

## B.Eng (Hons) in Chemical and Biomolecular Engineering with 2nd Major in Data Analytics

*with Professional Internship*

AY2023 - 2024 Intake onwards (CBDA)

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)		
Chemical & Biomolecular Engineering with Second Major in Data Analytics	1	24/25*		9			33/34*
	2	28		8	3		39
	3	17			12		29
	4	8	6			22	36
	Total	77/78*	6	17	15	22	137/138*

Category		AU	Total AU
Interdisciplinary Collaborative Core (ICC)	<b>Common Core (University-level)</b>		
	CC0001 Inquiry and Communication in the Interdisciplinary World	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 the	2	
	<b>Foundational Core (College-level)</b>		
	HW0288 Engineering Communication	2	15
	CB0494 Introduction to Data Science and Artificial Intelligence	3	
	CH3920 Professional Internship	10	
Major Requirement	<b>CBE Core</b>		
	EG1001 Engineers In Society	2	27
	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	
	CB1131 Introduction to Biomolecular Engineering	3	
	CH1104 Materials & Energy Balance	3	
	CH1801 Chemical & Biomolecular Engineering Laboratory	1	
	CH1802 Chemical & Biomolecular Engineering Laboratory	1	
	CH2010^ Engineering Statistics	3	

Major Requirement	CH2103	Fluid Systems	3	50
	CH2107^	Introduction to Computational Thinking	3	
	CH2108	Thermodynamics	3	
	CH2112	Chemical Reaction Engineering	3	
	CH2114	Heat & Mass Transfer in Chemical and Biological Systems	3	
	CH2123	Chemical Thermodynamics	3	
	CH2151	Unit Operations: Fluid-Solid Separation	3	
	CH2801	Chemical & Biomolecular Engineering Laboratory	2	
	CH2802	Chemical & Biomolecular Engineering Laboratory	2	
	CH3104	Biochemical Engineering	3	
	CH3109	Decision Tools for Business & Engineering	3	
	CH3111	Process Control and Dynamics	3	
	CH3121	Chemical, Biological & Plant Safety	2	
	CH3140	Unit Operations: Fluid-Fluid Separation	3	
	CH3802	Chemical & Biomolecular Engineering Laboratory	3	
	CH4801	Final Year Design Project	8	
	<b>CBE Major Prescribed Electives (MPE)</b>			
	CBE PE 1		3	6
	CBE PE 2		3	
2nd Major in Data Analytics (BDEs)	<b>Data Analytics Compulsory Courses</b>			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 (3AU)		3	
	6) Data Mining: EE4483 Artificial Intelligence & Data Mining		3	
	7) Data Visualisation/Management: BC2406 Analytics I: Visual and Predictive Techniques		4	
	<b>Electives</b>			
	CH4244	Numerical Method and Data Analytics	3	
	CB4246	Optimisation Using Artificial Intelligence	3	
	<i>Choose 1 from the following:</i>			
	EE4414 Machine Learning Design & Application (3AU)			
	EE4497 Pattern Recognition & Machine Learning (3AU)			
	MA4829 Machine Intelligence (3AU)		3	
	MA4830 Real Time Software for Mechatronics System (3AU)			
	MA4832 Microprocessor System (3AU)			
MS4671 Introduction to Materials Simulation (3AU)				
<b>Total</b>			<b>137/138*</b>	

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

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

**B.Eng. (Chemical & Biomolecular Engineering) with 2nd Major in Data Analytics (DA)**

Suggested Study Plan for AY2023-2024 intake (CBDA)

with Professional Internship**Year 1 Semester 1**

Course	Type	AU
CB1102 Introduction to Chemical and Biomedical Engineering	C	1
CB1131 Introduction to Biomolecular Engineering	C	3
CH1801 Chemical & Biomolecular Engineering Laboratory 1A	C	1
MH1810 Math 1	C	3
PH1011 Physics	C	3
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

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15 16**Year 2 Semester 1**

Course	Type	AU
CH2103 Fluid Systems	C	3
CH2107 Introduction to Computational Thinking	C	3
CH2108 Thermodynamics	C	3
CH2010 Engineering Statistics	C	3
CH2801 Chemical & Biomolecular Engineering Laboratory 2A	C	2
CC0006 Sustainability: Society, Economy & Environment	CC	3
ML0004 Career and Entrepreneurial Development for the Future World	CC	2

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**Year 3 Semester 1**

Course	Type	AU
CH3104 Biochemical Engineering	C	3
CH3109 Decision Tools for Business & Engineering	C	3
CH3111 Process Control and Dynamics	C	3
CH3121 Chemical, Biological & Plant Safety	C	2
CH3140 Unit Operations: Fluid-Fluid Separation	C	3
CH3802 Chemical & Biomolecular Engineering Laboratory 5	C	3
HW0288 Engineering Communication	FC	2

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**Year 4 Semester 1**

Course	Type	AU
CH4801 Final Year Design Project	C	4
CBE PE 1	MPE	3
EE4483 Artificial Intelligence & Data Mining	BDE	3
BC2406 Analytics I: Visual and Predictive Techniques	BDE	4
CH4244 Numerical Method and Data Analytics	BDE	3
DA Elective 2	BDE	3

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**Year 1 Semester 2**

Course	Type	AU
CB1103 Organic Chemistry For Engineers	C	3
CB1117 Engineering Mathematics	C	4
CH1104 Materials & Energy Balance	C	3
CH1802 Chemical & Biomolecular Engineering Laboratory 2	C	1
EG1001 Engineers in Society	C	2
CC0003 Ethics & Civics in a Multi-Cultural World	CC	2
CC0005 Healthy Living & Wellbeing	CC	3

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**Year 2 Semester 2**

Course	Type	AU
CH2112 Chemical Reaction Engineering	C	3
CH2114 Heat & Mass Transfer in Chemical and Biological Systems	C	3
CH2123 Chemical Thermodynamics	C	3
CH2151 Unit Operations A	C	3
CH2802 Chemical & Biomolecular Engineering Laboratory 2B	C	2
CC0007 Science & Technology for Humanity	CC	3
CB0494 Introduction to Data Science and Artificial Intelligence	FC	3

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**Year 3 Semester 2**

Course	Type	AU
CH3920 Professional Internship	FC	10

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**Year 4 Semester 2**

Course	Type	AU
CH4801 Final Year Design Project	C	4
CBE PE 2	MPE	3
MH1403 Algorithms & Computing	BDE	3
EE4791 Database Systems	BDE	3
CB4246 Optimisation Using Artificial Intelligence	BDE	3

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**Total (AU)**

137

138\*

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