

**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	27	-	2	-	-	-	11	40
4	8	9	-	-	-	-	12	29
								149/150 ⁺

⁺ 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
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
CH3111 Process Control and Dynamics	Unrestricted Electives	3
CH3802 Chem Eng Lab	Unrestricted Electives	3
Total		19

Year 3 - Semester 2		
Course Code and Title	Course Type	AU
HW0288 Engineering Communication	GER-Core	2
MS4012 Quality Control	Core	3
MS4013 Biomaterials	Core	3
MS4014 Nanomaterials: fundamentals and applications	Core	3
UE 1	Unrestricted Electives	3
UE 2	Unrestricted Electives	2
Total		16

Year 3 - Special Term		
Course Code and Title	Course Type	AU
MS3096 Professional Attachment	Core	5
Total		5

Year 4 - Semester 1		
Course Code and Title	Course Type	AU
MS4089 Final Year Project	Core	4
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		16

Year 4 - Semester 2		
Course Code and Title	Course Type	AU
MS4089 Final Year Project	Core	4
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		13