

## B.Eng (Hons) in Bioengineering with 2nd Major in Pharmaceutical Engineering

*\*with Professional Internship (BEPE)*

AY2022 - 2023 Intake onwards

Programme	Year of Study	Number of Academic Units (AU)					
		Major Requirement		Interdisciplinary Collaborative Core		Broadening and Deepening Electives (BDE)	Total
		Core (C)	Major PE (MPE)	Common Core (CC)	Foundational Core (FC)		
Bioengineering with Second Major in Pharmaceutical Engineering	1	21/22*		9		3	33/34*
	2	26		8	3	6	43
	3	13			12	6	31
	4	17	6			15	38
	Total	77/78*	6	17	15	30	145/146*

Category		AU	Total AU
Interdisciplinary Collaborative Core (ICC)	<b>Common Core (University-level)</b>		
	CC0001 Inquiry and Communication in the	2	17
	CC0002 Navigating the Digital World	2	
	CC0003 Ethics & Civics in a Multi-Cultural World	2	
	CC0005 Healthy Living & Wellbeing	3	
	CC0006 Sustainability: Society, Economy & Environment	3	
	CC0007 Science & Technology for Humanity	3	
	ML0004 Career and Entrepreneurial Development for	2	
	<b>Foundational Core (College-level)</b>		
Major Requirement	HW0288 Engineering Communication	2	15
	CB0494 Introduction to Data Science and Artificial	3	
	BG3880 Professional Internship	10	
	<b>BIE Core</b>		21
	EG1001 Engineers In Society	2	
	MH1810 Math 1	3	
	PH1011* Physics	3	
	Introduction to Chemical and Biomedical		
	CB1102 Engineering	1	
	CB1103 Organic Chemistry For Engineers	3	
	CB1117 Engineering Mathematics	4	
	BG1141 Fundamental Biology for Bioengineers	3	
	BG1801 Bioengineering Lab 1A	1	
	BG1802 Bioengineering Lab 1B	1	

Major Requirement	BG2103	Signal Processing in Biosystems	3	56
	BG2104	Electronics for Biomedical Engineering	3	
	BG2110	Bioelectricity	3	
	BG2119	Anatomy and Physiology	3	
	BG2131	Biomaterials	3	
	BG2142	Biological Thermodynamics	3	
	BG2209	Mechanics for Bioengineers	3	
	BG2211	Introduction to Computational Thinking	3	
	BG2801	Bioengineering Lab 2A	1	
	BG2802	Bioengineering Lab 2B	1	
	BG3102	Control in Biosystems	3	
	BG3104	Biomedical Imaging	3	
	BG3105	Biomedical Instrumentation	3	
	BG3112	Biofluid Mechanics and Medical Devices	3	
	BG3801	Bioengineering Lab 3	1	
		Machine Learning and Optimization for		
	BG4104	Bioengineers	3	
	BG4122	Medical Device Design	6	
	BG4801	Final Year Project	8	
BIE Major Prescribed Electives (MPE)				6
Bioengineering with Second Major in Pharmaceutical Engineering (BDEs)	<b>PE Compulsory Courses</b>			30
	CH1104	Materials & Energy Balance	3	
		Heat & Mass Transfer in Chemical &		
	CH2114	Biological Systems	3	
	CH2112	Chemical Reaction Engineering	3	
	CH2151	Unit Operations: Fluid-Solid Separation	3	
	CH3111	Process Control & Dynamics	3	
	CH4303	Bioseparations	3	
	CH4213	Pharmacokinetics & Biopharmaceutics	3	
		Chemical & Biomolecular Engineering		
	CH3802	Laboratory 5	3	
	CH4306	Bioanalytical Techniques	3	
		Formulation of Active Pharmaceutical		
CH4106	Ingredients Dosage Forms	3		
<b>Total</b>				<b>145/146*</b>

*\*Students without 'A' Level Physics will take 'PH1012 Physics A' (4AU).*

**B.Eng. (Bioengineering) with 2nd Major in Pharmaceutical Engineering**

Suggested Study Plan for AY2022-2023 intake (BEPE)

with Professional Internship**Year 1 Semester 1**

Course	Type	AU
CB1102 Introduction to Chemical and Biomedical Engineering	C	1
BG1141 Fundamental Biology for Bioengineers	C	3
BG1801 Bioengineering Lab 1A	C	1
MH1810 Math 1	C	3
PH1011 Physics	C	3
or PH1012 Physics A (* For students without 'A' Level Physics)	C	4
CC0001 Inquiry and Communication in the Interdisciplinary World	CC	2
CC0002 Navigating the Digital World	CC	2
		15
		16

**Year 2 Semester 1**

Course	Type	AU
BG2119 Anatomy and Physiology	C	3
BG2131 Biomaterials	C	3
BG2142 Biological Thermodynamics	C	3
BG2211 Introduction to Computational Thinking	C	3
BG2801 Bioengineering Lab 2A	C	1
CC0006 Sustainability: Society, Economy & Environment	CC	3
ML0004 Career and Entrepreneurial Development for the Future World	CC	2
		18

**Year 3 Semester 1**

Course	Type	AU
BG3102 Control in Biosystems	C	3
BG3104 Biomedical Imaging	C	3
BG3105 Biomedical Instrumentation	C	3
BG3112 Biofluid Mechanics and Medical Devices	C	3
BG3801 Bioengineering Lab 3	C	1
HW0288 Engineering Communication	FC	2
CH3111 Process Control and Dynamics	BDE	3
CH3802 Chem Eng Lab 5	BDE	3
		21

**Year 4 Semester 1**

Course	Type	AU
BG4104 Machine Learning and Optimization for Bioengineers	C	3
BG4122 Medical Device Design	C	3
BG4801 Final Year Project	C	4
BIE PE 1	MPE	3
CH4106 Formulation of Active Pharmaceutical Ingredients Solid Dosage Form	BDE	3
CH4306 Bioanalytical Techniques	BDE	3
		19

**Year 1 Semester 2**

Course	Type	AU
BG1103 Organic Chemistry For Engineers	C	3
CB1117 Engineering Mathematics	C	4
BG1802 Bioengineering Lab 1B	C	1
EG1001 Engineers in Society	C	2
CC0003 Ethics & Civics in a Multi-Cultural World	CC	2
CC0005 Healthy Living & Wellbeing	CC	3
CH1104 Materials & Energy Balance	BDE	3
		18

**Year 2 Semester 2**

Course	Type	AU
BG2103 Signal Processing in Biosystems	C	3
BG2104 Electronics for Biomedical Engineering	C	3
BG2110 Bioelectricity	C	3
BG2209 Mechanics for Bioengineers	C	3
BG2802 Bioengineering Lab 2B	C	1
CC0007 Science & Technology for Humanity	CC	3
CB0494 Introduction to Data Science and Artificial Intelligence	FC	3
CH2112 Chemical Reaction Engineering	BDE	3
CH2151 Unit Operations: Fluid-Solid Separation	BDE	3
		25

**Year 3 Semester 2**

Course	Type	AU
BG3880 Professional Internship	FC	10
		10

**Year 4 Semester 2**

Course	Type	AU
BG4122 Medical Device Design	C	3
BG4801 Final Year Project	C	4
BIE PE 2	MPE	3
CH2114 Heat and Mass Transfer	BDE	3
CH4303 Bioseparations	BDE	3
CH4213 Pharmacokinetics and Biopharmaceutics	BDE	3
		19

**Total (AU)****145****146\***

\*Students without 'A' Level Physics will take 'PH1012 Physics A' (4AU).