



The Kavery Engineering College

(Approved by AICTE, New Delhi & Affiliated to Anna University)
Mecheri, Mettur Tk. Salem Dt - 636 453.

DEPARTMENT OF MECHANICAL ENGINEERING

PROGRAMME: M. E. PRODUCT DESIGN AND DEVELOPMENT

VISION

- ❖ To deliver high quality education that creates new opportunities for students to meet the challenges and in pursuit of excellence in Mechanical Engineering.

MISSION

- ❖ To provide a sound mechanical engineering education for a successful career.
- ❖ To facilitate team work and culture to improve the social standards of graduates.
- ❖ To strengthen the industry institute interaction.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

- ❖ To prepare students to excel in new product design and development through application of knowledge and practical skills.
- ❖ To provide students with a solid foundation in mathematical modeling of engineering problems required for bringing new products fast into the market.
- ❖ To provide students with required scientific and engineering knowledge so as to comprehend, analyze, design and create innovative products and solutions for real life problems.

PROGRAM OUTCOMES (POs)

- ❖ Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- ❖ Problem analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- ❖ 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, and the cultural, societal, and environmental considerations.
- ❖ Conduct Investigations of Complex Problems: Use research-based knowledge and research methods



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including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

- ❖ Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- ❖ 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.
- ❖ Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- ❖ Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- ❖ Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- ❖ Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- ❖ 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.
- ❖ 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)

- ❖ Apply the knowledge gained from the principles of product design, development and management in innovating new products.
- ❖ Investigate research oriented problems through creativity to design, develop and manage innovative new products with due consideration for environmental and social impacts.
- ❖ Pursue professional careers as an individual in design industry and shall demonstrate abilities to communicate their creative ideas in the product design and manage the product development of new products.



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COURSE OUTCOMES (COs)

Regulation	2017
Semester	01
Course Code	MA5156
Course Name	Applied Mathematics for Engineers
Course Outcome	<ul style="list-style-type: none">• Apply various methods in matrix theory to solve system of linear equations.• Maximizing and minimizing the functional that occur in various branches of engineering disciplines.• Computation of probability and moments, standard distributions of discrete and continuous random variables and functions of a random variable.• Application of Laplace and Fourier transforms to initial value, initial-boundary value and boundary value problems in Partial Differential Equations.

Regulation	2017
Semester	01
Course Code	PD5101
Course Name	Introduction to Product Development
Course Outcome	<ul style="list-style-type: none">• At the end of this course the student is expected to demonstrate an understanding of the overview of all the product development processes and knowledge of concept generation and selection tools.

Regulation	2017
Semester	01
Course Code	ED5151
Course Name	Computer Applications in Design



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Course Outcome	<ul style="list-style-type: none">• It helps the students to get familiarized with the computer graphics application in design.• This understanding reinforces the knowledge being learned and shortens the overall learning curve which is necessary to solve CAE problems that arise in engineering.
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Regulation	2017
Semester	01
Course Code	ED5153
Course Name	Advanced Finite Element Analysis
Course Outcome	<ul style="list-style-type: none">• The students will understand the Finite Element Formulation of Plate and Shell Elements and its application.• The students will be able to gain knowledge in material & geometric non-and plasticity.• The students will be able to solve problems under dynamic conditions by applying various techniques.• The students can arrive at the solutions for fluid mechanics and heat transfer problems.• The students will acquire knowledge in error norms, convergence rates and refinement.• The students will solve the real world engineering problems using FEA.

Regulation	2017
Semester	01
Course Code	PD5102
Course Name	Industrial Design



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Course Outcome	<ul style="list-style-type: none"> • Get knowledge in manual, mechanical and automated systems. • Understand the importance of ergonomics in the design of new products. • Carry out environmental friendly design. • Gain knowledge on the effect of biomechanics, bio thermodynamics, bioenergetics on the design and development of new products. • Do information processing. • Understand the effects of other human factors.
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Regulation	2017	
Semester	01	Professional Elective – I
Course Code	CC5292	
Course Name	Additive Manufacturing and Tooling	
Course Outcome	<ul style="list-style-type: none"> • Understand history, concepts and terminology of additive manufacturing. • Apply the reverse engineering concepts for design development. • Understand the variety of additive manufacturing techniques. • Design and develop newer tooling models. • Analyse the cases relevant to mass customization and some of the important research challenges associated with AM and its data processing tools. 	

Regulation	2017	
Semester	01	
Course Code	ED5161	
Course Name	CAD Laboratory	
Course Outcome	<ul style="list-style-type: none"> • With laboratory classes, it helps the students to get familiarized with the computer applications in design and preparing drawings for various mechanical components. 	



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Regulation	2017
Semester	01
Course Code	ED5162
Course Name	Advanced Analysis and Simulation Laboratory
Course Outcome	<ul style="list-style-type: none">• Upon completion of this course, the Students can model, analyse and simulate experiments to meet real world system and evaluate the performance.

Regulation	2017
Semester	02
Course Code	PD5251
Course Name	Integrated Product Design and Process Development
Course Outcome	<ul style="list-style-type: none">• Understand The Integration Of Customer Requirements In Product Design.• Apply Structural Approach To Concept Generation, Selection and Testing.• Understand various aspects of design such as industrial design , design for manufacture , economic analysis and product architecture.

Regulation	2017
Semester	02
Course Code	PD5201
Course Name	Product and Process Engineering Tools
Course Outcome	<ul style="list-style-type: none">• Understand and apply the various tools used for design development analysis and optimization.• Learn about the various methodology for process improvement.• Use various statistical process control methods and control charts.• Appreciate the need for bench marking and project management.



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Regulation	2017
Semester	02
Course Code	PD5202
Course Name	Materials Selection for Product Development
Course Outcome	<ul style="list-style-type: none">• Understand the behaviour of various metals and non-metals.• Learn about process modelling.• Learn about the selection of material for different applications.• Gain knowledge in new product design methods and requirements for assembly.• Get exposure to the manufacturing processes in micro fabrication.• Appreciate design for assembly.

Regulation	2017
Semester	02
Course Code	PD5203
Course Name	Quality Concepts in Product Development
Course Outcome	<ul style="list-style-type: none">• Understand about the quality function deployment, design process.• Be able to apply failure mode effect analysis adopting both basic methods and advanced methods.• Learn about design of experiments – ANOVA and Taguchi method.• Apply statistical design methods and reliability procedures.• Gain knowledge in Six Sigma.• Be able to apply the quality concepts for real-time situations.

Regulation	2017	
Semester	02	Professional Elective – II
Course Code	CM5072	



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Course Name	Micro Electro Mechanical Systems
Course Outcome	<ul style="list-style-type: none">At the end of this course the student will be able to apply the knowledge in mechanics, scaling, design, fabrication and characterization of micro systems.

Regulation	2017	
Semester	02	Professional Elective – III
Course Code	CC5291	
Course Name	Design for Manufacture, Assembly and Environments	
Course Outcome	<ul style="list-style-type: none">To make the students get acquainted with the design for manufacturing, assembly and environment.	

Regulation	2017	
Semester	02	
Course Code	PD5211	
Course Name	Product Design Laboratory	
Course Outcome	<ul style="list-style-type: none">Appreciate the use of physical prototype models for evaluating product concept.Apply theoretical knowledge to design and development of physical products using clay, wood, sheet metal and RP techniques.	

Regulation	2017	
Semester	02	
Course Code	PD5212	
Course Name	Design Project	



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Course Outcome	<ul style="list-style-type: none"> It helps the students to get familiarized with respect to design standards, design calculations and analysis in designing any mechanical component or system.
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Regulation	2017	
Semester	03	
Course Code	PD5301	
Course Name	Marketing Research	
Course Outcome	<ul style="list-style-type: none"> The student will gain a fundamental knowledge marketing research and its application in the front end of product development. 	

Regulation	2017	
Semester	03	Professional Elective – IV
Course Code	PD5006	
Course Name	Maintenance engineering	
Course Outcome	<ul style="list-style-type: none"> Be exposed to maintenance systems and reliability based design Gain knowledge about the various techniques of condition monitoring of systems. Learn about reliability based maintenance, safety engineering and Asset planning. 	

Regulation	2017	
Semester	03	Professional Elective – V
Course Code	PD5007	
Course Name	Integrated manufacturing systems	



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Course Outcome	<ul style="list-style-type: none">• It helps the students to get familiarized with the computer aided process planning, group technology, process planning and control and computer integrated manufacturing systems.
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Regulation	2017
Semester	03
Course Code	PD5311
Course Name	Project Work Phase I
Course Outcome	<ul style="list-style-type: none">• At the end of the course the students will have a clear idea of their area of work and they will be in a position to carry out the remaining phase II work in a systematic way.

Regulation	2017
Semester	04
Course Code	PD5411
Course Name	Project Work Phase II
Course Outcome	<ul style="list-style-type: none">• On completion of the project work students will be in a position to take up any challenging practical problem in the field of engineering design and find better solutions to it.