

**Bachelor of Engineering (Materials Engineering)
Second Major in Medical Biology (AY2024-25)**

Last Update: 11-Nov-24

Academic Unit (AU) Required for graduation

| Year of Study | Core | MPE | CC | FC | BDE | Total AU |
|---------------|----------------------|-----|----|----|-----|------------------------|
| 1 | 26 / 27 ⁺ | - | 9 | - | 9 | 44 / 45 ⁺ |
| 2 | 19 | - | 8 | 3 | 9 | 39 |
| 3 | 13 | - | - | 12 | 3 | 28 |
| 4 | 19 | 8 | - | - | 9 | 36 |
| | 77 / 78 ⁺ | 8 | 17 | 15 | 30 | 147 / 148 ⁺ |

⁺Students without H2 Level Physics will take PH1012 (4 AU)

Year 1 (AY2024-25) - Semester 1

| Course Code and Title | Course Type | AU |
|--|-------------|-----------|
| CC0003 Ethics & Civics in a Multi-Cultural World | CC | 2 |
| CC0005 Healthy Living & Wellbeing | CC | 3 |
| PH1011 Physics ^{*/**} | Core | 3 |
| MH1810 Mathematics I [*] | Core | 3 |
| MS1013 Materials Chemistry I [*] | Core | 2 |
| MS1011 Materials Matter | Core | 1 |
| MS1016 Thermodynamics of Materials | Core | 3 |
| MS1017 Introduction to Materials Science | Core | 2 |
| BS1001 Introductory Biology | BDE | 3 |
| Total | | 22 |

** Students who obtained at least 3 'A's in H2 level subjects and at least grade 'E' or 'C6' in General Paper (GP) or Knowledge Inquiry (KI) will be eligible for exemption if a grade 'A' is obtained in the corresponding subject at H2 level.*

*** Students without H2 Level Physics will take PH1012 Physics A (4 AU)*

Year 1 (AY2024-25) - Semester 2

| Course Code and Title | Course Type | AU |
|---|-------------|----|
| CC0001 Inquiry and Communication in the Interdisciplinary World | CC | 2 |
| CC0002 Navigating the Digital World | CC | 2 |
| EG1001 Engineer & Society | Core | 2 |
| MS1008 Introduction to Computational Thinking | Core | 3 |
| MS1014 Materials Chemistry II | Core | 2 |
| MS1018 Properties of Materials | Core | 2 |
| MS2013 Introduction to Polymer Science | Core | 3 |

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|-------------------------------------|-----|-----------|
| BS1005 Biochemistry I | BDE | 3 |
| BS1007 Molecular and Cell Biology I | BDE | 3 |
| Total | | 22 |

Year 2 (AY2025-26) - Semester 1

| Course Code and Title | Course Type | AU |
|--|-------------|-----------|
| CC0007 Science & Technology for Humanity | CC | 3 |
| MH2811 Mathematics II | Core | 3 |
| MS2012 Introduction to Manufacturing Processes | Core | 3 |
| MS2015 Mechanical Behaviour of Materials | Core | 3 |
| MS2016 Introduction to Metallurgy | Core | 2 |
| MS2083 Laboratory on Structure-Property Relationship in Polymers | Core | 1 |
| BS1012 Foundations of Chemistry I | BDE | 3 |
| Total | | 18 |

Year 2 (AY2025-26) - Semester 2

| Course Code and Title | Course Type | AU |
|--|-------------|-----------|
| ML0004 Career and Entrepreneurial Development for the Future World | CC | 2 |
| CC0006 Sustainability: Society, Economy & Environment | CC | 3 |
| MS0003 Introduction to Data Science and Artificial Intelligence | FC | 3 |
| MS2014 Materials Structure and Defects | Core | 3 |
| MS2018 Electronic & Magnetic Properties of Materials | Core | 3 |
| MS2084 Phase Transformations and Kinetics in Steels | Core | 1 |
| BS2004 Molecular and Cell Biology II | BDE | 3 |
| BS3109 Fundamentals of Immunology | BDE | 3 |
| Total | | 21 |

Year 3 (AY2026-27) - Semester 1

| Course Code and Title | Course Type | AU |
|--|-------------|----|
| HW0288 Effective Communication | FC | 2 |
| MS3011 Metallic & Ceramic Materials | Core | 3 |
| MS3012 Micro/Nanoelectronic Materials Processing | Core | 3 |
| MS3013 Electrochemical Corrosion | Core | 3 |
| MS3014 Analysis of Materials | Core | 3 |

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| MS3082 Design Lab | Core | 1 |
| BS1016 Physiology | BDE | 3 |
| Total | | 18 |

Year 3 (AY2026-27) - Semester 2

| Course Code and Title | Course Type | AU |
|-----------------------------------|-------------|-----------|
| ***MS3099 Professional Internship | FC | 10 |
| Total | | 10 |

***The school will assign students for Professional Internship in Year 3, either Semester 1 or 2.

Year 4 (AY2027-28) - Semester 1

| Course Code and Title | Course Type | AU |
|---------------------------|-------------|-----------|
| MS4089 Final Year Project | Core | 4 |
| MS3015 Industrial Design | Core | 4 |
| MS4012 Quality Control | Core | 3 |
| MS4013 Biomaterials | Core | 2 |
| MPE1 | MPE | 2 |
| BSxxxx PE1 | BDE | 3 |
| Total | | 18 |

Year 4 (AY2027-28) - Semester 2

| Course Code and Title | Course Type | AU |
|---|-------------|------------|
| MS4089 Final Year Project | Core | 4 |
| MS4014 Nanomaterials: Fundamentals and Applications | Core | 2 |
| MPE2 | MPE | 3 |
| MPE3 | MPE | 3 |
| BSxxxx PE2 | BDE | 3 |
| BSxxxx PE3 | BDE | 3 |
| Total | | 18 |
| Total AU for Graduation | | 147 |

Students have a choice of 3 electives (9AU) from the following list:

| Course Code | Course Title | AUs | Semester | Course Typr |
|-------------|-----------------|-----|----------|-------------|
| BS2003 | Biochemistry II | 3 | 1 | BDE |
| BS2010 | Bioimaging | 3 | 2 | BDE |

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| BS3006 | Bioentrepreneurship | 3 | 2 | BDE |
| BS3013 | Drug Discovery and Development, Biotechnology | 3 | 2 | BDE |
| BS3332 | Undergraduate Advanced Experimental Biology (UAEB) Workshop (Series I) - Methods in Histology | 3 | 2 | BDE |
| BS3335 | Undergraduate Advanced Experimental Biology (UAEB) Workshop (Series I) - Protein Behaviour in Health and Disease - Biophysical Tools | 3 | 2 | BDE |
| BS4010 | Synthetic Biology | 3 | 1 | BDE |
| MS4610 | Advanced Biomaterials | 3 | 1 | MPE^/BDE |
| MS4611 | Biomedical Devices | 3 | 2 | MPE^/BDE |
| MS4612 | Drug Delivery and Tissue Engineering | 3 | 2 | MPE^/BDE |
| MS4640 | Advanced Analysis of Materials | 3 | 1 | MPE^/BDE |
| | | | | |

Student must meet all requirements of the principal Bachelor of Materials Engineering programme and fulfill the following condition:

Complete a Biomaterials-related Final Year Project

^Courses taken as MPE can be double-counted to fulfil the requirements of both the primary degree programme as well as the second major. See Table below for more information

Summary of Academic Unit Requirements for MTMB

| Option | Core | MPE | ICC Common Core | ICC Foundation Core | BDE | Total |
|--|------|-------|-----------------|---------------------|-----|------------|
| A) Maximum Double Counting Student takes all 3 electives as MPE. | 75 | 9 [9] | 17 | 15 | 21 | 137 |
| B) Student takes 2 electives as MPE, 1 remaining elective as BDE. | 75 | 9 [6] | 17 | 15 | 24 | 140 |
| C) Minimum Double Counting Student takes 1 elective as MPE, 2 remaining electives as BDE. | 75 | 9 [3] | 17 | 15 | 27 | 143 |
| D) No Double Counting Student takes all 3 electives as BDE. | 75 | 9 | 17 | 15 | 30 | 146 |

Note: [] indicates double-counted AU