

**MECH1906 Mechanical Engineering for Modern Life (Fall 2023-24)**

<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			
<b>Bulletin Course Description:</b> This course aims to introduce the main core and elective courses of Mechanical and Aerospace Engineering to prepare the students for essential understanding of the study. This course is designed with four major modules which are <i>Aerospace Engineering; Mechanics and Materials; Thermofluids; Design and Manufacturing.</i>			
<b>Course Topics:</b> <ol style="list-style-type: none"> <li>1. Introduction</li> <li>2. Engineering Ethics</li> </ol> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <p><b><i>Module I – Aerospace Engineering</i></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><i>Module III – Thermofluids</i></b></p> <ol style="list-style-type: none"> <li>13. Heat Transfer</li> <li>14. Thermodynamics</li> <li>15. Fluid Mechanics (1)</li> <li>16. Fluid Mechanics (2)</li> <li>17. Energy and Energy Utilization</li> <li>18. Modern Buildings</li> </ol> </td> <td style="width: 50%; vertical-align: top;"> <p><b><i>Module II – Materials and Mechanics</i></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><i>Module IV – Design and Manufacturing</i></b></p> <ol style="list-style-type: none"> <li>19. Engineering Design</li> <li>20. Manufacturing</li> <li>21. MEMS</li> <li>22. Mechanism of Machinery</li> <li>23. Controls</li> <li>24. Robots and Automation</li> </ol> </td> </tr> </table>		<p><b><i>Module I – Aerospace Engineering</i></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><i>Module III – Thermofluids</i></b></p> <ol style="list-style-type: none"> <li>13. Heat Transfer</li> <li>14. Thermodynamics</li> <li>15. Fluid Mechanics (1)</li> <li>16. Fluid Mechanics (2)</li> <li>17. Energy and Energy Utilization</li> <li>18. Modern Buildings</li> </ol>	<p><b><i>Module II – Materials and Mechanics</i></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><i>Module IV – Design and Manufacturing</i></b></p> <ol style="list-style-type: none"> <li>19. Engineering Design</li> <li>20. Manufacturing</li> <li>21. MEMS</li> <li>22. Mechanism of Machinery</li> <li>23. Controls</li> <li>24. Robots and Automation</li> </ol>
<p><b><i>Module I – Aerospace Engineering</i></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><i>Module III – Thermofluids</i></b></p> <ol style="list-style-type: none"> <li>13. Heat Transfer</li> <li>14. Thermodynamics</li> <li>15. Fluid Mechanics (1)</li> <li>16. Fluid Mechanics (2)</li> <li>17. Energy and Energy Utilization</li> <li>18. Modern Buildings</li> </ol>	<p><b><i>Module II – Materials and Mechanics</i></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><i>Module IV – Design and Manufacturing</i></b></p> <ol style="list-style-type: none"> <li>19. Engineering Design</li> <li>20. Manufacturing</li> <li>21. MEMS</li> <li>22. Mechanism of Machinery</li> <li>23. Controls</li> <li>24. Robots and Automation</li> </ol>		
<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-O5)</li> <li>(2) Demonstration of impact of mechanical and aerospace engineering on modern life (P-O5)</li> <li>(3) Description of mechanical and aerospace engineering as a profession (P-O5)</li> <li>(4) Enrichment non-engineering students with fundamental knowledge in mechanical and aerospace engineering (P-O5)</li> </ol>		
<b>Course Outcomes:</b> (correlated course objectives)	On successful completion of this course, students are expected to be able to:		

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

### **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.