

Instructions for Completing the Study Plan

Specialization: Chemical Synthesis and Drug Design

Study Plan (AIMS)

Specialization: Chemical Synthesis and Drug Design



Name: _____ Year of Enrollment: _____

Matricule Number: _____ Mentor: _____

Winter Semester (1st Semester)		approx. 30 CP	
Foundations 1.-2. semester 26 CP (total)	Compulsory	CP	
		Introduction to AIMS	5 x
		Mathematics for Engineers A	8 x
		Programming in Python and Python Lab	8 x
Specialization Chemical Synthesis and Drug Design 1.-3. Semester 37 CP (total)	Compulsory Basic Module choose 1 of 2 (4 CP)	Organometallic Chemistry	4
		Advanced Inorganic Chemistry	8
		Organic Synthesis Planning	4
		Enzyme Engineering	10
	Elective (16-20 CP)	Fundamentals of Protein Structure Analysis	10
		Advanced Theoretical Chemistry	8
		Machine Learning in Computational Chemistry	8
		A) Sum of achieved CP for Specialization	
Key Qualifications 1.-3. Semester 12 CP (total)	Compulsory	Ethics and Epistemology	5 x
	Elective	Elective Modules	7

Summer Semester (2nd Semester)		approx. 30 CP	
Foundations 1.-2. Semester 26 CP (total)	Compulsory	CP	
		Scientific Software Engineering – Lab	5 x
Advanced Machine Learning and AI 2.-3. Semester 15 CP (total)	Elective	Machine Learning for Data Science	5
		Pattern Recognition	5
		Computer Lab Pattern Recognition	5
		Deep Learning Lab	5
		Methods of Uncertainty Analysis and Quantification	5
Specialization Chemical Synthesis and Drug Design 1.-3. semester 37 CP (total)	Compulsory Basic Module choose 1 of 2 (4 CP)	Reaction Mechanisms	4
	Elective (16-20 CP)	Catalysis	8
		Biomolecular Modelling	8
		B) Sum of achieved CP for Specialization	
Key Qualifications 1.-3. Semester 12 CP (total)	Elective	Elective Modules	7

Winter Semester (3rd Semester)		approx. 30 CP	
Advanced Machine Learning and AI 2.-3. Semester 15 CP (total)	Elective	CP	
		Pattern Recognition (offered in German in winter semester)	5
		Computer Lab Pattern Recognition	5
Specialization Chemical Synthesis and Drugs 1.-3. Semester 37 CP (total)	Elective (16-20 CP)	Advanced Inorganic Chemistry	8
		Organic Synthesis Planning	4
		Enzyme Engineering	10
		Fundamentals of Protein Structure Analysis	10
		Advanced Theoretical Chemistry	8
		Machine Learning in Computational Chemistry	8
	Compulsory (13-17 CP)	C) Sum of achieved CP for Specialization	
Key Qualifications 1.-3. Semester 12 CP (total)	Compulsory	Research Lab	13-17 x
	Elective	37 CP = (A + B + C) = CP Research Lab	

Summer Semester (4th Semester)			approx. 30 CP	
Master's Thesis 4. Semester 30 CP	Compulsory		CP	
		Master's Thesis	30	x
120 CP in total				

Date: _____ Signature Student: _____

Signature Mentor: _____

In the 1st and 3rd semester you can see the modules that are offered every winter semester

Study Plan (AIMS)
Specialization: Chemical Synthesis and Drug Design

Name: _____ Year of Enrollment: _____
Matricule Number: _____ Mentor: _____



Winter Semester (1st Semester)		approx. 30 CP	
Foundations 1.-2. semester 26 CP (total)	Compulsory	Introduction to AIMS	5 x
		Mathematics for Engineers A	8 x
		Programming in Python and Python Lab	8 x
Specialization Chemical Synthesis and Drug Design 1.-3. Semester 37 CP (total)	Compulsory Basic Module choose 1 of 2 (4 CP)	Organometallic Chemistry	4
		Advanced Inorganic Chemistry	8
	Elective (16-20 CP)	Organic Synthesis Planning	4
		Enzyme Engineering	10
		Fundamentals of Protein Structure Analysis	10
		Advanced Theoretical Chemistry	8
		Machine Learning in Computational Chemistry	8
		A) Sum of achieved CP for Specialization	
Key Qualifications 1.-3. Semester 12 CP (total)	Compulsory	Ethics and Epistemology	5 x
	Elective	Elective Modules	7

Summer Semester (2nd Semester)		approx. 30 CP	
Foundations 1-2. Semester 26 CP (total)	Compulsory	Scientific Software Engineering – Lab	5
Advanced Machine Learning and AI 2-3. Semester 15 CP (total)	Elective	Machine Learning for Data Science	5
		Pattern Recognition	5
		Computer Lab Pattern Recognition	5
		Deep Learning Lab	5
		Methods of Uncertainty Analysis and Quantification	5
Specialization Chemical Synthesis and Drug Design 1-3. semester 37 CP (total)	Compulsory Basic Module choose 1 of 2 (4 CP)	Reaction Mechanisms	4
	Elective (16-20 CP)	Catalysis	8
		Biomolecular Modelling	8
		B) Sum of achieved CP for Specialization	
Key Qualifications 1-3. Semester 12 CP (total)	Elective	Elective Modules	7

Winter Semester (3rd Semester)		approx. 30 CP	
Advanced Machine Learning and AI 2.-3. Semester 15 CP (total)	Elective	Pattern Recognition (offered in German in winter semester)	5
		Computer Lab Pattern Recognition	5
Specialization Chemical Synthesis and Drugs 1.-3. Semester 37 CP (total)	Elective (16-20 CP)	Advanced Inorganic Chemistry	8
		Organic Synthesis Planning	4
		Enzyme Engineering	10
		Fundamentals of Protein Structure Analysis	10
		Advanced Theoretical Chemistry	8
		Machine Learning in Computational Chemistry	8
	Compulsory (13-17 CP)	C) Sum of achieved CP for Specialization	
		Research Lab	13-17 x
Key Qualifications 1.-3. Semester 12 CP (total)	Compulsory	37 CP - (A + B + C) = CP Research Lab	
	Elective	Ethics and Epistemology	5 x
		Elective Modules	7

Summer Semester (4th Semester)				approx. 30 CP	
Master's Thesis 4. Semester 30 CP	Compulsory			CP	
		Master's Thesis	30	x	
120 CP in total					

Date: _____ Signature Student: _____

Signature Mentor: _____

For the master's degree, you need a total of 120 CP

In the 2nd semester you can see the modules that are offered every summer semester

Study Plan (AIMS)
Specialization: Chemical Synthesis and Drug Design



Name: _____ Year of Enrollment: _____
Matricule Number: _____ Mentor: _____

Here you can see which area the modules belong to and how many CP must be earned in that area in total

Here you can see whether the modules are compulsory or elective.

Winter Semester (1st Semester)				approx. 30 CP
Foundations 1.-2. semester 26 CP (total)	Compulsory		CP	
		Introduction to AIMS	5	x
		Mathematics for Engineers A	8	x
		Programming in Python and Python Lab	8	x
Specialization Chemical Synthesis and Drug Design 1.-3. Semester 37 CP (total)	Compulsory Basic Module choose 1 of 2 (4 CP)	Organometallic Chemistry	4	
	Elective (16-20 CP)	Advanced Inorganic Chemistry	8	
		Organic Synthesis Planning	4	
		Enzyme Engineering	10	
		Fundamentals of Protein Structure Analysis	10	
		Advanced Theoretical Chemistry	8	
		Machine Learning in Computational Chemistry	8	
		A) Sum of achieved CP for Specialization		
Key Qualifications 1.-3. Semester 12 CP (total)	Compulsory	Ethics and Epistemology	5	x
	Elective	Elective Modules	7	

Summer Semester (2nd Semester)				approx. 30 CP
Foundations 1.-2. Semester 26 CP (total)	Compulsory		CP	
		Scientific Software Engineering – Lab	5	x
Advanced Machine Learning and AI 2.-3. Semester 15 CP (total)	Elective	Machine Learning for Data Science	5	
		Pattern Recognition	5	
		Computer Lab Pattern Recognition	5	
		Deep Learning Lab	5	
		Methods of Uncertainty Analysis and Quantification	5	
Specialization Chemical Synthesis and Drug Design 1.-3. semester 37 CP (total)	Compulsory Basic Module choose 1 of 2 (4 CP)	Reaction Mechanisms	4	
	Elective (16-20 CP)	Catalysis	8	
		Biomolecular Modelling	8	
		B) Sum of achieved CP for Specialization		
Key Qualifications 1.-3. Semester 12 CP (total)	Elective	Elective Modules	7	

Winter Semester (3rd Semester)				approx. 30 CP
Advanced Machine Learning and AI 2.-3. Semester 15 CP (total)	Elective		CP	
		Pattern Recognition <i>(offered in German in winter semester)</i>	5	
		Computer Lab Pattern Recognition	5	
Specialization Chemical Synthesis and Drugs 1.-3. Semester 37 CP (total)	Elective (16-20 CP)	Advanced Inorganic Chemistry	8	
		Organic Synthesis Planning	4	
		Enzyme Engineering	10	
		Fundamentals of Protein Structure Analysis	10	
		Advanced Theoretical Chemistry	8	
		Machine Learning in Computational Chemistry	8	
		C) Sum of achieved CP for Specialization		
	Compulsory (13-17 CP)	Research Lab	13-17	x
		37 CP - (A + B + C) = CP Research Lab		
	Key Qualifications 1.-3. Semester 12 CP (total)	Compulsory	Ethics and Epistemology	5
Elective Modules			7	
Elective				
Summer Semester (4th Semester)				approx. 30 CP
Master's Thesis 4. Semester 30 CP	Compulsory		CP	
		Master's Thesis	30	x
120 CP in total				

The ticked modules are compulsory; in the blank boxes, you should tick the modules you wish to select.

Date: _____ Signature Student: _____

Signature Mentor: _____

The **Foundations** should be taken in the 1st and 2nd semester (winter and summer semester). These modules are **compulsory** and comprise a total of **26 CP**.

The **Advanced Machine Learning and AI** modules should be taken in the 2nd and 3rd semester (winter and summer semester). You must **choose 3 elective modules worth 5 CP each** so that you accumulate a total of **15 CP**.

Winter Semester (1st Semester)			approx. 30 CP		
Foundations 1.-2. semester 26 CP (total)	Compulsory	Introduction to AIMS	5	x	
		Mathematics for Engineers A	8	x	
		Programming in Python and Python Lab	8	x	
Specialization Chemical Synthesis and Drug Design 1.-3. Semester 37 CP (total)	Compulsory Basic Module choose 1 of 2 (4 CP)	Organometallic Chemistry	4		
		Advanced Inorganic Chemistry	8		
	Elective (16-20 CP)	Organic Synthesis Planning	4		
		Enzyme Engineering	10		
		Fundamentals of Protein Structure Analysis	10		
		Advanced Theoretical Chemistry	8		
		Machine Learning in Computational Chemistry	8		
		A) Sum of achieved CP for Specialization			
Key Qualifications 1.-3. Semester 12 CP (total)	Compulsory	Ethics and Epistemology	5	x	
	Elective	Elective Modules	7		

Summer Semester (2nd Semester)			approx. 30 CP		
Foundations 1.-2. Semester 26 CP (total)	Compulsory	Scientific Software Engineering – Lab	5	x	
Advanced Machine Learning and AI 2.-3. Semester 15 CP (total)	Elective	Machine Learning for Data Science	5		
		Pattern Recognition	5		
		Computer Lab Pattern Recognition	5		
		Deep Learning Lab	5		
		Methods of Uncertainty Analysis and Quantification	5		
Specialization Chemical Synthesis and Drug Design 1.-3. semester 37 CP (total)	Compulsory Basic Module choose 1 of 2 (4 CP)	Reaction Mechanisms	4		
	Elective (16-20 CP)	Catalysis	8		
		Biomolecular Modelling	8		
		B) Sum of achieved CP for Specialization			
Key Qualifications 1.-3. Semester 12 CP (total)	Elective	Elective Modules	7		

Winter Semester (3rd Semester)			approx. 30 CP		
Advanced Machine Learning and AI 2.-3. Semester 15 CP (total)	Elective	Pattern Recognition <i>(offered in German in winter semester)</i>	5		
		Computer Lab Pattern Recognition	5		
Specialization Chemical Synthesis and Drugs 1.-3. Semester 37 CP (total)	Elective (16-20 CP)	Advanced Inorganic Chemistry	8		
		Organic Synthesis Planning	4		
		Enzyme Engineering	10		
		Fundamentals of Protein Structure Analysis	10		
		Advanced Theoretical Chemistry	8		
		Machine Learning in Computational Chemistry	8		
	C) Sum of achieved CP for Specialization				
Key Qualifications 1.-3. Semester 12 CP (total)	Compulsory (13-17 CP)	Research Lab	13-17		x
		37 CP - (A + B + C) = CP Research Lab			
	Compulsory	Ethics and Epistemology	5		x
	Elective	Elective Modules	7		
Summer Semester (4th Semester)			approx. 30 CP		
Master's Thesis 4. Semester 30 CP	Compulsory	Master's Thesis	30		x
120 CP in total					

The **Key Qualifications** should be completed in the 1st, 2nd, and 3rd semester and comprise a total of **12 CP**. It is advisable to complete the **compulsory Ethics and Epistemology** module (**5 CP**) in the 1st semester. The remaining **7 CP** can be earned through **professionalization elective modules** (e.g., language courses).

Study Plan (AIMS)

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Name: _____

Year of Enrollment: _____

Matricule Number: _____

Mentor: _____

Winter Semester (1st Semester)				approx. 30 CP
Foundations 1.-2. semester 26 CP (total)	Compulsory		CP	
		Introduction to AIMS	5	x
		Mathematics for Engineers A	8	x
		Programming in Python and Python Lab	8	x
Specialization Chemical Synthesis and Drug Design 1.-3. Semester 37 CP (total)	Compulsory Basic Module choose 1 of 2 (4 CP)	Organometallic Chemistry	4	
	Elective (16-20 CP)	Advanced Inorganic Chemistry	8	
		Organic Synthesis Planning	4	
		Enzyme Engineering	10	
		Fundamentals of Protein Structure Analysis	10	
		Advanced Theoretical Chemistry	8	
		Machine Learning in Computational Chemistry	8	
		A) Sum of achieved CP for Specialization		
Key Qualifications 1.-3. Semester 12 CP (total)	Compulsory	Ethics and Epistemology	5	x
	Elective	Elective Modules	7	

Summer Semester (2nd Semester)				approx. 30 CP
Foundations 1.-2. Semester 26 CP (total)	Compulsory		CP	
		Scientific Software Engineering – Lab	5	x
Advanced Machine Learning and AI 2.-3. Semester 15 CP (total)	Elective	Machine Learning for Data Science	5	
		Pattern Recognition	5	
		Computer Lab Pattern Recognition	5	
		Deep Learning Lab	5	
		Methods of Uncertainty Analysis and Quantification	5	
Specialization Chemical Synthesis and Drug Design 1.-3. semester 37 CP (total)	Compulsory Basic Module choose 1 of 2 (4 CP)	Reaction Mechanisms	4	
	Elective (16-20 CP)	Catalysis	8	
		Biomolecular Modelling	8	
		B) Sum of achieved CP for Specialization		
Key Qualifications 1.-3. Semester 12 CP (total)	Elective	Elective Modules	7	

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Advanced Machine Learning and AI 2.-3. Semester 15 CP (total)	Elective		CP	
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		Enzyme Engineering	10	
		Fundamentals of Protein Structure Analysis	10	
		Advanced Theoretical Chemistry	8	
		Machine Learning in Computational Chemistry	8	
		C) Sum of achieved CP for Specialization		
	Compulsory (13-17 CP)	Research Lab	13-17	x
		37 CP - (A + B + C) = CP Research Lab		
Key Qualifications 1.-3. Semester 12 CP (total)	Compulsory	Ethics and Epistemology	5	x
	Elective	Elective Modules	7	

Summer Semester (4th Semester)				approx. 30 CP
Master's Thesis 4. Semester 30 CP	Compulsory		CP	
		Master's Thesis	30	x
120 CP in total				

Date: _____ Signature Student: _____

Signature Mentor: _____

Specialization – 37 CP

In total, 37 CP must be earned in the specialization.

The modules can be completed in the 1st, 2nd, and 3rd semesters.

The specialization area consists of a **Compulsory Basic Module**, **Elective Modules**, and a **Research Lab**

Compulsory Basic Module – 4 CP

Note: in the Chemical Synthesis and Drug Design specialization, you can choose between two basic modules; you must complete one of them.

Elective Modules – 16 to 20 CP

You can choose from the remaining specialization elective modules so that you earn 16 to 20 CP.

Research Lab – 13 to 17 CP

The CP earned from the Basic Module and the Elective Modules are added together, in total 20 to 24 CP. The remaining CP to reach the 37 CP required for the specialization are then covered by the Research Lab. Therefore, depending on how many CP you still need, you will undertake a Research Lab worth 13 to 17 CP.

The **Research Lab** is a compulsory study research project including a report and presentation and participation in the seminar.

Study Plan (AIMS)

Specialization: Chemical Synthesis and Drug Design



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Foundations 1.-2. semester 26 CP (total)	Compulsory	CP	
		Introduction to AIMS	5 x
		Mathematics for Engineers A	8 x
Specialization Chemical Synthesis and Drug Design 1.-3. Semester 37 CP (total)	Compulsory Basic Module choose 1 of 2 (4 CP)	Programming in Python and Python Lab	8 x
		Organometallic Chemistry	4
	Elective (16-20 CP)	Advanced Inorganic Chemistry	8
		Organic Synthesis Planning	4
		Enzyme Engineering	10
		Fundamentals of Protein Structure Analysis	10
		Advanced Theoretical Chemistry	8
		Machine Learning in Computational Chemistry	8
		A) Sum of achieved CP for Specialization	
Key Qualifications 1.-3. Semester 12 CP (total)	Compulsory	Ethics and Epistemology	5 x
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Summer Semester (2nd Semester) approx. 30 CP			
Foundations 1.-2. Semester 26 CP (total)	Compulsory	CP	
		Scientific Software Engineering – Lab	5 x
Advanced Machine Learning and AI 2.-3. Semester 15 CP (total)	Elective	Machine Learning for Data Science	5
		Pattern Recognition	5
		Computer Lab Pattern Recognition	5
		Deep Learning Lab	5
		Methods of Uncertainty Analysis and Quantification	5
Specialization Chemical Synthesis and Drug Design 1.-3. semester 37 CP (total)	Compulsory Basic Module choose 1 of 2 (4 CP)	Reaction Mechanisms	4
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		B) Sum of achieved CP for Specialization	
Key Qualifications 1.-3. Semester 12 CP (total)	Elective	Elective Modules	7

Winter Semester (3rd Semester) approx. 30 CP			
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		Pattern Recognition (offered in German in winter semester)	5
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		Enzyme Engineering	10
		Fundamentals of Protein Structure Analysis	10
		Advanced Theoretical Chemistry	8
		Machine Learning in Computational Chemistry	8
		C) Sum of achieved CP for Specialization	
	Compulsory (13-17 CP)	Research Lab	13-17 x
		37 CP - (A + B + C) = CP Research Lab	
Key Qualifications 1.-3. Semester 12 CP (total)	Compulsory	Ethics and Epistemology	5 x
	Elective	Elective Modules	7

Summer Semester (4th Semester) approx. 30 CP			
Master's Thesis 4. Semester 30 CP 120 CP in total	Compulsory	CP	
		Master's Thesis	30 x

Date: _____ Signature Student: _____

Signature Mentor: _____

Master's Thesis:

In the 4th semester, the master's thesis is completed (30 CP).

Once the study plan is completed, please have it signed by your mentor and submit it to the Examination Office.