

## MECH1906 Mechanical Engineering for Modern Life

<b>Course Code: MECH1906</b>	<b>Course Title:</b> Mechanical Engineering for Modern Life				
<b>Required Course Or Elective Course:</b> Elective	<b>Terms Offered (Credits):</b> Fall (3 credits)				
<b>Faculty In Charge: Prof. Hong Tao</b>	<b>Pre/Co-Requisites:</b> NA				
<b>Course Structure:</b> 2 classes (1.5 hours) per week					
<b>Textbook/Required Material:</b> Lecture notes based on wide range of references will be posted on Canvas before lectures					
<p><b>Bulletin Course Description:</b></p> <p>This course aims to provide students with a comprehensive introduction of the key sub – areas of Mechanical and Aerospace Engineering, preparing them for essential understanding of this field. This course is structured with four major modules which are <i>Aerospace Engineering; Mechanics and Materials; Thermo-fluids; Design and Manufacturing</i>. Each module focuses on a series of specific topics and incorporates demonstration kits which are carefully selected to engage students’ involvement, enhance their understanding, and enrich students’ learning experience in this course.</p>					
<p><b>Course Topics:</b></p> <ol style="list-style-type: none"> <li>1. Introduction</li> <li>2. Engineering Ethics</li> </ol> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <p><b>Module I – Aerospace Engineering</b></p> <ol style="list-style-type: none"> <li>3. Aerospace Engineering</li> <li>4. Aerodynamics (1)</li> <li>5. Aerodynamics (2)</li> <li>6. Propulsion</li> <li>7. Gas Turbine</li> </ol> </td> <td style="width: 50%; vertical-align: top;"> <p><b>Module II – Materials and Mechanics</b></p> <ol style="list-style-type: none"> <li>8. Statics and Dynamics</li> <li>9. Solid Mechanics</li> <li>10. Engineering Materials</li> <li>11. Metals</li> <li>12. Polymers</li> </ol> </td> </tr> <tr> <td style="vertical-align: top;"> <p><b>Module III – Thermo-Fluids</b></p> <ol style="list-style-type: none"> <li>13. Controls</li> <li>14. Robots and Automation</li> <li>15. Engineering Design</li> <li>16. Manufacturing</li> <li>17. Mechanism of Machinery</li> <li>18. MEMS Modern Buildings</li> </ol> </td> <td style="vertical-align: top;"> <p><b>Module IV – Design and Manufacturing</b></p> <ol style="list-style-type: none"> <li>19. Thermodynamics</li> <li>20. Heat and Heat Transfer</li> <li>21. Fluid Mechanics (1)</li> <li>22. Fluid Mechanics (2)</li> <li>23. Energy and Energy Utilization</li> <li>24. Modern Building</li> </ol> </td> </tr> </table>		<p><b>Module I – Aerospace Engineering</b></p> <ol style="list-style-type: none"> <li>3. Aerospace Engineering</li> <li>4. Aerodynamics (1)</li> <li>5. Aerodynamics (2)</li> <li>6. Propulsion</li> <li>7. Gas Turbine</li> </ol>	<p><b>Module II – Materials and Mechanics</b></p> <ol style="list-style-type: none"> <li>8. Statics and Dynamics</li> <li>9. Solid Mechanics</li> <li>10. Engineering Materials</li> <li>11. Metals</li> <li>12. Polymers</li> </ol>	<p><b>Module III – Thermo-Fluids</b></p> <ol style="list-style-type: none"> <li>13. Controls</li> <li>14. Robots and Automation</li> <li>15. Engineering Design</li> <li>16. Manufacturing</li> <li>17. Mechanism of Machinery</li> <li>18. MEMS Modern Buildings</li> </ol>	<p><b>Module IV – Design and Manufacturing</b></p> <ol style="list-style-type: none"> <li>19. Thermodynamics</li> <li>20. Heat and Heat Transfer</li> <li>21. Fluid Mechanics (1)</li> <li>22. Fluid Mechanics (2)</li> <li>23. Energy and Energy Utilization</li> <li>24. Modern Building</li> </ol>
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<b>Course Objectives:</b> (correlated program objectives)	<ol style="list-style-type: none"> <li>(1) General introduction of sub-disciplines in mechanical and aerospace engineering to year 1 students (P-05)</li> <li>(2) Demonstration of impact of mechanical and aerospace engineering on modern life (P-05)</li> <li>(3) Description of mechanical and aerospace engineering as a profession (P-05)</li> <li>(4) Enrichment non-engineering students with fundamental knowledge in mechanical and aerospace engineering (P-05)</li> </ol>				
<b>Course Outcomes:</b>	On successful completion of this course, students are expected to be				

(correlated course objectives and program outcomes)	able to: A. Understand the sub-disciplines in mechanical and aerospace engineering (1) & (4) (POC1, POC3, POC8, POC10) B. Evaluate the social and philosophical impacts of the advancements of mechanical and aerospace engineering technologies on modern life (2)&(3) (POC8, POC10)
<b>Assessment Tools:</b> (correlated course outcomes)	Assignments – 20% (A, B) Online Quizzes – 20% (A, B) Mid-term Exam – 30% (A, B) Final Exam / Report – 30% (A, B)

### **BEng in Mechanical Engineering (4-year program)**

#### **Program Objectives:**

- P-O1. Be able to communicate and perform as an effective engineering professional in both individual and team-based project environments,
- P-O2. Have an international outlook with clear perspectives on the Pearl river Delta and Greater China,
- P-O3. Be able to research, design, develop, test, evaluate and implement engineering solutions to problems that are of complexity encountered in professional practice and leadership,
- P-O4. Clearly Consider the ethical implications and societal impacts of engineering solutions,
- P-O5. Continuously improve through lifelong learning.

#### **Program Outcomes:**

- POC1. ability to identify and formulate problems in multidisciplinary environment with an understanding of engineering issues and constraints;
- POC2. ability to design and conduct experiments as well as analyze and interpret data;
- POC3. ability to apply knowledge of mathematics, science, and engineering for problem solving in mechanical engineering and related sectors or for further education in a research career;
- POC4. ability to develop specification and to design system, component, or process to meet needs;
- POC5. ability to understand the manufacturability, maintainability, and recyclability of engineering system and components;
- POC6. ability to use modern engineering tools, techniques, and skills in engineering practice;
- POC7. ability to communicate effectively;
- POC8. ability to function in multi-disciplinary teams and provide leadership;
- POC9. broadly educated with an understanding of the impact of engineering solutions on issues such as economics, business, politics, environment, health and safety, sustainability, and societal context;
- POC10. clear understanding of professional and ethical responsibilities;
- POC11. recognition of the need for life-long learning and continuing education;
- POC12. international outlook with knowledge of contemporary issues.