

**FACULTY OF ENGINEERING**  
**DEPARTMENT OF MECHANICAL ENGINEERING**

**1. NAME OF CURRICULUM**

**Bachelor of Engineering Program in Mechanical Engineering**

**2. NAME OF DEGREE**

**Bachelor of Engineering (Mechanical Engineering)**

**B. Eng. (Mechanical Engineering)**

**3. OBJECTIVES**

**3.1 To produce graduates who are knowledgeable and competent to work in their mechanical engineering professions.**

**3.2 To produce engineers who are skillful and well-prepared to pursue and develop advanced technologies.**

**3.3 To produce engineers in mechanical engineering who are creative and motivated.**

**3.4 To produce mechanical engineers with ethical responsibilities.**

**4. ACADEMIC SYSTEM**

The academic year of Thammasat University is divided into two 16-week semesters. The first semester starts from June to October. The second semester starts from November to March. Also, the Summer semester is optionally offered with the minimum duration of six weeks during the months of March and May.

**5. ACADEMIC DURATION**

Normally, it takes 4 years with an extension of up to 8 years to complete the degree.

**6. DEGREE REQUIREMENTS**

To be eligible for admission, an applicant must satisfy the following requirements:

(1) He or She must hold a Mathayom Suksa 6 certificate of high school or other equivalent for which the University recognizes.

(2) He or She must have passed the competitive entrance examination held by the University Entrance Examination Board, or

He or She must have passed the special admission qualifications set by Thammasat University.

## Curriculum Outline for Mechanical Engineering Students

<b><u>Total credit requirements</u></b>	<b>148 credits</b>
<b>1. General Basic Courses</b>	<b>48 credits</b>
1.1 Humanities	3 credits
1.2 Social Sciences	3 credits
1.3 General Sciences and Mathematics	6 credits
1.4 Languages	9 credits
1.5 Engineering Sciences and Mathematics	27 credits
<b>2. Engineering Courses</b>	<b>94 credits</b>
2.1 Core Courses	11 credits
2.2 Major Courses	83 credits
2.2.1 Compulsory Courses	71 credits
2.2.2 Elective Courses	12 credits
2.3 Training (no credits)	
<b>3. Free Electives</b>	<b>6 credits</b>

### **Detail of Curriculum**

<b>1. General Basic Courses</b>	<b>48 credits</b>
1.1 Humanities	3 credits
TU 110	
1.2 Social Sciences	3 credits
TU 120	
1.3 General Sciences and Mathematics - 2 courses	6 credits
TU 130            CN 208	
1.4 Languages - 3 courses	9 credits
1 compulsory Thai course:	
TH 161	
2 compulsory English courses:	
EL 171            EL 172	
1.5 Engineering Sciences and Mathematics - 11 courses	27 credits
SC 124            SC 133            SC 134            SC 174            SC 183	
SC 184            MA 111            MA 112            MA 131            MA 214	
MA 251	

**2. Engineering Courses** **94 credits**

**2.1 Core Courses** **11 credits**

**CE 100                      CE 101                      IE 121                      IE 261                      ME 111**

**2.2 Major Courses** **83 credits**

**2.2.1 Compulsory Courses** **71 credits**

**Mechanical Engineering Courses** **48 credits**

**ME 212                      ME 221                      ME 230                      ME 241                      ME 301**

**ME 313                      ME 322                      ME 323                      ME 324                      ME 331**

**ME 332                      ME 333                      ME 381                      ME 402                      ME 434**

**ME 335                      ME 451                      ME 482                      ME 483**

**Non-Mechanical Engineering Courses** **23 credits**

**CE 202                      CE 221                      IE 358                      IE 359                      LE 201**

**LE 202                      LE 220                      LE 221                      LE 230**

**2.2.2 Elective Courses** **12 credits**

**Select from the followings: 9 credits**

**ME 316                      ME 346                      ME 356                      ME 357                      ME 417**

**ME 418                      ME 419                      ME 426                      ME 427                      ME 436**

**ME 437                      ME 438                      ME 439                      ME 447                      ME 458**

**ME 466                      ME 467                      ME 468                      ME 476                      ME 477**

**ME 486                      ME 487                      ME 488                      ME 489                      ME 369**

**Select any English courses offered by the Language Institute: 3 credits**

**ME 369 New - comer**  
**Semester 2/2550**

**Close ME 466**  
**Semester 2/2551**

**close**

**2.3 Training (no credits)**

**ME 381 Industrial Training**

**(Not less than 6 weeks)**

**3. Free Electives** **6 credits**

**Select any courses offered by the Thammasat University for 3 credits and any English courses offered by the Language Institute for 3 credits.**

## Course Planning for Mechanical Engineering Students

### First Year

Course Number	Title	Credits (lecture-lab-self study)
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#### Semester 1

CE 100	Ethics for Engineers	0(0-0-0)
MA 111	Fundamentals of Calculus	3(3-0-6)
ME 111	Engineering Graphics	3(2-3-4)
SC 124	Chemistry for Engineers	3(3-0-6)
SC 133	Physics for Engineers I	3(3-0-6)
SC 174	Chemistry for Engineers Laboratory	1(0-3-0)
SC 183	Physics for Engineers Laboratory I	1(0-3-0)
TH 161	Thai Usage I	3(3-0-6)
EL xxx	English Course xx	<u>3(3-0-6)</u>
		<u>20(17-9-34)</u>

#### Semester 2

CE 101	Introduction to Engineering Profession	2(2-0-4)
IE 121	Engineering Materials I	3(3-0-6)
MA 112	Analytic Geometry and Applied Calculus	3(3-0-6)
MA 131	Applied Linear Algebra	3(3-0-6)
SC 134	Physics for Engineers II	3(3-0-6)
SC 184	Physics for Engineers Laboratory II	1(0-3-0)
TU 130	Integrated Science and Technology	3(3-0-6)
EL xxx	English Course xx	<u>3(3-0-6)</u>
		<u>21(20-3-40)</u>

**Second Year**

<b>Course Number</b>	<b>Title</b>	<b>Credits</b> <b>(lecture-lab-self study)</b>
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**Semester 3**

<b>CE 202</b>	<b>Engineering Mechanics – Statics</b>	<b>3(3-0-6)</b>
<b>LE 201</b>	<b>Basic Electrical Engineering Design I</b>	<b>2(1-3-2)</b>
<b>LE 220</b>	<b>Electric Circuit Analysis</b>	<b>3(3-0-6)</b>
<b>IE 261</b>	<b>Engineering Statistics</b>	<b>3(3-0-6)</b>
<b>MA 214</b>	<b>Differential Equation</b>	<b>3(3-0-6)</b>
<b>ME 230</b>	<b>Fundamental of Thermodynamics</b>	<b>3(3-0-6)</b>
<b>ME 241</b>	<b>Mechanics of Fluids I</b>	<b><u>3(3-0-6)</u></b>
		<b><u>20(19-3-38)</u></b>

**Semester 4**

<b>CE 221</b>	<b>Mechanics of Solids I</b>	<b>3(3-0-6)</b>
<b>CN 208</b>	<b>Basic Electronic Circuits and Devices</b>	<b>3(3-0-6)</b>
<b>LE 202</b>	<b>Basic Electrical Engineering Design II</b>	<b>2(1-3-2)</b>
<b>LE 221</b>	<b>Basic Electronic Circuits and Devices</b>	<b>3(3-0-6)</b>
<b>LE 230</b>	<b>Electrical Machines I</b>	<b>3(3-0-6)</b>
<b>ME 212</b>	<b>Mechanical Drawing</b>	<b>2(1-3-2)</b>
<b>ME 221</b>	<b>Engineering Mechanics - Dynamics</b>	<b><u>3(3-0-6)</u></b>
		<b><u>19(17-6-34)</u></b>

**Third Year**

<b>Course Number</b>	<b>Title</b>	<b>Credits</b> <b>(lecture-lab-self study)</b>
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**Semester 5**

<b>IE 358</b>	<b>Manufacturing Process for Mechanical Engineering</b>	<b>3(3-0-6)</b>
<b>MA 251</b>	<b>Numerical Methods and Application</b>	<b>3(3-0-6)</b>
<b>ME 301</b>	<b>Mechanical Engineering Laboratory I</b>	<b>2(0-4-2)</b>
<b>ME 322</b>	<b>Mechanics of Solids II</b>	<b>3(3-0-6)</b>
<b>ME 323</b>	<b>Mechanics of Machines</b>	<b>3(3-0-6)</b>
<b>ME 331</b>	<b>Thermodynamics for Mechanical Engineers</b>	<b>3(3-0-6)</b>
<b>TU xxx</b>	<b>Social Science/Humanities</b>	<b><u>3(3-0-6)</u></b>
		<b><u>20(18-4-38)</u></b>

**Semester 6**

<b>IE 359</b>	<b>Manufacturing Process Laboratory for Mechanical Engineering</b>	<b>1(0-3-0)</b>
<b>ME 313</b>	<b>Mechanical Design</b>	<b>3(3-0-6)</b>
<b>ME 332</b>	<b>Heat Transfer</b>	<b>3(3-0-6)</b>
<b>ME 333</b>	<b>Internal Combustion Engines</b>	<b>3(3-0-6)</b>
<b>ME 324</b>	<b>Mechanical Vibrations</b>	<b>3(3-0-6)</b>
<b>ME 3xx</b>	<b>Technical Electives</b>	<b>3(3-0-6)</b>
<b>TU xxx</b>	<b>Social Science/Humanities</b>	<b><u>3(3-0-6)</u></b>
		<b><u>19(18-3-36)</u></b>

**Summer**

<b>ME 381</b>	<b>Industrial Training</b> <b>(Not less than 6 weeks)</b>	<b>0 credits</b>
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**Fourth Year**

<b>Course Number</b>	<b>Title</b>	<b>Credits</b> <b>(lecture-lab-self study)</b>
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**Semester 7**

<b>ME 402</b>	<b>Mechanical Engineering Laboratory II</b>	<b>2(0-4-2)</b>
<b>ME 434</b>	<b>Refrigeration and Air Conditioning</b>	<b>3(3-0-6)</b>
<b>ME 451</b>	<b>Automatic Control System</b>	<b>3(3-0-6)</b>
<b>ME 435</b>	<b>Power Plant Engineering</b>	<b>3(3-0-6)</b>
<b>ME 482</b>	<b>Projects Seminar</b>	<b>0(0-3-0)</b>
<b>ME xxx</b>	<b>Technical Electives</b>	<b>3(3-0-6)</b>
<b>EL xxx</b>	<b>English Elective Course</b>	<b>3(3-0-6)</b>
		<b><u>17(15-7-32)</u></b>

**Semester 8**

<b>ME 483</b>	<b>Mechanical Engineering Project</b>	<b>3(0-6-3)</b>
<b>ME xxx</b>	<b>Technical Electives</b>	<b>3(3-0-6)</b>
<b>XX xxx</b>	<b>Free Electives</b>	<b>3(3-0-6)</b>
<b>XX xxx</b>	<b>Free Electives</b>	<b><u>3(3-0-6)</u></b>
		<b><u>12(12-6-27)</u></b>

## **COURSE DESCRIPTIONS**

**ME111 Engineering Graphics**

**3 CREDITS**

**Prerequisite : -**

The significance of drawing. Instruments and their uses. Lining and lettering. Work preparation. Applied geometry. Dimensioning and description. Orthographic drawing. Pictorial drawing. Freehand sketching. Sectioning. Computer aided drawing.

**ME212 Mechanical Drawing**

**2 CREDITS**

**Prerequisite : Pass ME111**

Basic descriptive geometry. Intersection and development of surfaces. Symbols in mechanical drawing. Piping drawing. Welding drawing. Drawing of machine elements. Specification of surface finish. Allowance and tolerance. Assembly and detailed drawing. Computer aided drawing.

**ME221 Engineering Mechanics - Dynamics**

**3 CREDITS**

**Prerequisite : Pass CE202**

Reviews of basic principles governing the laws of motion. Kinematics of particles and rigid bodies. Displacement, velocity, and acceleration. Absolute and relative motion. Kinetics of particles and rigid bodies. Newton's second law of motion. Force mass and acceleration. Work and Energy. Impulse and momentum. Centripetal motion. Introduction to vibration.

**ME230 Fundamental of Thermodynamics**

**3 CREDITS**

**Prerequisite : Pass SC133**

Properties of pure substances. Equation of state for ideal and real gas. Thermodynamics diagrams and tables. First law of thermodynamics. Second law of thermodynamics. Carnot cycle. Energy. Entropy. Heat transfer. Energy conversion.

**ME241 Mechanics of Fluids I**

**3 CREDITS**

**Prerequisite : Pass SC133**

Properties of fluids. Fluid statics. Buoyancy. Momentum equation. Energy equation. Angular momentum equation and its application to turbo machinery. Kinematics of incompressible and non-viscous fluid flow. Control volume. Dimensional analysis and similitude. Incompressible and viscous fluid flow. Flow in pipes. Fluid measurement.



**ME301 Mechanical Engineering Laboratory I 2 CREDITS**

**Prerequisite : Pass ME221, ME230, ME241, CE221 or Permission from Instructor and Department Head.**

**Basic measuring instruments for mechanical engineering applications. Measurement of dimension, linear and angular velocities, flow rate, force, stress, strain, pressure and temperature. Error analysis. Analysis of data and presentation of result. Basic experiments in mechanics of fluids, thermodynamics, kinetics and mechanics of solids. Engineering report preparation.**

**ME313 Mechanical Design 3 CREDITS**

**Prerequisite : Pass ME212 and ME322**

**Principles and significance of design. Philosophy and method. Factors affecting design. Theory of failure. Stress concentration. Failure under unsteady load. Design of simple machine elements i.e. spring, power screws, joints, shafts, keys, flywheels, couplings, etc. Introduction to computer aided design and engineering.**

**ME316 Computer Aided Engineering 3 CREDITS**

**Prerequisite : Pass CN208, IE261 and MA251**

**Fundamental and component of computers. Uses of computer for solutions of engineering problems. Reviews of numerical methods and their applications to mechanical engineering problems such as fluid flow, heat transfer and stress analysis problems, etc. Optimization techniques. Computer aided geometric design. Computer aided symbolic computation. Data acquisition. Data analysis. Graphs and charts for presentation of computational and experimental data.**

**ME322 Mechanics of Solids II 3 CREDITS**

**Prerequisite : Pass CE221**

**Deflection of composite beams. Variable cross sectioned beams and curved beams. Mohr's circle. Analysis of beam deflection by energy method. Asymmetric bending. Shear stress and shear center. Torsion of non-circular cross sectioned members. Torsion of thin-walled cylinder of open and closed sections. Stress in thick walled cylinders and rotating discs. Analysis of statically indeterminate beams and structures by superposition and energy methods. Theories of failure for static and repeated loads. Introduction to theories of elasticity.**

**ME323 Mechanics of Machines 3 CREDITS**

**Prerequisite : Pass ME221**

**Basic mechanisms and terminology. Kinematics of rigid bodies. Relative motion. Mathematical and graphical analyses of kinematics of gear trains, cams, linkages, and some power transmission mechanisms. Kinetics of rigid bodies. D'Alembert's principle. Analysis of forces in mechanisms. Balancing of machinery. Flywheel. Gyroscope. Introduction to numerical solution of kinematics problems.**

**ME324 Mechanical Vibrations 3 CREDITS**

**Prerequisite : Pass MA214 and ME221**

The behavior of lumped systems with single degrees of freedom. Natural frequency and damping effects. Principles of vibration isolation and vibration measuring instruments. Lumped systems with two degrees of freedom: natural frequencies, modes, and mode shapes. Principle of dynamics vibration absorbers. Lumped systems with several degrees of freedom. Whirling of shafts. Introduction to distributed parameter systems. Introduction to non-linear systems. Introduction to numerical solution of vibration problems.

**ME331 Thermodynamics for Mechanical Engineers 3 CREDITS**

**Prerequisite : Pass ME230**

Irreversibility and availability. Power cycles and refrigeration cycles. Thermodynamics relation. Mixtures and solutions. Combustion processes and analysis of combustion products.

**ME332 Heat Transfer 3 CREDITS**

**Prerequisite : Pass ME230 and ME241**

Conduction : steady state. One and two-dimensional heat conduction. One dimensional unsteady state conduction. Convection: dimensional analysis in convection heat transfer. Natural convection on plane and cylindrical surfaces. Forced convection on circular pipe. Plane surface and in conduits. Simplified analysis in convection heat transfer. Relationship between heat transfer and fluid friction. Condensation and boiling. Radiation: absorption and emission characteristics. Angle factor. Radiation of black and gray bodies. Heat exchangers. Introduction to numerical methods for solution of heat transfer problems.

**ME333 Internal Combustion Engines 3 CREDITS**

**Prerequisite : Pass ME331**

Engine components. Thermodynamics of spark ignition and compression ignition engines. Combustion processes. Power output. Smoke limit. Exhaust gas analysis and pollution control. Equilibrium charts. Fuels, carburetion and injection systems. Engine performance improvement techniques such as variable valve timing and lifting, supercharging, etc. Engine performance testing and analysis. Engine design. Introduction to current engine technology.

**ME346 Mechanics of Fluids II 3 CREDITS**

**Prerequisite : Pass ME241**

Kinematics of fluid flow. Steady and unsteady. Uniform and non uniform flows. Streamlines. Path lines and stream function. Fluid strain and rotation. Flownets. Circulation and rotational flow. Radial flow. Equations of motion and energy. Laminar flows in closed conduits. Shear stresses in turbulent flows. Velocity distribution. Laminar and turbulent boundary layers. Flow past submerged bodies. Separation, circulation drag force and lift force. Introduction to numerical solution of fluid flow problems.

**ME356 Mechatronics 3 CREDITS**

**Prerequisite : Pass CN208, LE221 and ME301**

**Review of principle and fundamental components of computers. Basic electronic circuits. Interfacing computers to the real world. Conversion between digital and analog signals. Types and principles of sensors for mechanical engineering applications. Data acquisition from sensors to computers. Use of electrical signals to control machines. Basic control theory. Sensors in automatic control. PLC. Basic experiment in mechatronics.**

**ME357 Pneumatics and Hydraulics 3 CREDITS**

**Prerequisite : Pass ME241 and CN208**

**Fundamental of fluid power systems and their applications. Pneumatic and hydraulic circuit. Structure and principle of pneumatic and hydraulic systems. Design and drawing of the circuits. Basic circuit. Cascade circuit. Flow control with electric. Ladder diagram. PLC. Selection of equipments such as air-compressor, pressure tank, control valves, actuator etc. Efficiency. Installation, maintenance and trouble shooting. Application to industry.**

**ME 369 Automotive Technology 3 CREDITS**

**Prerequisite : -**

**Introduction to the basic principle and components of internal combustion engines. Types of automobiles. Components. Body structure, Steering and Braking system, Suspension, Power transmission, Basic electrical system, Cooling system and Safety system, Introduction to current technology and future trend**

**Laboratory hours cover the following topics: disassembling, assembling and testing of various systems in automobiles, performance measurement.**

**ME381 Industrial Training 0 CREDITS**

**Prerequisite : Junior Standing.**

**Students must be trained at least six consecutive weeks in industries or similar sectors. Submissions of reports are required together with comments or certifications from the trainers.**

**ME396 Fundamentals of Mechanical Engineering 3 CREDITS**

**Prerequisite : Pass ME221, ME241, AE211 or Permission from Instructor and Department Head.**

**Analysis of engineering cycles with applications to steam power plants, gas turbine plants, internal-combustion engine plants, refrigeration plants, air conditioning plants, and heat pump. Basic heat transfer: conduction, convection, radiation, and heat exchangers. Kinematics of rigid bodies. Analysis of linkages, cams, gear trains, and power transmission devices.**

**(For non- Mechanical Engineering Students)**

- ME402 Mechanical Engineering Laboratory II 2 CREDITS**  
**Prerequisite :** Pass ME301, ME324, ME332 or Permission from Instructor and Department Head.  
Additional experiments in the fields of power plant engineering, heat transfer, automatic control system, mechanical vibrations and gas dynamics.
- ME417 Advanced Mechanical Design 3 CREDITS**  
**Prerequisite :** Pass ME313  
The design of machine elements for power transmission such as clutches, brakes, bearings, belts, chains, gears and cams. Design exercises of mechanical parts and mechanical systems. Design for manufacturing and assembly. Design for efficiency. Optimum design of mechanical parts. Design for multiple objectives. Reverse engineering case studies. Introduction to contemporary design concepts. Computer aided design.
- ME418 Engineering Piping System Design 3 CREDITS**  
**Prerequisite :** Pass ME241  
Design and specification of various piping systems such as hot and chilled water piping, compressed air and gas piping, drainage and vent piping, steam and condensate piping, steam trapping, pressure reduction in pipes. Selection of equipment and accessories in piping system such as various types of valves, pipes and fittings, strainer, pipe hanger, insulation etc. Installation techniques. Inspection and maintenance of piping systems.
- ME419 Plant Engineering 3 CREDITS**  
**Prerequisite :** Pass ME230, ME313 and ME331  
Plant location and layout. Design, installation, control and maintenance of various systems such as electrical system, hot water system, chilled water system, steam system, compressed air, gas system and fire protection system. Principle of typical equipment in industry such as motors, pumps, compressors, fans, conveyor systems, valves, mechanical seals etc. Preventive maintenance. Value engineering. Non-destructive testing. Trips to factories.
- ME426 Failure of Engineering Materials 3 CREDITS**  
**Prerequisite :** Pass ME322 and IE121  
Reviews of stress and deformation analyses. Engineering materials. Failure of materials. Yield and fracture due to principal stresses. Effect of stress concentration. Fracture of cracked material. Fatigue. Fatigue crack growth. Wear, erosion and corrosion. Stress measurement techniques. Material testing techniques.
- ME427 Agricultural Machinery 3 CREDITS**  
**Prerequisite :** Permission from Instructor.  
Basic knowledge of agricultural machinery: types, structure, operation and maintenance. Selection and performance testing. Mechanical properties of agricultural material such as soil, stem of plants etc. Design, strength and motion analysis of agricultural machinery. Detail study of some basic machinery.

**ME434 Refrigeration and Air Conditioning 3 CREDITS**

**Prerequisite : Pass ME332**

Reviews of thermodynamics principles. Principles of refrigeration and various refrigeration systems. Single stage and two stages mechanical vapor compression refrigeration cycles. Main components such as compressor, condenser, evaporator, refrigerant flow control equipment. Auxiliary equipment. Refrigerants. Psychrometrics. Air conditioning system design. Introduction to current refrigeration and air conditioning technology.

**ME435 Power Plant Engineering 3 CREDITS**

**Prerequisite : Pass ME331**

Types and characteristics of power plants. Load calculation. Hydro power plant. Diesel power plant. Steam power plant. Steam turbine. Boiler. Condenser. Feed water heater and auxiliary equipment. Gas turbine power plant. Combined cycle power plant. Nuclear power plant. Introduction to current power plant technology.

**ME436 Gas Turbine Engines 3 CREDITS**

**Prerequisite : Pass ME241 and ME331**

Gas turbine cycle. Performance improvement. Aircraft gas turbines. Compressors. Components of gas turbine engine. Materials. Lubrication and cooling system. Performance analysis at various operating conditions. Introduction to current gas turbine technology.

**ME437 Advanced Refrigeration and Air Conditioning 3 CREDITS**

**Prerequisite : Pass ME434**

Refrigerants. Analysis of multi-stages vapor compression cycles. Design of cold storage. Cryogenics. Air liquefaction. Refrigeration system control. Air conditioning system design in various types of building. Piping system. Ventilation. Smoke and dust removing. Noise and vibration control of air conditioning system. Energy saving in refrigeration and air conditioning system. Introduction to current refrigeration and air conditioning technology

**ME438 Energy Sources and Conversion 3 CREDITS**

**Prerequisite : Pass ME331**

Sources of energy in nature. Conversion to mechanical and electrical energy from various sources such as tidal energy, wind energy, heat energy from fuels and nuclear reaction. Magneto hydrodynamic conversion. Fuel cells. Potential and applications of solar energy, wind and tidal energy. Energy conversion from biomass. Energy storage. Clean energy. National and global trend of energy production and consumption. Introduction to current technology related to energy sources and conversion.

**ME439 Energy Management in Building and Industry 3 CREDITS**

**Prerequisite :** Pass ME230, ME331 and ME332 or Permission from Instructor.

Energy auditing program for buildings and industries. Design of building and related mechanical systems for optimization of energy consumed. Energy balance of various equipment in industry. Efficiency improvement. Waste heat recovery methods. Analysis of second law of thermodynamics. Energy management. Introduction to local legislation related to energy usage in building and industry. Introduction to current energy management and energy saving technology

**ME447 Fluid Machinery 3 CREDITS**

**Prerequisite :** Pass ME241

Principles of fluid mechanics when applied to fluid machinery. Classification of fluid machines: fan, pumps and compressors. Theory of positive displacement pumps and performance characteristics. Dimensional analysis and characteristic performance of turbo machines. Design of impeller casing and piping circuits. Theory of axial-flow machines. Introduction to current fluid machinery technology.

**ME451 Automatic Control System 3 CREDITS**

**Prerequisite :** Pass MA214

Introduction to control systems. Basic system components. Linear systems and feedbacks. Mathematical modeling of systems. Response solutions and response characteristics of systems. Transient behavior and performance criteria. Stability of systems. Error coefficients and error criteria. Analysis of linear control systems by the root-locus and the frequency-response methods. Basic control actions. Improving system performance using compensation techniques. Introduction to the state variable method of analysis.

**ME458 Introduction to Robotics 3 CREDITS**

**Prerequisite :** Pass MA131, ME313, ME323, ME356 and Pass or study together with ME451 or Permission from Instructor and Department Head.

Review of matrix calculus. Motion analysis of robots. Load analysis. Strength analysis of structure and mechanism. Selection of sensors. Basic robot control. Robot vision and artificial intelligence. Laboratory hours cover design, construction and control of robot. Trips to robot-assembly plants.

**ME466 Automotive Engineering**

**Prerequisite :** Pass ME301, ME333 and LE 221

**Close [ME 466](#)  
Semester 2/2551**

**3 CREDITS**

Reviews of principle and components of internal combustion engines. Types of automobiles. Components. Body structure. Suspension, power transmission, steering and braking systems. Electrical system. Sensors and control systems. Automotive aerodynamics. Automotive performance measurement and improvement. Automotive manufacturing. Maintenance and repair. Introduction to current technology and future trend.

Laboratory hours cover the following topics: disassembling, assembling and testing of various systems in automobiles, performance measurement. Trips to automotive manufacturing plants.

**ME467 Introduction to Aeronautical Engineering**

**3 CREDITS**

**Prerequisite : Pass ME346**

**History of flight. Fundamental of aerodynamics. Drag and lift on object traveling in air. Atmospheric condition at flight altitude. Materials used in modern aircraft. Component and systems in various types of aircrafts. Design of aircraft structure. Propulsion systems. Fuels. Aeronautic glossary. Flight control. Calculation of flight trajectories. Introduction to aerospace engineering.**

**ME468 Introduction to Marine Engineering**

**3 CREDITS**

**Prerequisite : Pass ME241 and CE 202**

**Reviews of principle of fluid mechanics. Buoyancy and stability. Environmental effects on marine structures such as corrosion and erosion. Load in marine structures. Marine grade materials. Design of marine structures such as hull, floating dock, oil rig etc. Marine glossary. Major components in ship. Introduction to ship design, Ship building process. Maintenance and inspection of marine structures. Corrosion prevention methods. Introduction to organizations related to marine industry. Introduction to current marine technology. Trips to ship building and repairing yard.**

**ME476 Introduction to Finite Element Method**

**3 CREDITS**

**Prerequisite : Pass MA251**

**Mathematical preliminaries and matrices, general procedure of the finite element method, derivation of finite element equations using; direct approach, variational approach, and method of weighted residuals, finite element types in one, two, and three dimensions, and their interpolation functions, applications to structural, heat transfer, and fluid flow problems.**

**ME477 Introduction to Biomechanics**

**3 CREDITS**

**Prerequisite : Pass ME221 and CE221**

**Related medical terms. Mechanical properties of biomaterials such as tissue, muscles, bones and fluids in mammals and structures of insect and trees etc. Static equilibrium and motion of the livings. Design of artificial organ. Measurement of mechanical properties in organs. Introduction to in vivo study. Explanation of reasons behind nature's design with theories in mechanical engineering. Neural synapse. Vision and object recognitions.**

- ME482 Projects Seminar 0 CREDITS**  
**Prerequisite : Senior Standing and Pass all Basic and Core courses or Permission from Instructor and Department Head.**  
This course is concurrent with ME483. Students will be trained in researching, report writing and presenting technical reports to an audience. Written report and oral presentations are required which aim to develop Thai usage and sound engineering report writing skills. The report must be related to the work in ME483.
- ME483 Mechanical Engineering Project 3 CREDITS**  
**Prerequisite : Pass ME482 or Permission from Instructor and Department Head.**  
Project related to mechanical engineering for students to self-practice in conducting experiment, research, development or study in specific topics under advisement of faculty members. Written report and oral presentations are required upon completion of the project.
- ME486 Special Topics in Mechanical Engineering I 3 CREDITS**  
**Prerequisite : Permission from Instructor.**  
Studies on the new technology of special interest in mechanical engineering.
- ME487 Special Topics in Mechanical Engineering II 3 CREDITS**  
**Prerequisite : Permission from Instructor.**  
Studies on the new technology of special interest in mechanical engineering.
- ME488 Special Topics in Mechanical Engineering III 3 CREDITS**  
**Prerequisite : Permission from Instructor.**  
Studies on the new technology of special interest in mechanical engineering.
- ME489 Special Topics in Mechanical Engineering IV 3 CREDITS**  
**Prerequisite : Permission from Instructor.**  
Studies on the new technology of special interest in mechanical engineering.

[Update 1 December 2007](#)