BSc in Chemistry and Biological Chemistry with 2nd Major in Data Analytics (CHDA)
AY2022 - 2023 Intake onwards
with Professional Internship

Programme	Year of Study	Number of Academic Units (AU)					
		Major Requirement		Interdisciplinary		Broadening and Deepening Electives (BDE)	Total
		Core (C)	Major PE (MPE)	Common Core (CC)	Foundational Core (FC)		
Chemistry and Biological Chemistry	1	17		9		6	32
	2	21		8	3	9	41
	3	18			2	21	41
	4		12		10	6	28
	Total	56	12	17	15	42	142

BSc in Chemistry and Biological Chemistry with 2nd Major in Data Analytics (CHDA)

Category		AU	Total AU
Interdisciplinary Collaborative Core (ICC)	**Common Core (University-level)**		
	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	17
	CC0006 Sustainability: Society, Economy & Environment	3	
	CC0007 Science & Technology for Humanity	3	
	ML0004 Career and Entrepreneurial Development for the Future World	2	
	Foundational Core (College-level)		
	HW0218 Communication Across the Sciences	2	15
	PS0002 Introduction to Data Science and Artificial Intelligence	3	
	CM4081 Professional Internship	10	
Major Requirement	**CHEM Core**		
	CM1001 Foundations of Chemistry I	4	
	CM1002 Foundations of Chemistry II	4	
	MH1082 Calculus for the Sciences	4	
	MH1804^ Mathematics for Chemistry	2	
	PH1801 Foundations of Physics I	3	
	CM2011 Analytical and Bioanalytical Chemistry	3	
	CM2021 Inorganic and Bioinorganic Chemistry	3	
	CM2061 Chemistry & Biological Chemistry Laboratory 1	3	
	CM2031 Organic and Bioorganic Chemistry	3	
	CM2041 Physical and Biophysical Chemistry 1	3	56
	CM2062 Chemistry & Biological Chemistry Laboratory 2	3	
	PS0001^ Introduction to Computational Thinking	3	
	CM3011& Chemical Spectroscopy and Applications	3	
	CM3041& Physical and Biophysical Chemistry 2	3	
	CM3062 Chemistry & Biological Chemistry Laboratory 4	3	
	CM3031& Organic Reaction Mechanisms and Synthesis	3	
	CM3021& Organometallic Chemistry	3	
	CM3061 Chemistry & Biological Chemistry Laboratory 3	3	
	CHEM Major Prescribed Electives (MPE)		
	4 x MPEs	12	12

	Data Analytics Compulsory Courses		
2nd Major in Data Analytics (BDEs)	1) Probability and Statistics: MH2500 Probability and Introduction to Statistics	4	16 - 18
	2) Linear Algebra: MH1804 Mathematics for Chemistry	NA	
	3) Data Analysis/Computing: PS0001 Introduction to Computational Thinking	NA	
	4) Algorithms: MH1403 Algorithms & Computing	3	
	5) Database: BC2402 Designing & Developing Databases (4AU) / EE4791 Database Systems (3AU)/SC2207 Introduction to Database(3AU)	3 - 4	
	6) Data Mining: EE4483 Artificial Intelligence & Data Mining	3	
	7) Data Visualisation/Management: BC2406 Analytics I: Visual and Predictive Techniques (4AU)/ SC4024 Data Visualization (3AU)	3 - 4	

	Data Analytics Electives (Read any 3)		
2nd Major in Data Analytics (BDEs)	BC2407 Analytics II: Advanced Predictive Techniques (4AU) BS3008 Computational Biology and Modeling (3AU) BS4017 High-Throughput Bioinformatics (3AU) CM4043* Molecular Modelling: Principles and Applications (3AU) CM4044* Artificial Intelligence in Chemistry (3AU) ES2001 Computational Earth Systems Science (4AU) MH3400 Algorithms for the Real World (4AU) MH3500 Statistics (4AU) MH3510 Regression Analysis (4AU) MH3511 Data Analysis with Computer (3AU) MH3701 Basic Optimization (4AU) MH4500 Time Series Analysis (4AU) MH4513 Survival Analysis (4AU) MH4302 Theory of Computing (4AU) MH4320 Computational Economics (4AU) MH4511 Sampling and Survey (4AU) @ MH4512 Clinical Trials (4AU) MH4702 Probabilistic Methods in OR (4AU)	9 - 12	9 - 12
	Students are responsible to plan for their 2nd major courses		
BDE	Any 6 BDE	17	17
Total			**142 - 147**

^Counted towards 2nd major in Data Analytic Compulsory Course

*Can be counted towards CHEM MPE

&CM3011, CM3021. CM3031, CM3041 are offered in both semesters.

B.Sci. (Chemistry and Biological Chemistry) with 2nd major in Data Analytics (CHDA)
Suggested Study Plan for AY2022-2023 intake
with Professional Internship

Year 1 Semester 1

Course		Type	AU
CM1001	Foundations of Chemistry I	C	4
MH1802	Calculus for the Sciences	C	4
CC0001	Inquiry and Communication in the Interdisciplinary World	CC	2
CC0002	Navigating the Digital World	CC	2
CC0005	Healthy Living & Well-being	CC	3
HW0001	*Introduction to Academic Communication**		
			15

for students who have not cleared QET

Year 1 Semester 2

Course		Type	AU
CM1002	Foundations of Chemistry II	C	4
MH1804^	Mathematics for Chemistry	C	2
PH1801	Foundations of Physics I	C	3
CC0003	Ethics & Civics in a Multi-Cultural World	CC	2
	BDE 1	BDE	3
	BDE 2	BDE	3
			17

Year 2 Semester 1

Course		Type	AU
CM2011	Analytical and Bioanalytical Chemistry	C	3
CM2021	Inorganic and Bioinorganic Chemistry	C	3
CM2061	Chemistry & Biological Chemistry Laboratory 1	C	3
PS0001^	Introduction to Computational Thinking	C	3
CC0006	Sustainability: Society, Economy & Environment	CC	3
ML0004	Career and Entrepreneurial Development for the Future World	CC	2
	BDE 3	BDE	3
			20

Year 2 Semester 2

Course		Type	AU
CM2031	Organic and Bioorganic Chemistry	C	3
CM2041	Physical and Biophysical Chemistry 1	C	3
CM2062	Chemistry & Biological Chemistry Laboratory 2	C	3
PS0002	Introduction to Data Science and Artificial Intelligence	FC	3
CC0007	Science & Technology for Humanity	CC	3
MH1403	Algorithms & Computing	BDE	3
	BDE 4	BDE	3
			21

Year 3 Semester 1

Course		Type	AU
CM3xxx&	CHEM-Core	C	3
CM3xxx&	CHEM-Core	C	3
CM3062	Chemistry & Biological Chemistry Laboratory 4	C	3
BC2402	Designing & Developing Databases	BDE	4
BC2406	Analytics I: Visual and Predictive Techniques	BDE	4
MH2500	Probability and Introduction to Statistics	BDE	4
			21

Year 3 Semester 2

Course		Type	AU
CM3xxx&	CHEM-Core	C	3
CM3xxx&	CHEM-Core	C	3
CM3061	Chemistry & Biological Chemistry Laboratory 3	C	3
HW0218	Communication Across the Sciences	FC	2
MH3500	Statistics (CHDA Elective 1)	BDE	4
	CHDA Elective 2	BDE	3
	BDE 5	BDE	2
			20

Year 4 Semester 1

Course		Type	AU
CM4043^/	Molecular Modelling: Principles and Applications or	MPE	3
CM4044^	Artificial Intelligence in Chemistry		
	CHEM MPE2	MPE	3
	CHEM MPE3	MPE	3
	CHEM MPE4	MPE	3
EE4483	Artificial Intelligence & Data Mining	BDE	3
	BDE 6	BDE	3
			18

Year 4 Semester 2

Course		Type	AU
CM4081	Professional Internship	FC	10
			10
	Total (AU)		**142**

This study plan is meant as a guide.
^Counted towards 2nd major in Data Analytic requirements
& CM3xxx refers to CM3011, CM3021, CM3031, CM3041 - These courses are offered in both semesters

BSc in Chemistry and Biological Chemistry with 2nd Major in Data Analytics (CHDA)
AY2022 - 2023 Intake onwards
FYP with Professional Attachment

Programme	Year of Study	Number of Academic Units (AU)					Total
		Major Requirement		Interdisciplinary		Broadening and Deepening Electives (BDE)	
		Core (C)	Major PE (MPE)	Common Core (CC)	Foundational Core (FC)		
Chemistry and Biological Chemistry	1	17		9		6	32
	2	21		8	3	6	38
	3	18			7	19	44
	4		22			6	28
	Total	56	22	17	10	37	142

BSc in Chemistry and Biological Chemistry with 2nd Major in Data Analytics (CHDA)

Category			AU	Total AU
Interdisciplinary Collaborative Core (ICC)	**Common Core (University-level)**			
	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 Future World		2	
	Foundational Core (College-level)			
	HW0218 Communication Across the Sciences		2	10
	PS0002 Introduction to Data Science and Artificial Intelligence		3	
	CM4082 Professional Attachment		5	
Major Requirement	**CHEM Core**			
	CM1001	Foundations of Chemistry I	4	56
	CM1002	Foundations of Chemistry II	4	
	MH1082	Calculus for the Sciences	4	
	MH1804^	Mathematics for Chemistry	2	
	PH1801	Foundations of Physics I	3	
	CM2011	Analytical and Bioanalytical Chemistry	3	
	CM2021	Inorganic and Bioinorganic Chemistry	3	
	CM2061	Chemistry & Biological Chemistry Laboratory 1	3	
	CM2031	Organic and Bioorganic Chemistry	3	
	CM2041	Physical and Biophysical Chemistry 1	3	
	CM2062	Chemistry & Biological Chemistry Laboratory 2	3	
	PS0001^	Introduction to Computational Thinking	3	
	CM3011&	Chemical Spectroscopy and Applications	3	
	CM3041&	Physical and Biophysical Chemistry 2	3	
	CM3062	Chemistry & Biological Chemistry Laboratory 4	3	
	CM3031&	Organic Reaction Mechanisms and Synthesis	3	
	CM3021&	Organometallic Chemistry	3	
	CM3061	Chemistry & Biological Chemistry Laboratory 3	3	
	CHEM Major Prescribed Electives (MPE)			
	CM4080	Honours Project 1	10	22
	4 x MPEs		12	

	Data Analytics Compulsory Courses		
2nd Major in Data Analytics (BDEs)	1) Probability and Statistics: MH2500 Probability and Introduction to Statistics	4	16 - 18
	2) Linear Algebra: MH1804 Mathematics for Chemistry	NA	
	3) Data Analysis/Computing: PS0001 Introduction to Computational Thinking	NA	
	4) Algorithms: MH1403 Algorithms & Computing	3	
	5) Database: BC2402 Designing & Developing Databases (4AU) / EE4791 Database Systems (3AU) / SC2207 Introduction to Database (3AU)	3 - 4	
	6) Data Mining: EE4483 Artificial Intelligence & Data Mining	3	
	7) Data Visualisation/Management: BC2406 Analytics I: Visual and Predictive Techniques (4AU) / SC4024 Data Visualization (3AU)	3 - 4	
	Data Analytics Electives (Read any 3)		
2nd Major in Data Analytics (BDEs)	BC2407 Analytics II: Advanced Predictive Techniques (4AU) BS3008 Computational Biology and Modeling (3AU) BS4017 High-Throughput Bioinformatics (3AU) CM4043* Molecular Modelling: Principles and Applications (3AU) CM4044* Artificial Intelligence in Chemistry (3AU) ES2001 Computational Earth Systems Science (4AU) MH3400 Algorithms for the Real World (4AU) MH3500 Statistics (4AU) MH3510 Regression Analysis (4AU) MH3511 Data Analysis with Computer (3AU) MH3701 Basic Optimization (4AU) MH4500 Time Series Analysis (4AU) MH4513 Survival Analysis (4AU) MH4302 Theory of Computing (4AU) MH4320 Computational Economics (4AU) MH4511 Sampling and Survey (4AU) @ MH4512 Clinical Trials (4AU) MH4702 Probabilistic Methods in OR (4AU)	9 - 12	9 - 12
	Students are responsible to plan for their 2nd major courses		
BDE	Any 3 BDE	12	12
Total			**142 - 147**

^Counted towards 2nd major in Data Analytic Compulsory Course

*Can be counted towards CHEM MPE

&CM3011, CM3021. CM3031, CM3041 are offered in both semesters.

B.Sci. (Chemistry and Biological Chemistry) with 2nd major in Data Analytics (CHDA)
Suggested Study Plan for AY2022-2023 intake
FYP with Professional Attachment

Year 1 Semester 1

Course		Type	AU
CM1001	Foundations of Chemistry I	C	4
MH1802	Calculus for the Sciences	C	4
CC0001	Inquiry and Communication in the Interdisciplinary World	CC	2
CC0002	Navigating the Digital World	CC	2
CC0005	Healthy Living & Well-being	CC	3
HW0001	*Introduction to Academic Communication**		
			15

*for students who have not cleared QET

Year 1 Semester 2

Course		Type	AU
CM1002	Foundations of Chemistry II	C	4
MH1804^	Mathematics for Chemistry	C	2
PH1801	Foundations of Physics I	C	3
CC0003	Ethics & Civics in a Multi-Cultural World	CC	2
	BDE 1	BDE	3
	BDE 2	BDE	3
			17

Year 2 Semester 1

Course		Type	AU
CM2011	Analytical and Bioanalytical Chemistry	C	3
CM2021	Inorganic and Bioinorganic Chemistry	C	3
CM2061	Chemistry & Biological Chemistry Laboratory 1	C	3
PS0001^	Introduction to Computational Thinking	C	3
CC0006	Sustainability: Society, Economy & Environment	CC	3
ML0004	Career and Entrepreneurial Development for the Future World	CC	2
	BDE 3	BDE	3
			20

Year 2 Semester 2

Course		Type	AU
CM2031	Organic and Bioorganic Chemistry	C	3
CM2041	Physical and Biophysical Chemistry 1	C	3
CM2062	Chemistry & Biological Chemistry Laboratory 2	C	3
PS0002	Introduction to Data Science and Artificial Intelligence	FC	3
CC0007	Science & Technology for Humanity	CC	3
MH1403	Algorithms & Computing	BDE	3
			18

Year 3 Semester 1

Course		Type	AU
CM3xxx^&	CHEM-Core	C	3
CM3xxx^&	CHEM-Core	C	3
CM3062	Chemistry & Biological Chemistry Laboratory 4	C	3
BC2402	Designing & Developing Databases	BDE	4
BC2406	Analytics I: Visual and Predictive Techniques	BDE	4
MH2500	Probability and Introduction to Statistics	BDE	4
			21

Year 3 Semester 2

Course		Type	AU
CM3xxx^&	CHEM-Core	C	3
CM3xxx^&	CHEM-Core	C	3
CM3061	Chemistry & Biological Chemistry Laboratory 3	C	3
HW0218	Communication Across the Sciences	FC	2
MH3500	Statistics (CHDA Elective 1)	BDE	4
	CHDA Elective 2	BDE	3
Year 3 Special Sem			
CM4082	Professional Attachment	FC	5
			23

Year 4 Semester 1

Course		Type	AU
CM4043^/	Molecular Modelling: Principles and Applications <u>or</u>	MPE	3
CM4044^	Artificial Intelligence in Chemistry		
	CHEM MPE2	MPE	3
	CHEM MPE3	MPE	3
	CHEM MPE4	MPE	3
EE4483	Artificial Intelligence & Data Mining	BDE	3
	BDE 4	BDE	3
			18

Year 4 Semester 2

Course		Type	AU
CM4080	Honours Project 1	MPE	10
			10
	Total (AU)		**142**

This study plan is meant as a guide.

^Counted towards 2nd major in Data Analytic requirements

& CM3xxx refers to CM3011, CM3021, CM3031, CM3041 - These courses are offered in both semesters

BSc in Chemistry and Biological Chemistry with 2nd Major in Data Analytics (CHDA)
AY2022 - 2023 Intake onwards
with Professional Internship and FYP

Programme	Year of Study	Number of Academic Units (AU)					Total
		Major Requirement		Interdisciplinary		Broadening and Deepening Electives (BDE)	
		Core (C)	Major PE (MPE)	Common Core (CC)	Foundational Core (FC)		
Chemistry and Biological Chemistry	1	17		9		7	33
	2	21		8	3	3	35
	3	18	3		2	19	42
	4		19		10	3	32
	Total	56	22	17	15	32	142

BSc in Chemistry and Biological Chemistry with 2nd Major in Data Analytics (CHDA)

Category			AU	Total AU
Interdisciplinary Collaborative Core (ICC)	**Common Core (University-level)**			
	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 Future World		2	
	Foundational Core (College-level)			
	HW0218 Communication Across the Sciences		2	15
	PS0002 Introduction to Data Science and Artificial Intelligence		3	
	CM4081 Professional Internship		10	
Major Requirement	**CHEM Core**			
	CM1001	Foundations of Chemistry I	4	56
	CM1002	Foundations of Chemistry II	4	
	MH1082	Calculus for the Sciences	4	
	MH1804^	Mathematics for Chemistry	2	
	PH1801	Foundations of Physics I	3	
	CM2011	Analytical and Bioanalytical Chemistry	3	
	CM2021	Inorganic and Bioinorganic Chemistry	3	
	CM2061	Chemistry & Biological Chemistry Laboratory 1	3	
	CM2031	Organic and Bioorganic Chemistry	3	
	CM2041	Physical and Biophysical Chemistry 1	3	
	CM2062	Chemistry & Biological Chemistry Laboratory 2	3	
	PS0001^	Introduction to Computational Thinking	3	
	CM3011&	Chemical Spectroscopy and Applications	3	
	CM3041&	Physical and Biophysical Chemistry 2	3	
	CM3062	Chemistry & Biological Chemistry Laboratory 4	3	
	CM3031&	Organic Reaction Mechanisms and Synthesis	3	
	CM3021&	Organometallic Chemistry	3	
	CM3061	Chemistry & Biological Chemistry Laboratory 3	3	
	CHEM Major Prescribed Electives (MPE)			
	CM4080	Honours Project 1	10	22
	4 x MPEs		12	

	Data Analytics Compulsory Courses		
2nd Major in Data Analytics (BDEs)	1) Probability and Statistics: MH2500 Probability and Introduction to Statistics	4	16 - 18
	2) Linear Algebra: MH1804 Mathematics for Chemistry	NA	
	3) Data Analysis/Computing: PS0001 Introduction to Computational Thinking	NA	
	4) Algorithms: MH1403 Algorithms & Computing	3	
	5) Database: BC2402 Designing & Developing Databases (4AU) / EE4791 Database Systems (3AU) / SC2207 Introduction to Database (3AU)	3 - 4	
	6) Data Mining: EE4483 Artificial Intelligence & Data Mining	3	
	7) Data Visualisation/Management: BC2406 Analytics I: Visual and Predictive Techniques (4AU) / SC4024 Data Visualization (3AU)	3 - 4	
	Data Analytics Electives (Read any 3)		
2nd Major in Data Analytics (BDEs)	BC2407 Analytics II: Advanced Predictive Techniques (4AU) BS3008 Computational Biology and Modeling (3AU) BS4017 High-Throughput Bioinformatics (3AU) CM4043* Molecular Modelling: Principles and Applications (3AU) CM4044* Artificial Intelligence in Chemistry (3AU) ES2001 Computational Earth Systems Science (4AU) MH3400 Algorithms for the Real World (4AU) MH3500 Statistics (4AU) MH3510 Regression Analysis (4AU) MH3511 Data Analysis with Computer (3AU) MH3701 Basic Optimization (4AU) MH4500 Time Series Analysis (4AU) MH4513 Survival Analysis (4AU) MH4302 Theory of Computing (4AU) MH4320 Computational Economics (4AU) MH4511 Sampling and Survey (4AU) @ MH4512 Clinical Trials (4AU) MH4702 Probabilistic Methods in OR (4AU)	9 - 12	9 - 12
	Students are responsible to plan for their 2nd major courses		
BDE	Any 2 BDE	7	7
Total			**142 - 147**

^Counted towards 2nd major in Data Analytic Compulsory Course

*Can be counted towards CHEM MPE

&CM3011, CM3021. CM3031, CM3041 are offered in both semesters.

B.Sci. (Chemistry and Biological Chemistry) with 2nd major in Data Analytics (CHDA)
Suggested Study Plan for AY2022-2023 intake
with Professional Internship and FYP

Year 1 Semester 1

Course		Type	AU
CM1001	Foundations of Chemistry I	C	4
MH1802	Calculus for the Sciences	C	4
CC0001	Inquiry and Communication in the Interdisciplinary World	CC	2
CC0002	Navigating the Digital World	CC	2
CC0005	Healthy Living & Well-being	CC	3
HW0001	Introduction to Academic Communication*		
			15

for students who have not cleared QET

Year 1 Semester 2

Course		Type	AU
CM1002	Foundations of Chemistry II	C	4
MH1804^	Mathematics for Chemistry	C	2
PH1801	Foundations of Physics I	C	3
CC0003	Ethics & Civics in a Multi-Cultural World	CC	2
	BDE 1	BDE	3
	BDE 2	BDE	4
			18

Year 2 Semester 1

Course		Type	AU
CM2011	Analytical and Bioanalytical Chemistry	C	3
CM2021	Inorganic and Bioinorganic Chemistry	C	3
CM2061	Chemistry & Biological Chemistry Laboratory 1	C	3
PS0001^	Introduction to Computational Thinking	C	3
CC0006	Sustainability: Society, Economy & Environment	CC	3
ML0004	Career and Entrepreneurial Development for the Future World	CC	2
			17

Year 2 Semester 2

Course		Type	AU
CM2031	Organic and Bioorganic Chemistry	C	3
CM2041	Physical and Biophysical Chemistry 1	C	3
CM2062	Chemistry & Biological Chemistry Laboratory 2	C	3
PS0002	Introduction to Data Science and Artificial Intelligence	FC	3
CC0007	Science & Technology for Humanity	CC	3
MH1403	Algorithms & Computing	BDE	3
			18

Year 3 Semester 1

Course		Type	AU
CM3xxx^&	CHEM-Core	C	3
CM3xxx^&	CHEM-Core	C	3
CM3062	Chemistry & Biological Chemistry Laboratory 4	C	3
BC2402	Designing & Developing Databases	BDE	4
BC2406	Analytics I: Visual and Predictive Techniques	BDE	4
MH2500	Probability and Introduction to Statistics	BDE	4
			21

Year 3 Semester 2

Course		Type	AU
CM3xxx^&	CHEM-Core	C	3
CM3xxx^&	CHEM-Core	C	3
CM3061	Chemistry & Biological Chemistry Laboratory 3	C	3
HW0218	Communication Across the Sciences	FC	2
MH3500	Statistics (CHDA Elective 1)	BDE	4
	CHDA Elective 2	BDE	3
	CHEM MPE 1	MPE	3
			21

Year 4 Semester 1

Course		Type	AU
CM4080	Honours Project 1	MPE	10
CM4043^/	Molecular Modelling: Principles and Applications <u>or</u>	MPE	3
CM4044^	Artificial Intelligence in Chemistry		
EE4483	Artificial Intelligence & Data Mining	BDE	3
	CHEM MPE 3	MPE	3
	CHEM MPE 4	MPE	3
			22

Year 4 Semester 2

Course		Type	AU
CM4081	Professional Internship	FC	10
			10
	Total (AU)		**142**

This study plan is meant as a guide.
^Counted towards 2nd major in Data Analytic requirements
& CM3xxx refers to CM3011, CM3021, CM3031, CM3041 - These courses are offered in both semesters