B.Eng (Hons) in Bioengineering with 2nd Major in Data Analytics

<u>with Professional Internship</u>
AY2023- 2024 Intake onwards (BEDA)

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 Data Analytics	1	21/22*		9			30/31*
	2	26	3	8	3		40
	3	13			12	6	31
	4	17	3			16	36
	Total	77/78*	6	17	15	22	137/138*

Category			AU	Total AU
Interdisciplinary Collaborative Core (ICC)	**Common Core (University-level)**			17
	CC0001	Inquiry and Communication in the Interdisciplinary World	2	
	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 the	2	
	Foundational Core (College-level)			15
	HW0288	Engineering Communication	2	
	CB0494	Introduction to Data Science and Artificial Intelligence	3	
	BG3920	Professional Internship	10	
Major Requirement	**BIE Core**			27
	EG1001	Engineers In Society	2	
	MH1810	Math 1	3	
	PH1011*	Physics	3	
	CB1102	Introduction to Chemical and Biomedical Engineering	1	
	CB1103	Organic Chemistry For Engineers	3	
	CB1117^	Engineering Mathematics	4	
	BG1141	Cellular & Molecular Biology for Bioengineers	3	
	BG1801	Bioengineering Lab 1A	1	
	BG1802	Bioengineering Lab 1B	1	
	BG2103	Signal Processing in Biosystems	3	
	BG2104	Electronics for Biomedical Engineering	3	

Major Requirement	BG2110	Bioelectricity	3	50
	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	Cardiovascular Engineering	3	
	BG3801	Bioengineering Lab 3	1	
	BG4104	Machine Learning and Optimization for Bioengineers	3	
	BG4122	Medical Device Design	6	
	BG4801	Final Year Project	8	
	BIE Major Prescribed Electives (MPE)			
	CH2010^	Engineering Statistics	3	6
	BIE PE 2		3	
2nd Major in Data Analytics (BDEs)	**Data Analytics Compulsory Courses**			22
	1) Linear Algebra: CB1117 Engineering Mathematics		NA	
	2) Computing Skills: BG2211 Introduction to Computational Thinking		NA	
	3) Probability and Statistics: CH2010 Engineering Statistics		NA	
	4) Algorithms: MH1403 Algorithms & Computing		3	
	5) Database: EE4791 Database Systems		3	
	6) Data Mining: EE4483 Artificial Intelligence & Data Mining		3	
	7) Data Visualisation/Management: BC2406 Analytics I: Visual and Predictive Techniques		4	
	Electives			
	CH4244	Numerical Method and Data Analytics	3	
	CB4246	Optimisation Using Artificial Intelligence	3	
	Choose 1 from the following:			
	EE4414 Machine Learning Design & Application (3AU) EE4497 Pattern Recognition & Machine Learning (3AU) MA4829 Machine Intelligence (3AU) MA4830 Real Time Software for Mechatronics System (3AU) MA4832 Microprocessor System (3AU) MS4671 Introduction to Materials Simulation (3AU)		3	
Total			**137/138***	

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

^Counted towards 2nd Major in Data Analytics requirement (total 10AU)

B.Eng. (Bioengineering) with 2nd Major in Data Analytics
Suggested Study Plan for AY2023-2024 intake (BEDA)
with Professional Internship

Year 1 Semester 1

Course		Type	AU
CB1102	Introduction to Chemical and Biomedical Engineering	C	1
BG1141	Cellular & Molecular 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

Year 1 Semester 2

Course		Type	AU
CB1103	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
			15

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
CH2010	Engineering Statistics	MPE	3
			21

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
			19

Year 3 Semester 1

Course		Type	AU
BG3102	Control in Biosystems	C	3
BG3104	Biomedical Imaging	C	3
BG3105	Biomedical Instrumentation	C	3
BG3112	Cardiovascular Engineering	C	3
BG3801	Bioengineering Lab 3	C	1
HW0288	Engineering Communication	FC	2
CH4244	Numerical Method and Data Analytics	BDE	3
	DA Elective 2	BDE	3
			21

Year 3 Semester 2

Course		Type	AU
BG3920	Professional Internship	FC	10
			10

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
EE4483	Artificial Intelligence & Data Mining	BDE	3
BC2406	Analytics I: Visual and Predictive Techniques	BDE	4
			17

Year 4 Semester 2

Course		Type	AU
BG4122	Medical Device Design	C	3
BG4801	Final Year Project	C	4
	BIE PE 2	MPE	3
MH1403	Algorithms & Computing	BDE	3
EE4791	Database Systems	BDE	3
CB4246	Optimisation Using Artificial Intelligence	BDE	3
			19

Total (AU)	**137**
	138*

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