

Savitribai Phule Pune University
Board of Studies - Mechanical and Automobile Engineering
 Undergraduate Program – Final Year Mechanical Engineering (2019 pattern)

402047: Project (Stage I)					
Teaching Scheme		Credits		Examination Scheme	
Practical	4 Hrs./Week	Practical	2	Term Work	50 Marks
				Oral	50 Marks
Prerequisites: Project Based Learning, Internship/Mini Project, Laboratory works, Audit Courses					
Course Objectives: <ol style="list-style-type: none"> 1. To provide an opportunity of designing and building complete system or subsystems based on areas where the student likes to acquire specialized skills. 2. To obtain hands-on experience in converting a small novel idea / technique into a working model / prototype involving multi-disciplinary skills. 3. To embed the skill in a group of students to work independently on a topic/ problem/ experimentation selected by them and encourage them to think independently on their own to bring out the conclusion under the given circumstances of the curriculum period in the budget provided with the guidance of the faculty. 4. To encourage creative thinking processes to help them to get confidence by planning and carrying out the work plan of the project and to successfully complete the same, through observations, discussions and decision making process. 5. To get visibility in industry to Project and Project group 					
Course Outcomes: On completion of the course the learner will be able to; <ul style="list-style-type: none"> CO1. Implement systems approach. CO2. To conceptualize a novel idea / technique into a product. CO3. To think in terms of a multi-disciplinary environment. CO4. To take on the challenges of teamwork, and document all aspects of design work. CO5. To understand the management techniques of implementing a project. 					
Course Contents					
Project work in the seventh semester is an integral part of the TW work. The project work shall be based on the knowledge acquired by the student during the graduation and preferably it should meet and contribute towards the needs of the society. Project work shall be based on any of the following: <ol style="list-style-type: none"> 1. Fabrication of product/ testing setup of an experimentation unit/ apparatus/ small equipment, in a group. 2. Experimental verification of principles used in Mechanical Engineering Applications. 3. Projects having valid database, data flow, algorithm, and output reports, preferably software based. 					

4. Study projects are strictly allowed.
Project Lab
<ol style="list-style-type: none"> 1. There has to be a Project Lab in the department. <ol style="list-style-type: none"> a. It consists of necessary tools required to do a project. b. Previous projects and their components. c. Common measuring instruments. d. Previous years' project reports. e. Project related books and Publications. f. Proper linkage with central workshop and various laboratories. g. Safety measures. 2. All the project activities must be handled with a digital platform which is developed in the department according to the policies laid down by the institution. Respective authority levels created to maintain the transparency and confidentiality.
Books and other resources
References Books:
<ul style="list-style-type: none"> • Dissertations and Project Reports: A Step by Step Guide by Dr Stella Cottrell.
Web References:
<ol style="list-style-type: none"> 1. SWAYAM-NPTEL Course. 2. MOOCs' Courses.
Guidelines for Project Execution:
At the end of the 6th Semester
<ol style="list-style-type: none"> 1. Students will make groups according to their suitability. 2. Department faculty will float prospective Project Titles through Project Coordinator. 3. Department will take care of a list of titles at least two times of the groups. 4. Students will interact with guides for scope and outline of the project. 5. Maximum of two groups will be given to a guide. 6. Guide and Project groups will be finalized at the end of sixth semester so that project work can be started at the start of Seventh semester.
During the 7th Semester
<ol style="list-style-type: none"> 1. Project work is expected to be done in the Project Lab. 2. Projects must be executed in association with industrial experts/facilities. 3. Progress of project work is monitored regularly on weekly project slots/project day. 4. Regular interval presentations are to be arranged to review and assess the work. 5. Project work is monitored and continuous assessment is done by guide and authorities.
Term Work:
<ul style="list-style-type: none"> • The student shall prepare the duly certified final report of project work in standard format for satisfactory completion of the work by the concerned guide and head of the Department/Institute. • Recommended performance measure parameters may Include-Problem definition and scope

of the project, Literature Survey, Appropriate Engineering approach used, Exhaustive and Rational Requirement Analysis,

- Comprehensive Implementation - Design, modeling, documentation, Usability, Optimization considerations (Time, Resources, Costing), Thorough Testing, Project Presentation and Demonstration (ease of use and usability), Social and environment aspects.
- The term work under project submitted by students shall include
 1. Work Diary: Work Diary maintained by group and countersigned by the guide weekly. The contents of work diary shall reflect the efforts taken by project group for
 - a. Searching suitable project work
 - b. Brief report preferably on journals/ research or conference papers/ books or literature surveyed to select and bring up the project.
 - c. Brief report of feasibility studies carried to implement the conclusion.
 - d. Rough Sketches/ Design Calculations
 - e. Synopsis
- The group should submit the synopsis in the following form.
 - i. Title of Project
 - ii. Names of Students
 - iii. Name of Guide
 - iv. Relevance
 - v. Present Theory and Practices
 - vi. Proposed work
 - vii. Expenditure
 - viii. References
- The synopsis shall be signed by each student in the group, approved by the guide (along with external guide in case of sponsored projects) and endorsed by the Head of the Department
- Presentation: The group has to make a presentation in front of the faculty of department at the end of semester.

Examination Scheme:

- During university examination Internal examiner (preferably the guide) and External examiners jointly, evaluate the project work.
- During the process of monitoring and continuous assessment & evaluation the individual and team performance is to be measured.
- The project term work shall be evaluated on the basis of reviews. In first semester two reviews are to be taken and evaluated for total 30 marks (15 marks each)
- Review 1 and 2 will be based on synopsis submission (team members, Title of the Project Work, abstract, Problem Definition, work done earlier, Objectives of the Project, Methodology of the Project, Application / Significance of the Project, Duration of the Project, Individual Role of the Student, References, sponsored etc.)
- The final presentation shall be taken in front of external examiner and to be evaluated for 40 marks
 - 10 marks for presentation for group,
 - 15 marks for quality of the project work.
 - 15 marks for quality of the project report

Project Report
<ul style="list-style-type: none">● Stage I report shall be in the booklet form.● Plagiarism check is must, and certificate shall be attached in the report.
References: <ul style="list-style-type: none">● References format MUST BE STANDARD – ASME, SAE or IEEE

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402053: Project (Stage II)					
Teaching Scheme		Credits		Examination Scheme	
Practical	12 Hrs./Week	Practical	6	Term Work	100 Marks
				Oral	50 Marks
Prerequisites: Project Based Learning, Internship/Mini Project, Project (Stage I)					
Course Objectives:					
<ol style="list-style-type: none"> 1. To provide an opportunity of designing and building complete system or subsystems based on areas where the student likes to acquire specialized skills. 2. To obtain hands-on experience in converting a small novel idea / technique into a working model / prototype involving multi-disciplinary skills. 3. To embed the skill in a group of students to work independently on a topic/ problem/ experimentation selected by them and encourage them to think independently on their own to bring out the conclusion under the given circumstances of the curriculum period in the budget provided with the guidance of the faculty. 4. To encourage creative thinking processes to help them to get confidence by planning and carrying out the work plan of the project and to successfully complete the same, through observations, discussions and decision making process. 5. To get visibility in industry to Project and Project group 					
Course Outcomes:					
On completion of the course the learner will be able to;					
CO1. Implement systems approach.					
CO2. To conceptualize a novel idea / technique into a product.					
CO3. To think in terms of a multi-disciplinary environment.					
CO4. To take on the challenges of teamwork, and document all aspects of design work.					
CO5. To understand the management techniques of implementing a project.					
Course Contents					
Extended part of Project Stage I					
Guidelines for Project Execution					
1. Refer Project stage I guidelines.					
Term Work Evaluation					
<ol style="list-style-type: none"> 1. In Project Stage II, two reviews are to be taken for total 80 marks (40 marks each) 2. Review III shall be based on the approximate end of fabrication / design validation etc. in front of an expert panel from the department. 					

3. Review IV will be third party evaluation by Faculty/Student/Industry person/Alumni
4. Evaluation committee will consist of Guide, One Industry person and One Faculty appointed by the Institution.
5. Students shall be encouraged to publish a research paper/patent/technical note. Their credential shall be considered while term work evaluation.

Examination Scheme

1. Examination committee will consist of Guide, (Strictly) One Industry person and One Faculty appointed by the Institution.
2. Well in advance soft copies of the project shall be shared with examination committee.

Presentation of Project Work

Presentation of work in the form of Project Report (s), Understanding individual capacity, Role & involvement in the project, Team Work (Distribution of work, intrateam communication and togetherness), Participation in various contests, Publications and IPR, Manuals (Project Report, Quick reference, System, Installation guide) among other parameters. Team members with guide information shall be added at the end of the report.

Project Report

1. The report shall be both side print hard bound. A hardbound report shall be made after examination and examiner and guide's expected correction, before that report must be loosely bound.
2. Plagiarism check is must, and certificate shall be attached in the report.
3. A group activity shall be presented in report.
4. Report copies shall be submitted in the department, one for university and one for supervisor.
5. For standardization of the project reports the following format shall be strictly followed.
 - a. Page size: Trimmed A4
 - b. Top Margin: 1.00 Inches
 - c. Bottom Margin: 1.32 Inches
 - d. Left Margin: 1.5 Inches
 - e. Right Margin: 1.0 Inches
 - f. Para Text: Times New Roman 12-point font
 - g. Line Spacing: 1.15 Lines
 - h. Page Numbers: Right aligned at footer. Font 12 point Times New Roman
 - i. Headings: Times New Roman, 14 Points, Boldface 10.

Certificate

1. All students should attach a standard format of Certificate as described by the department.
2. Certificates should be awarded to project groups and not individual students of the group.
3. Certificates should have signatures of Guide, External Examiner, Head of Department and Principal.

Index of Report

1. Title Sheet
2. Certificate (Institution)
3. Certificate (Company, if sponsored by company)
4. Acknowledgement
5. Abstract of the Project
6. List of Figures
7. List of Photographs / Plates
8. List of Tables
9. Table of Contents
10. Introduction
11. Literature Survey / Theory
12. Design / Experimentation / Fabrication / Production / Actual work carried out for the same
13. Observation Results
14. Discussion on Result and Conclusion
15. Student and Guide details. (A common photograph with project)

202052 - Project Based Learning - II

Teaching Scheme	Credits	Examination Scheme
Practical : 04 Hr./Week	02 Practical : 02	Term Work : 50 Marks

Preamble

Currently, engineering education is undergoing significant structural changes worldwide. The rapidly evolving technological landscape forces educators to constantly reassess the content of engineering curricula in the context of emerging fields and with a multidisciplinary focus. In this process, it is necessary to devise, implement and evaluate innovative pedagogical approaches for the incorporation of these novel subjects into the educational programs without compromising the cultivation of the traditional skills. In this context, the educational community is showing rapidly rising interest in project-based learning approaches.

The mainstream engineering education follows traditional classroom teaching, in which the major focus is mainly on the lecture and the student has very little (if any) choice on the learning process. However rapid development in engineering and technology requires adopting a teaching approach that would assist students not only in developing a core set of industry relevant skills, but also enable them to adapt to changes in their professional career.

Course Objectives

1. To emphasize project based learning activities that are long-term, interdisciplinary and student-centric.
2. To inculcate independent and group learning by solving real world problems with the help of available resources.
3. To be able to develop applications based on the fundamentals of mechanical engineering by possibly applying previously acquired knowledge.
4. To get practical experience in all steps in the life cycle of the development of mechanical systems: specification, design, implementation, and testing.
5. To be able to select and utilize appropriate concepts of mechanical engineering to design and analyze selected mechanical system.

Course Outcomes

On completion of the course, learner will be able to

- CO1. IDENTIFY the real-world problem (possibly of interdisciplinary nature) through a rigorous literature survey and formulate / set relevant aims and objectives.
- CO2. ANALYZE the results and arrive at valid conclusions.
- CO3. PROPOSE a suitable solution based on the fundamentals of mechanical engineering by possibly integration of previously acquired knowledge.
- CO4. CONTRIBUTE to society through proposed solutions by strictly following professional ethics and safety measures.
- CO5. USE of technology in proposed work and demonstrate learning in oral and written form.
- CO6. DEVELOP ability to work as an individual and as a team member.

Group Structure

Working in supervisor/mentor –monitored groups. The students plan, manage and complete a task/project/activity which addresses the stated problem.

1. Create groups of 5 (five) to 6 (six) students in each class
2. A supervisor/mentor teacher is assigned to 3-4 groups or one batch

Project Selection

The project can be selected by undertaking a survey of journal papers, patents or field visit (A problem can be theoretical, practical, social, technical, symbolic, cultural and/or scientific). The problem shall consist of following facets: feasibility of arriving at a solution, analyzing the problem, design and development of the system (hardware or virtual).

There are no commonly shared criteria/ guidelines for what constitutes an acceptable project. Projects vary greatly in the depth of the questions explored, the clarity of the learning goals, the

content and structure of the activity undertaken.

Solution to problem-based projects through “*learning by doing*” is recommended. The model begins with the identifying of a problem, often growing out of a question or “wondering”. This formulated problem then stands as the starting point for learning. A problem can be theoretical, practical, social, technical, symbolic, cultural and/or scientific and grows out of students’ wandering within different disciplines and professional environments. As stated in the preamble as the world has adapted and propagated multidisciplinary approach, hence the proposed project activity preferably should not be restricted to only mechanical domain specific projects rather should be Interdisciplinary in nature. However the chosen problem should be integration of other streams of engineering with Mechanical engineering.

Although in a genuine case 100% software/ virtual project topic may be allowed.

Ethical Practices, teamwork and project management:

Use Indian standards or any relevant standards for project manufacturing, respect the time of others, attend the reviews, poster presentation and model exhibitions, strictly follow the deadline of project completion, comply with all legislation requirements that govern workplace health and safety practices.

Effective Documentation

In order to make our engineering graduates capable of preparing effective documentation, it is required for the students to learn the effective writing skills. The PBL final report is expected to consist of the Literature Survey, Problem Statement, Aim and Objectives, System Block Diagram, System Implementation Details, Discussion and Analysis of Results, Conclusion, System Limitations and Future Scope. Many freely available software tools (for instance Mendley (Elsevier), Grammarly) are expected to be used during the preparation of PBL synopsis and final report. It is expected that the PBL guides/mentors shall teach students about utilizing valid sources of information (such as reference papers, books, magazines, etc) related to their PBL topic.

Evaluation & Continuous Assessment

The institution/head shall be committed to ensuring the effective and rigorous implementation of the idea of project based learning. Progress of PBL shall be monitored regularly on a weekly basis. Weekly review of the work shall be necessary. During the process of monitoring and continuous assessment and evaluation the individual and team performance is to be measured. PBL is monitored and continuous assessment is done by supervisor /mentor and authorities. Students must maintain an institutional culture of authentic collaboration, self-motivation, peer-learning and personal responsibility. The institution/department should support students in this regard through guidance/orientation programs and the provision of appropriate resources and services. Supervisor/mentor and Students must actively participate in assessment and evaluation processes.

The effectiveness of the concept PBL lies in rigorous and continuous assessment and evaluation of the student performance. It is recommended that all activities are required to be recorded regularly. A regular assessment of PBL work is required to be maintained at the department in PBL log book by students. It is expected that the PBL log book must include following:

1. Information of students and guide
2. Weekly monitoring by the PBL guide,
3. Assessment sheet for PBL work review by PBL guide and PBL Evaluation Committee (PEC).

The PEC structure shall consist of Head of the department, 1/2 senior faculties of the department and one industry expert (optional). Continuous Assessment Sheet (CAS) is to be maintained by the department.

Recommended parameters for assessment, evaluation and weightage

1. Idea Inception (kind of survey). (10%)
2. Documentation (Gathering requirements, design & modeling, implementation/execution, use of technology and final report, other documents). (15%)
3. Attended reviews, poster presentation and model exhibition. (10%)

4. Demonstration (Poster Presentation, Model Exhibition etc). (10%).
5. Awareness /Consideration of - Environment/ Social /Ethics/ Safety measures/Legal aspects. (5%)
6. Outcome (physical model/prototype/ virtual model/ product development/ assembly & disassembly and analysis of standard mechanism or system, design and development of small applications using Arduino, design of control systems, development of various systems/ subsystems of BAJA/SUPRA/Robots/GoKart/ Sunrisers/Hackathon/ application development and similar activities/ System performance and analysis) (40%)
7. Participation in various competitions/ publication/ copyright/ patent) (10%)

Learning Resources

Reference Books / Research Articles

1. John Larmer, John R. Mergendoller, and Suzie Boss, “Setting the Standard for Project Based Learning”
2. John Larmer and Suzie Boss, “Project Based Teaching: How to Create Rigorous and Engaging Learning Experiences”
3. Erin M. Murphy and Ross Cooper, “Hacking Project Based Learning: 10 Easy Steps to PBL and Inquiry”

Web resources

1. <https://www.edutopia.org/project-based-learning>
2. www.howstuffworks.com
3. <https://www.pblworks.org/>
4. www.wikipedia.org

302055: Internship/Mini project				
Teaching Scheme**		Credits	Examination Scheme	
		04	TW	100 Marks
Prerequisites: Knowledge of design, manufacturing processes, modeling, and mechanical systems				
Course Objectives:				
<p>Internship provides an excellent opportunity to learner to see understand the conceptual aspects learned in classes and deployed into the practical world. Industry/on project experience provides much more professional experience as value addition to classroom teaching.</p> <ol style="list-style-type: none"> 1. To encourage and provide opportunities for students to get professional/personal experience through internships. 2. To learn and understand real life/industrial situations. 3. To get familiar with various tools and technologies used in industries and their applications. 4. To nurture professional and societal ethics. 5. To create awareness of social, economic and administrative considerations in the working environment of industry organizations. 				
Course Outcomes:				
<p>On completion of the course, learners should be able to</p> <p>CO1. DEMONSTRATE professional competence through industry internship.</p> <p>CO2. APPLY knowledge gained through internships to complete academic activities in a professional manner.</p> <p>CO3. CHOOSE appropriate technology and tools to solve given problem.</p> <p>CO4. DEMONSTRATE abilities of a responsible professional and use ethical practices in day to day life.</p> <p>CO5. DEVELOP network and social circle, and DEVELOPING relationships with industry people.</p> <p>CO6. ANALYZE various career opportunities and DECIDE career goals.</p>				
**Guidelines:				
<p>Internships are educational and career development opportunities, providing practical experience in a field or discipline. Internships are far more important as the employers are looking for employees who are properly skilled and having awareness about industry environment, practices and culture. Internship is structured, short-term, supervised training often focused around particular tasks or projects with defined time scales.</p> <p>Core objective is to expose technical students to the industrial environment, which cannot be simulated/experienced in the classroom and hence creating competent professionals in the industry and to understand the social, economic and administrative considerations that influence the working environment of industrial organizations.</p> <p>Engineering internships are intended to provide students with an opportunity to apply conceptual knowledge from academics to the realities of the field work/training. The following guidelines are proposed to give academic credit for the internship undergone as a part of the Third Year Engineering curriculum.</p>				

Duration:
Internship is to be completed after semester 5 and before commencement of semester 6 of at least 4 to 6 weeks; and it is to be assessed and evaluated in semester 6.
Internship work Identification:
<p>Student may choose to undergo Internship at Industry/Govt. Organizations/NGO/MSME/Rural Internship/ Innovation/IPR/Entrepreneurship. Student may choose either to work on innovation or entrepreneurial activities resulting in start-up or undergo internship with industry/NGO's/Government organizations/Micro/Small/ Medium enterprises to make themselves ready for the industry.</p> <p>Students must get Internship proposals sanctioned from college authority well in advance. Internship work identification process should be initiated in the Vth semester in coordination with training and placement cell/ industry institute cell/ internship cell. This will help students to start their internship work on time. Also, it will allow students to work in vacation period after their Vth semester examination and before academic schedule of semester VI.</p> <p>Student can take internship work in the form of the following but not limited to:</p> <ol style="list-style-type: none"> 1. Working for consultancy/ research project, 2. Contribution in Incubation/ Innovation/ Entrepreneurship Cell/ Institutional Innovation Council/ startups cells of institute / 3. Learning at Departmental Lab/Tinkering Lab/ Institutional workshop, 4. Development of new product/ Business Plan/ registration of start-up, 5. Industry / Government Organization Internship, 6. Internship through Internshala, 7. In-house product development, intercollegiate, inter department research internship under research lab/group, micro/small/medium enterprise/online internship, 8. Research internship under professors, IISC, IIT's, Research organizations, 9. NGOs or Social Internships, rural internship, 10. Participate in open source development.
Internship Diary/ Internship Workbook:
<p>Students must maintain Internship Diary/ Internship Workbook. The main purpose of maintaining diary/workbook is to cultivate the habit of documenting. The students should record in the daily training diary the day-to-day account of the observations, impressions, information gathered and suggestions given, if any. The training diary/workbook should be signed every day by the supervisor.</p> <p>Internship Diary/workbook and Internship Report should be submitted by the students along with attendance record and an evaluation sheet duly signed and stamped by the industry to the Institute immediately after the completion of the training.</p>
Internship Work Evaluation:
<p>Every student is required to prepare and maintain documentary proofs of the activities done by him as internship diary or as workbook. The evaluation of these activities will be done by Program Head/Cell In-charge/ Project Head/ faculty mentor or Industry Supervisor based on- Overall compilation of internship activities, sub-activities, the level of achievement expected, evidence needed to assign the points and the duration for certain activities.</p> <p>Assessment and Evaluation is to be done in consultation with internship supervisor (Internal and External – a supervisor from place of internship).</p>

Recommended evaluation parameters-Post Internship Internal Evaluation -50 Marks + Internship Diary/Workbook and Internship Report - 50 Marks

Evaluation through Seminar Presentation/Viva-Voce at the Institute

The student will give a seminar based on his training report, before an expert committee constituted by the concerned department as per norms of the institute. The evaluation will be based on the following criteria:

- Depth of knowledge and skills
- Communication & Presentation Skills
- Team Work and Creativity
- Planning & Organizational skills
- Adaptability
- Analytical Skills
- Attitude & Behavior at work
- Societal Understanding
- Ethics
- Regularity and punctuality
- Attendance record
- Diary/Workbook
- Student's Feedback from External Internship Supervisor

After completion of Internship, the student should prepare a comprehensive report to indicate what he has observed and learnt in the training period.

Internship Diary/workbook may be evaluated on the basis of the following criteria:

- Proper and timely documented entries
- Adequacy & quality of information recorded
- Data recorded
- Thought process and recording techniques used
- Organization of the information

The report shall be presented covering following recommended fields but limited to,

- Title/Cover Page
- Internship completion certificate
- Internship Place Details- Company background-organization and activities/Scope and object of the study / Supervisor details
- Index/Table of Contents
- Introduction
- Title/Problem statement/objectives
- Motivation/Scope and rationale of the study
- Methodological details
- Results / Analysis /inferences and conclusion
- Suggestions / Recommendations for improvement to industry, if any
- Attendance Record
- Acknowledgement
- List of reference (Library books, magazines and other sources)

Feedback from internship supervisor(External and Internal)

Post internship, faculty coordinator should collect feedback about student with recommended parameters include as- Technical knowledge, Discipline, Punctuality, Commitment, Willingness to do the work, Communication skill, individual work, Team work, Leadership...

Reference:

1. <https://www.aicte-india.org/sites/default/files/AICTE%20Internship%20Policy.pdf>
2. <https://internship.aicte-india.org/>

IMPORTANT NOTE:

The student shall be encouraged to undertake the industrial internships however the Industry may provide opportunity to a limited few amongst the students available. In such scenario it becomes the moral responsibility of the faculty to create opportunity for such group of students (similar to the ones in Industry) by assigning them some real life problem as a part of the mini project and encouraging/mentoring them to attempt viable solutions. Hence the provision of Mini project is being done to accommodate such students and expose them with the Industrial practices in house. The students can be encouraged to consider analysis of the global patents available as a mini project,

Mini project

Teaching Scheme		Credits		Examination Scheme	
Practical	4 Hrs./Week	Practical	4	Term work	100

Course Objectives:

Students shall UNDERTAKE and EXECUTE a Mini Project through a group of students to

1. **UNDERSTAND** the “Product Development Cycle”, through Mini Project.
2. **PLAN** for various activities of the project and distribute the work amongst team members.
3. **LEARN** budget planning for the project.
4. **INCULCATE** mechanical/interdisciplinary implementation skills.
5. **DEVELOP** students’ abilities to transmit technical information clearly and test the same by delivery of Seminar based on the Mini Project.
6. **UNDERSTAND** the importance of document design by compiling Technical Report on the Mini Project work carried out.

Course Outcomes:

On completion of the course, learner will be able to

- CO1. **EXPLAIN** plan and execute a Mini Project with team.
- CO2. **IMPLEMENT** hardware/software/analytical/numerical techniques, etc.
- CO3. **DEVELOP** a technical report based on the Mini project.
- CO4. **DELIVER** technical seminar based on the Mini Project work carried out.

Course Contents

Maximum Group Size: Minimum 2 and maximum 4 students can form a group for the mini project.

Project Type: (The selected mini project must be based on any of the following)

1. Development of a prototype mechanical system/product.
2. Investigate performance of mechanical systems using experimental method

3. Parametric analysis of components/systems/devices using suitable software
4. Investigation of optimum process/material for product development using market survey.
5. Solution for society/industry problems

The Assessment Scheme will be:

- a. **Continuous Assessment 50 marks** (*based on regular interaction, circuit development*)
- b. **End Semester 50 marks** (*based on poster presentation, demonstration / Seminar*)

Project domain may be from the following, but not limited to:

1. Thermal Systems
2. Robotics Mechanisms/design systems
3. Production/advance manufacturing
4. Materials: Composite/Nano
5. Automation and Control Systems
6. Mechatronic Systems
7. Agriculture system.
8. Smart systems using AI-ML

A project report with following contents shall be prepared:

1. Title
2. Objectives
3. Relevance and significance
4. Methodology
5. Analysis-Simulation/experimentation/survey/testing etc.
6. Result and Discussion
7. Conclusion