

National Engineering College,

(An Autonomous Institution)

K R Nagar, Kovilpatti

**Department of
Mechanical Engineering**

MINUTES of 25th Meeting of Board of Studies held

on

06th June, 2026 at 10.30 a.m.

**Venue: Smart Classroom,
Mechanical Engineering Department,
National Engineering College**

National Engineering College, K.R.Nagar, Kovilpatti – 628 503
(An Autonomous Institution - Affiliated to Anna University, Chennai)
www.nec.edu.in

25th Board of Studies Meeting
Department of Mechanical Engineering

Venue: Smart Classroom,
Department of Mechanical Engineering,
National Engineering College

Date & Time: 06.06.2026 & 10.30 a.m.

AGENDA

BoS / MECH 25.1	:	Welcome address and Opening Remarks by Chairman, Board of Studies, Department of Mechanical Engineering
BoS / MECH 25.2	:	Vision and Mission of Department & PEOs and PSOs of B.E. Mechanical Engineering
BoS / MECH 25.3	:	Action taken report on minutes of 24 th Board of Studies meeting
BoS / MECH 25.4	:	B.E. Mechanical Engineering Programme– Syllabus for few Programme Elective Courses under R2023
BoS / MECH 25.5	:	Student Feedback on R2023 Regulation
BoS / MECH 25.6	:	Any other matters

National Engineering College, K.R.Nagar, Kovilpatti – 628 503
(An Autonomous Institution - Affiliated to Anna University, Chennai)

F. No. 1-2/NEC/ MECH

Date: 11th June, 2026

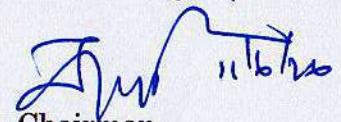
Dear Sir,

Sub: Minutes of the 25th Board of Studies meeting for Mechanical Engineering - Reg.

Kindly find attached herewith the Minutes of the Board of Studies meeting for Mechanical Engineering of National Engineering College, K.R.Nagar, Kovilpatti – 628503 held on 06th December, 2026 at 10.30 a.m. in the Smart classroom, Mechanical Engineering department, National Engineering College, K R Nagar, Kovilpatti

It is requested that comments on the Minutes of Board of Studies meeting, if any, may please be sent by email to hodmech@nec.edu.in, at the earliest. If no comments are received, within one week, the Minutes shall be taken as confirmed.

Yours Sincerely,



Chairman
Board of Studies

National Engineering College, K.R.Nagar, Kovilpatti – 628 503
(An Autonomous Institution - Affiliated to Anna University, Chennai)

Department of Mechanical Engineering

MINUTES OF THE MEETING

The 25th Board of Studies meeting of the Mechanical Engineering was held on 06th June, 2026 at 10.30 a.m.in in the Smart Classroom, Mechanical Engineering Department, National Engineering College, K.R.Nagar, Kovilpatti – 628 503

1. The following members were present

1.	Dr. S. Iyahraja, Professor & Head, Department of Mechanical Engg., NEC	Chairman
2.	Dr. D Samuel Raj, Associate Professor/Mechanical Engineering, CEG Campus, Anna University, Chennai – 600025.	University Nominee
3.	Dr. M. Venkata Ramanan, Professor & Director, Institute for Energy Studies, CEG, Anna University, Chennai – 600025	Academic Experts
4.	Dr. N. Siva Shanmugam, Professor / Mechanical Engg., NIT Trichy.	
5.	Dr. K. Hariharan, Professor / Mechanical Engineering, Indian Institute of Technology, Madras.	
6.	Mr. K. Monickavasagom Pillai, Chief Scientist, CSIR –National Aerospace Laboratories, Bangalore.	Meritorious Alumnus Nominated by the Principal
7.	Mr. Hari Babu Vulava Senior Vice President, Axicades Technologies Ltd., Bengaluru.	Industrial Experts
8.	Mr. S. Ravikumar, Chief Research & Innovation Testing and Validation, Iniciotek Private Limited, Chennai.	
9.	Mr. S. Balaji, Assistant General Manager, Hyundai Motor India Limited, Chennai.	
10.	Dr. D. Venkat Kumar, Professor / Mechanical Engineering	Internal Members
11.	Dr. R. Harichandran, Professor / Mechanical Engineering	
12.	Dr. P. Ramanan, Associate Professor / Mechanical Engineering	

13.	Dr. I. Sankar, Associate Professor / Mechanical Engineering	
14.	Dr. D. Vignesh Kumar, Associate Professor / Mechanical Engineering	
15.	Dr. F. Michael Thomas Rex, Associate Professor / Mechanical Engineering	
16.	Dr. A. Andrews, Assistant Professor (S.G) / Mechanical Engineering	
17.	Dr. K. Thoufiq Mohammed, Assistant Professor (S.G) / Mechanical Engineering	
18.	Dr. T. Sakthi, Assistant Professor (S.G) / Science & Humanities	
19.	Dr. C. Veera Ajay, Assistant Professor (S.G) / Mechanical Engineering	
20.	Ms. M. Rajeswari Assistant Professor / Mechanical Engineering	
21.	Dr. B. Prince Abraham Assistant Professor / Mechanical Engineering	
22.	Mr. N. Muthu Saravanan Assistant Professor / Mechanical Engineering	
23.	Dr. M. C. Eniyan Assistant Professor / Mechanical Engineering	
24.	Mr. V. Sanjay, III Year / Mechanical Engineering	Student Members
25.	Mr. P. Subramanyan, II Year / Mechanical Engineering	

2. The following members could not attend the meeting due to unavoidable reasons and they were granted leave of absence.

1.	Dr. C. Prathap, Professor / Aerospace Engg, Indian Institute of Space Science & Tech., Thiruvananthapuram.	Academic Experts
2.	Mr. K. Subramanian Team Lead, ELGI Equipments Limited, Coimbatore.	Industrial Experts
3.	Mr. Arcot Thanjan Paary, DGM, Mech. – Static Dept., L&T Ltd, Chennai	
4.	Mr. S. Manikandan, Senior Engineer, Rolls-Royce Power Systems,	

	Pune.	
5.	Dr. D. P. Sudhakar Deputy Director ISRO - Indian Space Research Organization Mahendragiri, Tirunelveli District.	R & D Expert

BoS / MECH 25.1	:	WELCOME ADDRESS AND OPENING REMARKS BY CHAIRMAN, BOARD OF STUDIES, DEPARTMENT OF MECHANICAL ENGINEERING
	:	The Chairman, BOS of the Mechanical Engineering welcomed and introduced the members of 25 th Board of Studies and acknowledged each one of them for sparing their valuable time to attend the meeting.
BoS / MECH 25.2	:	TO DISCUSS ANY SUGGESTIONS / MODIFICATIONS NEEDED IN THE VISION AND MISSION OF DEPARTMENT & PEOs AND PSOs OF B.E. MECHANICAL ENGINEERING
	:	Vision and Mission of the Mechanical Engineering Department, and PEOs and PSOs of B.E. Mechanical Engineering were presented by the Chairman.
BoS / MECH 25.3	:	TO APPROVE THE ACTION TAKEN REPORT OF THE MINUTES OF TWENTY FOURTH BOS MEETING HELD ON 29 th NOVEMBER, 2025.
	:	The minutes of the Twenty fourth Board of Studies meeting held on 29th November, 2025 were communicated to the members. The comments given by the members have been incorporated wherever possible and placed for confirmation. The same was approved in the 24th Academic Council Meeting. The action taken report of the Twenty fourth Board of Studies meeting held on 29th November, 2026 has been presented and the same has been approved in the 25th Board of Studies meeting. (Enclosed in Annexure – I)
BoS / MECH 25.4	:	TO CONFIRM AND APPROVE the B.E. Mechanical Engineering Programme – Syllabus for few Programme Elective Courses under R2023 (Enclosed in Annexure – II)

		The syllabi of the proposed Programme Elective courses were presented to the BoS members for review. The members reviewed the course contents, Course Outcomes, textbooks, and references, and provided various suggestions for improvement and enhancement of the syllabi. The suggestions and recommendations were noted and listed below.
		Suggestions Given by the Members
25.4.1		<u>Refrigeration and Air Conditioning</u> • The book “Principles of Refrigeration” by Roy J. Dossat, “Basic Refrigeration and Air Conditioning” by P. N. Ananthanarayanan and “Refrigeration and Air Conditioning” by Prof. P. L. Ballaney may be included in the Textbook/Reference section. • In CO5, the topic “Sustainable Cooling techniques” can be added.
25.4.2	:	<u>Automobile Engineering</u> • In CO2, the statement “Compare the working of SI and CI engines and deliberate the recent development in the area of alternates for automotive engines” may be revised by removing the phrase “in the area of alternates for automotive engines” for better clarity and alignment with the course content. • The topics “Introduction to Electric Vehicles (EVs)” and “Battery Management Systems (BMS)” may be incorporated into a suitable Course Outcome to address emerging trends in automotive technology. • In CO2, the topic “Vehicle Performance” may be included near the content related to “Emission Control and Standards”. • In CO4, the content under the topic “Tyres” may be reduced to avoid excessive coverage and to maintain balance among the course topics.
25.4.3	:	<u>Advanced Internal Combustion Engines</u> • In CO1, the term “Combustion Stoichiometry” may be revised to “Introduction to Combustion Stoichiometry” • In CO5, the topic “Ethanol” may be included at a suitable place within the course content to enhance coverage of renewable and sustainable automotive fuels.

25.4.4	:	<u>Thermal Design and Management of Electronic Equipment</u> • In CO2, the topic “Data Center” may be incorporated at a suitable place in the course content. • In CO4, the terms “Smartphones” and “Laptops” may be replaced with the broader term “Electronic Gadgets” to provide wider applicability and flexibility in covering contemporary electronic devices.
25.4.5	:	<u>Computational Fluid Dynamics</u> • The topic “Applications in Engineering Systems” may be incorporated into a suitable Course Outcome. • Add the book authored “Suhas V Patankar, Computation of conduction and Duct flow heat transfer”
25.4.6	:	<u>Gas Dynamics and Jet Propulsion Systems</u> • In CO4, the statement “Use of measurement techniques and experimental facilities for measuring compressible flow” may be revised to “Use of measurement techniques and experimental facilities for measurement of parameters associated with compressible flow” for improved clarity.
25.4.7	:	<u>Energy Storage Systems</u> • In CO1, the content “Current Electric Vehicle Market” may be removed, as it is more market-oriented and may not directly contribute to the core technical objectives of the course. • In CO4, the topics “Metal Oxide Fuel Cells,” “Solid Oxide Fuel Cells,” and “Comparative Analysis of Fuel Cells” may be incorporated at a suitable place in the course content to enhance coverage of advanced energy conversion technologies and their engineering applications.
25.4.8	:	<u>Fuel Cells and Hydrogen Energy</u> • In CO4, the statement may be revised by replacing the word “Demonstrate” with “Analyze” or “Elucidate” to better reflect the expected cognitive level of the course outcome. • In CO5, the term “Safety” may be revised to “Mitigate, Safety” within the course content.
25.4.9	:	<u>Heating, Ventilation and Air Conditioning</u> • All Course Outcome (CO) statements may be reviewed and revised in short.

	• The topics “MATLAB” and “Simulink” may be incorporated at a suitable place in the course content.
25.4.10	<u>Vibration Control</u> • The book “Mechanical Vibrations” by A. S. Kailey and J. S. Mehta may be included in the Reference section. • The book “Schaum's Outline of Mechanical Vibrations” may be added to the Reference section. • The textbook “Mechanical Vibrations” by R. Venkatachalam may be incorporated in the Textbook/Reference section to strengthen the available learning resources. • In CO4 and CO5, the topic “Case Studies and Applications” may be included at suitable places in the course content to enhance practical understanding and industry relevance. • In CO5, under the topic “Frequency-Domain Analysis,” the topic “Fast Fourier Transform (FFT)” may be included.
25.4.11	<u>MEMS Devices - Design and Fabrication</u> • “The BoS members approved the inclusion of the subject “MEMS Devices – Design and Fabrication” under the vertical Product & Process Development, considering it to be highly appropriate and relevant to the objectives of the vertical. • In CO1, the topic “Nano-Electro-Mechanical Systems (NEMS)” may be included to provide an introduction to emerging micro and nano-scale device technologies. • In CO4, the topic “Topology Optimization” may be incorporated at a suitable place in the course content. • In CO4, the topic “Optical Metrology for MEMS” may be included at a suitable place in the course content to strengthen coverage of characterization and measurement techniques used in MEMS devices.
25.4.12	<u>Materials Selection and Design</u> • The proposed subject “Automotive Materials Components Design and Testing” was removed and replaced with the new subject “Materials Selection and Design.” The BoS members noted that the revised subject offers broader coverage of material selection methodologies, design considerations, and engineering applications across multiple domains. • As per the suggestions of the BoS Committee members, the subject “Materials Selection and Design”, adopted from the syllabus of Anna University, has been included in the curriculum considering its relevance and significance to the program outcomes and industry requirements.

25.4.13	<u>Optimization Methods in Engineering Design</u> • The course title “Optimization Methods in Engineering Design” may be revised to “Optimization Methods in Engineering” to provide a broader scope and applicability across various engineering domains. • In CO4, broader optimization and intelligent computing techniques such as Artificial Neural Networks (ANN), Recurrent Neural Networks (RNN), Deep Learning, Metaheuristic Algorithms, and Data-Driven Approaches may be incorporated at suitable places in the course content to reflect recent advancements in engineering optimization and decision-making.
25.4.14	<u>Condition Monitoring</u> • In CO1, the statement may be revised by replacing the word “Practice” with “Review on” to better reflect the intended learning outcome and scope of the course. • In CO1, the topics “Machine Tools” and “Testing Equipment” may be incorporated at suitable places in the course content.
25.4.15	<u>Design Codes and Standards</u> • In CO1, the topics “What is Code?,” “What is Standard?,” and “Need for Codes and Standards” may be suitably framed. • In CO3, the topic “Who Publishes Codes and Standards?” may be removed from the course content. Topics framed as questions are generally not appropriate for a syllabus and may be revised to maintain a professional and outcome-based course structure.
25.4.16	<u>Quality Control of Welded Structures</u> • In CO1, the topic “Welding Defects” may be included in the course content to provide students with knowledge of common welding imperfections and their significance in quality assurance. • In CO3, the topic “What are Codes & Standards?” may be revised to “Codes & Standards” to maintain a concise and professional syllabus format. • In CO1, the topics “Residual Stress” and “Distortion” may be incorporated at suitable places in the course content. • European standards such as DIN Standards may be included at a suitable place in the course content, along with other relevant international standards, to provide broader exposure to globally recognized engineering codes and standards.

25.4.17	<u>Lean Manufacturing</u> • The course title “Lean Manufacturing” may be revised to “Lean Manufacturing and Six Sigma” to reflect the integration of both Lean Manufacturing and Six Sigma concepts. • The BoS members suggested that the subject “Lean Six Sigma” may be shifted from the Manufacturing Engineering domain to the Industrial Engineering domain, as the course primarily focuses on process improvement, quality management, statistical analysis, waste reduction, and continuous improvement methodologies that are closely aligned with Industrial Engineering. • The Course Outcomes (COs) may be restructured such that three COs focus on Lean Manufacturing concepts and two COs focus on Six Sigma methodologies, ensuring balanced coverage of both domains. • In CO2, the topic “Define, Measure, Analyze, Improve and Control (DMAIC) Methodology” may be incorporated at a suitable place in the course content to strengthen the coverage of Six Sigma principles and problem-solving approaches.
25.4.18	<u>Sustainable Manufacturing</u> • The topics “Digital Manufacturing” and “Industry 5.0” may be incorporated at suitable places in the relevant Course Outcomes and course content to provide students with exposure to emerging trends and advanced technologies in modern manufacturing systems.
25.4.19	<u>Statistical Quality Control and Reliability</u> • In CO3, the topics “Composite Design,” “Full Factorial Design,” and “Fractional Factorial Design” may be incorporated at suitable places in the course content. • The topic “Monte Carlo Simulation” may be included in CO1, provided it aligns with the course objectives and content, to introduce students to probabilistic analysis and simulation techniques used in quality control and reliability engineering.
25.4.20	<u>Process Planning and Cost Estimation</u> • In CO4 and CO5, the course content may be restructured under the three major headings: Formative Manufacturing Processes (Estimation of production Cost Casting Processes, Welding Processes, and Forging Processes), Subtractive Manufacturing Processes (Estimation of Machining Time and Cost for Lathe Operations, Drilling, Milling, Shaping

		and Planing, and Grinding), and Additive Manufacturing, to provide a systematic and process-oriented organization of the syllabus. • The textbook “Process and Operation Planning” by Gideon Halevi, Kluwer Academic Publishers, 2013 may be transferred from the Textbook Section to the Reference Section. • The book “Process Planning: The Design/Manufacture Interface” by Peter Scallan, Butterworth-Heinemann, 2003 may be transferred from the Reference Section to the Textbook Section, as it is more suitable as a primary course text.
25.4.21		<u>Engineering Economics and Cost Analysis</u> • CO2 and CO4 statements may be reviewed and revised to ensure proper alignment with the updated course content. • In CO1, the topic “Fishbone Diagram may be incorporated at a suitable place in the course content to enhance students’ understanding of root cause analysis and quality improvement techniques.
25.4.22		<u>Production Planning and Control</u> • No comments
BoS / MECH 25.5	:	TO DISCUSS the Student Feedback on R2023 Regulation. The Chairman, Board of Studies (BoS), Mechanical Engineering, presented the student feedback collected from first-, second-, and third-year mechanical engineering students under three categories: (i) Concept Understanding Outcomes, (ii) Practical Skill Outcomes, and (iii) Soft Skill Outcomes. The discussion was held on each category with respect to the questionnaire and feedback and suggestion given by the students. The BoS members appreciated the questionnaire designed for obtaining students’ feedback under Regulation R2023 and students’ feedback and suggestions.
BoS / MECH 25.6		<u>Any other matter</u> • The BoS members suggested placing greater emphasis on GATE coaching initiatives and incorporating GATE-oriented questions in assessments to enhance students’ competitive examination preparedness and subject proficiency. • The student members from the second year and third year B.E. Mechanical Engineering program presented their views on the R2023 curriculum and its courses. They suggested allocating more time for laboratory activities and experiential learning, as these would enhance practical

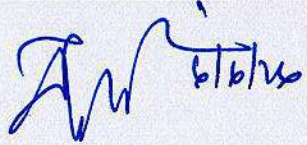
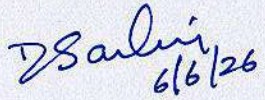
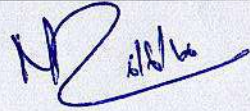
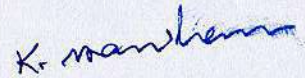
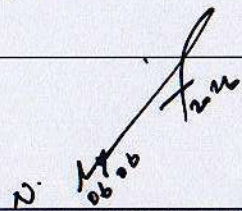
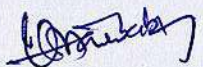
	understanding, hands-on skills, and the application of theoretical concepts to real-world engineering problems.
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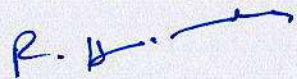
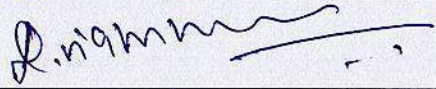
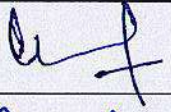
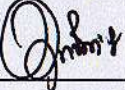
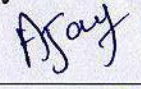
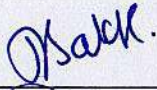
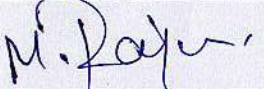
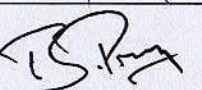
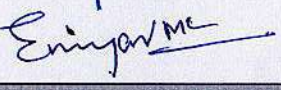
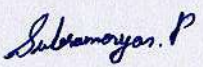
The members had a brainstorming discussion and interaction among themselves. After discussion, Board of Studies of Mechanical Engineering resolved to recommend the changes in syllabus for the few programme elective courses (Annexure II) prescribed for B.E. Mechanical Engineering under Regulation 2023.

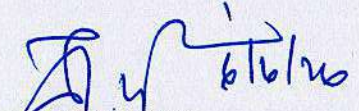
After carrying out the modifications suggested by the members, it will be presented to the Academic Council for further approval.

Dr. D. Venkatkumar, Professor / Mechanical Engineering proposed vote of thanks for their kind cooperation and the meeting came to an end.

Members Present for the 25th BoS Meeting of Mechanical Engineering on 06.06.2026

CHAIRMAN	
Dr. S. Iyahraja, Professor & Head / Mechanical Engineering, National Engineering College, Kovilpatti	
UNIVERSITY NOMINEE	
Dr. D Samuel Raj, Associate Professor / Mechanical Engineering, CEG Campus, Anna University, Chennai.	
ACADEMIC EXPERTS	
Dr. M. Venkata Ramanan, Professor & Director / Institute for Energy Studies, CEG Campus, Anna University, Chennai.	
Dr. K. Hariharan, Professor / Mechanical Engineering, Indian Institute of Technology, Madras.	
Dr. N. Siva Shanmugam, Professor / Mechanical Engineering, National Institute of Technology, Trichy.	
MERITORIOUS ALUMNUS NOMINATED BY THE PRINCIPAL	
Mr. K Monickavasagom Pillai, Chief Scientist, CSIR –National Aerospace Laboratories, Bengaluru.	
INDUSTRIAL EXPERTS	
Mr. Hari Babu Vulava Senior Vice President, Axiscades Technologies Ltd., Bengaluru.	
Mr. S. Ravikumar, Chief Research & Innovation Testing and Validation, Iniciotek Private Limited, Chennai.	
Mr. S. Balaji, Assistant General Manager, Hyundai Motor India Limited, Chennai.	

INTERNAL MEMBERS	
Dr. D. Venkat Kumar, Professor / Mechanical Engineering	
Dr. R. Harichandran, Professor / Mechanical Engineering	
Dr. P. Ramanan, Associate Professor / Mechanical Engineering	
Dr. I. Sankar, Associate Professor / Mechanical Engineering	
Dr. D. Vignesh Kumar, Associate Professor / Mechanical Engineering	
Dr. F. Michael Thomas Rex, Associate Professor / Mechanical Engineering	
Dr. A. Andrews, Assistant Professor (S.G) / Mechanical Engineering	
Dr. K. Thoufiq Mohammed, Assistant Professor (S.G) / Mechanical Engineering	
Dr. C. Veera Ajay, Assistant Professor (S.G) / Mechanical Engineering	
Dr. T. Sakthi, Assistant Professor (S.G) / Humanities	
Ms. M. Rajeswari Assistant Professor / Mechanical Engineering	
Dr. B. Prince Abraham Assistant Professor / Mechanical Engineering	
Mr. N. Muthu Saravanan Assistant Professor / Mechanical Engineering	
Dr. M. C. Eniyan Assistant Professor / Mechanical Engineering	
STUDENT MEMBERS	
Mr. V. Sanjay, III Year / Mechanical Engineering	
Mr. P. Subramanyan, II Year / Mechanical Engineering	


CHAIRMAN

BOARD OF STUDIES/MECH. ENGG.

National Engineering College, K.R.Nagar, Kovilpatti – 628 503

(An Autonomous Institution - Affiliated to Anna University, Chennai)

Department of Mechanical Engineering

Action Taken for Minutes of 25th BoS Meeting

S. No.	Suggestions by BoS Committee	Action Taken
B.E Mechanical Engineering – Curriculum & Syllabus		
1.	<u>Refrigeration and Air Conditioning</u> - The book “Principles of Refrigeration” by Roy J. Dossat, “Basic Refrigeration and Air Conditioning” by P. N. Ananthanarayanan and “Refrigeration and Air Conditioning” by Prof. P. L. Ballaney may be included in the Textbook/Reference section. - In CO5, the topic “Sustainable Cooling techniques” can be added.	- The books “Principles of Refrigeration” by Roy J. Dossat, “Basic Refrigeration and Air Conditioning” by P. N. Ananthanarayanan, and “Refrigeration and Air Conditioning” by Prof. P. L. Ballaney have been included in the Textbook/Reference section. - In the CO5 statement, the topic “Sustainable Cooling Techniques” has been added to provide students with exposure to energy-efficient and environmentally sustainable refrigeration and air conditioning practices.
2.	<u>Automobile Engineering</u> - In CO2, the statement “Compare the working of SI and CI engines and deliberate the recent development in the area of alternates for automotive engines” may be revised by removing the phrase “in the area of alternates for automotive engines” for better clarity and alignment with the course content. - The topics “Introduction to Electric Vehicles (EVs)” and “Battery Management Systems (BMS)” may be incorporated into a suitable Course Outcome to address emerging trends in automotive technology.	- In the CO2 statement, the phrase “in the area of alternates for automotive engines” has been removed for better clarity and alignment with the course content. - The topics “Introduction to Electric Vehicles (EVs)” and “Battery Management Systems (BMS)” have been incorporated into CO1 and the relevant course content to provide students with exposure to emerging trends in automotive technology.

	• In CO2, the topic “Vehicle Performance” may be included near the content related to “Emission Control and Standards”. • In CO4, the content under the topic “Tyres” may be reduced to avoid excessive coverage and to maintain balance among the course topics.	• In CO2, the topic “Vehicle Performance” has been added at a suitable place near the content on “Emission Control and Standards.” • In CO4, the content under the topic “Tyres” (Tyres, Types, Static and rolling properties of pneumatic tyres) has been reduced to maintain balanced coverage of the course topics.
3.	<u>Advanced Internal Combustion Engines</u> • In CO1, the term “Combustion Stoichiometry” may be revised to “Introduction to Combustion Stoichiometry” • In CO5, the topic “Ethanol” may be included at a suitable place within the course content to enhance coverage of renewable and sustainable automotive fuels.	• In the CO1 statement, the term “Combustion Stoichiometry” has been revised to “Introduction to Combustion Stoichiometry” for improved clarity and appropriate scope. • In CO5, the topic “Ethanol” has been added at a suitable place in the course content to enhance coverage of renewable and sustainable automotive fuels.
4.	<u>Thermal Design and Management of Electronic Equipment</u> • In CO2, the topic “Data Center” may be incorporated at a suitable place in the course content. • In CO4, the terms “Smartphones” and “Laptops” may be replaced with the broader term “Electronic Gadgets” to provide wider applicability and flexibility in covering contemporary electronic devices.	• In CO2, the topic “Data Center” has been incorporated at a suitable place in the course content. • In CO4, the terms “Smartphones” and “Laptops” have been replaced with the broader term “Electronic Gadgets” to provide wider applicability and flexibility in covering contemporary electronic devices.

5.	<u>Computational Fluid Dynamics</u> • The topic “Applications in Engineering Systems” may be incorporated into a suitable Course Outcome. • Add the book authored “Suhas V Patankar, Computation of conduction and Duct flow heat transfer”	• The topic “Applications in Engineering Systems” has been incorporated into CO5 and the relevant course content to enhance the practical application of the concepts in engineering systems. • The book “Computation of Conduction and Duct Flow Heat Transfer” by Suhas V. Patankar has been included in the Textbook/Reference section.
6.	<u>Gas Dynamics and Jet Propulsion Systems</u> • In CO4, the statement “Use of measurement techniques and experimental facilities for measuring compressible flow” may be revised to “Use of measurement techniques and experimental facilities for measurement of parameters associated with compressible flow” for improved clarity.	• In the CO4 statement, the phrase “Use of measurement techniques and experimental facilities for measuring compressible flow” has been revised to “Use of measurement techniques and experimental facilities for measurement of parameters associated with compressible flow” for improved clarity.
7.	<u>Energy Storage Systems</u> • In CO1, the content “Current Electric Vehicle Market” may be removed, as it is more market-oriented and may not directly contribute to the core technical objectives of the course. • In CO4, the topics “Metal Oxide Fuel Cells,” “Solid Oxide Fuel Cells,” and “Comparative Analysis of Fuel Cells” may be incorporated at a suitable place in the course content to enhance coverage of advanced energy conversion technologies and their engineering applications.	• In CO1, the content “Current Electric Vehicle Market” has been removed to maintain focus on the core technical objectives of the course. • In CO4, the topics “Metal Oxide Fuel Cells,” “Solid Oxide Fuel Cells,” and “Comparative Analysis of Fuel Cells” have been incorporated at a suitable place in the course content to enhance coverage of advanced energy conversion technologies and their engineering applications.

8.	<u>Fuel Cells and Hydrogen Energy</u> • In CO4, the statement may be revised by replacing the word “Demonstrate” with “Analyze” or “Elucidate” to better reflect the expected cognitive level of the course outcome. • In CO5, the term “Safety” may be revised to “Mitigate the Safety” within the course content.	• In the CO4 statement, the word “Demonstrate” has been replaced with “Elucidate” to better reflect the expected cognitive level of the course outcome. • In CO5, the term “Safety” has been revised to “Mitigate the Safety” in the course content for improved alignment with the intended learning outcome.
9.	<u>Heating, Ventilation and Air Conditioning</u> • All Course Outcome (CO) statements may be reviewed and revised in short. • The topics “MATLAB” and “Simulink” may be incorporated at a suitable place in the course content.	• All Course Outcome (CO) statements have been reviewed and revised in short. • The topics “MATLAB” and “Simulink” have been incorporated in the CO2 course content.
10.	<u>Vibration Control</u> • The book “Mechanical Vibrations” by A. S. Kailey and J. S. Mehta may be included in the Reference section. • The book “Schaum's Outline of Mechanical Vibrations” may be added to the Reference section. • The textbook “Mechanical Vibrations” by R. Venkatachalam may be incorporated in the Textbook/Reference section to strengthen the available learning resources. • In CO4 and CO5, the topic “Case Studies and Applications” may be included at suitable places in the course content to enhance practical understanding and industry relevance. • In CO5, under the topic “Frequency-Domain Analysis,” the topic “Fast Fourier Transform (FFT)” may be included.	• The book “Mechanical Vibrations” by A. S. Kailey and J. S. Mehta has been included in the Reference section. • The book “Schaum's Outline of Mechanical Vibrations” has been added to the Reference section. • The textbook “Mechanical Vibrations” by R. Venkatachalam has been incorporated into the Textbook/Reference section to strengthen the available learning resources. • In CO5, the topic “Case Studies and Applications” has been included at suitable places in the course content to enhance practical understanding and industry relevance. • In CO5, under the topic “Frequency-Domain Analysis,” the topic “Fast Fourier Transform (FFT)” has been added.

11.	<u>MEMS Devices - Design and Fabrication</u> • “The BoS members approved the inclusion of the subject “MEMS Devices – Design and Fabrication” under the vertical Product & Process Development, considering it to be highly appropriate and relevant to the objectives of the vertical. • In CO1, the topic “Nano-Electro-Mechanical Systems (NEMS)” may be included to provide an introduction to emerging micro and nano-scale device technologies. • In CO4, the topic “Topology Optimization” may be incorporated at a suitable place in the course content. • In CO4, the topic “Optical Metrology for MEMS” may be included at a suitable place in the course content to strengthen coverage of characterization and measurement techniques used in MEMS devices.	• The subject “MEMS Devices – Design and Fabrication” has been included under the vertical Product & Process Development as approved by the Board of Studies (BoS). • In CO1, the topic “Nano-Electro-Mechanical Systems (NEMS)” has been included to provide an introduction to emerging micro- and nano-scale device technologies. • In CO4, the topic “Topology Optimization” has been incorporated at a suitable place in the course content. • In CO4, the topic “Optical Metrology for MEMS” has been included at a suitable place in the course content to strengthen coverage of characterization and measurement techniques used in MEMS devices.
12.	<u>Materials Selection and Design</u> • The proposed subject “Automotive Materials Components Design and Testing” was removed and replaced with the new subject “Materials Selection and Design.” The BoS members noted that the revised subject offers broader coverage of material selection methodologies, design considerations, and engineering applications across multiple domains. • As per the suggestions of the BoS Committee members, the subject “Materials Selection and Design”, adopted from the syllabus of Anna University, has been included in the curriculum considering its relevance and significance to the program outcomes and industry requirements.	• The proposed subject “Automotive Materials Components Design and Testing” has been replaced with “Materials Selection and Design” to provide broader coverage of material selection methodologies, design considerations, and engineering applications across multiple domains. • As recommended by the Board of Studies (BoS), the subject “Materials Selection and Design,” adopted from the Anna University syllabus, has been included in the curriculum considering its relevance to the programme outcomes and industry requirements.

13.	<u>Optimization Methods in Engineering Design</u> • The course title “Optimization Methods in Engineering Design” may be revised to “Optimization Methods in Engineering” to provide a broader scope and applicability across various engineering domains. • In CO4, broader optimization and intelligent computing techniques such as Artificial Neural Networks (ANN), Recurrent Neural Networks (RNN), Deep Learning, Metaheuristic Algorithms, and Data-Driven Approaches may be incorporated at suitable places in the course content to reflect recent advancements in engineering optimization and decision-making.	• The course title “Optimization Methods in Engineering Design” has been revised to “Optimization Methods in Engineering” to provide a broader scope and applicability across various engineering domains. • In CO4, the topics “Artificial Neural Networks (ANN),” “Recurrent Neural Networks (RNN),” “Deep Learning,” “Metaheuristic Algorithms,” and “Data-Driven Approaches” have been incorporated at suitable places in the course content to reflect recent advancements in engineering optimization and decision-making.
14.	<u>Condition Monitoring</u> • In CO1, the statement may be revised by replacing the word “Practice” with “Review on” to better reflect the intended learning outcome and scope of the course. • In CO1, the topics “Machine Tools” and “Testing Equipment” may be incorporated at suitable places in the course content.	• In the CO1 statement, the word “Practice” has been replaced with “Review on” to better reflect the intended learning outcome and scope of the course. • In CO1, the topics “Machine Tools” and “Testing Equipment” have been incorporated at suitable places in the course content.
15.	<u>Design Codes and Standards</u> • In CO1, the topics “What is Code?,” “What is Standard?,” and “Need for Codes and Standards” may be suitably framed. • In CO3, the topic “Who Publishes Codes and Standards?” may be removed from the course content. Topics framed as questions are generally not appropriate for a syllabus and may be revised to maintain a professional and outcome-based course structure.	• In CO1, the topics “What is Code?,” “What is Standard?,” and “Need for Codes and Standards” have been suitably reframed to align with a professional and outcome-based course structure. • In CO3, the topic “Who Publishes Codes and Standards?” has been removed from the course content, and topics framed as questions have been revised to maintain a professional and outcome-based syllabus.

16.	<u>Quality Control of Welded Structures</u> • In CO1, the topic “Welding Defects” may be included in the course content to provide students with knowledge of common welding imperfections and their significance in quality assurance. • In CO3, the topic “What are Codes & Standards?” may be revised to “Codes & Standards” to maintain a concise and professional syllabus format. • In CO1, the topics “Residual Stress” and “Distortion” may be incorporated at suitable places in the course content. • European standards such as DIN Standards may be included at a suitable place in the course content, along with other relevant international standards, to provide broader exposure to globally recognized engineering codes and standards.	• In CO1, the topic “Welding Defects” has been included in the course content to provide students with knowledge of common welding imperfections and their significance in quality assurance. • In CO3, the topic “What are Codes & Standards?” has been revised to “Codes & Standards” to maintain a concise and professional syllabus format. • In CO1, the topics “Residual Stress” and “Distortion” have been incorporated at suitable places in the course content. • European standards have been included in the CO5 course content along with other relevant international standards to provide broader exposure to globally recognized engineering codes and standards.
17.	<u>Lean Manufacturing</u> • The course title “Lean Manufacturing” may be revised to “Lean Manufacturing and Six Sigma” to reflect the integration of both Lean Manufacturing and Six Sigma concepts. • The BoS members suggested that the subject “Lean Six Sigma” may be shifted from the Manufacturing Engineering domain to the Industrial Engineering domain, as the course primarily focuses on process improvement, quality management, statistical analysis, waste reduction, and continuous improvement methodologies that are closely aligned with Industrial Engineering.	• The course title “Lean Manufacturing” has been revised to “Lean Manufacturing and Six Sigma” to reflect the integration of both Lean Manufacturing and Six Sigma concepts. • The subject “Lean Manufacturing and Six Sigma” has been shifted from the Manufacturing Engineering domain to the Industrial Engineering domain as approved by the Board of Studies (BoS).

	• The Course Outcomes (COs) may be restructured such that three COs focus on Lean Manufacturing concepts and two COs focus on Six Sigma methodologies, ensuring balanced coverage of both domains. • In CO2, the topic “Define, Measure, Analyze, Improve and Control (DMAIC) Methodology” may be incorporated at a suitable place in the course content to strengthen the coverage of Six Sigma principles and problem-solving approaches.	• The Course Outcomes (COs) have been restructured such that three COs focus on Lean Manufacturing concepts and two COs focus on Six Sigma methodologies, ensuring balanced coverage of both domains. • In CO2, the topic “Define, Measure, Analyze, Improve and Control (DMAIC) Methodology” has been incorporated at a suitable place in the course content to strengthen the coverage of Six Sigma principles and problem-solving approaches.
18.	<u>Sustainable Manufacturing</u> • The topics “Digital Manufacturing” and “Industry 5.0” may be incorporated at suitable places in the relevant Course Outcomes and course content to provide students with exposure to emerging trends and advanced technologies in modern manufacturing systems.	• The topics “Digital Manufacturing” and “Industry 5.0” have been incorporated at CO4 course content to provide students with exposure to emerging trends and advanced technologies in modern manufacturing systems.
19.	<u>Statistical Quality Control and Reliability</u> • In CO3, the topics “Composite Design,” “Full Factorial Design,” and “Fractional Factorial Design” may be incorporated at suitable places in the course content. • The topic “Monte Carlo Simulation” may be included in CO1, provided it aligns with the course objectives and content, to introduce students to probabilistic analysis and simulation techniques used in quality control and reliability engineering.	• In CO3, the topics “Composite Design,” “Full Factorial Design,” and “Fractional Factorial Design” have been incorporated at suitable places in the course content. • In CO3, the topic “Monte Carlo Simulation” has been incorporated at a suitable place in the course content which is opt rather than to include in CO1 Course content.
20.	<u>Process Planning and Cost Estimation</u> • In CO4 and CO5, the course content may be restructured under the three major headings:	• In CO4 and CO5, the course content has been restructured such that CO4 covers Formative

	Formative Manufacturing Processes (Estimation of production Cost Casting Processes, Welding Processes, and Forging Processes), Subtractive Manufacturing Processes (Estimation of Machining Time and Cost for Lathe Operations, Drilling, Milling, Shaping and Planing, and Grinding), and Additive Manufacturing, to provide a systematic and process-oriented organization of the syllabus. • The textbook “Process and Operation Planning” by Gideon Halevi, Kluwer Academic Publishers, 2013 may be transferred from the Textbook Section to the Reference Section. • The book “Process Planning: The Design/Manufacture Interface” by Peter Scallan, Butterworth-Heinemann, 2003 may be transferred from the Reference Section to the Textbook Section, as it is more suitable as a primary course text.	Manufacturing Processes and Additive Manufacturing Processes, while CO5 covers Subtractive Manufacturing Processes, providing a systematic and process-oriented organization of the syllabus. • The textbook “Process and Operation Planning” by Gideon Halevi, Kluwer Academic Publishers, 2013 has been transferred from the Textbook section to the Reference section. • The book “Process Planning: The Design/Manufacture Interface” by Peter Scallan, Butterworth-Heinemann, 2003 has been transferred from the Reference section to the Textbook section, as it is more suitable as a primary course text.
21.	<u>Engineering Economics and Cost Analysis</u> • CO2 and CO4 statements may be reviewed and revised to ensure proper alignment with the updated course content. • In CO1, the topic “Fishbone Diagram may be incorporated at a suitable place in the course content to enhance students’ understanding of root cause analysis and quality improvement techniques.	• The CO2 and CO4 statements have been reviewed and revised to ensure proper alignment with the updated course content. • In CO1, the topic “Fishbone Diagram” has been incorporated at a suitable place in the course content to enhance students’ understanding of root cause analysis and quality improvement techniques.
22.	<u>Production Planning and Control</u> No comments	

Chairman

Board of Studies – Mechanical Engineering

25th BOARD OF STUDIES MEETING

DEPARTMENT OF MECHANICAL ENGINEERING ON 06.06.2026

