

**Bachelor of Engineering (Materials Engineering)
Second Major in Pharmaceutical Engineering (AY2020-21)**

| Academic Unit (AU) Required for graduation | | | | | | | | |
|--|--------|----------------------------|----------|-------------|------------|--------------|------------------------|----------|
| Year of Study | Core | Major Prescribed Electives | GER-Core | GER-PE (BM) | GER-PE(LA) | GER-PE (STS) | Unrestricted Electives | Total AU |
| 1 | 27/28* | - | 8 | 3 | | - | 3 | 41/42* |
| 2 | 26 | - | 4 | - | - | - | 9 | 39 |
| 3 | 26 | - | 2 | - | - | - | 6 | 34 |
| 4 | 14 | 9 | - | - | - | - | 15 | 38 |
| | | | | | | | | 152/153* |

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

Description of Abbreviation

BM – Business & Management

LA – Liberal Arts

STS – Science, Technology & Society

| Year 1 - Semester 1 | | |
|---|----------------|-----------|
| Course Code and Title | Course Type | AU |
| HW0001 Introduction to Academic Communication | | 0 |
| GC0001 Introduction to Sustainability: Multidisciplinary Approaches and Solutions | GER-Core | 1 |
| HY0001 Ethics and Moral Reasoning | GER-Core | 1 |
| ET0001 Enterprise and Innovation | GER-Core | 1 |
| MH1810 Mathematics I* | Core | 3 |
| PH1011 Physics ^{*/**} | Core | 3 |
| MS1008 Introduction to Computational Thinking | Core | 3 |
| MS1013 Materials Chemistry (EF1) | Core | 3 |
| MS1015 Materials Science | Core | 3 |
| GER-PE (BM/LA) | GER-PE (BM/LA) | 3 |
| Total | | 21 |

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

* 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.

| Year 1 - Semester 2 | | |
|----------------------------|-------------|----|
| Course Code and Title | Course Type | AU |
| MS1012 Materials Physics | Core | 3 |
| MS1014 Materials Chemistry | Core | 3 |

| | | |
|---|------------------------|-----------|
| MS1016 Thermodynamics of Materials | Core | 3 |
| HW0111 Communication: A Journey of Inquiry through Writing and Speech | GER-Core | 2 |
| EG0001 Engineers & Society | GER-Core | 3 |
| Engineering Fundamentals (EF 2) | Core | 3 |
| CH1104 Materials & Energy Balance | Unrestricted Electives | 3 |
| Total | | 20 |

| Year 2 - Semester 1 | | |
|--|--------------------|-----------|
| Course Code and Title | Course Type | AU |
| MH2811 Mathematics II | Core | 3 |
| MS2012 Introduction to Manufacturing Processes | Core | 3 |
| MS2013 Polymers and Composites | Core | 3 |
| MS2014 Materials Structure and Defects | Core | 3 |
| MS2015 Mechanical Behaviour of Materials | Core | 3 |
| MS2016 Phase Transformation and Kinetics | Core | 3 |
| MS2082 Laboratory IIB | Core | 1 |
| Total | | 19 |

| Year 2 - Semester 2 | | |
|---|------------------------|-----------|
| Course Code and Title | Course Type | AU |
| MS2018 Electronic & Magnetic Properties of Materials | Core | 3 |
| MS2081 Laboratory IIA | Core | 1 |
| MS3011 Metallic & Ceramic Materials | Core | 3 |
| MS0003 Introduction to Data Science and Artificial Intelligence | GER-Core | 3 |
| ML0003 Kickstart your Career Success | GER-Core | 1 |
| CH2114 Heat & Mass Transfer | Unrestricted Electives | 3 |
| CH3141 Unit Operation | Unrestricted Electives | 3 |
| CH2112 Chemical Reaction Engineering | Unrestricted Electives | 3 |
| Total | | 20 |

| Year 3 - Semester 1 | | |
|--|------------------------|-----------|
| Course Code and Title | Course Type | AU |
| HW0288 Engineering Communication | GER-Core | 2 |
| MS3012 Micro/Nanoelectronic Materials Processing | Core | 3 |
| MS3013 Environmental Effects on Materials | Core | 3 |
| MS3014 Analysis of Materials | Core | 3 |
| MS3015 Materials Aspects in Design | Core | 3 |
| MS3081 Laboratory III | Core | 1 |
| MS4012 Quality Control | Core | 3 |
| CH3111 Process Control and Dynamics | Unrestricted Electives | 3 |

| | | |
|---------------------|------------------------|-----------|
| CH3802 Chem Eng Lab | Unrestricted Electives | 3 |
| Total | | 24 |

| Year 3 - Semester 2 | | |
|--------------------------------|--------------------|-----------|
| Course Code and Title | Course Type | AU |
| MS3099 Professional Internship | Core | 10 |
| Total | | 10 |

| Year 4 - Semester 1 | | |
|--|----------------------------|-----------|
| Course Code and Title | Course Type | AU |
| MS4089 Final Year Project | Core | 4 |
| MS4013 Biomaterials | Core | 3 |
| Major Prescribed Elective 1 | Major Prescribed Electives | 3 |
| Major Prescribed Elective 2 | Major Prescribed Electives | 3 |
| CH4106 Formulation of Active Pharmaceutical Ingredients Dosage Forms | Unrestricted Electives | 3 |
| CH4306 Bioanalytical Techniques | Unrestricted Electives | 3 |
| Total | | 19 |

| Year 4 - Semester 2 | | |
|---|----------------------------|-----------|
| Course Code and Title | Course Type | AU |
| MS4089 Final Year Project | Core | 4 |
| MS4014 Nanomaterials: fundamentals and applications | Core | 3 |
| Major Prescribed Elective 3 | Major Prescribed Electives | 3 |
| CH4213 Pharmacokinetics & Biopharmaceutics | Unrestricted Electives | 3 |
| CH4303 Bioseparations | Unrestricted Electives | 3 |
| CH4305 Special Topics in Biotechnology | Unrestricted Electives | 3 |
| Total | | 19 |