

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

AY2023 - 2024 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	17/18*		9		6	32/33*
	2	21		8	3	6	38
	3	18			7	19	44
	4		22			6	28
	Total	56/57*	22	17	10	37	142/143*

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 CC0002 Navigating the Digital World CC0003 Ethics & Civics in a Multi-Cultural World CC0005 Healthy Living & Wellbeing CC0006 Sustainability: Society, Economy & Environment CC0007 Science & Technology for Humanity ML0004 Career and Entrepreneurial Development for the Future World	17
Major Requirement	Foundational Core (College-level)	
	HW0218 Communication Across the Sciences PS0002 Introduction to Data Science and Artificial Intelligence CM4082 Professional Attachment	10
	CHEM Core	
	CM1001 Foundations of Chemistry I CM1002 Foundations of Chemistry II MH1082 Calculus for the Sciences CM1804^ Mathematics for Chemistry PH1011 Physics <u>or</u> PH1012* Physics A CM2011 Analytical and Bioanalytical Chemistry CM2021 Inorganic and Bioinorganic Chemistry CM2061 Chemistry & Biological Chemistry Laboratory 1 CM2031 Organic and Bioorganic Chemistry CM2041 Physical and Biophysical Chemistry 1 CM2062 Chemistry & Biological Chemistry Laboratory 2 PS0001^ Introduction to Computational Thinking CM3011& Chemical Spectroscopy and Applications CM3041& Physical and Biophysical Chemistry 2 CM3062 Chemistry & Biological Chemistry Laboratory 4 CM3031& Organic Reaction Mechanisms and Synthesis CM3021& Organometallic Chemistry CM3061 Chemistry & Biological Chemistry Laboratory 3	56/57*
	CHEM Major Prescribed Electives (MPE)	
	CM4080 Honours Project 1 4 x MPEs	22

2nd Major in Data Analytics (BDEs)	Data Analytics Compulsory Courses 1) Probability and Statistics: MH2500 Probability and Introduction to Statistics 2) Linear Algebra: CM1804 Mathematics for Chemistry 3) Data Analysis/Computing: PS0001 Introduction to Computational Thinking 4) Algorithms: MH1403 Algorithms & Computing 5) Database: BC2402 Designing & Developing Databases (4AU) / EE4791 Database Systems (3AU) / SC2207 Introduction to Database (3AU) 6) Data Mining: MH4510 Statistical Learning & Data Mining (4AU) / IE4483 Artificial Intelligence & Data Mining (3AU) / SC4020 Data Analytics and Mining (3AU) 7) Data Visualisation/Management: BC2406 Analytics I: Visual and Predictive Techniques (4AU) / SC4023 Big Data Management (3AU) / SC4024 Data Visualization (3AU)	4 NA NA 3 3 - 4 3 - 4 3 - 4	16 - 19
2nd Major in Data Analytics (BDEs)	Data Analytics Electives (Read any 3) 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
<i>Students are responsible to plan for their 2nd major courses</i>			
BDE	Any 4 BDE	12	12
Total			142 - 149

[^]Counted towards 2nd major in Data Analytic Compulsory Course

⁺ Counted towards CHEM MPE

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

[&] 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 AY2023-2024 intake							
FYP with Professional Attachment							
Year 1 Semester 1			Year 1 Semester 2				
Course		Type	AU	Course	Type	AU	
CM1001	Foundations of Chemistry I	C	4	CM1002	Foundations of Chemistry II	C	4
MH1802	Calculus for the Sciences	C	4	CM1804 [^]	Mathematics for Chemistry	C	2
CC0001	Inquiry and Communication in the Interdisciplinary World	CC	2	PH1011/	Physics <u>or</u>	C	3
CC0002	Navigating the Digital World	CC	2	PH1012*	Physics A (<i>For students without 'A' Level Physics</i>)	C	4
CC0005	Healthy Living & Well-being	CC	3	CC0003	Ethics & Civics in a Multi-Cultural World	CC	2
HW0001	Introduction to Academic Communication [#]			BDE 1		BDE	3
				BDE 2		BDE	3
			15				17/18*
[#] for students who have not cleared QET							
Year 2 Semester 1			Year 2 Semester 2				
Course		Type	AU	Course	Type	AU	
CM2011	Analytical and Bioanalytical Chemistry	C	3	CM2031	Organic and Bioorganic Chemistry	C	3
CM2021	Inorganic and Bioinorganic Chemistry	C	3	CM2041	Physical and Biophysical Chemistry 1	C	3
CM2061	Chemistry & Biological Chemistry Laboratory 1	C	3	CM2062	Chemistry & Biological Chemistry Laboratory 2	C	3
PS0001 [^]	Introduction to Computational Thinking	C	3	PS0002	Introduction to Data Science and Artificial Intelligence	FC	3
CC0006	Sustainability: Society, Economy & Environment	CC	3	CC0007	Science & Technology for Humanity	CC	3
ML0004	Career and Entrepreneurial Development for the Future World	CC	2	MH1403	Algorithms & Computing (CHDA-Core)	BDE	3
	BDE 3	BDE	3				
			20				18
Year 3 Semester 1			Year 3 Semester 2				
Course		Type	AU	Course	Type	AU	
CM3xxx ^{&}	CHEM-Core	C	3	CM3xxx ^{&}	CHEM-Core	C	3
CM3xxx ^{&}	CHEM-Core	C	3	CM3xxx ^{&}	CHEM-Core	C	3
CM3062	Chemistry & Biological Chemistry Laboratory 4	C	3	CM3061	Chemistry & Biological Chemistry Laboratory 3	C	3
BC2402	Designing & Developing Databases (CHDA-Core)	BDE	4	HW0218	Communication Across the Sciences	FC	2
BC2406	Analytics I: Visual and Predictive Techniques (CHDA-Core)	BDE	4	MH3500	Statistics (CHDA-Elective 1)	BDE	4
MH2500	Probability and Introduction to Statistics (CHDA-Core)	BDE	4		CHDA-Elective 2	BDE	3
			21				23
Year 3 Special Sem							
				CM4082	Professional Attachment	FC	5
			21				23
Year 4 Semester 1			Year 4 Semester 2				
Course		Type	AU	Course	Type	AU	
CM4044 [^] [^]	Artificial Intelligence in Chemistry	MPE	3	CM4080	Honours Project 1	MPE	10
	CHEM MPE2	MPE	3				
	CHEM MPE3	MPE	3				
	CHEM MPE4	MPE	3				
IE4483	Artificial Intelligence & Data Mining (CHDA-Core)	BDE	3				
	BDE 4	BDE	3				
			18				10
						Total (AU)	142/143*

This study plan is meant as a guide.

[^]Counted towards 2nd major in Data Analytic requirements

[^]+Counted towards CHEM MPE

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

[&] 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)

AY2023 - 2024 Intake onwards

with Professional Internship

Programme	Year of Study	Number of Academic Units (AU)					Broadening and Deepening Electives (BDE)	Total
		Major Requirement		Interdisciplinary				
		Core (C)	Major PE (MPE)	Common Core (CC)	Foundational Core (FC)			
Chemistry and Biological Chemistry	1	17/18*		9		6	32/33*	
	2	21		8	3	9	41	
	3	18			2	21	41	
	4		12		10	6	28	
	Total	56/57*	12	17	15	42	142/143*	

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)	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	56/57*
	CM1002	Foundations of Chemistry II	4	
	MH1082	Calculus for the Sciences	4	
	CM1804 [^]	Mathematics for Chemistry	2	
	PH1011	Physics or PH1012* Physics A	3/4*	
	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)			
4 x MPEs		12	12	

2nd Major in Data Analytics (BDEs)	Data Analytics Compulsory Courses		
	1) Probability and Statistics: MH2500 Probability and Introduction to Statistics	4	
	2) Linear Algebra: CM1804 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	16 - 19
	6) Data Mining: MH4510 Statistical Learning & Data Mining (4AU) / IE4483 Artificial Intelligence & Data Mining (3AU) / SC4020 Data Analytics and Mining (3AU)	3 - 4	
	7) Data Visualisation/Management: BC2406 Analytics I: Visual and Predictive Techniques (4AU) / SC4023 Big Data Management (3AU) / SC4024 Data Visualization (3AU)	3 - 4	
2nd Major in Data Analytics (BDEs)	Data Analytics Electives (Read any 3)		
	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)			
<i>Students are responsible to plan for their 2nd major courses</i>			
BDE	Any 6 BDE	17	17
Total			142 - 149

^Counted towards 2nd major in Data Analytic Compulsory Course

+ Counted towards CHEM MPE

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

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

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Suggested Study Plan for AY2023-2024 intake						
<i>with Professional Internship</i>						
Year 1 Semester 1			Year 1 Semester 2			
Course		Type	AU	Course	Type AU	
CM1001	Foundations of Chemistry I	C	4	CM1002	Foundations of Chemistry II	C 4
MH1802	Calculus for the Sciences	C	4	CM1804 [^]	Mathematics for Chemistry	C 2
CC0001	Inquiry and Communication in the Interdisciplinary World	CC	2	PH1011/	Physics <u>or</u>	C 3
CC0002	Navigating the Digital World	CC	2	PH1012*	Physics A (For students without 'A' Level Physics)	C 4
CC0005	Healthy Living & Well-being	CC	3	CC0003	Ethics & Civics in a Multi-Cultural World	CC 2
HW0001	Introduction to Academic Communication [#]			BDE 1	BDE	3
				BDE 2	BDE	3
			15			17/18*
<i># for students who have not cleared QET</i>						
Year 2 Semester 1			Year 2 Semester 2			
Course		Type	AU	Course	Type AU	
CM2011	Analytical and Bioanalytical Chemistry	C	3	CM2031	Organic and Bioorganic Chemistry	C 3
CM2021	Inorganic and Bioinorganic Chemistry	C	3	CM2041	Physical and Biophysical Chemistry 1	C 3
CM2061	Chemistry & Biological Chemistry Laboratory 1	C	3	CM2062	Chemistry & Biological Chemistry Laboratory 2	C 3
PS0001 [^]	Introduction to Computational Thinking	C	3	PS0002	Introduction to Data Science and Artificial Intelligence	FC 3
CC0006	Sustainability: Society, Economy & Environment	CC	3	CC0007	Science & Technology for Humanity	CC 3
ML0004	Career and Entrepreneurial Development for the Future World	CC	2	MH1403	Algorithms & Computing (CHDA-Core)	BDE 3
	BDE 3	BDE	3	BDE 4	BDE	3
			20			21
Year 3 Semester 1			Year 3 Semester 2			
Course		Type	AU	Course	Type AU	
CM3xxx ^{&}	CHEM-Core	C	3	CM3xxx ^{&}	CHEM-Core	C 3
CM3xxx ^{&}	CHEM-Core	C	3	CM3xxx ^{&}	CHEM-Core	C 3
CM3062	Chemistry & Biological Chemistry Laboratory 4	C	3	CM3061	Chemistry & Biological Chemistry Laboratory 3	C 3
BC2402	Designing & Developing Databases (CHDA-Core)	BDE	4	HW0218	Communication Across the Sciences	FC 2
BC2406	Analytics I: Visual and Predictive Techniques (CHDA-Core)	BDE	4	MH3500	Statistics (CHDA-Elective 1)	BDE 4
MH2500	Probability and Introduction to Statistics (CHDA-Core)	BDE	4		CHDA-Elective 2	BDE 3
				BDE 5	BDE	2
			21			20
Year 4 Semester 1			Year 4 Semester 2			
Course		Type	AU	Course	Type AU	
CM4081	Professional Internship	FC	10	CM4043+ [^]	Molecular Modelling: Principles and Applications	MPE 3
					CHEM MPE2	BDE 3
					CHEM MPE 3	MPE 3
					CHEM MPE 4	MPE 3
					CHDA-Core	BDE 3
					BDE 6	BDE 3
			10			18
				Total (AU)		142/143*

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[^]Counted towards 2nd major in Data Analytic requirements

⁺Counted towards CHEM MPE

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

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with Professional Internship and FYP

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	2	21		8	3	3	35
	3	18	3		2	19	42
	4		19		10	3	32
	Total	56/57*	22	17	15	32	142/143*

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	CC0001 Inquiry and Communication in the Interdisciplinary World CC0002 Navigating the Digital World CC0003 Ethics & Civics in a Multi-Cultural World CC0005 Healthy Living & Wellbeing CC0006 Sustainability: Society, Economy & Environment CC0007 Science & Technology for Humanity ML0004 Career and Entrepreneurial Development for the Future World	17
Major Requirement	Foundational Core (College-level)	
	HW0218 Communication Across the Sciences PS0002 Introduction to Data Science and Artificial Intelligence CM4081 Professional Internship	15
	CHEM Core	
	CM1001 Foundations of Chemistry I CM1002 Foundations of Chemistry II MH1082 Calculus for the Sciences CM1804^ Mathematics for Chemistry PH1011 Physics or PH1012* Physics A CM2011 Analytical and Bioanalytical Chemistry CM2021 Inorganic and Bioinorganic Chemistry CM2061 Chemistry & Biological Chemistry Laboratory 1 CM2031 Organic and Bioorganic Chemistry CM2041 Physical and Biophysical Chemistry 1 CM2062 Chemistry & Biological Chemistry Laboratory 2 PS0001^ Introduction to Computational Thinking CM3011& Chemical Spectroscopy and Applications CM3041& Physical and Biophysical Chemistry 2 CM3062 Chemistry & Biological Chemistry Laboratory 4 CM3031& Organic Reaction Mechanisms and Synthesis CM3021& Organometallic Chemistry CM3061 Chemistry & Biological Chemistry Laboratory 3	56/57*
	CHEM Major Prescribed Electives (MPE)	
	CM4080 Honours Project 1 4 x MPEs	22

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2nd Major in Data Analytics (BDEs)	Data Analytics Electives (Read any 3) 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
<i>Students are responsible to plan for their 2nd major courses</i>			
BDE	Any 2 BDE	7	7
Total			142 - 149

^Counted towards 2nd major in Data Analytic Compulsory Course

+ Counted towards CHEM MPE

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

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B.Sci. (Chemistry and Biological Chemistry) with 2nd major in Data Analytics (CHDA)							
Suggested Study Plan for AY2023-2024 intake							
<i>with Professional Internship and FYP</i>							
Year 1 Semester 1				Year 1 Semester 2			
Course		Type	AU	Course		Type	AU
CM1001	Foundations of Chemistry I	C	4	CM1002	Foundations of Chemistry II	C	4
MH1802	Calculus for the Sciences	C	4	CM1804 [^]	Mathematics for Chemistry	C	2
CC0001	Inquiry and Communication in the Interdisciplinary World	CC	2	PH1011/	Physics <u>or</u>	C	3
CC0002	Navigating the Digital World	CC	2	PH1012*	Physics A (<i>For students without 'A' Level Physics</i>)	C	4
CC0005	Healthy Living & Well-being	CC	3	CC0003	Ethics & Civics in a Multi-Cultural World	CC	2
HW0001	Introduction to Academic Communication [#]			BDE 1		BDE	3
				BDE 2		BDE	4
			15				18/19*
<i># for students who have not cleared QET</i>							
Year 2 Semester 1				Year 2 Semester 2			
Course		Type	AU	Course		Type	AU
CM2011	Analytical and Bioanalytical Chemistry	C	3	CM2031	Organic and Bioorganic Chemistry	C	3
CM2021	Inorganic and Bioinorganic Chemistry	C	3	CM2041	Physical and Biophysical Chemistry 1	C	3
CM2061	Chemistry & Biological Chemistry Laboratory 1	C	3	CM2062	Chemistry & Biological Chemistry Laboratory 2	C	3
PS0001 [^]	Introduction to Computational Thinking	C	3	PS0002	Introduction to Data Science and Artificial Intelligence	FC	3
CC0006	Sustainability: Society, Economy & Environment	CC	3	CC0007	Science & Technology for Humanity	CC	3
ML0004	Career and Entrepreneurial Development for the Future World	CC	2	MH1403	Algorithms & Computing (CHDA-Core)	BDE	3
			17				18
Year 3 Semester 1				Year 3 Semester 2			
Course		Type	AU	Course		Type	AU
CM3xxx ^{&}	CHEM-Core	C	3	CM3xxx ^{&}	CHEM-Core	C	3
CM3xxx ^{&}	CHEM-Core	C	3	CM3xxx ^{&}	CHEM-Core	C	3
CM3062	Chemistry & Biological Chemistry Laboratory 4	C	3	CM3061	Chemistry & Biological Chemistry Laboratory 3	C	3
BC2402	Designing & Developing Databases (CHDA-Core)	BDE	4	HW0218	Communication Across the Sciences	FC	2
BC2406	Analytics I: Visual and Predictive Techniques (CHDA-Core)	BDE	4	MH3500	Statistics (CHDA-Elective 1)	BDE	4
MH2500	Probability and Introduction to Statistics (CHDA-Core)	BDE	4		CHDA-Elective 2	BDE	3
					CHEM MPE 1	MPE	3
			21				21
Year 4 Semester 1				Year 4 Semester 2			
Course		Type	AU	Course		Type	AU
CM4081	Professional Internship	FC	10	CM4080	Honours Project 1	MPE	10
				CM4043+ [^]	Molecular Modelling: Principles and Applications	MPE	3
					CHEM MPE 3	MPE	3
					CHEM MPE 4	MPE	3
					CHDA-Core	BDE	3
			10				22
				Total (AU)			142/143*

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

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