.02.21	3	Pascal's Law, Principles of flow	T1
6	27.02.21	3	Friction loss - Work, Power and Torque Problems	R2
7	01.03.21	4	Sources of Hydraulic power : Pumping Theory	R2
8	02.03.21	5	Pump Classification	R2

  
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9	03.03.21	7	Construction, Working, Design, Advantages, Disadvantages	R2
10	05.03.21	3	Performance, Selection criteria of Linear and Rotary	T1
11	06.03.21	4	Fixed and Variable displacement pumps	T1
12	08.03.21	4	Problems	T1
<b>UNIT II -HYDRAULIC ACTUATORS AND CONTROL COMPONENTS</b>				<b>Target periods :09</b>
13	09.03.21	5	Hydraulic Actuators: Cylinders	T1
14	10.03.21	7	Types and construction, Application, Hydraulic cushioning	T1
15	12.03.21	3	Hydraulic motors	T1
16	13.03.21	5	Control Components : Direction Control,	T1
17	15.03.21	4	Flow control and pressure control valves	R1
18	16.03.21	5	Types, Construction and Operation	R1
19	17.03.21	7	Servo and Proportional valves	R1
20	19.03.21	3	Applications	R1
21	20.03.21	7	Accessories : Reservoirs, Pressure Switches, Applications	T1
22	22.03.21	4	Fluid Power ANSI Symbols	T1
23	23.03.21	5	Problems.	T1
<b>UNIT III - HYDRAULIC CIRCUITS AND SYSTEMS</b>				<b>Target Periods :09</b>
24	24.03.21	7	Accumulators, Intensifiers, Industrial hydraulic circuits	T1
25	26.03.21	3	Regenerative, Pump Unloading	T1
26	29.03.21	4	Double Pump,	T1
27	30.03.21	5	Pressure Intensifier	T1
28	31.03.21	7	Air-over oil	T1
29	02.04.21	3	Sequence, Reciprocation	T1
30	03.04.21	3	Synchronization, Fail-Safe	T1
31	05.04.21	4	Speed Control	R3
32	06.04.21	5	Hydrostatic transmission	R3
33	07.04.21	7	Electro hydraulic circuits	R3
34	09.04.21	3	Mechanical hydraulic servo systems.	R2
35	10.04.21	4	Problems.	R3
<b>UNIT IV - PNEUMATIC AND ELECTRO PNEUMATIC SYSTEMS</b>				<b>Target Periods :09</b>
36	12.04.21	3	Properties of air – Perfect Gas Laws	T2
37	13.04.21	4	Compressor – Filters	T2
38	14.04.21	5	Regulator, Lubricator, Muffler	T2
39	16.04.21	7	Air control Valves, Quick Exhaust Valves,	T2
40	17.04.21	4	Pneumatic actuators. Design of Pneumatic circuit	T2
41	19.04.21	3	Cascade method	T2
42	20.04.21	4	Electro Pneumatic System	T2
43	21.04.21	5	Elements Ladder diagram	R4
44	23.04.21	7	Problems	R4
45	24.04.21	5	Introduction to fluidics and pneumatic logic circuits	R4
<b>UNIT V – TROUBLE SHOOTING AND APPLICATIONS</b>				<b>Target Periods:09</b>
46	26.04.21	3	Installation, Selection, Maintenance, Trouble Shooting	T2
47	27.04.21	4	Remedies in Hydraulic and Pneumatic systems,	T2
48	28.04.21	5	Design of hydraulic circuits for Drilling, Planning, Shaping, Surface grinding, Press and Forklift applications	T2
49	30.04.21	7	Design of Pneumatic circuits for Pick and Place applications and tool handling in CNC Machine tools	T2
50	03.05.21	3	Low cost Automation	T2

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51	04.05.21	4	Hydraulic and Pneumatic power packs	R5
<b>Content Beyond the Syllabus</b>				
52	05.05.21	5	The latest innovations and technology in hydraulics and its scope in future	Material

#### Book Reference - Text Books

Sl.	Title of the Book	Author	Publisher	Year
1.	Fluid Power with Applications	Anthony Esposito	Pearson Education	2005.
2.	Oil Hydraulics Systems- Principles and Maintenance	Majumdar S.R.	Tata McGraw-Hill,	2001

#### Book Reference – References

Sl	Title of the Book	Author	Publisher	Year
1.	Oil hydraulics in the service of industry	Anthony Lal	Allied publishers	1982.
2.	Basic Fluid Power	Dudelyt, A. Pease and John T. Pippenger	Prentice Hall	1987.
3.	Pneumatic systems – Principles and maintenance	Majumdar S.R.	Tata McGraw Hill	1995
4	Power Hydraulics	Michael J, Princhis and Ashby J. G	Prentice Hall	1989.
5	Hydraulic and Pneumatic controls	Shanmugasundaram.K,	Chand & Co	2006.

#### Website Reference:

<https://archive.nptel.ac.in/courses/112/106/112106300/>

<https://www.sciencedirect.com/book/9780080966748/hydraulics-and-pneumatics>

Signature of the Faculty in-charge

HoD Mechanical

  
Dr. G. Balakrishnan, M.E., Ph.D.,  
Principal

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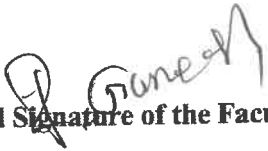
**DEPARTMENT OF MECHANICAL ENGINEERING**


**Assignment Question Paper**


<b>Assignment – 01</b>			<b>Date of Issue:</b>	03.02.2020	<b>Marks</b>	10
<b>Course code</b>	ME8694	<b>Course Title</b>	Hydraulics and Pneumatics			
<b>Year</b>	III	<b>Semester/Section</b>	VI/A	<b>Date of Submission:</b>	07.02.2020	

<b>Q.No</b>	<b>Questions</b>	<b>CO</b>
1	Explain the working Principle of hydraulic press with neat sketch	C313.1
2	Explain with a neat sketch the construction & working principle of Gerotor pump.	C313.1

Name and Signature of the Faculty Incharge



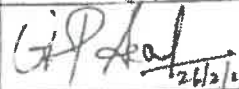
  
HOD/Mech

  
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Manikandam, Trichy-620 012.

# INDRA GANESAN COLLEGE OF ENGINEERING

IG Valley, Manikundam, Tiruchirappalli, Tamil Nadu - 622 012, India  
(Approved by AICTE, New Delhi and affiliated to Anna University, Chennai)

## Internal Assessment Test Answer Book

Name	Karthick A.	Year/Semester	Ei/iv		
Reg No.	81216114015	Date/Session	26/2/21 - FN	Department	Mecl.
Course code	M/E 8894	Course Title	Hydraulics and Pneumatics		
Internal Assessment Test	IAT 1 <input type="checkbox"/>	IAT 2 <input checked="" type="checkbox"/>	IAT 3 <input type="checkbox"/>	Model <input type="checkbox"/>	
Name and Signature of the Invigilator with date		 G.P. ARUL. 26/2/21			

Instruction to the Student: Put tick mark to the question attended in the column against question.

Part A			Part B / Part C				Total Marks
Q. No.	✓	Marks	Q. NO.	✓	a	b	
					Marks	Marks	
1	✓	2	11		10		10
2	✓	2	12		9		9
3	✓	2	13		7		7
4	✓	2	14				
5	✓	1	15				
6	✓	2	16				
7	✓	2	Total			26	
8	✓	1	Grand Total			Name and Signature of the Examiner with date  R. Ganesh 26/2/21 (R. Ganesh)	
9	✓	2	$\frac{44}{50} \rightarrow \frac{88}{100}$				
10	✓	2					
Total		18					

To be filled by the examiner							
Course Outcomes	1	2	3	4	5	6	Total
Marks allotted		50					50
Marks Obtained		44					44
IQAC Audit - Remarks						Name and Signature of the IQAC member	

  
**Dr. G. Balakrishnan, M.E., Ph.D.,**  
 Principal

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**INDRA GANESAN COLLEGE OF ENGINEERING**  
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**DEPARTMENT OF MECHANICAL ENGINEERING**

**Proof of Conduct of Content Beyond Syllabus(CBS)**

Name of the Faculty : Mr.R.Ganesh  
Degree & Program: B.E. /Mechanical

Course Code & Name:ME8694-Hydraulics & Pneumatics  
Semester: IV Academic Year: 2020 -2021 /EVEN

**TOPIC:**

THE LATEST INNOVATIONS AND TECHNOLOGY IN HYDRAULICS AND ITS SCOPE IN FUTURE

**INTRODUCTION:**

The development of smart sensing technologies will have an impact on pneumatics in the future. All sorts of fluid power equipment, from connectors, tubing, and hoses to pneumatic cylinders, actuators, and filters, are increasingly included cost-effective sensing and information processing devices.

**Hydraulics** is a matured industry, but still, it requires improvements to become a part of the digital world. The fact is, current hydraulic industry have several drawbacks. The hydraulic experts are working on these issues for improving energy efficiency, reliability, energy storage, and redeployment capabilities. So, the latest technology in hydraulics will focus on improvements in these areas by reducing the size and environmental hazards. Today, most of the hydraulic systems are used to lift, pick or grasp things. Such systems have a wide range of application in various industries like construction, manufacturing, automobile, medical, etc. But soon the new hydraulic technology will bring advancements to these existing technologies and applications. The latest hydraulics innovations are focusing on renewable energy applications, smart user interfaces, load sensing valve technology, and hybrid actuation systems. Some of the applications of these are mentioned below.

- **Hybrid actuation systems**

Hybrid Actuation System (HAS) is ideal for harsh power generation environments such as those used with solar panels, wind turbines, and hydroelectric dams. HAS can be combined with an integrated Intellinder sensor, that eliminates the complexity of gun drilling and unprotected external sensors. This system improves efficiency without any complex maintenance.

- **Smart user interfaces**

The hydraulic industry is moving forward to create user interface applications. Already, Parker has succeeded in developing a UX Toolkit software tool that simplifies all applications of the machine. This application included core machine functions, smart control systems, diagnostics or prediction applications that decrease downtime, or GPS monitoring and navigation applications. Using Parker's pro display HMI module, the desired features can be centralized into a single display and a uniform user interface.

- **Load sensing valve technology**

EQA (Electric Flow Amplifier) EcoFormance technology bring advancements in load sensing valves by improving the machine control. This technology is used in mining, forest and construction machines. Similarly, IQAN connect is another product by Parker that monitor and control mobile machines.

- **Expandable SKF Quick grip Bolt**

  
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These new generation bolts are used to connect two rotating flanges quickly, reliably and easily. These SKF Quickgrip Bolts can be applied to all types of critical applications such as propulsion systems. It eliminates potential slippage and it can transfer both heavy radial and axial loads.

- **Hydraulic Design Tools**

Most of the current generation hydraulic design tools included one-dimensional modeling. But, soon the industry will convert into two dimensional or 3D modeling. This will improve the project quality and resiliency. This technology can locate and illustrate patterns of flow discharge, water surface elevations, depth, velocity, and shear stress. Thus, it provides accurate data for the planning and design team.

- **Future of the Hydraulics Industry**

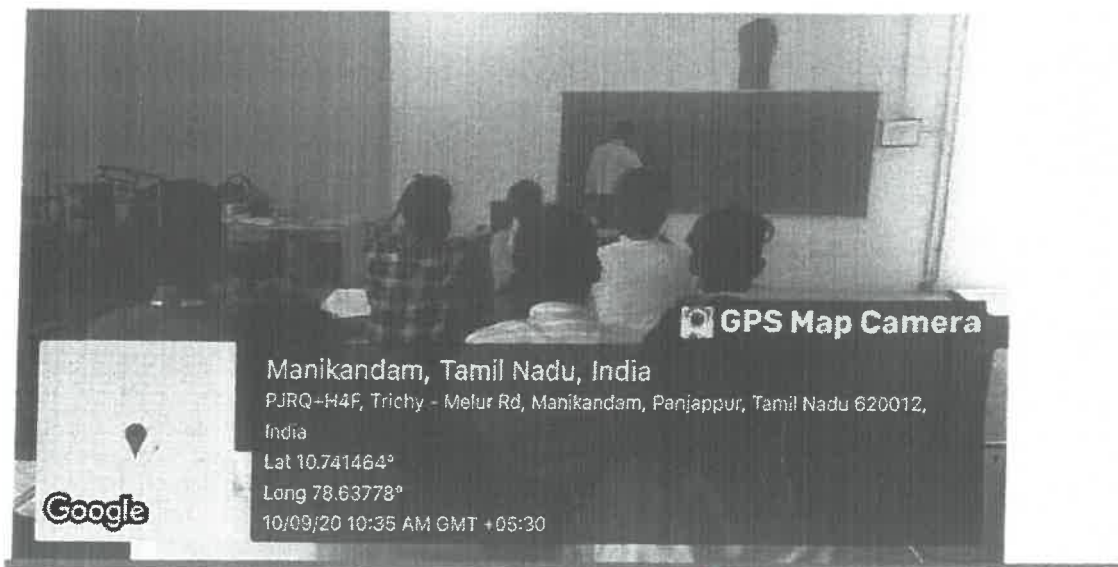
A few years back, hydraulic was considered as a dying industry. Because nobody wanted to become a hydraulic professional due to the danger in that field. But now the situation has changed, this industry will be there in the next century also.

Hydraulics is there from the 17th century onwards. When you consider the applications of hydraulics from the past to the present, the growth of this industry will become clearly visible for you. The early inventions included piston pumps and water clocks and now it has reached on robotics and heavy equipment.

Recently most of the hazardous industrial applications use hydraulic power transmission method. Because electrical sparks will create accidents on potentially combustible atmospheres. Also, the advancements in reactance-based technology will create more vacancies in Hydraulic Job.

**Website Reference:**

<https://www.linkedin.com/pulse/latest-innovations-technology-hydraulics-its-scope-future-atchison/>



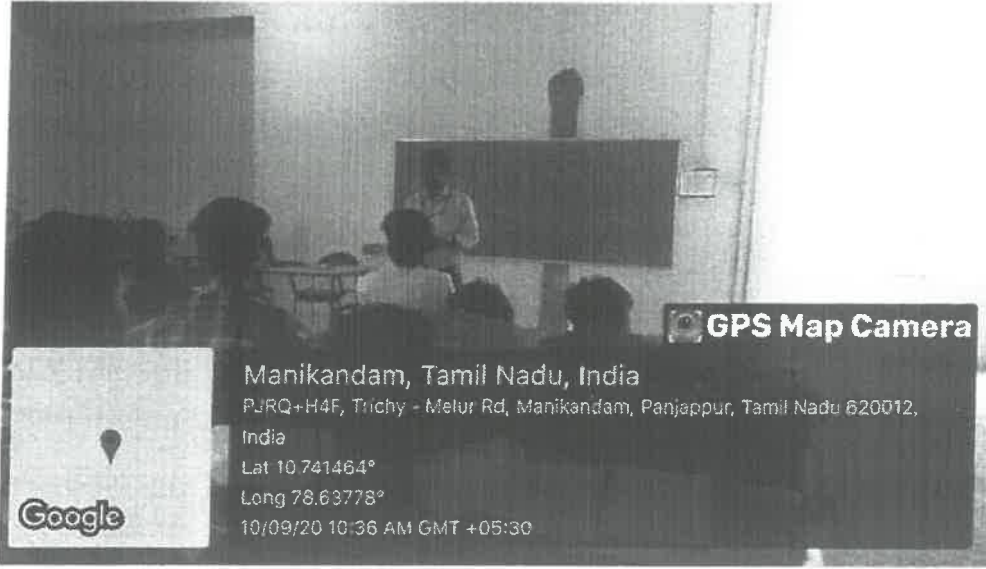
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*G. Ganesh*  
Signature of the Faculty in-charge

*P. Ramya*  
HoD Mechanical

*G. Balakrishnan*  
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## DEPARTMENT OF MECHANICAL ENGINEERING

### Identification of Curricular Gap & Content Beyond Syllabus(CBS)

Name of the Faculty : Mr.R.Ganesh Course Code & Name:ME8694-Hydraulics & Pneumatics

Degree & Program: B.E. /Mechanical Semester: VI Academic Year: 2020 -2021 /EVEN

#### I.Mapping of Course Outcomes with POs & PSOs.( before CBS)

Table.1 Mapping of COs, C, PSOs with POs - before CBS.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO313.1	3	3	-	2	-	-	-	1	-	-	-	-	3	3	2
CO313.2	3	3	-	-	-	-	-	1	-	-	-	-	3	2	2
CO313.3	3	3	-	-	-	-	-	1	-	-	-	-	3	2	2
CO313.4	3	3	-	2	-	-	-	1	-	-	-	-	3	2	2
CO313.5	3	3	-	2	-	-	-	1	-	-	-	-	3	2	2
CO313.6	3	3	-	2	-	-	-	1	-	-	-	-	3	2	2
CO313	3	3	-	2	-	-	-	1	-	-	-	-	3	2	3

#### II. Identification of content beyond syllabus.

Table.2 Identification of content beyond syllabus

Details of Content Beyond Syllabus(CBS) added	POs strengthened/ vacant filled	CO/Unit
The latest innovations and technology in hydraulics and its scope in future	PO4, PO5,PO9(2) Vacant filled	CO313.2 & CO313.3 II & III

#### III. Mapping of Course Outcomes with POs & PSOs. (After CBS)

Table.3 Mapping of COs, C, PSOs with POs- after CBS.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO313.1	3	3	-	2	-	-	-	1	-	-	-	-	3	2	2
CO313.2	3	3	-	*2	*2	-	-	1	*2	-	-	-	2	2	2
CO313.3	3	3	-	*2	*2	-	-	1	*2	-	-	-	2	2	2
CO313.4	3	3	-	2	-	-	-	1	-	-	-	-	2	2	2
CO313.5	3	3	-	2	-	-	-	1	-	-	-	-	2	2	2
CO313.6	3	3	-	2	-	-	-	1	-	-	-	-	2	2	2
CO313	3	3	-	2	2	-	-	1	2	-	-	-	2	2	2

Signature of the Faculty

HoD/MECHANICAL

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**DEPARTMENT OF MECHANICAL ENGINEERING**

**Assignment Answer Sheet**

Name of the Student : p. Nandha Kumar

AU Register Number: 811216114023

Assignment – 01			Date of Issue:	03.02.2020	Marks	10
Course code	ME8694	Course Title	Hydraulics and Pneumatics			
Year	III	Semester/Section	VIA	Date of Submission:	07.02.2020	

Q.No	Questions	CO
1	Explain the working Principle of hydraulic press with neat sketch	C313.1
2	Explain with a neat sketch the construction & working principle of Gerotor pump.	C313.1

**Mark Allocation**

Rubrics	Marks Allocated	Marks obtained
Content Quality	6	6
Presentation Quality	2	1
Timely submission	2	2
<b>Total marks</b>	<b>10</b>	<b>9</b>

R. GANESH

Name and Signature of the Faculty Incharge

H/D/Mech

Dr. G. Balakrishnan, M.E., Ph.D.  
Principal

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 IG Valley, Madurai Mani Pondi,  
 Manikandam, Tiruchirappalli-620 012

Register Number: [ ]



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<b>Internal Assessment Exam – II - Key Notes</b>		<b>Date</b>			<b>Marks</b>	<b>50</b>
<b>Course code</b>	ME 8694	<b>Course Title</b>	Hydraulics and Pneumatics			
<b>Regulation</b>	2017	<b>Duration</b>	90 minutes	<b>Academic Year</b>	2020-21	
<b>Year</b>	III	<b>Semester</b>	VI	<b>Department</b>	Mechanical Engg	

**COURSE OUTCOMES**

<b>CO1:</b>	Explain the Fluid power and operation of different types of pumps
<b>CO2:</b>	Summarize the features and functions of Hydraulic motors, actuators and Flow control valves.
<b>CO3:</b>	Explain the different types of Hydraulic circuits and systems.
<b>CO4:</b>	Explain the working of different pneumatic circuits and system
<b>CO5:</b>	Summarize the various trouble shooting methods and applications of hydraulic and pneumatic systems.
<b>CO6:</b>	Explain the applications of Hydraulic and Pneumatic systems.

Q.No.	Question	CO	BTS		
<b>PART A</b>					
<b>(Answer all the Questions 10 x 2 = 20 Marks)</b>					
1	<p>What is the function of pump in hydraulic system?</p> <p>Ans: In a hydraulic system, a pump converts mechanical energy into hydraulic energy. Mechanical energy is given to the pump via a prime mover such as an electric motor.</p>	CO313.2	K1		
2	<p>What is the purpose of baffle plate in a fluid reservoir?</p> <p>Ans: • The baffle plate is provided between the pump's inlet and return lines for preventing the continuous recirculation of the same fluid into the system. • So the foreign particles from the returning fluid are allowed to settle down without any disturbance and the trapped air is allowed to escape.</p>	CO313.2	K1		
3	<p>State the reason why positive displacement pumps found suitable for fluid power application.</p> <p>Ans: Positive displacement pump has minimal internal leakage (slippage) due to which it can sustain the load put on it from the actuator. Hence it found suitable applications in Fluid power engineering.</p>	CO313.2	K1		
4	<p>Distinguish between positive and variable displacement pumps.</p> <p>Ans:  <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <b>SI. No. POSITIVE DISPLACEMENT</b>                      1. The positive displacement pumps discharge fixed quantity of fluid into the hydraulic system per Revolution of pump shaft rotation.                      2. Ex. Gear pumps, Vane pumps Ex. Unbalanced Vane pump                 </td> <td style="width: 50%; vertical-align: top;"> <b>VARIABLE DISPLACEMENT</b>                      In variable displacement pumps, the pump displacement can be varied by an arrangement.                 </td> </tr> </table> </p>	<b>SI. No. POSITIVE DISPLACEMENT</b> 1. The positive displacement pumps discharge fixed quantity of fluid into the hydraulic system per Revolution of pump shaft rotation. 2. Ex. Gear pumps, Vane pumps Ex. Unbalanced Vane pump	<b>VARIABLE DISPLACEMENT</b> In variable displacement pumps, the pump displacement can be varied by an arrangement.	CO313.2	K2
<b>SI. No. POSITIVE DISPLACEMENT</b> 1. The positive displacement pumps discharge fixed quantity of fluid into the hydraulic system per Revolution of pump shaft rotation. 2. Ex. Gear pumps, Vane pumps Ex. Unbalanced Vane pump	<b>VARIABLE DISPLACEMENT</b> In variable displacement pumps, the pump displacement can be varied by an arrangement.				
5	<p>Name two designs of vane pumps?</p> <p>Ans: a. Unbalanced Vane Pump b. Balanced Vane Pump</p>	CO313.2	K1		
6	<p>How can you vary the displacement in an axial piston pump?</p> <p>Ans: • The variable displacement in an axial piston pump can be achieved by altering the angle of the swash plate. • Because in axial pumps, this swing angle determines the piston stroke and hence the pump displacement.</p>	CO313.2	K1		
7	<p>Define the volumetric efficiency of the pump</p>	CO313.2	K1		

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No	Name	Health Issue	Test Done	advised to
24	Vincent Kumar	Health Issue	27	advised to lose weight
27	Ramkrishna R	Health Issue	27	27
30	Senthil Kumar B	Attended family function	27	advised to stop
32	Janak Selvan	Health issue	27	advised to lose some weight
34	vasudevan A	Health Issue	27	27
36	Vishwanath	Attended family function	27	advised to stop
301	Balashankar	Attended family function	27	advised to stop

*R. Ganesan*  
Secretary to the Board

*(Signature)*

*R. Raj*  
Secretary to the Board

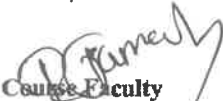
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Manikandam, Trichy-620 012.

	<p>Ans: It indicates the amount of leakage within the pump. This involves considerations such as manufacturing tolerances and flexing of the pump casing under the design pressure operating conditions.</p> $\eta_v = \frac{\text{Actual Flow rate produced by pump}}{\text{Theoretical flow rate the pump should produce}} \times 100 = \frac{Q_A}{Q_T}$		
8	<p>Define the mechanical efficiency of a pump?</p> <p>Ans: It indicates the amount of energy losses that occur due to reasons other than leakages. This includes friction in bearings and between other mating parts. It also includes energy losses due to fluid turbulence.</p> $\eta_m = \frac{\text{Theoretical Power required to operate the pump}}{\text{Actual power delivered to the pump}} \times 100 = \frac{P_{QT}}{2\pi NT}$	CO313.2	K1
9	<p>What are the types of hydraulic actuators?</p> <p>Ans:</p> <ul style="list-style-type: none"> <li>Hydraulic Cylinders - Linear motion</li> <li>Hydraulic Motors - Continuous rotary motion</li> <li>Semi rotary Actuators - Limited angle movement</li> </ul>	CO313.2	K1
10	<p>What are the advantages of double acting cylinder over single acting cylinder?</p> <p>Ans:</p> <ul style="list-style-type: none"> <li>In a single acting cylinder, the fluid is fed only on one side. Hence the cylinder can produce work in one direction only. But the fluid moves the piston in two directions in double acting cylinder, so they perform work in both directions.</li> <li>In a single acting cylinder, the stroke is limited by the compressed length of the spring. But the stroke is unlimited in a double acting cylinder</li> </ul> <p>While the piston moves forward in a single acting cylinder, the fluid has to overcome the pressure of the spring and hence some power is lost before the actual stroke of the piston starts. But this problem is not present in a double acting cylinder.</p>	CO313.2	K1
<b>PART B</b> (Answer all the Questions 2 x 10 = 20 Marks)			
11a	<p>Explain how positive displacement pumps build pressure compared to rotor dynamic pumps. What are the advantages of positive displacement pump?</p> <p>Ans: Diagram – 5 marks Description &amp; formulae – 5 marks</p>	CO313.2	K2
OR			
11b	<p>A gear pump has 75 mm outside diameter, 50mm inside diameter and 25mm width. If the volumetric efficiency is 95 % at rated pressure what is the actual flow rate? N=1200 rpm.</p> <p>Ans: Diagram – 5 marks Description &amp; formulae – 5 marks</p>	CO313.2	K2
12a	<p>Enumerate the working principles of balanced vane pump with neat sketch. Also write the advantages and disadvantages?</p> <p>Ans: Diagram – 5 marks Description &amp; formulae – 5 marks</p>	CO313.2	K2
OR			
12b	<p>Explain the working of a radial piston pump with a neat sketch. Also write an expression for the theoretical displacement per revolution of the crank?</p>	CO313.2	K2


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	Ans: Diagram – 5 marks Description & formulae – 5 marks		
<b>PART C</b> (Answer all the Questions 1 x 10 = 10 Marks)			
13a	A rotary vane air motor has a displacement volume of 80 cm <sup>3</sup> /rev and operates at 1750rpm using 700 kPa gauge pressure air. Calculate the standard ml/min rate of consumption and kW power output of the motor. Assume the temperature remains constant? Ans: Diagram – 5 marks Description & formulae – 5 marks	CO313.2	K2
OR			
13b	If a hydraulic circuit has pump inlet and exit ports interchanged, unloading valve given internal pilot .What happens? Explain. Ans: Diagram – 5 marks Description & formulae – 5 marks	CO313.2	K2

  
Course Faculty  
(Name / Sign / Date)

  
HOD  
(Name / Sign / Date)

  
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# Indra Ganesan College of Engineering

Madurai Main Road(NH-45B),Manikandam,Tiruchirappalli-620012

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IGCE/EXAMCELL/IA/2020-21/Even/UT/006

RE MODEL EXAM-I

Test Time: (AN) 2.00 pm to 5.00 pm

DATE	YEAR/ SESSION	22.03.2021	23.03.2021	24.03.2021	25.03.2021	26.03.2021	27.03.2021
BRANCH	SESSION	AN	AN	AN	AN	AN	AN
CIVIL	II	CE8401	CE8402	MA8491	CE8491	CE8404	CE8403
	III	CE8601	CE8602	CE8603	CE8604	EN8592	CE8005
	IV	GE8076		CE8022			
CSE	II	CS8491	CS8493	CS8451	CS8494	MA8402	CS8492
	III	CS8603	CS8691	CS8601	CS8602	CS8651	CS8075
	IV	GE8076		CS8080			
EEE	II	EE8401	EE8451	MA8491	EE8402	IC8451	EE8403
	III	EE8601	EE8691	EE8602	EE8661	EE8002	EE8005
	IV	EE8015		EE8018			
ECE	II	EC8491	MA8451	EC8451	GE8291	EC8453	EC8452
	III	MG8591	EC8691	EC8004	EC8652	EC8095	EC8651
	IV	EC8072		EC8094			
MECH	II	ME8493	ME8491	ME8492	MA8452	ME8451	CE8395
	III	ME8651	ME8691	ME8091	ME8693	ME8694	ME8692
	IV	MG8591		ME8094			
IT	II	CS8491	CS8493	CS8451	GE8291	MA8391	CS8492
	III	CS8091	CS8592	IT8601	IT8076	CS8092	IT8602
	IV	GE8076		IT8078			

  
EXAM CELL COORDINATOR

  
PRINCIPAL

Copy To:

1. The Director for favor of kind information
2. The Principal (file copy)
3. All HoDs :request to circulate among their faculty members
4. Exam cell file
5. Notice Board (Lab Block)

  
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## IQAC Academic Audit Form

ACADEMIC YEAR: 2020-2021 EVEN SEMESTER

Name of Department : MECH Year / Sem: III / VI No. of Students Registered : 48

Details of Examination : IA Test-2

S No	Course Code	List of Reg No Verified	Course Log Book Verified (Y/N)	Course File Verified (Y/N)	No of students Attended	No of Absentees	No of Failures	Pass %	Remarks
1	ME 8694	811216114001	Y	Y	48	-	12	75	
2		811216114002	Y	Y					
3		811216114003	Y	Y					
4		811216114004	Y	Y					
5		811216114005	Y	Y					
6		811216114006	Y	Y					
7		811216114007	Y	Y					
8		811216114008	Y	Y					
9		811216114009	Y	Y					
10		811216114010	Y	Y					
11		811216114011	Y	Y					

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12	811216114012	Y	Y
13	811216114013	Y	Y
14	811216114014	Y	Y
15	811216114015	Y	Y
16	811216114016	Y	Y
17	811216114017	Y	Y
18	811216114018	Y	Y
19	811216114019	Y	Y
20	811216114020	Y	Y
21	811216114021	Y	Y
22	811216114022	Y	Y
23	811216114023	Y	Y
24	811216114024	Y	Y
25	811216114025	Y	Y
26	811216114026	Y	Y
27	811216114027	Y	Y

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28	81216114028	Y	Y
29	81216114029	Y	Y
30	81216114030	Y	Y
31	81216114031	Y	Y
32	81216114032	Y	Y
33	81216114033	Y	Y
34	81216114034	Y	Y
35	81216114035	Y	Y
36	81216114036	Y	Y
37	81216114037	Y	Y
38	81216114301	Y	Y
39	81216114302	Y	Y
40	81216114304	Y	Y
41	81216114305	Y	Y
42	81216114701	Y	Y
43	81216114702	Y	Y

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IGCE/EXAMCELL/IA/2020-21/Even/UT/001

## INTERNAL ASSESSMENT TEST - I

Test Time: (FN) 11.30 am to 1.00 pm - (AN) 3.30 pm to 5.00 pm

DATE	YEAR / SESSION	28.12.2020		30.12.2020		02.01.2021	
		FN	AN	FN	AN	FN	AN
CIVIL	II	CE8401	CE8402	MA8491	CE8491	CE8404	CE8403
	III	CE8601	CE8602	CE8603	CE8604	EN8592	CE8005
	IV	GE8076		CE8022			
CSE	II	CS8491	CS8493	CS8451	CS8494	MA8402	CS8492
	III	CS8603	CS8691	CS8601	CS8602	CS8651	CS8075
	IV	GE8076		CS8080			
EEE	II	EE8401	EE8451	MA8491	EE8402	IC8451	EE8403
	III	EE8601	EE8691	EE8602	EE8661	EE8002	EE8005
	IV	EE8015		EE8018			
ECE	II	EC8491	MA8451	EC8451	GE8291	EC8453	EC8452
	III	MG8591	EC8691	EC8004	EC8652	EC8095	EC8651
	IV	EC8072		EC8094			
MECH	II	ME8493	ME8491	ME8492	MA8452	ME8451	CE8395
	III	ME8651	ME8691	ME8091	ME8693	ME8694	ME8692
	IV	MG8591		ME8094			
IT	II	CS8491	CS8493	CS8451	GE8291	MA8391	CS8492
	III	CS8091	CS8592	IT8601	IT8076	CS8092	IT8602
	IV	GE8076		IT8078			

EXAM CELL CO ORDINATOR

PRINCIPAL

COPY TO:

1. The Director for favour of kind information
2. The Principal (file copy)
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5. Notice Board (Lab Block)

Dr. G. Balakrishnan, M.E., Ph.D.,

Principal

Indra Ganesan College of Engineering

IG Valley, Madurai Main Road

Manikandam, Trichy-620 012



**Indra Ganesan College of Engineering**  
Madurai Main Road(NH-45B),Manikandam,Tiruchirappalli-620012  
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**IGCE/EXAMCELL/IA/2020-21/Even/UT/003**

**INTERNAL ASSESSMENT TEST – II**

**Test Time: (FN) 11.30 am to 1.00 pm - (AN) 3.30 pm to 5.00 pm**

DATE	YEAR / SESSION	18.02.2021		19.02.2021		20.02.2021	
		FN	AN	FN	AN	FN	AN
CIVIL	II	CE8401	CE8402	MA8491	CE8491	CE8404	CE8403
	III	CE8601	CE8602	CE8603	CE8604	EN8592	CE8005
	IV	GE8076		CE8022			
CSE	II	CS8491	CS8493	CS8451	CS8494	MA8402	CS8492
	III	CS8603	CS8691	CS8601	CS8602	CS8651	CS8075
	IV	GE8076		CS8080			
EEE	II	EE8401	EE8451	MA8491	EE8402	IC8451	EE8403
	III	EE8601	EE8691	EE8602	EE8661	EE8002	EE8005
	IV	EE8015		EE8018			
ECE	II	EC8491	MA8451	EC8451	GE8291	EC8453	EC8452
	III	MG8591	EC8691	EC8004	EC8652	EC8095	EC8651
	IV	EC8072		EC8094			
MECH	II	ME8493	ME8491	ME8492	MA8452	ME8451	CE8395
	III	ME8651	ME8691	ME8091	ME8693	ME8694	ME8692
	IV	MG8591		ME8094			
IT	II	CS8491	CS8493	CS8451	GE8291	MA8391	CS8492
	III	CS8091	CS8592	IT8601	IT8076	CS8092	IT8602
	IV	GE8076		IT8078			

  
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Manikandam, Trichy-620 012.



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IGCE/EXAMCELL/IA/2020-21/Even/UT/005

## MODEL EXAM-I

Test Time: (AN) 2.00 pm to 5.00 pm

DATE	YEAR / SESSION	08.03.2021	09.03.2021	10.03.2021	11.03.2021	12.03.2021	13.03.2021
BRANCH		AN	AN	AN	AN	AN	AN
CIVIL	II	CE8401	CE8402	MA8491	CE8491	CE8404	CE8403
	III	CE8601	CE8602	CE8603	CE8604	EN8592	CE8005
	IV	GE8076		CE8022			
CSE	II	CS8491	CS8493	CS8451	CS8494	MA8402	CS8492
	III	CS8603	CS8691	CS8601	CS8602	CS8651	CS8075
	IV	GE8076		CS8080			
EEE	II	EE8401	EE8451	MA8491	EE8402	IC8451	EE8403
	III	EE8601	EE8691	EE8602	EE8661	EE8002	EE8005
	IV	EE8015		EE8018			
ECE	II	EC8491	MA8451	EC8451	GE8291	EC8453	EC8452
	III	MG8591	EC8691	EC8004	EC8652	EC8095	EC8651
	IV	EC8072		EC8094			
MECH	II	ME8493	ME8491	ME8492	MA8452	ME8451	CE8395
	III	ME8651	ME8691	ME8091	ME8693	ME8694	ME8692
	IV	MG8591		ME8094			
IT	II	CS8491	CS8493	CS8451	GE8291	MA8391	CS8492
	III	CS8091	CS8592	IT8601	IT8076	CS8092	IT8602
	IV	GE8076		IT8078			

EXAM CELL COORDINATOR

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# INDRA GANESAN COLLEGE OF ENGINEERING

IG Valley, Manikandam, Tiruchirappalli, Tamil Nadu - 620 012, India

(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)

## DEPARTMENT OF MECHANICAL ENGINEERING

### ROOT CAUSE ANALYSIS

Name of the Faculty : Mr. R. Ganesh  
Degree & Program : B.E. Mechanical  
IA Test : IA Test - 2  
Target : 95%

Course Code & Name : ME 8694 - Hydraulics & Pneumatics  
Semester : IV  
University Exam/Month & Year: May/June 2020  
Achieved : 75%

S.NO	ROLL NO	NAME OF THE STUDENT	CAUSES FOR FAILURE	CORRECTIVE ACTION TAKEN	PREVENTIVE ACTION TAKEN
1.	2	Amar Praveen.D	Health Issue	Retest conducted	advised to take care of health
2.	3	Ananda Perumal.P	Health Issue	??	??
3.	4	Chinnappan. A	Health Issue	??	??
4.	8	Dinash Babu.M	Attended family function	??	advised to skip
5.	11	Gunasalan. G	Health Issue	??	advised to take care of health
6.	12	Maniram. S	Attended family function	??	advised to skip
7.	17	Kirathikayan. P	Health Issue	??	advised to take care of health
8.	20	Mahendran. K	Health Issue	??	??

Dr. S. Balakrishnan, M.E., Ph.D.  
Principal  
Indra Ganesan College of Engineering  
IG Valley, Madurai Main Road  
Manikandam, Trichy-620 012.





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IGCE/EXAMCELL/IA/2020-21/Even/UT/002

## INTERNAL ASSESSMENT RETEST - I

Test Time: (FN) 11.30 am to 1.00 pm - (AN) 3.30 pm to 5.00 pm

DATE	YEAR / SESSION	05.01.2021		06.01.2021		07.01.2021	
BRANCH		FN	AN	FN	AN	FN	AN
CIVIL	II	CE8401	CE8402	MA8491	CE8491	CE8404	CE8403
	III	CE8601	CE8602	CE8603	CE8604	EN8592	CE8005
	IV	GE8076		CE8022			
CSE	II	CS8491	CS8493	CS8451	CS8494	MA8402	CS8492
	III	CS8603	CS8691	CS8601	CS8602	CS8651	CS8075
	IV	GE8076		CS8080			
EEE	II	EE8401	EE8451	MA8491	EE8402	IC8451	EE8403
	III	EE8601	EE8691	EE8602	EE8661	EE8002	EE8005
	IV	EE8015		EE8018			
ECE	II	EC8491	MA8451	EC8451	GE8291	EC8453	EC8452
	III	MG8591	EC8691	EC8004	EC8652	EC8095	EC8651
	IV	EC8072		EC8094			
MECH	II	ME8493	ME8491	ME8492	MA8452	ME8451	CE8395
	III	ME8651	ME8691	ME8091	ME8693	ME8694	ME8692
	IV	MG8591		ME8094			
IT	II	CS8491	CS8493	CS8451	GE8291	MA8391	CS8492
	III	CS8091	CS8592	IT8601	IT8076	CS8092	IT8602
	IV	GE8076		IT8078			

  
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Dr. G. Balakrishnan, M.E., Ph.D.,

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Manikandam, Trichy-620 012.



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IGCE/EXAMCELL/IA/2020-21/Even/UT/004

## INTERNAL ASSESSMENT RETEST – II

Test Time: (FN) 11.30 am to 1.00 pm - (AN) 3.30 pm to 5.00 pm

DATE	YEAR / SESSION	24.02.2021		25.02.2021		26.02.2021	
		FN	AN	FN	AN	FN	AN
CIVIL	II	CE8401	CE8402	MA8491	CE8491	CE8404	CE8403
	III	CE8601	CE8602	CE8603	CE8604	EN8592	CE8005
	IV	GE8076		CE8022			
CSE	II	CS8491	CS8493	CS8451	CS8494	MA8402	CS8492
	III	CS8603	CS8691	CS8601	CS8602	CS8651	CS8075
	IV	GE8076		CS8080			
EEE	II	EE8401	EE8451	MA8491	EE8402	IC8451	EE8403
	III	EE8601	EE8691	EE8602	EE8661	EE8002	EE8005
	IV	EE8015		EE8018			
ECE	II	EC8491	MA8451	EC8451	GE8291	EC8453	EC8452
	III	MG8591	EC8691	EC8004	EC8652	EC8095	EC8651
	IV	EC8072		EC8094			
MECH	II	ME8493	ME8491	ME8492	MA8452	ME8451	CE8395
	III	ME8651	ME8691	ME8091	ME8693	ME8694	ME8692
	IV	MG8591		ME8094			
IT	II	CS8491	CS8493	CS8451	GE8291	MA8391	CS8492
	III	CS8091	CS8592	IT8601	IT8076	CS8092	IT8602
	IV	GE8076		IT8078			

  
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INDRA GANESAN COLLEGE OF ENGINEERING  
 IG Valley, Manikandam, Tiruchirappalli, Tamil Nadu - 620 012, India  
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STUDENT FEEDBACK ON FACULTY  
 THEORY COURSE

ACADEMIC YEAR: 2020 - 2021 (online mode) SEMESTER VI (Even)

Name of Department : MECH Year / Sem: III / VI

Faculty Name: Mr. R. Ganesh

Subject Code & Name: ME88694 - Hydraulics & Pneumatics

S.No.	QUESTIONS	Percentage					Total Weight age	Not Satisfactory	Somewhat Satisfactory	Satisfactory	Very Good	good
		5	4	3	2	1						
1.	Delivery of Lectures by Interactive Communication	✓	✓	✓	✓	✓	0	1	2	3	✓	
2.	Use of Teaching Aids and ICT	✓	✓	✓	✓	✓					✓	
3.	Level of Preparedness & Knowledge Level	✓	✓	✓	✓	✓					✓	
4.	Involvement in mentoring and guiding	✓	✓	✓	✓	✓					✓	
5.	Effective Time management	✓	✓	✓	✓	✓					✓	
6.	Is the teacher completing syllabus as per lecture schedule?	✓	✓	✓	✓	✓					✓	
7.	Is the teacher distributing answer scripts of students as per schedule?	✓	✓	✓	✓	✓					✓	
8.	Is the teacher addressing grievances on answer scripts of IA while distributing?	✓	✓	✓	✓	✓					✓	
9.	Is the teacher covering content beyond syllabus (CBS)?	✓	✓	✓	✓	✓					✓	
10.	Is the teacher punctual to class?	✓	✓	✓	✓	✓					✓	

P. Senthil

HoD/ MECHANICAL

IQAC Co-ordinator

Principal

Dr. G. Balakrishnan, M.E., Ph.D.,  
 Principal  
 Indra Ganesan College of Engineering  
 IG Valley, Madurai Main Road  
 Manikandam, Trichy-620 012.



**STUDENT FEEDBACK ON FACULTY THEORY COURSE**

ACADEMIC YEAR: 2020-21 SEMESTER Even Sem  
 Name of Department: MECH Year/Sem: III/VI  
 Faculty Name: Mr. R. Ganesk  
 Student Name: S. Abdul Yasin

S.No.	QUESTIONS	RATING				
		5	4	3	2	1
1	Delivery of Lectures by Interactive Communication	✓				
2	Use of Teaching Aids and ICT		✓			
3	Level of Preparedness & Knowledge Level		✓			
4	Involvement in mentoring and guiding		✓			
5	Effective Time management		✓			
6	Is the teacher completing syllabus as per lecture schedule?	✓				
7	Is the teacher distributing answer scripts of students as per schedule?	✓				
8	Is the teacher addressing grievances on answer scripts of IA while distributing?	✓				
9	Is the teacher covering content beyond syllabus (CBS)?	✓				
10	Is the teacher punctual to class?	✓				

HOD/MECHANICAL: *[Signature]*  
 IQAC Co-ordinator: *[Signature]*  
 Principal: *[Signature]*

Dr. G. Balakrishnan, M.E., Ph.D.,  
 Principal  
 Indra Ganesan College of Engineering  
 IG Valley, Madurai Main Road  
 Manikandam, Trichy-620 012.