

# **MECHANICAL ENGINEERING – AERONAUTICAL ENGINEERING**

## **SPECIALISATION + ELECTIVES (CAREER IN AVIATION)**



| FOR COHORT AY2021/2022 ONWARDS                                                                                                                                                                                                   | MC         |
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| <b>Common Curriculum</b>                                                                                                                                                                                                         | <b>60</b>  |
| Singapore Studies                                                                                                                                                                                                                | 4          |
| Cultures and Connections                                                                                                                                                                                                         | 4          |
| Communities and Engagement                                                                                                                                                                                                       | 4          |
| Critical Thinking and Writing                                                                                                                                                                                                    | 4          |
| Programming Methodology                                                                                                                                                                                                          | 4          |
| Quantitative Reasoning with Data                                                                                                                                                                                                 | 4          |
| Design Thinking <sup>^</sup>                                                                                                                                                                                                     | 4          |
| Design and Make <sup>^</sup>                                                                                                                                                                                                     | 4          |
| Systems Thinking and Dynamics                                                                                                                                                                                                    | 4          |
| Introduction to Machine Learning                                                                                                                                                                                                 | 4          |
| Liveable Cities                                                                                                                                                                                                                  | 4          |
| Creating Narratives                                                                                                                                                                                                              | 4          |
| Fundamentals of Project Management                                                                                                                                                                                               | 4          |
| B.Eng. Dissertation <u>or</u> Mechanical Systems Design                                                                                                                                                                          | 8          |
| <b>Major Requirements</b>                                                                                                                                                                                                        | <b>60</b>  |
| Mathematics I                                                                                                                                                                                                                    | 4          |
| Differential Equations for Engineering                                                                                                                                                                                           | 2          |
| Linear Algebra and Differential Equations                                                                                                                                                                                        | 2          |
| Engineering Professionalism                                                                                                                                                                                                      | 2          |
| Industrial Attachment <sup>^</sup>                                                                                                                                                                                               | 10         |
| Engineering Principles & Practice I                                                                                                                                                                                              | 4          |
| Engineering Principles & Practice II                                                                                                                                                                                             | 4          |
| Strength of Materials                                                                                                                                                                                                            | 4          |
| Engineering Thermodynamics                                                                                                                                                                                                       | 4          |
| Fluids Mechanics I                                                                                                                                                                                                               | 4          |
| Feedback Control Systems                                                                                                                                                                                                         | 4          |
| Mechanics of Machines                                                                                                                                                                                                            | 4          |
| Manufacturing Processes                                                                                                                                                                                                          | 4          |
| Engineering Innovation and Modelling                                                                                                                                                                                             | 4          |
| Technical Elective (TE)                                                                                                                                                                                                          | 4          |
| <b>Specialisation in Aeronautical Engineering</b>                                                                                                                                                                                | <b>20</b>  |
| (Up to 8 MCs can be double counted towards TE / UEM requirements.)                                                                                                                                                               |            |
| Compulsory module: Intermediate Fluid Mechanics                                                                                                                                                                                  | 4          |
| Two modules from group A:                                                                                                                                                                                                        | 8          |
| <ul style="list-style-type: none"> <li>• Aerodynamics</li> <li>• Small Aircraft and Unmanned Aerial Vehicles</li> <li>• Aircraft Performance, Stability and Control</li> <li>• Aircraft Engines and Rocket Propulsion</li> </ul> |            |
| Two modules from group B:                                                                                                                                                                                                        | 8          |
| <ul style="list-style-type: none"> <li>• Aircraft Structures</li> <li>• Computational Methods in Fluids Mechanics</li> <li>• Finite Element Analysis</li> <li>• Experimental Fluid Mechanics</li> </ul>                          |            |
| <b>Other Unrestricted Electives<sup>^</sup></b>                                                                                                                                                                                  | <b>20</b>  |
| Introductory Mathematics ( <i>For direct poly intake only</i> )                                                                                                                                                                  | 4          |
| <b>TOTAL</b>                                                                                                                                                                                                                     | <b>160</b> |

<sup>^</sup> If you have a diploma from an approved programme in the polytechnics, you may receive a total of 38 MCs of Advanced Placement Credits (APCs) in the following modules: Unrestricted Elective Modules (20 MCs), Industrial Attachment (10 MCs), Design and Make (4 MCs), Design Thinking (4 MCs).

**List of Technical Elective modules:**

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| <ul style="list-style-type: none"><li>• ME2114 Mechanics of Material</li><li>• ME2135 Intermediate Fluid Mechanics</li><li>• ME2143 Sensors and Actuators</li><li>• ME3122 Heat Transfer</li><li>• ME3211 Mechanics of Solids</li><li>• ME3221 Sustainable Energy Conversion</li><li>• ME3241 Microprocessor Applications</li><li>• ME3242 Automation</li><li>• ME3243 Robotic System Design</li><li>• ME3252 Materials Engineering Principles for Engineers</li><li>• ME3261 Computer-Aided Design and Manufacturing</li><li>• ME3263 Design for Manufacturing and Assembly</li><li>• ME3281 Microsystems Design and Applications</li><li>• ME3291 Numerical Methods in Engineering</li><li>• ME4105 Specialisation Study Module (Offshore Oil &amp; Gas Technology)</li><li>• ME4212 Aircraft Structures</li></ul> | <ul style="list-style-type: none"><li>• ME4223 Thermal Environmental Engineering</li><li>• ME4225 Applied Heat Transfer</li><li>• ME4226 Energy and Thermal Systems</li><li>• ME4227 Internal Combustion Engines</li><li>• ME4231 Aerodynamics</li><li>• ME4232 Small Aircraft and Unmanned Aerial Vehicles</li><li>• ME4233 Computational Methods in Fluid Mechanics</li><li>• ME4241 Aircraft Performance and Stability</li><li>• ME4242 Soft Robotics</li><li>• ME4245 Robot Mechanics and Control</li><li>• ME4253 Biomaterials Engineering</li><li>• ME4255 Materials Failure</li><li>• ME4261 Tool Engineering</li><li>• ME4262 Automation in Manufacturing</li><li>• ME4263 Fundamentals of Product Development</li><li>• ME4291 Finite Element Analysis</li></ul> |
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