

## **Program Curriculum**

Jaya Sakthi Engineering College established in 2007, approval of AICTE has been affiliated to ANNA UNIVERSITY. Hence the curriculum/ syllabus as follow:

Department of Mechanical Engineering follows a systematic process in the design and development of the curriculum as per Choice Based Credit System (CBCS), which involves high level of participation, discussion and critical inquiry involving all the stakeholders contributing to the introduction, innovation, and revision of the syllabus. The curriculum have the balance in the composition of Basic Science Courses, Engineering Science Courses, Humanities and Social Science Courses, professional Core, professional Electives, Open Elective, Employability enhancement courses, Basic Life skills and Project Work.

Program Outcomes and Program Specific Outcomes as defined by the program are listed below:-

### **Program Outcomes (POs)**

Engineering Graduates will be able to:

- PO-1. Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO-2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO-3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety & the cultural, societal & environmental considerations.
- PO-4. Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO-5. Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern eng. & IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

- PO-6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- PO-7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts & demonstrate the knowledge of, & need for sustainable development.
- PO-8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO-9. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO-10. Communication:** Communicate effectively on complex engineering activities with the engineering community & with society at large, such as, being able to comprehend and write effective reports & design doc., make effective presentations & give & receive clear instructions.
- PO-11. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO-12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### **Program Specific Outcomes (PSOs)**

- PSO -1.** To build the Identification, Fabrication, Testing operation of basic mechanical systems /process.
- PSO -2.** To analyze the complex engineering problems in the area of thermal, Design and Manufacturing Engineering.
- PSO -3.** To apply moral and ethical principles to the engineering career and adapt to technological and environmental developments.

The composition of the curriculum Regulation 2017 & 2021 for the program of B.E (Bachelor of Engineering) in Mechanical Engineering is shown in table .1

Table 1. Credit Contribution of Basic Curricular Components

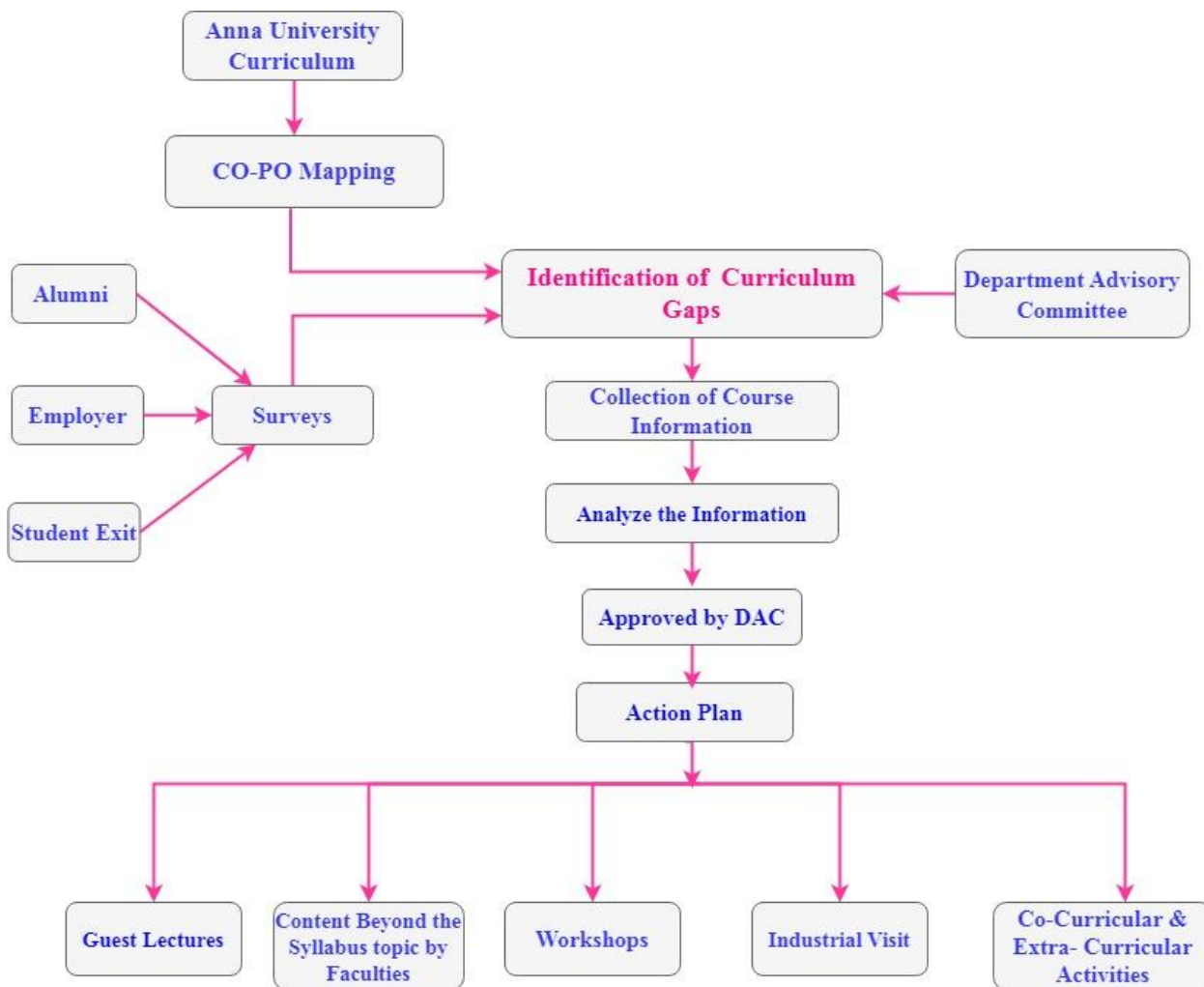
Curricular Components			Percentage Contribution in (%)			Mapped PO's
SI No	Course Category	Code	AICTE Model Curricular	Regulation 2017	Regulation 2021	
1	Humanities and Social Sciences	HS	6.25	7.40	7.78	PO-7,PO-8,PO-12
2	Basic Sciences	BS	14.58	14.28	14.97	PO-1,PO-2,PO-3, PO-4,PO-6,PO-6, PO-12
3	Engineering Sciences	ES	14.59	17.98	14.37	PO-1, PO-12
4	Professional Core	PC	31.25	40.74	33.53	PO-1, PO-2, PO- 3, PO-4, PO-5, PO-6, PO-8, PO-9, PO-10, PO-11, PO12
5	Professional Electives	PE	12.5	10.05	12.57	PO-1, PO-2, PO- 3, PO-4, PO-5, PO-6, PO-8, PO-9, PO-10, PO-11, PO12
6	Open Electives	OE	6.25	3.17	7.18	PO-1, PO-2, PO-3 PO-8, PO-10, PO12
7	Mandatory Courses	MC	6.25	0	0	PO-1, PO-2, PO-3 PO-8, PO-10, PO12
8	Employability Enhancement Courses	EEC	8.33	7.6	7.78	PO-1, PO-3, PO-4 PO-5, PO-8, PO-9 PO-10, PO-11, PO12

Table 1 depicts that the university recommended curriculum maintains the balance in the

composition of various basic curricular components. However, it is necessary that the student's learning outcome should be in consonance, to the extent possible, with the current academic scenario in the relevant field of engineering and with the needs of the relevant industry.

## 2 Process used to identify extent of compliance of university curriculum for attaining POs & PSOs

### The curriculum gaps for the attainment of defined Pos & PSOs



**Fig.2 Process to identify gap in the syllabus**

The gaps are identified using the following methods

1. Alumni Survey
2. Employer Survey

3. Student Exit Survey
4. DAC

Different surveys are conducted at different frequencies from different stakeholders of the program. Two survey forms and samples of surveys taken are shown.

Process to identify curricular gaps for courses through surveys:

1. Alumni Survey
  - Measures the extent to which past students believe that they have achieved study results at the program level.
  - Overall program satisfaction.
  - Overall satisfaction with the program delivery.
  - Information on current professional or academic status.
2. Employers Survey
  - Provides general information on current industry trends.
  - Desirable graduate attributes
  - Overall perceptions of program quality
  - Strengths and expectations of graduates.
  - Overall satisfaction with the program delivery.
3. Exit Students Survey
  - Measures quality of the program and satisfaction with curriculum.
  - An overall program delivery.
4. DAC survey
  - Provides general information on the quality of the program.
  - Comparison of syllabus on current and previous syllabus
  - Discussion about industry –institute interaction

Table 2 Details of the Curriculum gaps and their implementation

<b>Academic Year 2022-2023 ODD SEM</b>		
<b>II YEAR III SEM –Regulation 2021</b>		
<b>S.No</b>	<b>Content Beyond syllabus</b>	<b>Proposed Actions</b>
1	<b>Course Name:CE3391 / Fluid Mechanics and Machinery</b>	
	Velocity Triangles for Reciprocating Pump	Seminar
2	<b>Course Name:ME3391 / Engineering Thermodynamics</b>	
	Air Standard Power cycles	Guest Lecture
<b>III YEAR V SEM - Regulation 2017</b>		
<b>S.No</b>	<b>Content Beyond syllabus</b>	<b>Proposed Actions</b>
3	<b>Course Name: ME8593 / Design of Machine Elements</b>	
	Design of Universal Joints	Guest Lecture
4	<b>Course Name: ME8594 / Dynamics of Machines</b>	
	Vibration Measurement	Seminar
<b>IV YEAR VII SEM –Regulation 2017</b>		
<b>S.No</b>	<b>Content Beyond syllabus</b>	<b>Proposed Actions</b>
5	<b>Course Name: ME8791 / Mechatronics</b>	
	Car Barrier used in Mechatronics System	Guest Lecture
6	<b>Course Name: ME8792 / Power Plant Engineering</b>	
	Waste Heat Recovery System	Seminar
7	<b>Course Name: OML 751/ Testing of Materials</b>	
	Condition Monitoring in Vibration	Guest Lecture
8	<b>Course Name: ME 8077 / Total Quality Management</b>	
	TQM Framework	Seminar
<b>Academic Year 2021-2022</b>		
<b>II YEAR Regulation 2017</b>		
<b>S.No</b>	<b>Content Beyond syllabus</b>	<b>Proposed Actions</b>
1	<b>Course Name:CE8394 / Fluid Mechanics and Machinery</b>	
	Buoyancy and Floatation	Seminar
2	<b>Course Name: ME8391 / Engineering Thermodynamics</b>	
	Exhaust gas Analysis	Seminar
3	<b>Course Name:ME8451 / Manufacturing Technology - II</b>	
	Special Attachment in Lathe	Workshop
4	<b>Course Name:CE8395 / Strength of Materials for Mechanical Engineers</b>	
	Deformation in Thick Spherical Shell	Guest Lecture
<b>III YEAR Regulation 2017</b>		

S.No	Content Beyond syllabus	Proposed Actions
5	<b>Course Name: ME8593 / Design of Machine Elements</b>	
	Design of Universal Joints	Webinar
6	<b>Course Name: ME8594 / Dynamics of Machines</b>	
	Vibration Measurement	Webinar
7	<b>Course Name : ME8692 / Finite Element Analysis</b>	
	Shape function of higher Order Elements	Guest Lecture
8	<b>Course Name : ME8693 / Heat and Mass Transfer</b>	
	General 3D Equation of heat conduction	Guest Lecture
<b>IV YEAR –Regulation 2017</b>		
S.No	Content Beyond syllabus	Proposed Actions
9	<b>Course Name: ME8791 / Mechatronics</b>	
	Car Barrier used in Mechatronics System	Webinar
10	<b>Course Name: ME8792 / Power Plant Engineering</b>	
	Waste Heat Recovery System	Webinar
11	<b>Course Name: OML 751/ Testing of Materials</b>	
	Condition Monitoring in Vibration	Guest Lecture
12	<b>Course Name: ME 8077 / Total Quality Management</b>	
	Six Sigma	Guest Lecture
<b>Academic Year 2020-2021</b>		
<b>II YEAR Regulation 2017</b>		
S.No	Content Beyond syllabus	Proposed Actions
1	<b>Course Name: CE8394 / Fluid Mechanics and Machinery</b>	
	Buoyancy and Floatation	Webinar
2	<b>Course Name: ME8391 / Engineering Thermodynamics</b>	
	Exhaust gas Analysis	Webinar
3	<b>Course Name: ME8451 / Manufacturing Technology - II</b>	
	Special Attachment in Lathe	Webinar
4	<b>Course Name: CE8395 / Strength of Materials for Mechanical Engineers</b>	
	Deformation in Thick Spherical shell	Webinar
<b>III YEAR Regulation 2017</b>		
S.No	Content Beyond syllabus	Proposed Actions
5	<b>Course Name: ME8593 / Design of Machine Elements</b>	
	Design Procedure of Universal Joints	Webinar
6	<b>Course Name: ME8594 / Dynamics of Machines</b>	
	Vibration Measurement	Webinar
7	<b>Course Name : ME8692 / Finite Element Analysis</b>	
	Shape function of higher Order Elements	Webinar
8	<b>Course Name : ME8693 / Heat and Mass Transfer</b>	
	Green House Effect	Webinar

IV YEAR – Regulation 2017		
S.No	Content Beyond syllabus	Proposed Actions
9	Course Name: ME8791 / Mechatronics	
	Car Barrier used in Mechatronics System	Webinar
10	Course Name: ME8792 / Power Plant Engineering	
	Waste Heat Recovery System	Webinar
11	Course Name: OML 751/ Testing of Materials	
	Condition Monitoring in Vibration	Webinar
12	Course Name: ME 8077 / Total Quality Management	
	Quality Function Deployment	Webinar

### 3. List the curricular gaps for the attainment of defined POs and PSOs

#### LIST OF CURRICULAR GAPS IDENTIFIED FROM DIFFERENT SOURCES:

Table3. Curricular Gaps (R-2017)

REGULATION 2017					
Sl.No	Domain	Course	Additional Cos(Gaps)	Relevance to POs/PSOs	Source of Identification
1	Professional Core	Dynamics of Machines	Identify new trends in vibration sensor and its application	PO12/ PSO1, PSO2 , PSO3	Alumni Survey
2	Professional Core	Design of Machine Elements	Identify the new material implementation in automotive field	PO12/ PSO1, PSO2, PSO3	Alumni Survey
3	Open Elective	Testing of Materials	Distinguish the latest trends in materials used in industrial application	PO12/ PSO1, PSO2, PSO3	Employer Survey
4	Professional Elective	Non Destructive Testing and Evaluation	Distinguish the latest trends in materials testing methods	PO12/ PSO1, PSO2, PSO3	Employer Survey
5	Professional Core	Finite Element Analysis	Identify new trends for analyzing non linear systems	PO12/ PSO1, PSO2, PSO3	Student Exit Survey



### 3. State the delivery details of the content beyond the syllabus for the attainment of POs& PSOs

#### Steps taken to get identified gaps included in the curriculum.

**Table 4. Steps taken for attaining the Gaps identified**

Sl. No.	Additional Cos(Gaps)	Name of the Course/Year / Sem	Date of Step Taken	Explanation	PO/ PSOs	Submitted to
1.	Familiarize with the Analysis Tool.	Finite Element Analysis / III / VI	07.02.2022	Requested to include various Design Analysis Techniques	PO1, PO2, PO3, PO4, PO5, PSO1, PSO2, PSO3	Centre for academic research, Anna University Chennai.
2.	Publicize with the Analysis Tool.	Dynamics of Machines / V/ III	18.07.2021	Requested to include various Design Analysis Techniques	PO1, PO2, PO3, PO4, PO5, PSO1, PSO2, PSO3	Centre for academic research, Anna University Chennai.

### 2 Delivery details of content beyond syllabus:

The following additional activities have been initiated by the department of Mechanical Engineering to enhance the attainment of the POs and PEOs.

- a) Additional experiments in laboratories
- b) Industrial Internships
- c) Planning of Industrial Visits/Tours
- d) Awareness Programs
- e) Co-Curricular Activities
- f) Online Certification courses
- g) Activities under Professional bodies

## 2. Mapping of content beyond syllabus with the POs &PSOs

**Table 5.** Mapping content beyond syllabus with Action Taken

ACADEMIC YEAR 2022-2023						
S. No	GAP	ACTION TAKEN	DD/MM/YY	RESOURCE PERSON WITH DESIGNATION	TOTAL NUMBER OF STUDENTS	RELEVANCE TO PO'S, PSO'S
1	Velocity Triangles of Reciprocating Pump	Seminar on pump classification	18.08.2022	Dr.S.Ramadoss Professor Tiruvallur College of Engineering & Technology Vandavasi	38	1,2,3,4,5,9,12 & 1,2,3
2	Air standard Power cycles	Guest Lecture on Engineering Thermodynamics	20.08.2022	Dr.S.Ramesh Professor Sankara Engineering College Kancheepuram	38	1,2,3,4,5,9,12 & 1,2,3
3	Design of Universal Joints	Guest Lecture on Design procedure of Universal Joints	27.08.2022	Dr.K.Prabhu Professor Crescent Institute of Science and Technology Chennai	18	1,2,3,4,5,9,12 & 1,2,3
4	Vibration Measurement	Seminar on Vibration Sensor	03.09.2022	Mrs.C.Chandravathanam Assistant Professor Jaya Engineering College Chennai	40	1,2,3,4,5,9,12 & 1,2,3
5	Car Barrier used in Mechatronics System	Guest Lecture on Mechatronics Systems	08.09.2022	Dr.K.Poiyathappan Professor ARM College of Engineering Chennai	5	1,2,3,4,5,9,12 & 1,2,3

6	Waste Heat Recovery System	Seminar on Waste Heat Recovery System	09.09.2022	Dr.S.Ramesh Professor Sankara Engineering College Kancheepuram	30	1,2,3,4,5,9,12 & 1,2,3
7	Condition Monitoring in Vibration	Guest Lecture on Condition Monitoring	08.10.2022	Mrs.C.Chandravathanam Assistant Professor Jaya Engineering College Chennai	25	1,2,3,4,5,9,12 & 1,2,3
8	TQM Framework	Seminar on TQM	15.10.2022	Dr.A.Saibalaji Professor Crescent Institute of Science and Technology Chennai	30	1,2,3,4,5,9,12 & 1,2,3

### ACADEMIC YEAR 2021-2022

1	Buoyancy and Floatation	Seminar on Fluid Mechanics and its properties	14.08.2021	Dr.K.Poiyathappan Professor ARM College of Engineering Chennai	42	1,2,3,4,5,9,12 & 1,2,3
2	Exhaust gas Analysis	Seminar on Exhaust Gas Analysis in Thermodynamics	20.08.2021	Dr.S.Ramesh Professor Sankara Engineering College Kancheepuram	35	1,2,3,4,5,9,12 & 1,2,3
3	Special Attachment in Lathe	Workshop on Special Purpose Machines	12.02.2022	Dr.S.Ramadoss Professor Tiruvallur College of Engineering & Technology Vandavasi	42	1,2,3,4,5,9,12 & 1,2,3
4	Deformation in Thick Spherical Shells	Guest Lecture on Strength of Materials	19.02.2022	Dr.K.Prabhu Professor Crescent Institute of Science and Technology Chennai	40	1,2,3,4,5,9,12 & 1,2,3

5	Design of Universal Joints	Webinar on Design of Machine Elements	28.08.2021	Dr.A.Saibalaji Professor Crescent Institute of Science and Technology Chennai	30	1,2,3,4,5,9,12 & 1,2,3
6	Vibration Measurement	Webinar on Vibration Analysis	04.09.2021	Mrs.C.Chandravathanam Assistant Professor Jaya Engineering College	35	1,2,3,4,5,9,12 & 1,2,3
7	Shape function of higher Order Elements	Guest Lecture on Finite Element Analysis	05.03.2022	Dr.S.Rajendran Associate Professor Jaya Engineering College	30	1,2,3,4,5,9,12 & 1,2,3
8	General 3D Equation of heat conduction	Guest Lecture on Heat and Mass Transfer	12.03.2022	Dr.M.Shanmugasundaram Professor Adhiparasakthi College of Engineering Kalavai	28	1,2,3,4,5,9,12 & 1,2,3
9	Car Barrier used in Mechatronics System	Webinar on Mechatronics Systems	18.09.2021	Mr.S.Ganesh Assistant Professor, Jaya Institute of Technology	32	1,2,3,4,5,9,12 & 1,2,3
10	Waste Heat Recovery System	Webinar on Power Plant Engineering	24.09.2021	Dr.S.Ashok Kumar Professor Crescent Institute of Science and Technology Chennai	32	1,2,3,4,5,9,12 & 1,2,3
11	Condition Monitoring in Vibration	Guest Lecture on Condition Monitoring	27.09.2021	Mrs.C.Chandravathanam Assistant Professor Jaya Engineering College	30	1,2,3,4,5,9,12 & 1,2,3
12	Density Measurements	Guest Lecture on Material Testing	08.10.2021	Mr.Kevin Bennet Assistant Professor Jaya Engineering College	30	1,2,3,4,5,9,12 & 1,2,3

**ACADEMIC YEAR 2020-2021**

1	Buoyancy and Floatation	Webinar on Pumps	14.08.2020	Dr.K.Prabhu Professor VIT, Vellore	30	1,2,3,4,5,9,12 & 1,2,3
2	Exhaust gas Analysis	Webinar on Exhaust Systems	21.08.2020	Dr.M.Shanmugasundaram Professor Adhiparasakthi College of Engineering Kalavai	29	1,2,3,4,5,9,12 & 1,2,3
3	Special Attachment in Lathe	Webinar on Special Machines	06.02.2021	Dr.K.Poiyathappan Professor ARM College of Engineering Chennai	25	1,2,3,4,5,9,12 & 1,2,3
4	Deformation Thick Spherical Shell	Webinar on Strength of Materials	13.02.2021	Dr.K.Poiyathappan Professor ARM College of Engineering Chennai	30	1,2,3,4,5,9,12 & 1,2,3
5	Design of Universal Joints	Webinar on Design Procedure of Machine	19.09.2020	Dr.A.Saibalaji Professor Crescent Institute of Science and Technology Chennai	30	1,2,3,4,5,9,12 & 1,2,3
6	Vibration Measurement	Webinar on Dynamics of Machines	26.09.2020	Mrs.C.Chandravathanam Assistant Professor Jaya Engineering College	35	1,2,3,4,5,9,12 & 1,2,3
7	Shape function of higher Order Elements	Webinar on Finite Element Analysis	27.02.2021	Dr.S.Rajendran Associate Professor Jaya Engineering College	30	1,2,3,4,5,9,12 & 1,2,3

8	General Equation of heat conduction	3D Webinar on Heat and Mass Transfer	06.03.2021	Dr.M.Shanmugasundaram Professor Adhiparasakthi College of Engineering Kalavai	29	1,2,3,4,5,9,12 & 1,2,3
9	Car used in Mechatronics System	Barrier in Mechatronics Systems	10.10.2020	Mr.S.Ganesh Assistant Professor, Jaya Institute of Technology	42	1,2,3,4,5,9,12 & 1,2,3
10	Waste Recovery System	Heat on Waste Heat Recovery System	17.10.2020	Dr.S.Ashok Kumar Professor Crescent Institute of Science and Technology Chennai	40	1,2,3,4,5,9,12 & 1,2,3
11	Condition Monitoring in Vibration	Guest Lecture on Condition Monitoring	07.11.2020	Mrs.C.Chandravathanam Assistant Professor Jaya Engineering College	41	1,2,3,4,5,9,12 & 1,2,3
12	TQM Framework	Seminar on TQM	14.11.2020	Mr.Kevin Bennet Assistant Professor Jaya Engineering College	42	1,2,3,4,5,9,12 & 1,2,3

### **3. Teaching - Learning Processes**

#### **3.1 Describe Processes followed to improve quality of Teaching & Learning**

The stated Program Educational Objectives (PEOs) serves as guidelines for the graduates to achieve career and professional accomplishments. The PEOs are further transformed into specific student performance and behaviors that demonstrate student learning and skill development as Program Outcomes (POs). All courses have their own course outcomes which are mapped with relevant POs and PSOs. Achieving course outcomes is the direct way of accomplishing program outcomes hence the teaching-learning process and assessment methods are implemented in such a

way to correlate with the POs.

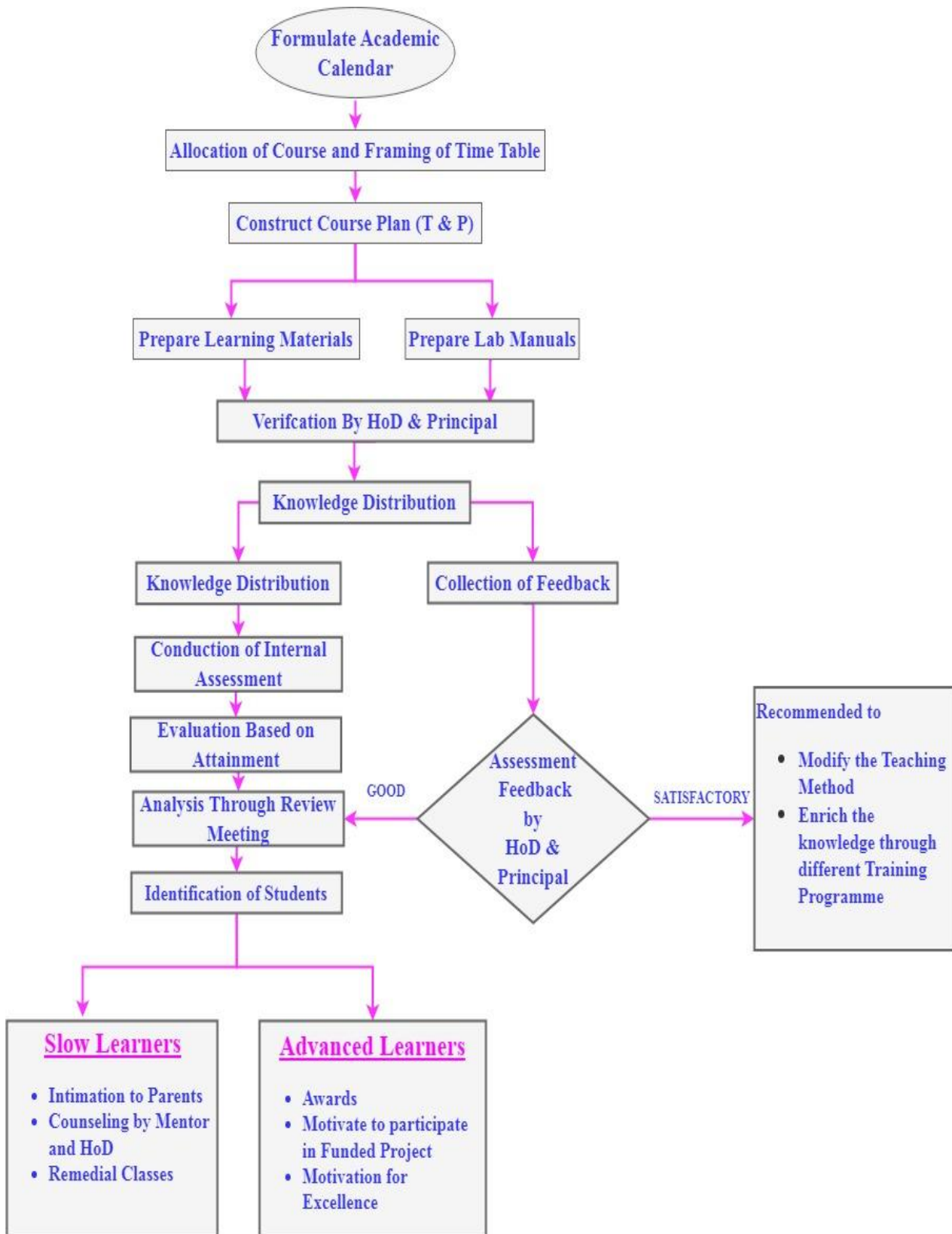
The quality improvement of teaching learning process is customized by the following activities:

- Academic Calendar
- Use of Various instructional methods and pedagogical initiatives
- Methodologies to support weak students and encourage bright students
- Quality of classroom teaching
- Conduct of experiments
- Continuous Assessment in the laboratory
- Student feedback of teaching learning process and actions taken

### **Processes followed to improve quality of Teaching & Learning**

#### **Academic Calendar:**

The academic calendar based on the Anna University guidelines. The academic calendar includes Internal Assessment Tests, Review Meetings, Department Level Co Curricular Activities, Class Committee Meetings, College Level Co-Curricular and Extra Curricular Activities and Holidays. The institution completes the curricular activities within the planned time frame and as per calendar. The last working day of semester and University exam dates are announced by Anna University which is subjective to change. Such necessary changes will be announced at the earliest.



**Fig 3 Processes followed to improve quality of Teaching & Learning**



## Use of various instructional methods and pedagogical initiatives

### Initiative for Faculty in Instructional methods:

#### Induction Program:

- Purpose of the Faculty Induction Programs to help newly recruited faculty adjust and feel comfortable in the new environment, inculcate in them the ethos and culture of the institution.
- Help them build bonds with other faculty members, and expose them to a sense of larger purpose and self-exploration.

**Table 2. Faculty training to improve the Instructional Methods and Pedagogical Initiatives**

Name of the Faculty	Program Title	Topic Discussed	New Pedagogy method / Instrumental method	Year of Training
Dr.S.Mohan	National Level Seminar on “ Outcome based Education”	❖ Best way in teaching methods	Outcome based Education	06.08.2022
Mr.S.Vijayan		❖ Identify the weak areas		
Mr.S.Vignesh		❖ Develop the communication and deliver the message		
Mr.D.Loganathan				
Mr.P.Karthikeyan				
Mr.J.Boopalan				
Mr.J.Sam Prasanna	FDP on “Unconventional machining processes”	❖ Selection of an appropriate machining process for a particular application	Outcome based Education	26.07.2021 to 02.08.2021
Mrs.K.Vijay Karan		❖ properties of the work material and shape to be machined		
Mr.N.Mohamed Feroz				
Mr.S.Vignesh	FDP on “Research Insights	❖ Quantitative and	Hands on Training	13.12.2021 to

Mr.P.Karthikeyan	in Materials and Manufacturing (RIMM 21)”	qualitative study for the main manufacturing processes.		17.12.2021
Mr.D.Loganathan		❖ Applications of different machine tools and engineering materials for product manufacturing		
Mr.P.Karthikeyan	FDP On “Applications Of Artificial Intelligence In Digital Manufacturing”	❖ IoT Concepts, technologies and standards.	Simulation using Python	21.02.2022 to 03.03.2022
Mrs.K.Vijay Karan		❖ Manufacturing advancement in medical technologies		

### Faculty Seminar:

- A seminar is a lecture or presentation delivered on a particular topic or set of topics using the modern teaching aids that are educational in nature to disseminate the knowledge among the faculty members.
- This event will be executed once in a week, thereby their skills of handling the session get enhanced.

### Use of Various Instructional Methods:

The various instructional methodologies followed for each subJSECT

- ICT Supported Learning
- NPTEL
- Seminars
- Tutorials
- Assignments
- Group activity (Quiz & Case study)
- Industrial Training/Visit
- Demo
- Project

## **Pedagogical Initiatives:**

### **1. Interactive classrooms:**

Classes are made more interactive by encouraging student participation as follows:

- Asking questions that involve higher-order thinking skills like diagnostic, challenge, evaluation or prediction questions.
- Asking students to summarize the main points that they learned in class that day and the points they found most confusing.
- Providing course related worksheets for the better understanding of the subject.
- Asking the students to explain the relevance, utility, or significance of the information presented in the class.

### **2. Collaborative learning:**

- Groups comprising a maximum of five to six students are formed in each class.
- One from the group will be designated as the group leader.
- Each group may be assigned tasks by the faculty and a report on the activity will be provided by the respective group leader.
- The focus of the tasks should be on learning new technologies, enhance the knowledge on a particular topic, studying new tools to be in pace with the industry, doing some mini proJSECTs, Presentation etc.

### **3. Rewinding concepts:**

- It is one of the best practices used for improving the technical level of the students.
- Every semester the reopening day of the classes will be scheduled with rewind concept, where the previous semester core papers will be refreshed by the faculty members and some topics will be assigned as seminar for the students.

### **4. Group Discussion:**

- Group discussions are arranged and facilitated by faculty members. Group removes shyness of students and develops their communication skill. It builds their self-confidence. It nurtures them to express their views regarding a subJSECT in a polite manner.
- The recollection of such topics can be effectively carried out by hosting a Group Discussion rather than a lecture course delivery. This approach also paves way to

improvise the communication and technical presentation skills of the students. The debate on topics by students effectively improvises the skills of the students.

- At times, the faculty member summarizes the topic for the non-participants of the group discussions such that they appreciate the need for recollection of the topic.
- At the end of a group discussion, the student members have clear and unbiased thoughts.

#### **5. SEMINAR**

- Seminar plays a vital part of most academic courses and they give opportunity to students to discuss the topics in depth with other students, and with the faculty member.
- Seminar is designed for students to talk about topics in the particular course or lectures in detail.

#### **6. Tutorial:**

- Tutorial classes are conducted to train the students in analytical subJSEctS.
- Facilitators promote self-learning and help the students to develop critical thinking skills in their own.
- Implementation of tutorial classes helps the students to clear analytical papers in University examination.

#### **7. Guest lecturers**

- The unique teaching capability of each faculty member is tapped in this method. The variety of perceptions of the same subJSEct by different experts is experienced by the students. The method effectively works for courses of higher levels where the students get a blend of knowledge on focused topics.

#### **8. Demonstration**

- Learning Engineering demands on demonstrations. Demonstrations need not be working models. This style gives teachers opportunities to incorporate a variety of formats including lectures, multimedia presentations.
- Faculty members choose day-to-day essentials for demonstrations of engineering concepts. The approach is much suitable for basic level engineering courses so that the student recollects the basic concept each and every time he looks at the items.

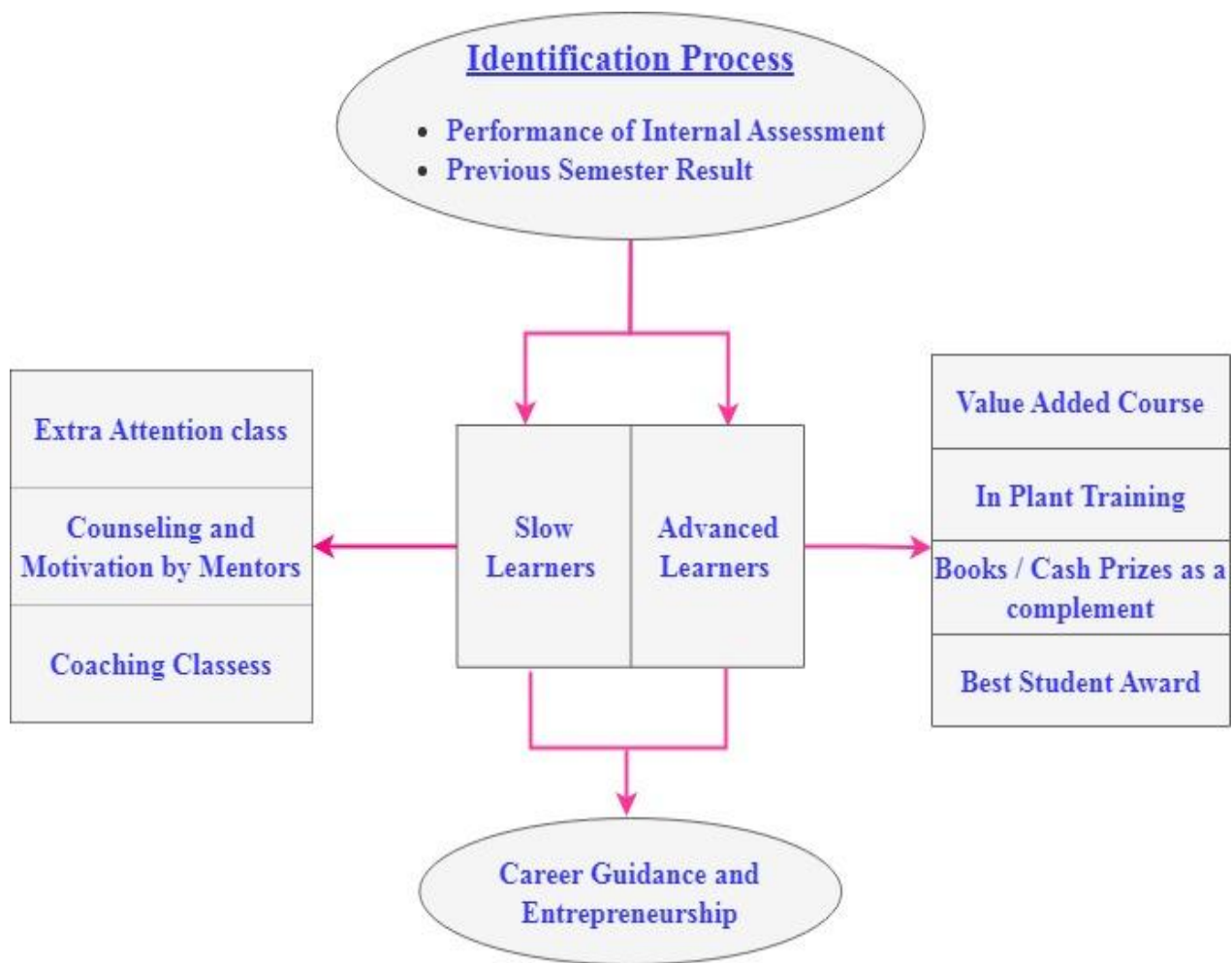
### **Teaching Methodology:**

The quality improvement of teaching learning process is customized by the following activities:

- ❖ Academic Calendar
- ❖ Allocation of Course
- ❖ Course Plan
- ❖ Content delivery process
- ❖ Conduct of assessment
- ❖ Segregations of learners
- ❖ Feedback Process

### **Methodologies to support Slow learners and encourage bright students**

- **Observation of students' performance in class:** Based on the interaction and discussions during class hours and tutorial sessions.
- **Analysis of the performance in assessment tests:** Based on the performance in, internal assessment tests and model examination.
- **Review of previous semester results:** Slow learner and bright students are identified at the beginning of the semester based on the previous semester results (grades obtained and number of arrears etc.). The process of identification of Slow learner and bright students is shown in Figure



**Fig 4 : Identification of students**

**Sample Slow learner Details for CE8395 – Strength of Materials for Mechanical Engineers Year: II  
AY : 2021-2022**

<b>Internal Assessment - I</b>		<b>Internal Assessment - II</b>		<b>Internal Assessment - III</b>	
<b>Total Strength : 10</b>		<b>Total Strength : 05</b>		<b>Total Strength : 03</b>	
112020114003	Prasanna Raj.M	112020114315	Haribabu.O.G	112020114318	John joseph.J
112020114311	Deepak.K	112020114318	John joseph.J	112020114335	Prakash. S
112020114315	Haribabu.O.G	112020114324	Manoj.M.J	112020114351	Vignesh.K
112020114319	Karthik.A	112020114335	Prakash. S		
112020114318	John joseph.J	112020114351	Vignesh.K		
112020114324	Manoj.M.J				
112020114328	Nagarajan. V				
112020114335	Prakash. S				
112020114351	Vignesh.K				

## Conduct of experiments

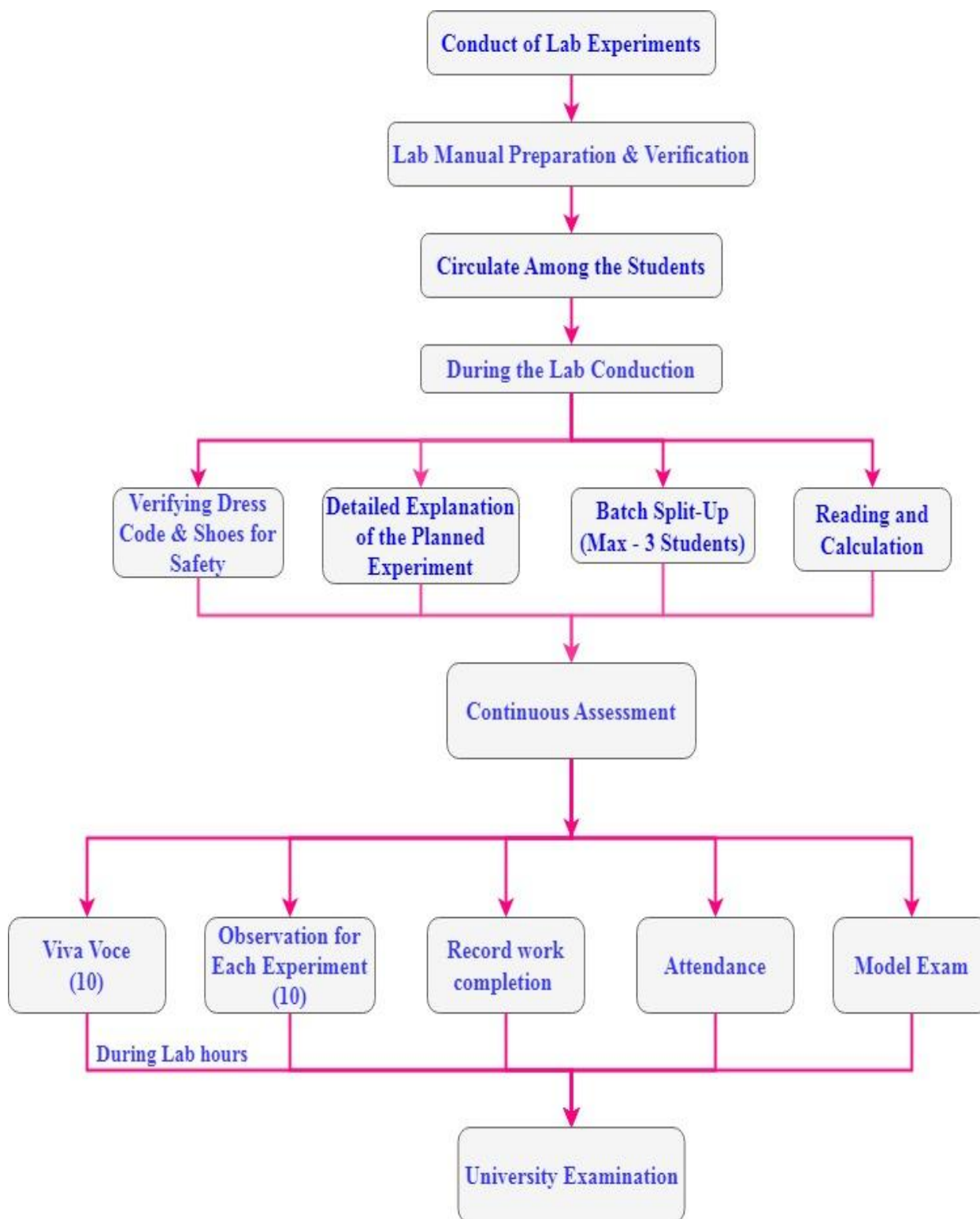


Fig 5 Process of conducting experiment

## **Procedure for the conduct of lab experiments**

### **Maximum Size of Each Batch = 3 Students**

- Check dress code (coat, shoe etc)
- Request to read DOs and DON'Ts displayed in the lab
- Check observation book in detail (circuit diagram, tabulation, program code etc)
- Ask viva question and procedure for the conduct of experiments to each student in a batch
- Ask to connect all the equipment's/apparatus/components as per the circuit diagram and verify the same
- Execute experiment with the help of Faculty members
- Tabulate reading and do the calculations using required formulae
- Evaluate experimental results with calculated results
- Get Approval from Faculty members for assessment
- Discuss with faculty in charge ( if any clarifications)

A lab manual will be maintained in each laboratory.

- Each laboratory include two types of experiments:
- Experiments in the prescribed syllabus.
- Content beyond the syllabus
- All the experiments in the prescribed syllabus will be compulsorily followed and completed before the end of the semester.
- The objective and the procedure for all experiments in the prescribed syllabus will be available in the lab manual.



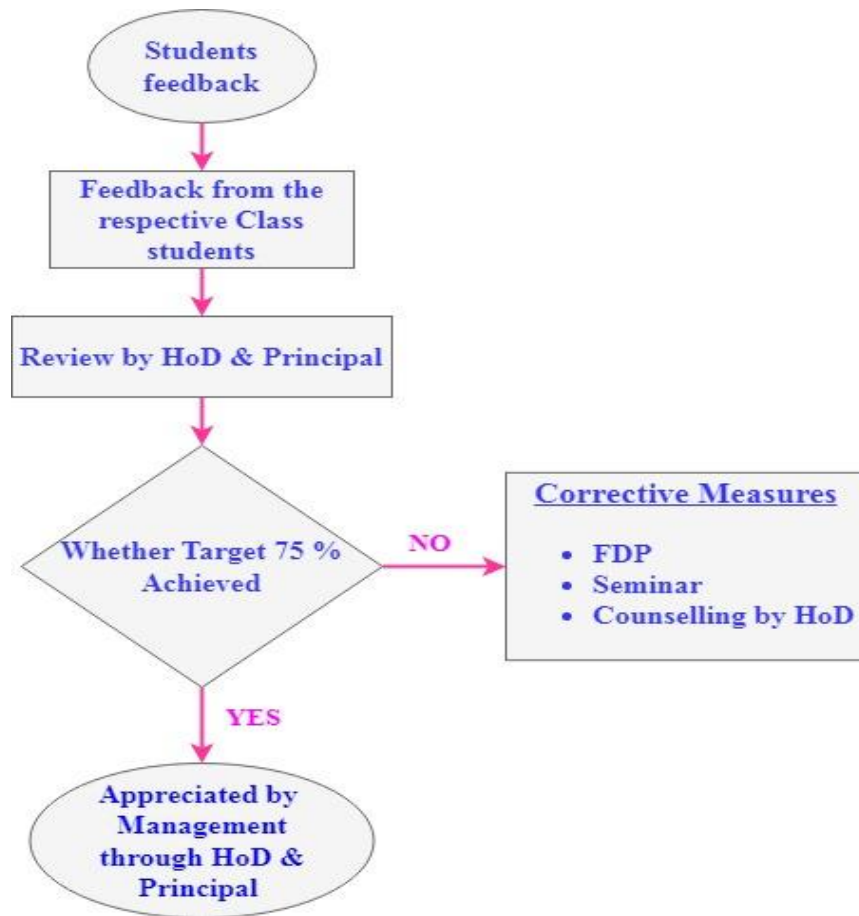
### Continuous Assessment in the laboratory

- Students should record the observations in the lab manual while doing the Experiment
- Students may also analyze the data to plot graph or other related work.
- The final output will be verified by the faculty-in-charge.
- Students should add the details of the experiments done in the laboratory to the prescribed record note-book.
- Students can appear for the University practical Examination only if the record is certified by the faculty-in-charge

Observation	Record	Aim/ Procedure/ Design	Experiment	Result	Viva voice	Cumulative
5	10	10	10	5	10	50

### Student feedback of teaching learning process and actions taken

- Student Feedback is valuable for identifying areas for instructional improvement because simple changes can help motivate students and enhance student learning.
- The feedback of faculty is taken twice in every semester, one at the mid semester and the other at the end of semester.
- The Head of the Department will provide some suggestions for improvement based on the feedback if required.
- The questionnaire is prepared covering all areas of faculty's including ability of teaching, quality of learning, class-handling attitude, acceptance authority by students, etc where students are asked to record their opinion directly
- All the comments by the students in the feedback forms will be communicated to the respective faculty members along with their feedback levels to know their strengths and weaknesses and to enhance their teaching skills.



**Fig. 6 Student feedback of teaching learning process and actions taken**

**Class Committee Meeting:**

Class Committee Meetings are conducted thrice in a semester to convey information regarding academic activity and know the issues of students. It is headed by the Chairperson.

The members of Class Committee meeting are

- a. Chairperson
- b. HOD
- c. Class Advisor
- d. Faculty handling the subjects
- e. Student representatives

Initially Circular is formed with agenda and circulated to faculty and students. On the class

committee day, the points concerning agenda will be discussed. Chairperson will circulate the minutes of the meeting to the subject in-charges. Finally Student representatives are asked to discuss the same in the classroom, in which the actions taken by the department shall transparent to all student. The Action taken for the issues discussed will be intimated to the Principal through HOD.

## **2.2.2 Quality of internal semester Question papers, Assignments and Evaluation**

**A.** Process for Internal Assessment question paper setting and evaluation and effective process implementation

### **INTERNAL SEMESTER QUESTION PAPER**

- All tests are conducted in strict adherence to the academic calendar which will be made with the concurrence of Anna University portal entry.
- The question papers for each subject are set in such a way that it maps to the Course Outcomes of the respective subject.
- For each subject two question paper along with answer key will be prepared by the corresponding course in charges and submitted for the approval by the Head of the Department.
- The question paper will be verified by the Head of the Department and may accept with or without modifications.
- The question paper has to be prepared and submitted well in advance (Two days before the exam commencement period) to the exam cell.
- For the model assessment exam the question papers will be prepared by the experienced and eminent professors from reputed and benchmark institutions.
- The questions asked in each subject are categorized as below:
  - K1 –Remember
  - K2 –Understand
  - K3 –Apply
  - K4 –Analyze
  - K5 –Evaluate

- K6 -Create
- All course outcomes will be achieved through the tests conducted in each semester.
- The above process of conduction of the internal examinations is routed through the Local Exam Cell for proper monitoring and effective implementation.

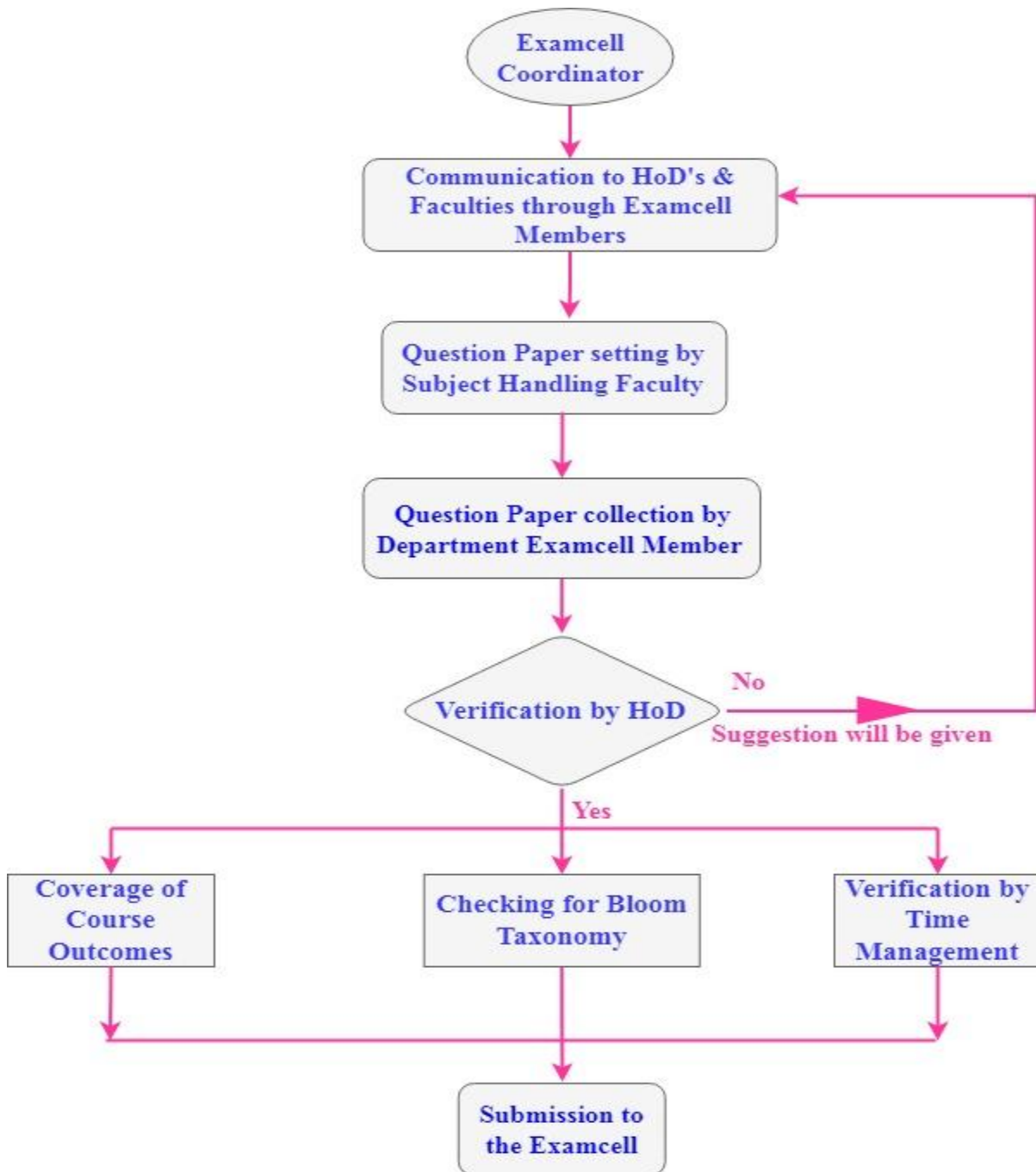


Fig 7 Process of Internal Assessment Question Paper Setting

## B. Evidence of COs coverage in class test / mid-term tests

- Sample of question paper and answer key are shown below which shows the level of course outcomes and knowledge level coverage.
- The marks are awarded for each question thereby we are able to calculate the attainment for the individual Course outcomes.
- The attained marks for the individual course outcomes are used to calculate the attainment level.

### Sample Question Paper with Course Outcome

**Subject Code / Subject Name : ME8593 / Design of Machine Elements**

**Year / Semester : III / V**

**Regulation : 2017**

#### **COURSE OUTCOMES:**

Course Outcomes	DESCRIPTION	BTL
C302.1	To find the influence of steady and variable stresses in machine component design.	K3
C302.2	To apply the concepts of design to shafts, keys and couplings	K3
C302.3	To apply the concepts of design to temporary and permanent joints	K3
C302.4	To apply the concepts of design to energy absorbing members, connecting rod and crank shaft	K3
C302.5	To apply the concepts of design to bearings.	K3

Reg.No														
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**INTERNAL ASSESSMENT EXAMINATION - III (B.E. / B.Tech)**

(2017-Regulation)

**Sub. Code / Sub. Name: ME 8593 - DESIGN OF MACHINE ELEMENTS**

**Degree/Branch/Sem: B.E/MECH / V**

**Time: 3 Hours**

**Date: 30.11.2022**

**Maximum Marks: 100**

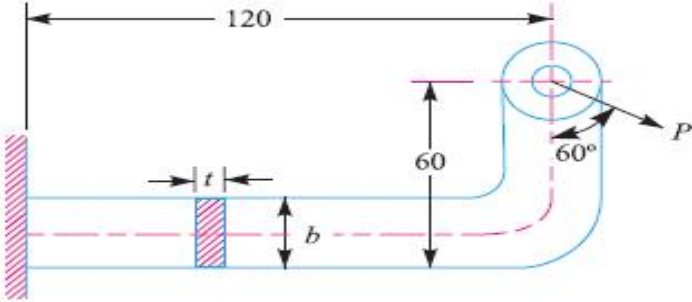
**Answer ALL the questions**

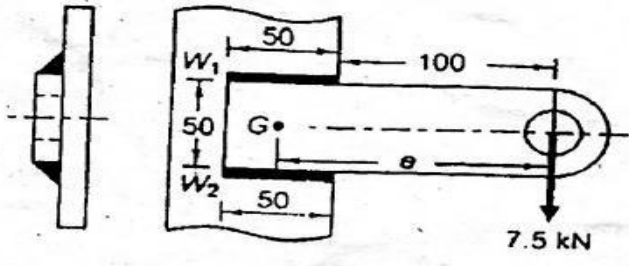
**PART – A (10 x 2 = 20 Marks)**

Q.No.	Questions	KL	CO Attainment
1.	What is an adaptive design?	K1	CO 1
2.	What are preferred numbers?	K1	CO 1
3.	Differentiate between rigid coupling and flexible coupling	K2	CO 2
4.	What are possible modes of failure of the pin in a flexible coupling?	K1	CO 2
5.	Explain how is a bolt designated?	K2	CO 3
6.	List out the materials used for rivets.	K1	CO 3
7.	Define co-efficient of fluctuation of energy of a flywheel.	K1	CO 4
8.	Distinguish between crank effort and piston effort.	K1	CO 4
9.	Classify the types of bearings.	K2	CO 5
10.	What are the required properties of bearing materials?	K1	CO 5

**PART – B (5 x 13 = 65 Marks)**

Q.No.	Questions	KL	CO Attainment
11.	a. The load on a bolt consists of an axial pull of 10kN together with a transverse shear force of 5kN. Find the diameter of bolt required according to 1. Maximum principle stress theory 2. Maximum shear stress theory; 3. Maximum principle strain theory; 4. Maximum strain energy theory; and 5. Maximum distortion energy theory. Take permissible tensile stress at elastic limit = 100 MPa and Poisson's ratio = 0.3.	K2	CO1

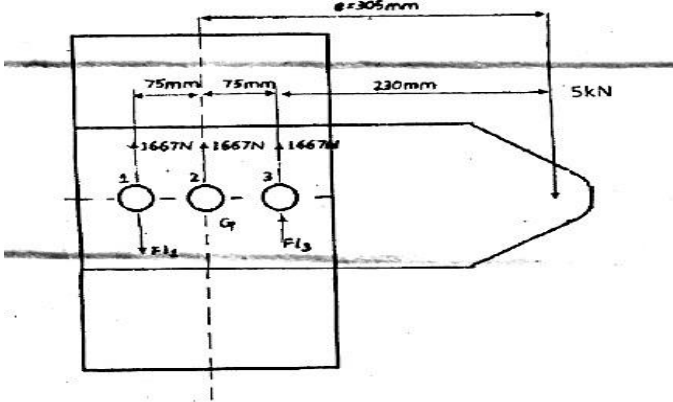
		(OR)		
	b.	<p>A plate 100 mm wide and 12.5 mm thick is to be welded to another plate by means of parallel fillet welds. The plates are subjected to a load of 50 kN. Find the length of the weld so that the maximum stress does not exceed 56 MPa. Consider the joint first under static loading and then under fatigue loading.</p>  <p style="text-align: center;">All dimensions in mm.</p>	<b>K2</b>	<b>CO1</b>
12.	a.	<p>Design the shaft IS to transmit 50 kW at 1200 rpm .It is also subjected to a bending moment of 275 N-m. Allowable shear stress is 60 N/mm<sup>2</sup>.The shaft is not to twist more than 2° in a length of 2m.G=80x10<sup>3</sup> N/mm<sup>2</sup>.</p>	<b>K 3</b>	<b>CO2</b>
		(OR)		
	b.	<p>Design a cast iron protective type flange coupling to transmit 15kW at 900 rpm from an electric motor to a compressor. The service factor may be assumed s 1.35.The following permissible stresses may be used. Shear stress for shaft, bolt and key material=40MPa, Crushing stress for bolt and key = 80 MPa, Shear stress for cast iron=8 MPa.</p>	<b>K 3</b>	<b>CO2</b>
13.	a.	<p>Design a knuckle joint for a tie rod of a circular cross section to sustain a maximum pull of 70kN.The ultimate, strength of the material of the rod against tearing is 420 MPa. The ultimate tensile and shearing strength of the pin material are 510 MPa and 396 MPa respectively. Determine the tie rod section and pin section.Take factor of safety=6.</p>	<b>K3</b>	<b>CO3</b>
		(OR)		
	b.	<p>A welded connection as shown in fig. below is subjected to an</p>	<b>K3</b>	<b>CO3</b>

		<p>eccentric force of 7.5KN. Determine the size of welds if the permissible shear stress for the weld is 100 N/mm<sup>2</sup>. Assume static conditions.</p> 		
14.	a.	<p>A spring loaded safety valve for a boiler is required to blow-off at a pressure 1.2 N/mm<sup>2</sup>. The diameter of the valve is 60 mm. Design a suitable compression spring for the safety valve, assuming spring index to be 5, and 35 mm initial compression. The maximum lift of the valve is 10 mm. The shear stress in the spring material is to be limited to 500 MPa. Take <math>G = 0.8 \times 10^5</math> MPa.</p>	K2	CO4
		(OR)		
	b.	<p>The turning moment diagram for a petrol engine is drawn to the following scales. Turning moment, 1mm=5N.m, Cranking angle 1mm=1°. The turning moment diagram repeats itself at every half revolution of the engine and the areas above and below the mean turning moment line, taken in order are 295,685,40,340,960,270mm<sup>2</sup>. Determine the mass of 300mm diameter flywheel rim when the coefficient of fluctuation of speed is 0.3% and the engine runs at 1800 rpm. Also determine the cross section of the rim when the width of the rim is twice of thickness. Assume density of rim material as 7250kg/m<sup>3</sup>.</p>	K2	CO4
15.	a.	<p>The load on the journal bearing is 150kN due to turbine shaft of 300mm diameter running at 1800 rpm. Determine the following. Length of the bearing if the allowable bearing pressure is 1.6N/mm<sup>2</sup> and amount of heat to be removed by the lubricant per minute if the bearing temperature is 60°C and viscosity of the oil at 60°C is 0.02 kg/m.s and the bearing clearance is 0.25 mm.</p>	K2	CO5



(OR)			
b.	Select a single row deep groove ball bearing for a radial load of 4000N and an axial load of 5000N, operating at a speed of 1600 rpm for an average life of 5 year at 10hours per day. Assume uniform and steady load.	<b>K2</b>	<b>CO5</b>

**PART – C (1 x 15 = 15 Marks)**

Q.No.	Questions	KL	CO Attainment
16.	<p>a. A steel plate is subjected to a force of 5kN and fixed to a channel by means of 3 identical bolts as shown in figure. The bolts are made from plain carbon steel for which yield stress in tension is <math>380 \text{ N/mm}^2</math> and factor of safety is 3. Determine the size of the bolts.</p> 	<b>K3</b>	<b>CO3</b>
(OR)			
	<p>b. Design a knuckle joint for a tie rod of a circular cross section to sustain a maximum pull of 80 KN. The ultimate strength of the material of the rod against tearing is 400 MPa. The ultimate tensile and shearing strength of the pin material are 500 MPa and 350 MPa respectively. Determine the tie rod section and pin section. Take factor of safety=5.</p>	<b>K3</b>	<b>CO3</b>

***Table of Specifications (Question – Wise)***

<i>Outcome</i>	<i>No. of Questions</i>	
e		

Unit	K1 Remembering	K2 Understanding	K3 Applying	K4 Analyzing	K5 Evaluating	K6 Creating	Total
I	2	1					3
II	1	1	1				3
III	1	1	2				4
IV	2	1					3
V	1	2					3
Total	7	6	3				16

Table of Specifications (Marks – Wise)

Outcome	Marks						Total
Unit	K1 Remembering	K2 Understanding	K3 Applying	K4 Analyzing	K5 Evaluating	K6 Creating	Total
I	4	13					17
II	2	2	13				17
III	2	2	28				32
IV	4	13					17
V	2	15					17
Total	14	45	41				100

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**Subject Incharge**

**HOD**

### **Quality of Evaluation:**

- After internal assessment test, course handling faculty member evaluates the answer scripts within 3 days after completion of the examination.
- Paper valued by the respective staff members with answer key/interchanged correction can be done if needed.
- Submission of answer scripts for verification to ensure the completion of valuation.
- Distribution of answer scripts to students on the next day.

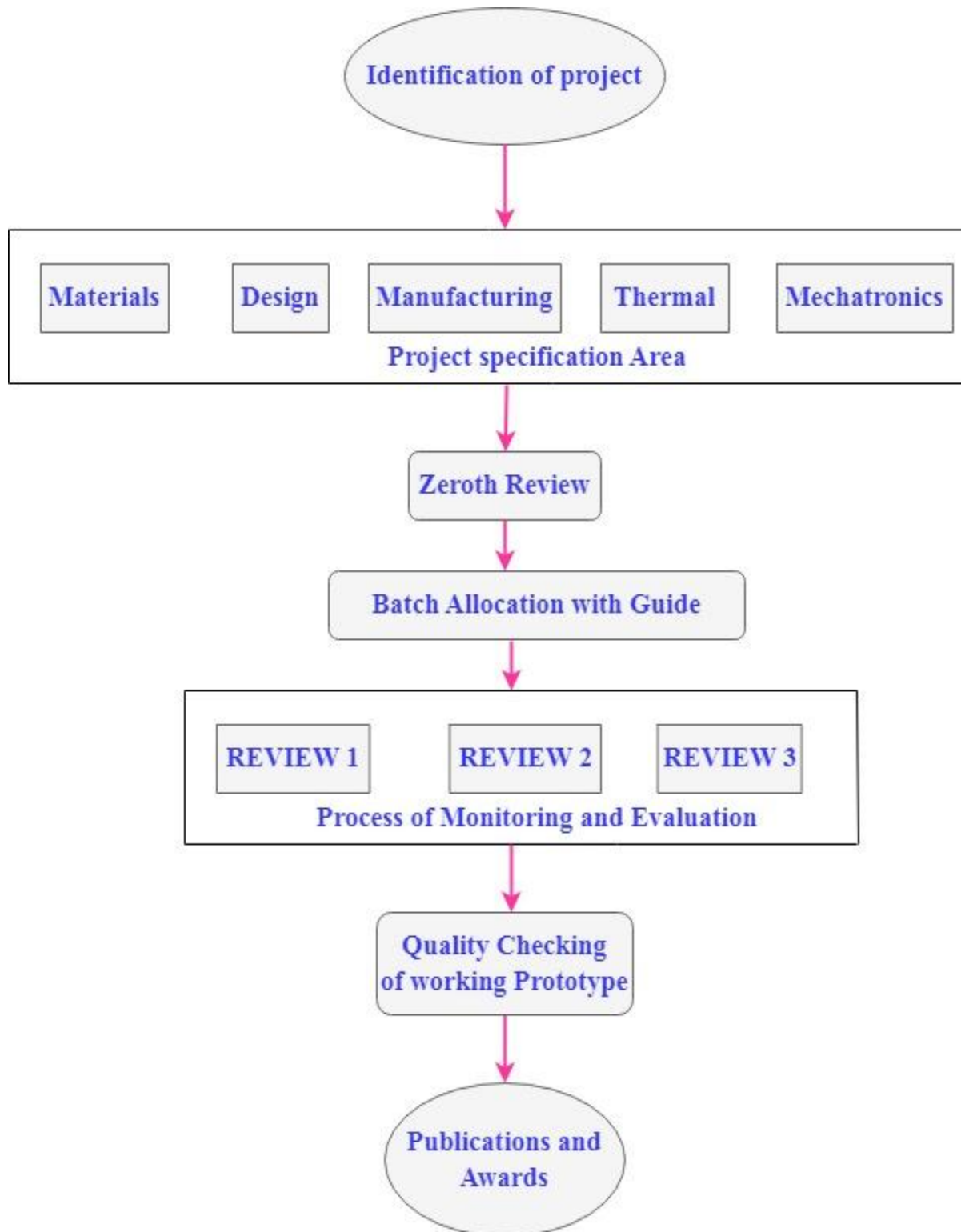
### **Review Procedure**

- Soon after the completion of the mark entry in the Mark analysis statement will be prepared by the concerned class advisors, circulated and verified by the subject in-charges, students, Head of The Department, Principal.
- After this process presentation regarding the class performance will be headed by Principal with the team comprising of Head of The Department, Subject In-charges.
- Complete analysis, suggestions, remedial measures will be given by the Principal for better improvement in the forthcoming exams.
- Minutes of the meeting regarding the Review meeting will be recorded for further action.
- A letter report comprising of the mark statement of the individual student will be sent to their parent soon after the completion of the exam.
- As a corrective measure counseling will be done individually with the student along with or without their parent based on their performance in the assessment exams.
- To encourage the best performers in the internal exam, Cash/prize amount will be issued as a token of appreciation for their performance.

### **Quality of assignments and its relevance to Cos**

- The main objective of assignment is to promote self-learning.
- A minimum of Three assignments will be given for each subject, which cover the course outcomes of the subject
- The questions given are categorized to knowledge, comprehension, application, analysis, evaluation and synthesis level.

### **Quality of student projects.**



**Fig.8 Process flow chart for identification of project  
Identification of proJSECTs and guide allocation methodology:**

- ❖ As part of Anna University curriculum, students have to undertake a project in their final semester of study. The objective of final semester project is to develop student's knowledge for solving technical problems in recent technology. Students are provided with brief idea of various fields for selecting their project titles.
- ❖ Upon completion of their project, students are able to identify and describe the problem and scope of the project
  - Batch allocation based on specific domains (Maximum 4 per batch)
  - Zeroth review will be conducted for choosing the title of the project under the domain selected by the batch.
  - Guide allotted for each batch based on the domain.
  - A review committee is formed comprising of Project Coordinator, Project Supervisor, and External Expert Member from Reputed Institutions for analyzing the project.
  - Maximum of three reviews will be conducted for the best outcome of the project.
  - The student shall make presentation on the progress made by him / her before the committee.
  - The total marks obtained in the three reviews will be reduced for 20 marks and rounded to the nearest integer.
  - The project report shall carry a maximum 30 marks. The project report shall be submitted as per the approved guidelines as given by Director, Academic Courses. Same mark shall be awarded to every student within the project group for the project report. The viva- voce examination shall carry 50 marks. Marks are awarded to each student of the project group based on the individual performance in the viva-voce examination.

**Batch Allocation:**

The topics for the projects are selected in such a way that it caters the following parameters:

- Innovation

- Novelty
- Societal desires
- Engineering Solution for the Real world challenges
- Cost effective
- Meeting the corporate needs
- Industrial, Scientific Research & Medical application topics are highly encouraged

Students are instructed to carry out literature survey by referring reputed journals and articles to identify the problem statement and propose suitable solution. **The students are encouraged to apply for Project sponsorship (TNSCST, SAE, ASME, etc).**

### **Types and Relevance of the Projects and their contribution towards attainment of POs & PSOs**

SI. No	Domain	2020-2021	2021-2022	2022-2023
1.	Materials	2	2	2
2.	Design	3	2	1
3.	Manufacturing	3	1	1
4.	Thermal Engineering	1	1	1
5.	Mechatronics	2	1	1

Students are encouraged to do projects in the following categories

1. Product
2. Application
3. Simulation
4. Research

Each projects is evaluated based on the project's contribution and attainment of program outcome, such as engineering knowledge, problem analysis, design/development of solutions, conducting investigations of complex problems, modern tool usage, engineer and society, environment and sustainability, ethics, individual and team work, communication, projects

management and finance and life-long learning by the projects supervisor. These projects are then categorized into 3 types - best, average and below average.

Table 2.2.2 Categories of student’s projects and Evaluation Process

Review	Time line	Note
Zeroth Review	End of December month	Title , Abstract
First Review	End of January month	Title Abstract Introduction Literature Survey
Second Review	End of February month	Title, Abstract, Layout Design for Proposed System
Third Review	End of March month	Title, Abstract, Detailed Design (if any deviation), Computational Analysis (If required), Experimental (if any deviation)
Viva Voce	April month	Title, Abstract, Overall Design, Experimental Results Performance Evaluation, Report Submission
S.No	Review	Evaluation Process
1	0 <sup>th</sup> Review	Based on the presentation and the discussion made during the review, the title of the proJSEct is tentatively fixed. Subsequently the guides of the proJSEctS were allocated
2	1 <sup>st</sup> Review	Identification Problem based on the literature, similarly the industrial problems also identified based on the problems faced by industries.
3	2 <sup>nd</sup> Review	Methodologies were identified to solve the problem and the responsibility of each individual team member to accomplish the proJSEct is fixed.
4	3 <sup>rd</sup> Review	Output of the work is presented by consolidating the work done by the team members individually as well as in groups.
5	University Viva Voce	Students should submit their proJSEct report and demonstrate of the outcome of the proJSEct.

**Steps followed for monitoring and evaluating the students’ performance**



**Step 1 :**Reviews are conducted as per the proJSEct review schedule which is prepared by the proJSEct coordinator.

**Step 2 :** After each review, the ProJSEct Review committee awards marks based on performance metrics for each batch of students.

**Step 3:** Students are instructed to identify the best journals and conferences to publish their work.

**Step 4:** The proJSEct report is evaluated and marks are awarded based on the quality of work by the concerned supervisor.

**Step 5 :**The students' performance in viva voce is assessed and marks are awarded accordingly by the internal and external examiner.

**Step 6:** The marks from reviews, attendance and viva voce is summed and assessed for correlation with Program Outcomes and Program Specific Outcomes.

**Table 2.2.3** Pos Mapping of Various ProJSEct Areas

S.NO	PROJECT AREA	POs MAPPED	JUSTIFICATION
1	Materials	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO 1, PSO2, PSO 3	PO1: Analysis and manipulation of a digitized image, especially in order to improve its quality. PO2: Manipulation, interpretation and identification of the various transforms for various applications. PO3: The design methodologies of the different transforms source to meet the societal and medical aids. PO4: Investigate the complex imaging techniques based on various transformations. PO5: Utilization of sophisticated software and hardware modules depending on the type of application. PO6: Application of knowledge to provide solution so as to cater the needs of Societal, Engineering, environment PO8: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice PO9: Enhances the team forming, decision making capability when working as a team. P10: Needs communication effectively to deliver the proJSEct through presentation P11:Application of management principles to manage proJSEcts in various environment

			P12:Provides lifelong learning.
2	Design	<p>PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO 1, PSO2, PSO 3</p>	<p>PO1: Analysis and manipulation of a digitized image, especially in order to improve its quality. PO2: Manipulation, interpretation and identification of the various transforms for various applications. PO3: The design methodologies of the different transforms source to meet the societal and medical aids. PO4: Investigate the complex imaging techniques based on various transformations. PO5: Utilization of sophisticated software and hardware modules depending on the type of application. PO6: Application of knowledge to provide solution so as to cater the needs of Societal, Engineering, environment PO8: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice PO9: Enhances the team forming, decision making capability when working as a team. P10: Needs communication effectively to deliver the projects through presentation P11:Application of management principles to manage projects in various environment P12:Provides lifelong learning .</p>
3	Manufacturing	<p>PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO 1, PSO2, PSO 3</p>	<p>PO1: Analysis and manipulation of a digitized image, especially in order to improve its quality. PO2: Manipulation, interpretation and identification of the various transforms for various applications. PO3: The design methodologies of the different transforms source to meet the societal and medical aids. PO4: Investigate the complex imaging techniques based on various transformations. PO5: Utilization of sophisticated software and hardware modules depending on the type of application. PO6: Application of knowledge to provide solution so as to cater the needs of Societal, Engineering, environment PO8: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice PO9: Enhances the team forming, decision making capability when working as a team. P10: Needs communication effectively to deliver the projects through presentation P11:Application of management principles to manage projects in various environment</p>

			P12:Provides lifelong learning .
4	Thermal	<p>PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO 1, PSO2, PSO 3</p>	<p>PO1: Analysis and manipulation of a digitized image, especially in order to improve its quality. PO2: Manipulation, interpretation and identification of the various transforms for various applications. PO3: The design methodologies of the different transforms source to meet the societal and medical aids. PO4: Investigate the complex imaging techniques based on various transformations. PO5: Utilization of sophisticated software and hardware modules depending on the type of application. PO6: Application of knowledge to provide solution so as to cater the needs of Societal, Engineering, environment PO8: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice PO9: Enhances the team forming, decision making capability when working as a team. P10: Needs communication effectively to deliver the projects through presentation P11:Application of management principles to manage projects in various environment P12:Provides lifelong learning .</p>
5	Mechatronics	<p>PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO 1, PSO2, PSO 3</p>	<p>PO1: Analysis and manipulation of a digitized image, especially in order to improve its quality. PO2: Manipulation, interpretation and identification of the various transforms for various applications. PO3: The design methodologies of the different transforms source to meet the societal and medical aids. PO4: Investigate the complex imaging techniques based on various transformations. PO5: Utilization of sophisticated software and hardware modules depending on the type of application. PO6: Application of knowledge to provide solution so as to cater the needs of Societal, Engineering, environment PO8: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice PO9: Enhances the team forming, decision making capability when working as a team. P10: Needs communication effectively to deliver the projects through presentation P11:Application of management principles to</p>

			manage projects in various environment P12:Provides lifelong learning .
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**Table 2.2.4. Pos and PSOs Mapping Project Batch list**

S. No.		Project Title	Type	Domain	POs and PSOs Mapping
<b>Academic Year 2021-2022</b>					
1	Kamalesh.M (112018114001)	Tensile Test on Dissimilar Metals of Aluminum 6063 and Aluminum 8112 Welded By GTAW Method	Research	Materials	PO1,PO3,PO4,P O5,PO7,PO8, PO9,PO10, PO11, PSO1,PSO2, PSO3.
	Rabin.P (112018114002)				
	Sam Solomon.J (112018114003)	<b>Justification :</b> Students can able to understand the process of dissimilar metals and their testing procedure			
2	Karthikeyan.K (112018114302)	Experimental and Analysis of Burr Elimination in Case pipe Hole Drilling on Watch Cases	Analysis	Manufacturing	PO1,PO3,PO4,P O5,PO7,PO8, PO9,PO10, PO11, PSO1,PSO2, PSO3.
	Mohamed Yasen Khan.A.K (112018114303)				
	<b>Justification :</b> Students can able to understand the process of dissimilar metals and their testing procedure				
<b>ACADEMIC YEAR 2020-2021</b>					
1	Ajay.A (112017114001)	Experimental Investigation on Pomegranate Seed Oil Methyl Ester Blended Diesel in Diesel Engine	Research	Thermal	PO1,PO3,PO4,P O5,PO7,PO8, PO9,PO10, PO11, PSO1,PSO2, PSO3.
	Padmesh Kumar.V (112017114008)				
	Praveen Kumar.S (112017114009)	<b>Justification :</b> Students can able to identify the conversion in the internal Combustion Engines.			
2	Divakar.B (112017114002)	Compression Test On Glass Fibre Reinforced Polymer Matrix Composite of Pipe Section	Research	Materials	PO1,PO3,PO4,P O5,PO7,PO8, PO9,PO10, PO11, PSO1,PSO2, PSO3.
	Kumar..M (112017114005)				
	Martin Royal.M (112017114006)				
	Revanth Kumar.K (112017114010)	<b>Justification :</b> Students can able to identify the testing methods for the new material			

3	Harishwar.J (112017114004)	Tensile Test on Dissimilar Metal Welding of Aluminium 6061 and 7075 By Gtaw Method	Research	Materials	PO1,PO3,PO4,P O5,PO7,PO8, PO9,PO10, PO11, PSO1,PSO2, PSO3.
	Santhosh.K (112017114011)				
	Vijay.D (112017114013)	<b>Justification :</b> Students can able to understand the process of dissimilar metals and their testing procedure			

### PROJECT COURSE OUTCOMES:

Students will be able to,

1. Survey the articles related to the area of Specialization and identify the problem.
2. Analyze the available methodologies to solve the problem identified.
3. Propose a solution and create the process flow as a team.
4. Design and develop a prototype to bring the proposed solution ethically.
5. Implement the prototype as a working model for the intended application.

### C. Process for continuous monitoring and evaluation:

- The teacher acts as a facilitator by initiating the projects and giving guidance, input and feedback during the projects.
- He / She encourages all the students to participate and ensures that the student accomplish their tasks as scheduled.
- The progress of the project is evaluated based on minimum three reviews at various stages of the project implementation.
- The review committee consisting of senior faculty member is constituted by the Head of the Department.
- Students will present the progress of their projects for each stage of implementation during each review meeting conducted by the review committee.
- The presentation will cover all the relevant factors, from the problem formulation till the particular stage along with the simulation and hardware details which they have inferred before the review.
- The reviewers will take the points presented into consideration and the test data / results / screenshots and elicit information on those angles not covered or partly covered in the

presentation.

- Students are directed to maintain a projects diary to record the activities they do in relation with projects.
- Students should also record the details of their interactions with the guide in the projects diary.
- The feedback of the performance will be given to students to improve the quality of work.

### Project review Mark distribution

Table 2.2.5 Mark split up for final review conducted by university has given below

Review 1	Review 2	Review 3	End semester examinations				
			Thesis Submission (30 marks)		Viva- Voce (50Mark)		
5 Marks	7.5 Marks	7.5 Marks	Internal (15Marks)	External (15Marks)	Internal (15Marks)	External (20Marks)	Supervisor (15Marks)

#### D. Process to assess individual and team performance:

Students will present the progress of their project for each stage of implementation during each review meeting conducted by the review committee.

#### E. Quality of completed projects/working prototypes:

Project review committee evaluates the quality of project based on the following criteria:

- Design, Analysis and Implementation as well as presentation.
- Application oriented, Research oriented and projects having societal impacts.
- Projects suitable for applying for patents, publishing papers in National conference, International conference and reputed journals.
- Project enabling the students to improve their organizational and research skills which develop better communication with their peers.

- Cost effectiveness.

## F. Papers Published / Awards received by the Projects

The following are the papers published in International Conference.

- ❖ Best Projects are identified based on factors like novelty & implementation.
- ❖ Those projects will be sent to national and international conferences and it will be published in the reputed journals.
- ❖ For evaluating the project quality, experts are invited from various industries.
- ❖ Best projects are identified and students are motivated to develop further improvement in their projects.
- ❖ Best projects are identified and recommended to apply for patents.
- ❖ The students are also encouraged to do industry oriented projects.

**Table 2.2.6 Sample Project converted into Publication**

S. No	Author Name	Paper Title	Published in National/International Symposium/Conference/Journal
<b>Academic Year 2021-2022</b>			
2	Karthikeyan.K Mohamed Yasen Khan.A.K	Experimental and Analysis of Burr Elimination in Case pipe Hole Drilling on Watch Cases feed	<b>Symposium</b>

Academic Year 2020-2021			
1	Ajay.A Padmesh Kumar.V Praveen Kumar.S	Experimental Investigation on Pomegranate Seed Oil Methyl Ester Blended Diesel in Diesel Engine	Symposium
2	Harishwar.J Santhosh.K Vijay.D	Tensile Test on Dissimilar Metal Welding of Aluminium 6061 and 7075 By Gtaw Method	Symposium

## 2.2.2 Initiatives related to industry interaction

### *Initiatives*

- Department academic advisory committee is constituted by involving an active industry person as a member of the committee.
- Department Mechanical Engineering has signed MOUs with some industries.
- To promote outcome based education and enhance employability skills among students, add- on courses and additional contents through lectures by adjunct faculty have been instructed.
- Department provides platform for students to visit industries and undergo internships.

S.NO	INITIATIVES
1	Workshop
2	Value Added Course
3	Guest Lecture
4	Training Program
5	MoU
6	Inplant training /Internship



7	Symposium/Conference
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## Implementation

Department of Mechanical Engineering has implemented several initiatives to strengthen Industry-Institute interaction. The academic year wise details of the initiatives are listed as below table.

<i>Academic Year</i>	<i>Mode</i>	<i>Details</i>	<i>Venue</i>	<i>Dates</i>
2022-23	Workshop	Workshop on “ <b>Additive Manufacturing</b> ”	Seminar Hall, JSEC	16-08-2022
		Workshop on “ <b>Latest Trends In CAD / CAM</b> ”	Seminar Hall, JSEC	26-08-2022
		WORKSHOP ON “ <b>Radial Engine Detailing and Assembling</b> ”	Seminar Hall, JSEC	17-09-2022
		WORKSHOP ON “ <b>Emerging Trends in Mechanical Industry</b> ”	CAD LAB JSEC	15-12-2022
	Value Added Courses	Industrial Automation,	ME 101, JSEC	17-09-2022 to 21-09-20221 & 30-09-2022 to 04-10-2022
		Machine Learning	ME 103, JSEC	
		Robotics	ME 105, JSEC	
	Guest Lecture	Latest Trends in NDT Techniques ( IV Year)	CAD LAB JSEC	03/09/2022
		3D scanning and printing prototype of Industrial Models ( III Year)	CAD LAB JSEC	24/09/2022
		Product Life cycle Management ( III Year)	CAD LAB JSEC	08/10/2022
		Dimension and Tolerance (II Year)	CAD LAB JSEC	29/10/2022
		Campus Readiness Program (IV Year)	CAD LAB JSEC	05/12/2022

	MOU	Metro Composites Research and Development Centre	Chennai	2017 (Lifetime)
		Unique Pump Solutions and Services	Chennai	2017 (Lifetime)
		P K Industries	Chennai	2017 (Lifetime)
		Ragavendra Engineering	Chennai	2017 (Lifetime)
		Industrial Tooling Services	Chennai	2017 (Lifetime)
Industrial Visit	Armed Vehicle Exhibition – HVF AVADI	Chennai	17/08/2022	
	National Small Industries Corporation	Chennai	14/09/2022	
Inplant Training	Evolve-DIY ROBOT NNOVATION LAB	Chennai	01/08/2022 to 10/08/2022	
	Metro Composites Research and Development Centre	Chennai	28/11/2022 to 07/12/2022	
Training Program	Training Program on Digital Marketing	JSEC	11/08/2022 to 23/09/2022	
	Training Program in coding Lab	JSEC	11/08/2022 to 23/09/2022	
	Training Program on selenium	JSEC	11/08/2022 to 23/09/2022	
	Training Program on Part Programming	JSEC	01/10/2022 to 30/10/2022	
	Training Program on AutoCAD	JSEC	01/10/2022 to 30/10/2022	
	Training Program on Mechatronics system	Evolve-DIY ROBOT NNOVATION LAB	01/10/2022 to 30/10/2022	

<b>2021-22</b>	<b>Workshop</b>	Webinar on Current trends in 3D Printing	JSEC (online)	18/09/2021
		Webinar on Internal Combustion Engines	JSEC (online)	23/10/2021
		Webinar on Advanced Techniques in NDT	JSEC (online)	20/11/2021
		Webinar on Recent Trends of Design Fields in Mechanical Engineering	JSEC (online)	11/1/2022
		Webinar on Building a simple Chatbox using NLTK	JSEC (online)	28/01/2022
		Seminar on Industrial Automation using PLC, SCADA, HMI AND VFD	CAD LAB, JSEC	29/03/2022
	<b>Value Added Courses</b>	Industrial safety	JSEC (online)	13/09/2021 to 18/09/2021
		Mechanical handling systems and equipment	JSEC (online)	13/09/2021 to 18/09/2021
		Industrial automation, CNC and Robotics	JSEC (online)	25/10/2021 to 30/10/2021
		Applied Elasticity and Plasticity	JSEC (online)	25/10/2021 to 30/10/2021
		Robotics Coding	JSEC (online)	25/10/2021 to 30/10/2021
	<b>Guest Lecture</b>	Webinar on safety awareness and safety Culture (II Year)	JSEC (online)	11/09/2021

		Webinar Automation and Robotics (IV Year)	JSEC (online)	25/09/2021
		Hydrogen in Automobiles Electric & Hybrid vehicles and Fuel cell (III Year)	JSEC (online)	12/02/2022
		Webinar on Six Sigma Concepts (III Year)	JSEC (online)	19/02/2022
		Latest Trends in Materials and its application (IV Year)	JSEC (online)	05/03/2022
	MOU	Metro Composites Research and Development Centre	Chennai	2017 (Lifetime)
		Unique Pump Solutions and Services	Chennai	2017 (Lifetime)
		P K Industries	Chennai	2017 (Lifetime)
		Ragavendra Engineering	Chennai	2017 (Lifetime)
		Industrial Tooling Services	Chennai	2017 (Lifetime)
	Industrial Visit	Armed Vehicle Exhibition – HVF AVADI	Chennai	17-12-21
	In Plant Training	Ragavendra Engineering	Chennai	04/09/2021 to 11/09/2021
		Industrial Tooling Services	Chennai	23/10/2021 to 30/10/2021

	Training Program	Training on CAD Modeling Software	CAD LAB JSEC	07/08/2021 to 14/08/2021
		Training on Simulation software	CAD LAB JSEC	09/10/2021 to 16/09/2021
		Training on CNC Lathe	CAM LAB JSEC	07/08/2021 to 14/08/2021
		Training on Welding process	Workshop JSEC	09/10/2021 to 16/09/2021
		Training Program in coding Lab	FOSS LAB JSEC	09/10/2021 to 16/09/2021
<b>2020-21</b>	Workshop	Webinar on Advanced NDT Techniques	JSEC (online)	26/09/2020
		Webinar on Vibration Isolation	JSEC (online)	22/10/2020
		Webinar on Six Sigma Concepts	JSEC (online)	22/01/2021
		Webinar on Theory of Machines	JSEC (online)	29/01/2021
		Webinar on Career Guidance	JSEC (online)	20/02/2021
	Guest Lecture	Online Webinar on Basic concepts in CFD (III Year)	JSEC (online)	16/10/2020
		Online Webinar on Advances in Casting Technology (II Year)	JSEC (online)	19/10/2020

		Online Webinar on wind energy potential for power generation (III Year)	JSEC (online)	20/10/2020
		Online Webinar on Application in Industrial Engineering (III Year)	JSEC (online)	23/10/2020
		Online Webinar on Recent Development in welding Technology (II Year)	JSEC (online)	27/10/2020
		Online Webinar on Finite Element Analysis (III Year)	JSEC (online)	28/10/2020
		Online Webinar on Power Plant Engineering (IV Year)	JSEC (online)	07/11/2020
		Online Webinar on Non Destructive Testing (IV Year)	JSEC (online)	10/11/2020
		Online Webinar on Process Planning and Cost Estimation (IV Year)	JSEC (online)	11/11/2020
	MoU	Metro Composites Research and Development Centre	JSEC	2016 (Lifetime)
		PK Industries	JSEC	2016 (Lifetime)
		Ragavendra Engineering	JSEC	2016 (Lifetime)
		Industrial Tooling Services	JSEC	2016 (Lifetime)
	Inplant Training	Metro Composites Research and Development Centre	Chennai	28/12/2020 to 09/01/2021

		PK Industries	Chennai	28/12/2020 to 09/01/2021
		Ragavendra Engineering	Chennai	28/12/2020 to 09/01/2021
	Training Program	Training on CAD Modeling Software	JSEC (online)	21/12/2020 to 23/12/2020
		Training on Simulation software	JSEC (online)	21/12/2020 to 23/12/2020
		Training on 5S Principles	JSEC (online)	21/12/2020 to 23/12/2020

### A. Industry supported laboratories

Sl. No	Name of the Industry	Details of Equipments	Objective of the Lab	Utilization & Effectiveness
<b>CAY 2022-2023</b>				
1	CADD Centre Pvt. Ltd	CATIA, Ansys Software	To conduct workshops, technical events, seminars/webinars, model making competitions for students	<b>CAD Lab</b>
2	Metro Composites Research and Development Centre	Moulded Glass Plate, Roller, Weighing Machine,	To arrange workshops, seminars/webinars, model making competitions for faculty and student's technical support and conduct .	<b>Engineering Practice Lab</b>
3	PK Industries	Capstan and Turret Lathe	To arrange Technical support to the students	<b>Machine Shop</b>
4	Ragavendra Engineering	Milling Machine	To conduct workshop for students	<b>Machine Shop</b>
<b>AY 2021-2022</b>				
1	Metro Composites Research and Development Centre	Moulded Glass Plate, Roller, Weighing Machine,	To arrange workshops, seminars/webinars, model making competitions for faculty and student's technical support and conduct .	<b>Engineering Practice Lab</b>

2	<b>PK Industries</b>	<b>Capstan and Turret Lathe</b>	To arrange Technical support to the students	<b>Machine Shop</b>
3	<b>Ragavendra Engineering</b>	<b>Milling Machine</b>	To conduct workshop for students	<b>Machine Shop</b>
<b>AY 2020-2021</b>				
1	<b>Metro Composites Research and Development Centre</b>	<b>Moulded Glass Plate, Roller, Weighing Machine,</b>	To arrange workshops, seminars/webinars, model making competitions for faculty and student's technical support and conduct .	<b>Engineering Practice Lab</b>
2	<b>Ragavendra Engineering</b>	<b>Milling Machine</b>	To conduct webinar for the students through online	<b>Machine Shop</b>

## **B. Industry involvement in the program design and partial delivery of any regular courses for students.**

**Memorandum of Understanding ( MoU) Details:**

### **Initiatives related to industry internship/summer training**

<b>S.No</b>	<b>Name of the institution/ industry/ corporate house with whom MoU is signed</b>	<b>Year of signing MoU</b>
1	<b>Metro Composites Research and Development Centre</b> 13, Seenas Enclave, JP Nagar, 1 <sup>st</sup> Street, Surapet, Chennai - 66	2017
2	<b>P K Industries</b> 121, Tiny Shed, Patravakkam, Ambattur, Chennai - 98	2017
3	Ragavendra Engineering No 12, 7 <sup>th</sup> Street, Anna Memorial Nagar Puzhal, Chennai -66	2017
4	<b>Industrial Tooling Services</b> No 214, New Tiny Sector Ambattur Industrial Estate, Chennai - 58	2017
5	<b>CADD Centre Training Services</b> No 3 vellalar street, Third main road, Ambattur Industrial Estate ,Chennai-58	2017



**Guest Lecture Summary with Industrial Experts CAY 2022-2023**

<b>EVENT</b>	<b>FACULTY NAME AND DESIGNATION</b>	<b>PROGRAM OUTCOME</b>
Workshop on “ <b>Additive Manufacturing</b> ”	Mr.Rahul Shivakumar Managing Director ShivPrema Industries Pvt. Ltd, Chennai	PO6, PO8, PO9, PO10, PO11, PO12, PSO1, PSO3
Workshop on “ <b>Latest Trends In CAD / CAM</b> ”	Mr.P.G.RAMAN Director CADDAM Technologies Pvt. Ltd, Chennai	PO6, PO8, PO9, PO10, PO11, PO12, PSO1, PSO3
WORKSHOP ON “ <b>Radial Engine Detailing and Assembling</b> ”	<b>Mr.M.Ranjith</b> CAD Trainer CADD Centre, Chennai	PO6, PO8, PO9, PO10, PO11, PO12, PSO1, PSO3
WORKSHOP ON “ <b>Emerging Trends in Mechanical Industry</b> ”	<b>Mr. Mr Ligen Mohan</b> Industrial Training academy CADD Design solution, Chennai	PO6, PO8, PO9, PO10, PO11, PO12, PSO1, PSO3

**Guest Lecture Summary with Industrial Experts CAY 2021-2022**

<b>EVENT</b>	<b>FACULTY NAME AND DESIGNATION</b>	<b>PROGRAM OUTCOME</b>
Webinar on Current trends in 3D Printing	Mr.M.Elavarasan Business Development Officer CADD Centre Chennai	PO6, PO8, PO9, PO10, PO11, PO12, PSO1, PSO3
Webinar on Internal Combustion Engines	Mr.S.Arun Prasad Managing Director Metro Composites Research and Development Centre Chennai	PO6, PO8, PO9, PO10, PO11, PO12, PSO1, PSO3
Webinar on Advanced Techniques in NDT	Mr.M.Ranjith Trainer CADD Centre Chennai	PO6, PO8, PO9, PO10, PO11, PO12, PSO1, PSO3

Webinar on Recent Trends of Design Fields in Mechanical Engineering	Mr.M.Kovarasan Marketing Executive I3 Design Technologies Pvt. Ltd, Avadi Chennai.	PO6, PO8, PO9, PO10, PO11, PO12, PSO1, PSO3
Webinar on Building a simple Chatbox using NLTK	Mr. P.G.RAMAN Director CADDAM Technologies Pvt. Ltd	PO6, PO8, PO9, PO10, PO11, PO12, PSO1, PSO3

### **Impact analysis of industry institute interaction and actions taken thereof**

- The students of the department have shown keen interest to undertake courses offered by the course of excellences.
- Students have successfully completed the given courses.
- Students will analyze the concepts of industry practices and needs of the industry
- Feedback will be collected from the students

### **2.2.5 Initiatives related to industry internship/summer training (15) (Mention the initiatives, implementation details and Analysis)**

**A. Industrial training/tours for students** Industrial visit is a part of the professional courses, during which students visit companies and get insight on how companies work and also useful information related to the practical aspects of the course which cannot be visualized in lectures. With an aim to go beyond academics, these visits are arranged to develop the insights of the students – attaining practical knowledge and their theoretical applications there of

- To expose the industrial environment to the students
- To gain the practical knowledge and outcome based learning

#### **Procedure**

- Plan the industrial visit schedule as per the following guidelines
- Dates as mentioned in the department academic schedule
- Separate place of visit for boys and girls except first year students
- One day industrial visit for second, third and final year students
- Get the students willingness list in concurrence with their parents /guardian within one month from the start of the semester
- Get the industrial visit requisition letter from the Principal and mail it to the concern industry for approval

- After approval the following supporting documents are to be enclosed industrial visit schedule
- Expense estimate(budget)
- Students name list with contact details
- Bonafide certificate from Principal in prescribed format industrial visit Approval letter
- Faculty members (teaching and non-teaching) accompanying students for industrial visit have to claim OD and advance amount for expenses in two days prior to the departure date.
- Issuing and collecting the undertaking/declaration form signed by ward parents/guardian before one day of industrial visit
- Submission of documents to industrial visit coordinator.
- Awareness regarding safety and precautions will be given by the Principal to the accompanying faculty members and the same will be conveyed to the students by HOD and industrial visit coordinator
- Before leaving for Industrial Visit, concerned faculty organizer shall arrange to procure adequate and proper FIRST AID KIT in consultation with Health Centre if necessary. The faculty members shall accompany the students throughout the IV and shall stay along with the students.
- Faculty members accompanying students for industrial visit has to leave the report daily to Principal and respective HOD



Fig 9 Industrial Visit for IV Year Mechanical Engineering students in Integral Coach Factory

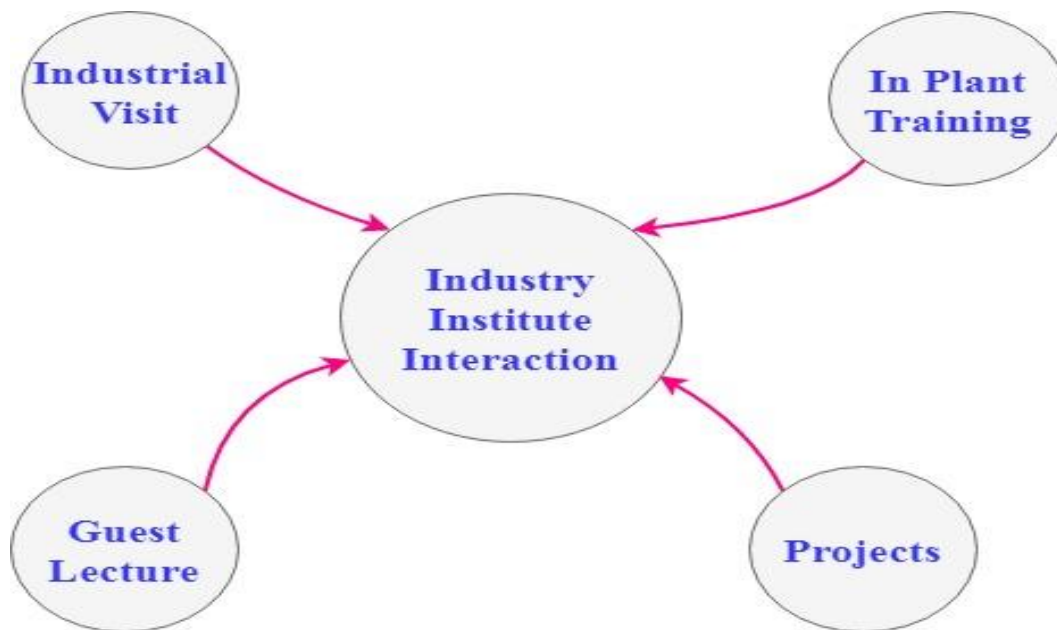


Fig. 10 Grouping of Industry Institute Interaction

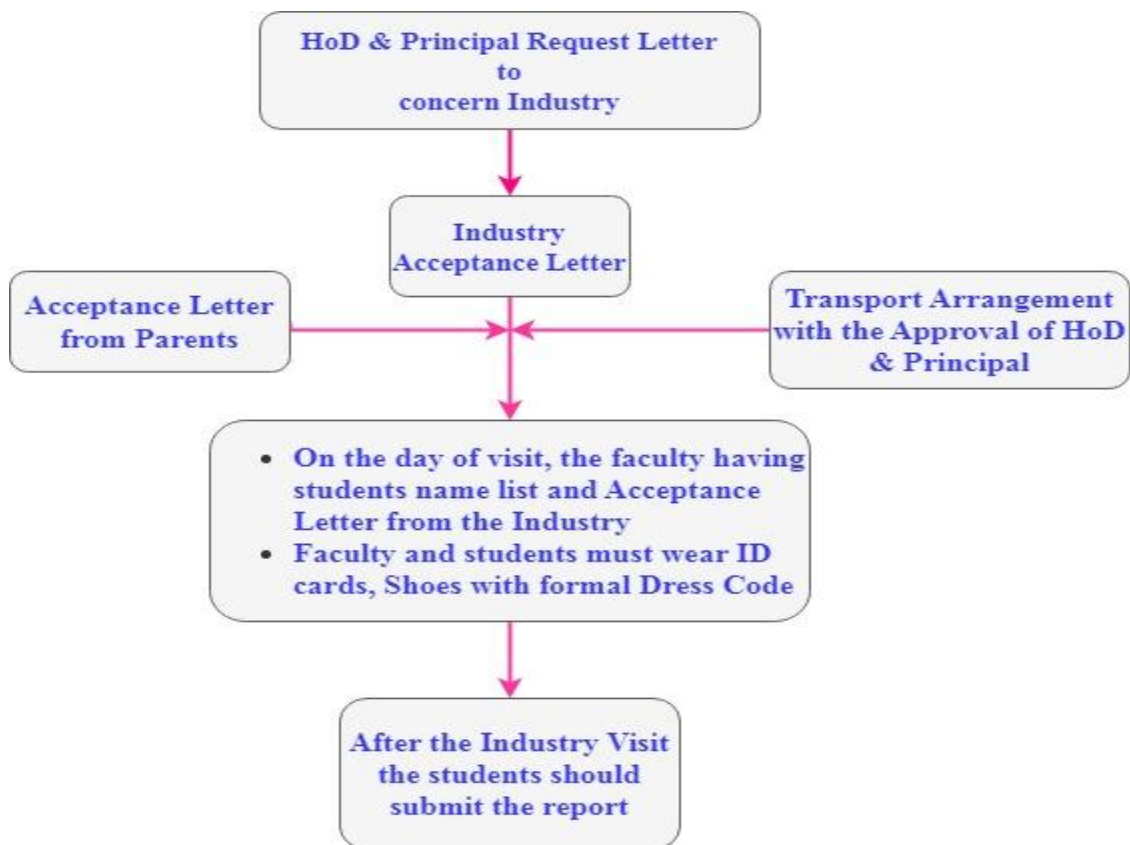


Fig 11 Process flowchart for getting Industrial Visit permission and Approval

### List of students visited the Industry

CAY 2022-2023				
S.NO	DATE OF VISIT	ORGANIZATION VISITED	YEAR OF STUDENTS VISITED	PROGRAM OUTCOME
1.	17/08/2022	Armed Vehicle Exhibition – HVF AVADI	II, III	PO6,PO7,PO8,PO10, P12
2.	18/08/2022	Armed Vehicle Exhibition – HVF AVADI	IV	PO6,PO7,PO8,PO10, P12
3.	14/09/2022	National Small Industries Corporation	II, III	PO6,PO7,PO8,PO10, P12

4.	15/09/2022	National Small Industries Corporation	IV	PO6,PO7,PO8,PO10, P12
<b>AY 2021-2022</b>				
1	16/12/2021	Armed Vehicle Exhibition – HVF AVADI	II	PO6,PO7,PO8,PO10, PO12
2	17/12/2021	Armed Vehicle Exhibition – HVF AVADI	III	PO6,PO7,PO8,PO10, PO12
3	18/12/2021	Armed Vehicle Exhibition – HVF AVADI	IV	PO6,PO7,PO8,PO10, PO12

**B. Industrial /internship /summer training of more than two weeks and post training Assessment**

**The in plant training coordinator encourages undergoing in-plant training or internship, in their vacations. This will enable the students**

- To gain hands-on experience in implementing whatever they have learnt in their curriculum.
- To train themselves on the state of the art equipment's and standards used by the industries.
- To present themselves as complete professionals, when they go for placements.

**Arranging for In-plant training / Internship**

- Students will choose a domain that they come across in their academia and find the industries available on that particular domain which provides training.
- Students will then approach the department for getting approval.
- The College will issue the necessary documents like a bonafide certificate and request letter to the concerned industry.
- After the consent of the industry the students will attend the training program in the respective industries.
- **Industry Internship students' details**

Name of the Industry	No. of Days	No. of Student's Participated	Course Area	Feedback	Impact	Action	PROGRAM OUTCOME
<b>CAY 2022-2023</b>							
Mind – PLM , Tiruvallur	20 days	4	Design	Get knowledge about product development	Able to design new component with modeling software	To get training 3D modeling software	PO6,PO7,PO8 , PO9&PO10
Evolve-DIY Robot Innovation Lab	20 days	5	Robotics	Get knowledge about Mechatronics System	Able to design new system with modeling software	To get training with Robot modeling software	PO6,PO7,PO8 , PO9&PO10
Metro Composites Research and Development Centre	20 days	5	Materials	Get knowledge about Composite Materials	Able to produce new composite materials	To get training for making new composite materials	PO6,PO7,PO8 , PO9&PO10
<b>AY 2021-2022</b>							
PK Industries	15 days	5	Design	Get knowledge about product development	Able to design new component with modeling software	To get training 3D modeling software	PO6,PO7,PO8 , PO9&PO10
Ragavendra Engineering	15 days	4	Robotics	Get knowledge about Mechatronics System	Able to design new system with modeling software	To get training with Robot modeling software	PO6,PO7,PO8 , PO9&PO10

Industrial Tooling Services	15 days	5	Materials	Get knowledge about Composite Materials	Able to produce new composite materials	To get training for making new composite materials	PO6,PO7,PO8 , PO9&PO10
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### In-Plant training Student List

2022-2023					
S.NO	DURATION OF TRAINING	COURSE AREA	ORGANIZATION VISITED	NO. OF STUDENTS VISITED	PROGRAM OUTCOME
1	10 days	Production	TVS Fasteners Pvt. Ltd	7	PO6,PO7,PO8,PO9&PO10
2	10 days	Service	Honda Service Centre	8	PO6,PO7,PO8,PO9&PO10
3	10 days	Design	Cadd Centre Pvt. Ltd	7	PO6,PO7,PO8,PO9&PO10
4	7days	Quality	Ashok Leyland	6	PO6,PO7,PO8,PO9&PO10
2021-2022					
1	10days	Service	Volkswagen service	10	PO6,PO7,PO8,PO9&PO10
2	10days	Maintenance	Chennai Port Trust	5	PO6,PO7,PO8,PO9&PO10
3	10days	Design	Unique Technologies Service	8	PO6,PO7,PO8,PO9&PO10
4	7days	Production	Wabco TVS	10	PO6,PO7,PO8,PO9&PO10
5	7days	Quality	Royal Enfield	5	PO6,PO7,PO8,PO9&PO10



6	7days	Production	Hyundai Motors	5	PO6,PO7,PO8,PO9&PO10
7	7days	Design	CADDAM Technologies	7	PO6,PO7,PO8,PO9&PO10

### **C. Impact Analysis of Industrial Training: (4)**

- Students are exposed to real time practical experience of the subJSECTs studied in the classrooms and realized the practical importance of the subJSECTs.
- Industrial training inculcated more interest in the subJSECTs
- Students are inspired to do hard work and get placed in such type of industries.
- Students were exposed to the industry standards and workplace culture, the importance of being punctual and meeting the deadlines

### **D. Student Feedback on Initiative**

- a. The feedback is collected among the students about the initiatives taken by the department. This feedback resembles the attainment of knowledge by the student, whether it is enough or less to them