Study Guide

for the Degree Programme

Interdisciplinary Sciences

at the Department of Chemistry and
Applied Biosciences of ETH Zurich

Bachelor's and Master's Degree Programmes as from Summer 2022 (start of studies after summer 2022)
Current version: Aug 2022

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1 Overview and foreword

At the Department of Chemistry and Applied Biosciences of ETH Zurich, it is possible to study Interdisciplinary Sciences and to graduate with a Bachelor's degree in Interdisciplinary Sciences. The degree programme N (Interdisziplinäre **N**aturwissenschaften) aims at providing an interdisciplinary education in all basic subjects of the natural sciences. According to the current programme regulations (2018), the Bachelor's degree programme focuses on mathematics, physics, chemistry, biology and computer science. There are two disciplinary directions to choose from: the Physical-Chemical and the Biochemical-Physical direction.

After the first year of studies and the completion of the first-year examinations, a specialisation in different disciplines can be chosen. Combinations of the following subjects can be cited as examples: Inorganic, Analytical and Organic Chemistry, Biochemistry, Physical Chemistry, Computer-Aided Chemistry, Crystallography, Solid State Chemistry, Solid State Physics, Nuclear Physics, Theoretical Physics, Quantum Electronics, Computer Science, Environmental Physics, Environmental Chemistry, Molecular Biology, Biophysics, Evolutionary Biology and Genetics. In general, several subjects are combined to form an individual study programme. Laboratory courses and semester projects complement the lectures. Suggestions for possible subject combinations are given in this Study Guide. In addition, model study plans for both disciplinary directions can be found in the appendix. A suitable choice of subjects can very rapidly lead students to the forefront of modern scientific research. The Bachelor's degree programme serves as a preparation for the Master's degree programme of Interdisciplinary Sciences; it is equivalent in content to the former degree (diploma) and represents the first final degree.

Compared to other programmes of study at ETH and at other universities worldwide, the degree programme N provides a unique opportunity for interdisciplinary studies of all basic subject areas of the natural sciences. The study of Interdisciplinary Sciences requires a high degree of independence and commitment, but is an ideal introduction to many areas of scientific research and prepares for a broad range of professional careers.

For further information, please visit the website (www.chab.ethz.ch/en/studies.html) or contact:

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Representation of students:

Students are represented by the student representative N, i.e., the person responsible for the university policy of the degree programme N of the VCS (Hopo N = Hochschulpolitik-Verantwortlicher für den Studiengang N).
See https://vcs.ethz.ch/verein/vorstand/

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1.1 Foreword by the Director of Studies

At the Department of Chemistry and Applied Biosciences of ETH Zurich, it is possible to study Interdisciplinary Sciences. The degree programme N aims at providing an interdisciplinary education in all basic subjects of the natural sciences. The Bachelor's degree programme focuses on mathematics, physics, chemistry, biology and computer science. Furthermore, specialisation in basically any field of the natural sciences is possible.

The origins of this degree programme can be traced back to the former department X (Natural Sciences) of ETH, where a corresponding specialisation was at the core of the different subject areas. After dissolving the department X and splitting it up into various subdivisions, the development of the degree programme N was initially uncertain for several years until it was finally accommodated in the Chemistry Department (today D-CHAB - Department of Chemistry and Applied Biosciences) in the 1990s. The number of N students has been continuously increasing and the degree programme N has developed very well primarily thanks to the high value of the education offered. In 2001, the programme was subject to a fundamental reform, which was the basis for the two-stage degree programmes according to the Bachelor's and Master's system of the Bologna reform. This Study Guide serves as a first orientation.

The most frequently asked questions by future students at pre-study events concern the nature of the interdisciplinary education at ETH: Is broad knowledge in all areas of the natural sciences guaranteed? Will interdisciplinarity not lead to (too) superficial knowledge in (too) many areas of the natural sciences? A look at this Study Guide and the programme regulations is the best way to find an answer to these questions. A few crucial points will briefly be outlined here.

At the beginning of their studies, students choose one of the two major disciplinary directions: the Physical-Chemical direction, which focuses on chemistry and physics, or the Biochemical-Physical direction, which focuses on biology and chemistry. In the first direction, interdisciplinary students attend chemistry lectures with the chemistry students and physics lectures with the physics students. In the second direction, interdisciplinary students attend biology lectures with biology students and chemistry lectures with chemistry students. Thus interdisciplinarity is not at the cost of thoroughness. As from the second year of studies, apart from a few compulsory key subjects, there is already considerable freedom of choice, which enables students to channel their education in the preferred direction. In addition to subjects in the key disciplines Mathematics, Physics, Chemistry and Biology, courses in Environmental Sciences, Materials Science and Computer Science can be chosen, with the requirement that students of the Interdisciplinary Sciences always attend the courses with the students of the degree programme in question.

Interdisciplinarity cannot be obtained without a founded education in more than one discipline, which requires additional efforts: *The study of Interdisciplinary Sciences is therefore suited to motivated, enthusiastic, talented and committed students.* It offers them unrestricted room for development, a unique freedom of choice and an ideal preparation for their future scientific work in teaching, industry and research.

We wish all students joy and success in their studies and in their future scientific work!

Frédéric Merkt, April 2016

1.2 Foreword by the students

As students of Interdisciplinary Sciences (generally called N students), we can argue that our degree programme is unique. There is no other degree programme in Switzerland which allows so much freedom of choice. N students compile their individual study plan. Those who know exactly what they want will feel at home here; and so will those who want to find their way and try out this and that.

On the one hand, N students have the possibility to pursue personal scientific interests, but, on the other hand, the study of Interdisciplinary Sciences, in contrast to other degree programmes at ETH, requires talent, additional time and effort. Interdisciplinary students have to be highly motivated, committed and willing to flourish in the natural sciences to the full. There are definitely better alternatives for people who lack commitment and who desire clear structures.

However, those who have decided to study Interdisciplinary Sciences are in good hands. The rather small number of N students makes it possible to socialise with more experienced students and doctoral students as well as with professors. At social events such as the N apero, students can enquire about all possibilities offered by the degree programme and enjoy the relaxed atmosphere. N students are well represented in the student organisation VCS and can contribute to the shaping of their degree programme in many respects.

Prospective interdisciplinary students are well advised to attend the "Maturandentag" and the Pre-Study Event; at these events, detailed information on the degree programme is given. N students can address questions to the student representative N.

The model study plans attached at the end of this Study Guide give insight into possible combinations of scientific subjects and alternatives. In general, almost anything is possible for N students as long as there is a will, interest and some perseverance.

To succeed in your studies, you should consult older and more experienced students and ask them for advice.

I wish all N students success in their studies and thirst for knowledge.

Written by Manuel Weirich, Summer 2009

Revised by Lukas Möller, Winter 2014/2015

2 Year 1 of the Bachelor's degree programme

The first year of studies has the purpose of establishing basic knowledge in mathematics, physics, chemistry and biology. The first-year examinations have the purpose of selecting the students with the appropriate qualities for the study of Interdisciplinary Sciences. These exams must be passed within two years after beginning the studies and can only be repeated once. The students can choose between two disciplinary directions, as described below.

2.1 The Physical-Chemical direction

An overview of the compulsory subjects in the first year is given in table 1. Attending a course in computer science (e.g., "Informatik I") is recommended but optional. A brief description of the courses and a link to the website can be found in the Course Catalogue (www.vvz.ethz.ch). For detailed information, please visit the websites of last year's courses:

- D-MATH:
  - https://www.ethz.ch/de/studium/bachelor/studienangebot/naturwissenschaften-und-mathematik/mathematik.html
  - https://metaphor.ethz.ch/
- D-PHYS and D-CHAB: On the research website of the particular professor, the information can usually be found on a page called 'Education', 'Lectures' or 'Teaching'.
  - D-PHYS: www.solid.phys.ethz.ch (Solid State Physics) or www.iqe.phys.ethz.ch (Quantum Electronics); professors from these two institutes usually give the basic lectures in physics
  - D-CHAB: www.chab.ethz.ch → Research → Institutes & Laboratories → Laboratory of Inorganic, Organic or Physical Chemistry

On the course websites, one typically finds lecture notes, exercises and references which give a good overview of the lecture content. Although the content of the first-year lectures is largely set, the lecture style and sometimes also the choice of topics may depend on the lecturer.

First-year examinations

The subjects of the first-year examinations are:

	Grade weighting
Analysis I und II	2
Lineare Algebra I und II	2
Physik I	1
Physik II	1
Allgemeine Chemie I (PC) (Physikalische Chemie)	2
Physikalische Chemie I: Thermodynamik	2

New regulations from Fall Semester 2022: The two-semester course Analysis I and II is separated into two distinct one-semester courses, as with grade weighting as follows:

	Grade weighting
Analysis I	1
Analysis II	1

The remaining subjects of the first-year examination will remain unchanged.

The examinations are written exams, and successful completion of the first year requires an average of at least 4 when the grades of all these exams are given the according weight.

1st semester	ECTS	2nd semester	ECTS
Analysis I (D-MATH): 6V+3U	10	Analysis II (D-MATH): 6V+3U	10
Lineare Algebra I (D-MATH): 4V+2U	7	Lineare Algebra II (D-MATH): 4V+2U	7
Physik I (D-PHYS): 4V+2U	7	Physik II (D-PHYS): 4V+2U	7
Allgemeine Chemie I (D-CHAB): Physikalische Chemie: 2V+1U	3	Physikalische Chemie I (D-CHAB): Thermodynamik: 3V+1U	4
Allgemeine Chemie I (D-CHAB): Anorganische Chemie: 2V+1U	3	Allgemeine Chemie II (D-CHAB): Anorganische Chemie: 3V+1U	4
Organische Chemie: 2V+1U	3	Organische Chemie: 3V+1U	4
P: Allgemeine Chemie (D-CHAB: 529-0011-04L) in the semester break or 3rd semester	8		
Total ECTS	41	Total ECTS	36

Table 1: Compulsory courses of the first year of the Physical-Chemical direction. V=Lecture, U=Tutorial, P=Lab Course, Number placed in front of letter=Number of hours per week

2.2 The Biochemical-Physical direction

An overview of the compulsory courses in the first year is given in table 2. A brief description of the courses and a link to the particular website can be found in the Course Catalogue (www.vvz.ethz.ch). For detailed information, visit the course websites of last year's courses:

- D-MATH:
  - https://www.ethz.ch/de/studium/bachelor/studienangebot/naturwissenschaften-und-mathematik/mathematik.html
  - https://metaphor.ethz.ch/
- D-PHYS and D-CHAB: On the research website of the particular professor, the information can usually be found on a page called 'Education', 'Lectures' or 'Teaching'.
  - D-PHYS: www.solid.phys.ethz.ch (Solid State Physics) or www.iqe.phys.ethz.ch (Quantum Electronics); professors from these two institutes usually give the basic lectures in physics
  - D-CHAB: www.chab.ethz.ch → Research → Institutes & Laboratories → Laboratory of Inorganic, Organic or Physical Chemistry

First-year examinations

The subjects of the first-year examinations are:

	Grade weighting
Grundlagen der Biologie 1	2
Grundlagen der Biologie 2	2
Allgemeine Chemie I und II: Anorganische Chemie	3
Allgemeine Chemie I und II: Organische Chemie	3
Allgemeine Chemie I: Physikalische Chemie	2
Physikalische Chemie I: Thermodynamik	2
Grundlagen der Mathematik I: Analysis A und B	2
Grundlagen der Mathematik II: Lineare Algebra und Statistik	1
Physik I und II	3

The examinations are written exams, and successful completion of the first year requires an average of at least 4 when the grades of all these exams are given the weight as indicated in the programme regulations.

1st semester	ECTS	2nd semester	ECTS
Grundlagen der Biologie 1 (D-BIOL) 4V+1U	6	Grundlagen der Biologie 2 (D-BIOL) 4V+1U	6
Allgemeine Chemie I (D-CHAB): Anorganische Chemie I: 2V+1U Organische Chemie: 2V+1U Physikalische Chemie: 2V+1U	 3 3 3	Allgemeine Chemie II (D-CHAB): Anorganische Chemie: 3V+1U Organische Chemie: 3V+1U	 4 4
		Physikalische Chemie I (D-CHAB): Thermodynamik: 3V+1U	 4
Physik I (D-CHAB): 3V+1U	4	Physik II (D-CHAB): 3V+1U	4
Grundlagen der Mathematik I (D-CHAB): Analysis A: 3V+2U	 5	Grundlagen der Mathematik I&II (D-CHAB): Analysis B: 2V+1U Lineare Algebra und Statistik: 2V+1U	 3 3
P: Allgemeine Chemie (D-CHAB: 529-0011-04L) in the semester break or 3rd semester	8	To choose between P: Grundlagen der Biologie I (D-BIOL: 551-0128-00L) or P: Anorganische und Organische Chemie I (D-CHAB: 529-0230-00L)	8
Total ECTS	32	Total ECTS	36

Table 2: Compulsory courses of the first year of the Biochemical-Physical direction. V=Lecture, U=Tutorial, G=Lecture with Tutorial, P=Lab Course, Number placed in front of letter=Number of hours per week

3 Years 2 and 3 of the Bachelor's degree programme

In the second and third years, there are still a few compulsory courses which are assessed in an examination block. The majority of subjects, however, can be chosen freely within the framework of an individual study plan. For the Bachelor's degree, a total of 180 credits (ECTS) is required within five years after beginning the studies. In case of valid reasons, the Rector can grant an extension of the duration of studies upon request. Because of the additional workload, interdisciplinary students usually acquire a considerably higher number of credits than 180 ECTS upon completion of their Bachelor's degree. An overview of the recommended schedule for the study of Interdisciplinary Sciences is given in table 3.

Before semester start	Choosing the Physical-Chemical or the Biochemical-Physical direction
1st year	Attending courses and preparing for the examination block
3rd semester	Compiling an individual or choosing a model study plan
End of 3rd semester	Handing in the study plan to the Director of Studies
3rd-6th semester	Passing the first and second (for PC-N students only) examination blocks semester thesis
End of 6th semester	Handing in the Bachelor's thesis and, if applicable, informing the Director of Studies about changes to the study plan
Beginning of 7th semester	Enrolling for the MSc programme N and choosing a specialisation
7th semester	Compiling a study plan for the Master's degree programme
7th-8th semester	Attending courses and passing exams
9th semester	Handing in the Master's thesis and the study plan

Table 3: Recommended schedule for the study of Interdisciplinary Sciences (BSc and MSc)

3.1 Compulsory courses of the Physical-Chemical direction

- Physikalische Chemie II: Chemische Reaktionskinetik (D-CHAB)
- Physik III (D-PHYS)

These two subjects are assessed in an examination block and are weighted equally.

- Physikalische Chemie III: Quantenmechanik (D-CHAB)

This subject is examined individually. In case the grade is insufficient twice, the studies can only be continued if at least the grade 3.5 has been achieved in one of the two possible attempts. The missing credits, however, have to be compensated by additional courses. It is not permitted to acquire the credits by means of additional courses after the first unsuccessful attempt.

3.2 Compulsory courses of the Biochemical-Physical direction

The following subjects are assessed in an examination block.

	Grade weighting
Mathematik III (Partielle Differentialgleichungen)	1
Informatik *	1
Physikalische Chemie II und III	2
Organische Chemie I und II	2

Changes from Fall Semester 2023:

The examination block will be divided into two examination blocks. The previous annual course "Physical Chemistry II and III" will be separated into two distinct one-semester courses "Physical Chemistry II" and "Physical Chemistry III", with a grade weight of 1 each.

Examination block 1 is composed as follows:

	Grade weighting
Mathematik III (Partielle Differentialgleichungen)	1
Informatik *	1

Examination block 2 is composed as follows:

	Grade weighting
Physikalische Chemie II	1
Physikalische Chemie III	1
Organische Chemie I und II	2

*As an alternative to "Informatik", "Einführung in die Programmierung" from the Bachelor's degree programme Computer Sciences can be chosen. This option will no longer be offered as of Fall Semester 2022.

Alternative compulsory subjects have to be reported to the Examinations Office when registering for the exams in order to adjust the examination schedule.

3.3 Electives and individual study plans

The remaining study plan consists of electives. The first decision which has to be taken is the subject area which shall be given priority. Both for the Physical-Chemical as well as for the Biochemical-Physical direction, there are seven model study plans appended to this Study Guide. The model study plans in the present form can be chosen freely.

It is also possible to make adjustments; in that case, the model study plans should be taken as reference and the desired changes should be discussed with the Director of Studies. Other study advisors may be consulted if necessary. In Chapter 3.7, there is a list of possible electives.

Once the study plan has been fully elaborated, it is signed by the student and the Director of Studies, and will be regarded as a contract and a basis for recording the grades and preparing for the Bachelor's degree diploma.

In order to compile an individual study plan, there is a word template for the Biochemical-Physical as well as for the Chemical-Physical direction available for download on the D-CHAB Website

3.4 Laboratory courses, semester projects, seminars and excursions

Apart from the compulsory laboratory courses in the first year, at least another two laboratory courses (at least 32 ECTS) have to be attended; these courses have to match one of the chosen electives. At least one of the two laboratory courses has to be chosen from the main subject area. Depending on the courses available in the Course Catalogue, laboratory courses can be substituted by a semester project, a seminar or an excursion. The compulsory laboratory courses of the first year can also be completed after the first-year examinations.

The laboratory course "Physikalische Chemie" (6 ECTS) has been specially created for N students; it comprises the physical-chemical experiments of the laboratory course "Physikalische und Analytische Chemie", which is compulsory for students of chemistry.

It is recommended that a semester project be carried out in a research group during the semester or the semester break to become familiar with day-to-day research, which is of advantage particularly with regard to the Bachelor's thesis and future research projects. Working in a research group is very different from everyday student life. The duration of a semester project varies and is determined by the department, the research group and the student. For further information and deadlines, it is best to consult the project supervisor of the research group in question. In general, research projects should not be carried out before the fifth semester because they require knowledge and experience gathered until then.

3.5 Compulsory elective "Science in Perspective/SiP"

During the Bachelor's degree programme, courses worth 6 ECTS in total have to be attended in the realm of the compulsory elective "Science in Perspective/SiP" at the Department of Humanities, Social and Political Sciences (D-GESS). Details regarding SiP can be found in the programme regulations and in the Directives of the Rectorate. There are many different courses varying greatly in quality and the amount of work required. It is therefore worth asking other students about their experiences.

3.6 Bachelor's thesis

The Bachelor's thesis is usually written during the third year of studies and supervised by a professor. The purpose of the Bachelor's thesis is a first introduction to independent scientific research. Given the number of ECTS for a Bachelor's thesis, it generally takes about half a semester (if the whole day is dedicated to it). However, it can also be done during the semester break. Details concerning the Bachelor's thesis have to be discussed with the supervisor of the thesis, who will also determine the start date and the deadline and will grade it.

3.7 List of electives

Basically all lectures of the natural sciences offered at ETH can be chosen as electives. As a means of orientation, you can find a list of frequently chosen electives below (without claiming to be correct and exhaustive). Since all compulsory subjects of one disciplinary direction are considered electives of the other disciplinary direction, they are also included in the list. It is possible to attend courses of the Master's degree programme and incorporate the acquired ECTS as an elective in the Bachelor's degree programme. However, Master's courses included in the Bachelor's degree programme cannot again be incorporated in the Master's degree programme; they only count once. Due to the great number of courses in the Master's degree programmes, they are not listed below. All subjects can be found in the Course Catalogue of the degree programmes Physics, Chemistry, Biology, etc.

Most courses build on foundations acquired in earlier courses of the degree programme in question. Students of the Interdisciplinary Sciences are thus responsible for acquiring the required basic skills and knowledge for any elective they want to choose.

Abbreviations:
HS = fall semester; FS = spring semester; ECTS = credits.

D-PHYS

1.	Physik III	HS	7 ECTS	402-2883-00L
2.	Funktionentheorie	HS	6 ECTS	401-2303-00L
3.	Allgemeine Mechanik	HS	7 ECTS	402-2203-01L
4.	Methoden der mathematischen Physik I	HS	6 ECTS	401-2333-00L
5.	Methoden der mathematischen Physik II	FS	6 ECTS	401-2334-00L
6.	Einführung in die Festkörperphysik	HS	10 ECTS	402-0255-00L
7.	Quantum Electronics	FS	10 ECTS	402-0275-00L
8.	Astrophysics I	HS	10 ECTS	402-0263-00L
9.	Einführung in die Kern- und Teilchenphysik	FS	10 ECTS	402-0266-00L
10.	Quantenmechanik I	HS	10 ECTS	402-0205-00L
11.	Quantum Mechanics II	FS	10 ECTS	402-0206-00L
12.	Elektrodynamik	FS	7 ECTS	402-0204-00L
13.	Kontinuumsmechanik	FS	10 ECTS	402-0234-00L
14.	Theorie der Wärme	FS	10 ECTS	402-2214-00L

D-CHAB

15.	Analytische Chemie I	HS	3 ECTS	529-0051-00L
16.	Analytische Chemie II	FS	3 ECTS	529-0058-00L
17.	Anorganische Chemie I	HS	3 ECTS	529-0121-00L
18.	Inorganic Chemistry II	FS	3 ECTS	529-0122-00L
19.	Anorganische Chemie III: Metallorganische Chemie und Homogenkatalyse	HS	4 ECTS	529-0132-00L
20.	Inorganic Chemistry IV: (Nano-)Materials; Synthesis, Properties and Surface Chemistry	FS	4 ECTS	529-0131-00L
21.	Organische Chemie I	HS	3 ECTS	529-0221-00L
22.	Organic Chemistry II	FS	3 ECTS	529-0222-00L
23.	Organic Chemistry III: Introduction to Asymmetric Synthesis	HS	4 ECTS	529-0231-00L
24.	Organic Chemistry IV: Physical Organic Chemistry	FS	4 ECTS	529-0232-00L
25.	Organic Chemistry for Biochemistry and Chemical Biology	HS	6 ECTS	529-0018-00L
26.	Physikalische Chemie IV: Magnetische Resonanz	HS	4 ECTS	529-0432-00L
27.	Physical Chemistry V: Spectroscopy	FS	4 ECTS	529-0434-00L
28.	Messtechnik	HS	6 ECTS	529-0441-00L
29.	Advanced Kinetics	FS	6 ECTS	529-0442-00L
30.	Algorithmen und Programmentwicklung in C++	HS	6 ECTS	529-0002-00L
31.	Quantenchemie	FS	6 ECTS	529-0474-00L
32.	Supramolecular Chemistry	FS	6 ECTS	529-0242-00L
33.	Proteins and Lipids	FS	6 ECTS	529-0732-00L
34.	Nucleic Acids and Carbohydrates	HS	6 ECTS	529-0731-00L
35.	Advanced Organometallic and Coordination Chemistry: Learning from Nature and Industrial Processes (Voraussetzung: Anorganische Chemie III)	FS	6 ECTS	529-0142-00L
36.	Physikalische Methoden der Anorganischen Chemie	HS	6 ECTS	529-0141-00L

37.	Moderne Massenspektroskopie, gekoppelte Analysenmethoden, Chemometrie	HS	6 ECTS	529-0041-00L
38.	Grundlagen der Kristallstrukturanalyse	HS	6 ECTS	529-0039-00L
39.	Structure Elucidation by NMR	FS	4 ECTS	529-0042-00L
40.	Sicherheit, Umweltaspekte und Risikomanagement	FS	4 ECTS	529-0580-00L
41.	Elektrochemie	HS	6 ECTS	529-0659-00L
42.	Grundlagen der Umweltchemie und Ökotoxikologie	HS	4 ECTS	529-0037-01L
43.	Renewable Energy Technologies	HS	4 ECTS	151-0209-00L
44.	Electrochemical Energy Conversion and Storage Technologies	FS	4 ECTS	529-0191-01L
45.	Environmental and Human Health Risk Assessment of Chemicals	FS	3 ECTS	701-0998-00L
	D-BIOL			
46.	Grundlagen der Biologie 3: Mehrzellige Organismen / Mehrzelligkeit	HS	8 ECTS	
47.	Genetics and Genomics	FS	5 ECTS	
48.	Biochemical processes and molecular machines	FS	5 ECTS	
49.	Systems Biology	FS	5 ECTS	
50.	Introduction to Bioinformatics	HS	6 ECTS	551-1299-00L
51.	Cell Biology	FS	6 ECTS	551-0326-00L
52.	Concepts in Modern Genetics	HS	6 ECTS	551-0309-00L
53.	Molecular and Structural Biology I: Protein Structure and Function	HS	3 ECTS	551-0307-00L
54.	Molecular and Structural Biology II: Molecular Machines and Cellular Assemblies	FS	3 ECTS	551-0307-01L
55.	Biophysics of Biological Macromolecules	HS	6 ECTS	551-1601-00L
56.	Systems Biology	FS	6 ECTS	551-0324-00L
57.	Microbiology (Part I)	HS	3 ECTS	551-0313-00L
58.	Microbiology (Part II)	FS	3 ECTS	551-0314-00L
59.	Cellular Biochemistry (Part I)	HS	3 ECTS	551-0319-00L
60.	Cellular Biochemistry (Part II)	FS	3 ECTS	551-0320-00L
61.	Immunology I	HS	3 ECTS	551-0317-00L
62.	Immunology II	FS	3 ECTS	551-0318-00L
63.	Lebensmittel-Mikrobiologie I	HS	3 ECTS	752-4005-00L
64.	Lebensmittel-Mikrobiologie II	FS	3 ECTS	752-4006-00L
	D-INFK			
65.	Einführung in die Programmierung	HS	7 ECTS	252-0027-00L
66.	Datenstrukturen & Algorithmen	FS	8 ECTS	252-0002-00L
67.	Parallele Programmierung	FS	7 ECTS	252-0029-00L
68.	Formal Methods and Functional Programming	FS	7 ECTS	252-0058-00L
69.	Data Modelling and Databases	FS	7 ECTS	252-0063-00L
	D-MATL			
70.	Einführung in die Materialwissenschaft	HS	3 ECTS	327-0103-00L
71.	Kristallographie	HS	3 ECTS	327-0104-00L
72.	Materialwissenschaft I	HS	3 ECTS	327-0301-00L
73.	Materials Science II (presumably offered in FS2021 for the last time)	FS	3 ECTS	327-0401-00L

74.	Materials Physics I	HS	5 ECTS	327-0407-00L
75.	Metalle I	HS	3 ECTS	327-0501-00L
76.	Metalle II	FS	3 ECTS	327-0612-00L
77.	Polymere I	HS	3 ECTS	327-0502-00L
78.	Polymere II	FS	3 ECTS	327-0606-00L
79.	Keramik I	HS	3 ECTS	327-0503-00L
80.	Ceramics II	FS	3 ECTS	327-0603-00L
81.	Verbundwerkstoffe	FS	3 ECTS	327-0610-00L
	D-USYS			
82.	Pedosphäre	HS	3 ECTS	701-0501-00L
83.	Introduction to Evolutionary Biology	FS	2 ECTS	701-0245-00L
84.	Atmosphäre	HS	3 ECTS	701-0023-00L
85.	Atmosphärenphysik	HS	3 ECTS	701-0475-00L
86.	Atmosphärenchemie	HS	3 ECTS	701-0471-01L
87.	Hydrosphäre	FS	3 ECTS	701-0401-00L
88.	Agrarische Ressourcen- und Umweltökonomie	FS	2 ECTS	751-1552-00L
89.	Chemie aquatischer Systeme	FS	3 ECTS	701-0423-00L
90.	Introduction to Physical Oceanography	FS	3 ECTS	701-0478-00L
91.	Modelling Aquatic Ecosystems	FS	3 ECTS	701-0426-00L
92.	Wettersysteme	HS	3 ECTS	701-0473-00L
93.	Numerische Methoden in der Umweltphysik	HS	3 ECTS	701-0461-00L
94.	Umweltverträglichkeitsprüfung	FS	3 ECTS	102-0516-01L
95.	Klimasysteme	FS	3 ECTS	701-0412-00L
96.	Bodenbiologie	FS	3 ECTS	701-0524-00L
97.	Biologie III: Ökologie	HS	3 ECTS	701-0243-01L
98.	Evolutionary Genetics	HS	6 ECTS	701-2413-00L
99.	Ecology and Evolution: Interaction Seminar	HS	2 ECTS	551-0737-00L
100.	Stratospheric Chemistry	HS	4 ECTS	701-1233-00L

4 The Master's degree programme

The Master's degree programme of Interdisciplinary Sciences is the sequel to the Bachelor's degree programme and takes at least one year to complete, usually however three semesters (including the Master's thesis). With the completion of this degree programme, you will be awarded a Master in Interdisciplinary Sciences, ETH. There are different specialisations (Majors) that consist of two disciplines, which you can choose from the following list (e.g. Chemistry and Materials Sciences, or Physics and Computational Sciences):

1. Chemistry
2. Physics
3. Biology
4. Mathematics
5. Computational Sciences
6. Materials Sciences
7. Environmental Sciences
8. Earth Sciences

After selecting the Major, suitable subjects can be chosen for the Master's study plan, which has to be discussed with and approved by the Director of Studies. The advice given in Chapter 3 also applies to the Master's degree programme, but there are no compulsory subjects. For detailed information, please consult the programme regulations. In order to compile the individual study plan, there is a word template available for download on the D-CHAB website: https://www.chab.ethz.ch/en/studies/master/msc-interdisciplinary-sciences.html

5 Study abroad and student exchange

After passing the first-year examinations, Bachelor students have the possibility to study abroad for one or two semesters. It is advisable to gather information about the different possibilities at www.mobilitaet.ethz.ch early enough. Depending on whether students go abroad with an exchange programme such as the Swiss-European Mobility Programme (formerly Erasmus) or UNITECH or directly apply to a university with which ETH has a bilaterial agreement, there are different requirements and deadlines to meet. In some cases, it is necessary to register with the Student Exchange Office of ETH already a year prior to the desired beginning of your stay: As far as the choice of the university is concerned, former students' reports, which can also be found on the website of the Student Exchange Office of ETH, may be helpful. Once you have decided what your plans for an exchange are, get in touch with the departmental exchange coordinator of D-CHAB (via the Study Administration Office, HCI H 201).

The degree programme Interdisciplinary Sciences does not exist in the same form at most other universities. Thus students have to make their own enquiries as to which courses from the different departments of the guest university are most suited to their study plan. The programme of study at the guest university must be discussed with the Director of Studies and recorded in writing before your departure. In order to avoid unpleasant surprises upon your return, it should also be determined how many ECTS will be accepted for which courses by ETH.

Master students can also study abroad, but ETH only accepts max. 30 ECTS from other universities for the Master's degree. Therefore it is essential to draw up a study plan and have it approved by the Director of Studies in advance.

If you want to write your Bachelor's or Master's thesis during your stay abroad, you still have to find a professor from ETH Zurich as a supervisor of your thesis. In that case, it is not necessary to contact the Student Exchange Office of ETH, but you can start looking for a suitable research group with your supervisor's help straightaway. This form of mobility is the most commonly chosen by N students. Nevertheless, you will have to fill in the form "Research project outside ETH" (see https://www.chab.ethz.ch/en/studies/master/msc-interdisciplinary-sciences.html) and have it approved by the Director of Studies. Your supervisor from ETH will grade your thesis.

6 After your studies

6.1 Doctorate

After completing your Master's degree in Interdisciplinary Sciences, you have to decide whether to do a doctorate or to directly enter the labour market. This question - along with the consideration of where to do a doctoral thesis, if this option is preferred - is among the most important ones for your future career. You should take this decision primarily based on your personal preferences. If you aspire to work in research - be it in industry, at a research institute or a university - it is essential to do a doctorate. As a doctoral student, you are trained as an independent scientist with the opportunity to develop your own creativity and your personality in tackling difficult research problems as well as to apply your theoretical knowledge in real-world settings. If you intend to work in research and development, the experience as a doctoral student is indispensable. Should you be looking for another occupation - as a school teacher, in administration, management or in science- and technology-orientated business - there is no requirement for a doctoral thesis. A doctorate may, nevertheless, be useful (also with respect to the academic title), but it is absolutely necessary to take into consideration that a doctorate is very time-intensive and demands great commitment, which is only worth it if you want to do it wholeheartedly.

If you decide to do a doctoral thesis, you may want to take into account a change of university. With your internationally recognised Master's degree ETH, you can look for a doctoral position worldwide. As a general guideline, you should only consider top universities, particularly if you want to go to the United States because the standard of education varies greatly between different American universities. Improving your skills in English and familiarising yourself with the Anglo-American academic life may be valuable; however, choosing a mediocre university for your doctorate would be fatal for your future career. Before making a final decision, you should consult an ETH professor who specialises in the field of research which you have in mind. There are still opportunities for a stay abroad later in your academic career, e.g., during your postdoctoral studies, which last between two and three years.

Finally, you also have to find a supervisor for your doctorate. The variety of supervisors to choose from is very large for N students because anything from biology to chemistry to physics is possible. Yet, the direction will generally already be determined in the second half of your studies; there are subjects for which you have a predilection and at which you are particularly good. This should facilitate your decision. If you have a great enthusiasm for a certain subject, maybe even for a field of research, it is definitely worth having a closer look at the publications and review articles of the supervisor you have in mind before making an appointment with him or her, or asking other professors what doctoral research is possible in their research group. Whereas the time frame for completing your studies in the Bachelor's and Master's degree programmes is set, this is not the case for a doctoral thesis. Nonetheless, the general procedure of a doctoral project in an experimental field of research can be roughly summarised as follows: The first year serves reading up on the topic, getting familiar with experimental techniques or setting up an experimental apparatus. The first results and maybe also the first publications follow in the second year. The third year should be used to complete and write down the thesis and to publish the results. To be awarded the title "Doctor of Sciences (Dr. sc. ETH Zürich)", the doctoral thesis has to be defended during the doctoral examination. If everything goes according to plan, a doctorate takes approximately three years. Frequently, however, unforeseen problems or obstacles arise, thus prolonging the doctorate. In the third year at the latest, a clear strategy has to be developed to tackle the problems in order to bring the doctoral project to an end. In contrast to programme regulations with a fixed duration, for which the departments bear responsibility, doctoral students are themselves responsible for the time schedule of their thesis. There is no minimum duration for the completion of a doctorate. You should not be stingy with time. Should you want to stay in the academic world, a long time spent on your doctoral thesis

does not have to be detrimental if you have excellent results and numerous publications.

On the contrary, if a change into industrial research is planned, you should aspire to complete your doctorate in good time, even if you are tempted to prolong your doctoral studies for the sake of exciting results and publications. In the latter case, postdoctoral research is the preferable option. Age also plays an important role; it is recommended that the doctorate be completed before the age of 30.

Financial aspects may also be relevant for a doctoral position. As long as you are young and without any large financial responsibilities, financial considerations should not be given priority when choosing a doctoral project. Furthermore, choosing a topic with a precisely defined research plan in view of future usefulness in your career does not make much sense. Rather, enthusiasm for research should be of central importance.

6.2 Teaching

Along with the Master's degree in Interdisciplinary Sciences, the "Lehrdiplom für Maturitätsschulen (LD)" (Teaching Diploma for Secondary Education) or the "Didaktik-Zertifikat (DZ)" (Teaching Certificate) can be obtained. In anticipation of the teaching diploma, teacher training courses and exams may already be attended and completed during the Bachelor's studies. After passing the first-year examinations, students can have their individual study plan for the Bachelor's degree approved by the Director of Studies upon request. At present, two types of teacher training are offered at ETH:

- The Teaching Diploma for Secondary Education is a more time-consuming, yet broader education in teaching and comprises 60 ECTS. With this diploma, it is possible to teach at secondary, grammar and vocational schools in Switzerland. Please note that all academic requirements of the teaching diploma have to be incorporated in the study plan; otherwise, the courses in question will have to be attended after graduation.
  LD: https://www.ethz.ch/de/studium/didaktische-ausbildung/studienangebot-zulassung/lehrdiplom-fuer-maturitaetsschulen.html

- The Teaching Certificate is a certificate of competence in teaching and comprises 24 ECTS; with this certificate, it is possible to work as a teacher in education and further education at universities of applied sciences, vocational schools and other institutions. Employment at secondary or grammar schools may also be an option, but, in most cases, the Teaching Diploma for Secondary Education has to be obtained retrospectively.
  DZ: https://www.ethz.ch/de/studium/didaktische-ausbildung/studienangebot-zulassung/didaktik-zertifikat.html

In general, it is also possible to do the Teaching Diploma for Secondary Education or the Teaching Certificate independently of the study plan in Interdisciplinary Sciences, which, however, means additional work.

6.3 Typical professions

What professional future is there for graduates of the degree programme N - with or without doctorate? The career outlook in research is essentially similiar to the subject-related disciplines (biology, chemistry, physics) depending on the specialisation chosen in the second half of the studies or during the doctorate.

What is unique to the degree programme N is the broader basic education, which can be useful in many respects because it provides increased flexibility in the face of structural changes on the labour market. Many graduates find a job in biology-, chemistry- or physics-orientated industry,

in companies producing instruments or at research institutes. Former N students are also well suited for teaching professions at grammar schools and universities (there is no accurate statistics, but the number of future lecturers at universities from this discipline is disproportionately high). Also in patent offices, public administration and organisations, broad scientific knowledge and the resulting discernment are advantageous.

6.4 Advice given by graduates

The following advice stems from doctoral students and N graduates; it raises no claim to completeness or universal validity, but is only meant to provide some impressions of the conditions of a doctorate at ETH and of the entry into the labour market.

When your studies are coming to an end, you have to decide whether to do a doctorate or to take on a job in industry or education directly after completing your studies. For a career in research, a doctoral title is as good as required. For a career in industry, the pros and cons of a doctorate roughly balance one another out. As an alternative, a Master of Business Administration (MBA) may be taken into consideration.

If you want to improve your starting position on the labour market during your studies already, you should do traineeships in the semester break or during your leave of absence (or take on a part-time job alongside your studies) in order to gather first letters of reference. In this context, it is absolutely necessary to mention The International Association for the Exchange of Students for Technical Experience (IAESTE), which offers traineeships to students worldwide. Knowledge of foreign languages which goes beyond German, French or English at Matura level are clearly an asset. A diploma in teaching may also be useful in industry, since it attests, at least on paper, to the applicant's competence in teaching (e.g., the ability to lead a group). It is wrong to assume that grades are the decisive factor on the labour market. Rather, ability to work in a team, open-mindedness and knowledge of foreign languages are in demand. High military ranks are not as welcome nowadays as in the past because longer absences are often the consequence and, on top of that, the military style of leadership does not fit in with today's style of social interaction in private industry. What is still of central importance for an interview nowadays is the first personal impression, which cannot easily be changed with the help of a comprehensive guide. As part of your job hunt, you should exhaust all possibilities. Most jobs are published online nowadays: Scour the relevant online job boards on a regular basis! Moreover, the employment agency of ETH and the University of Zurich as well as numerous noticeboards are waiting with interesting job offers and traineeships. Also job advertisements in journals such as the "NZZ" or "Tages-Anzeiger" can lead to success. Not to be underestimated are speculative applications because they show your future employer that you are proactive. And last but not least, no need to say that networking is the easiest way to success, but who has the relevant business contacts? There is an abundance of books and guides on strategies of how to present your application documents and to prepare for a job interview. We therefore only want to cite one guide which has been specifically written for university graduates: "Aktive Stellensuche & schriftliche Bewerbung", Band 1 aus der Reihe JOB FIT des DSV Studenten Verlag, Forum.

The following remarks refer to a doctorate at ETH Zurich:

Income: ca. CHF 4,000.- per month.

Task: Doing research and mentoring students. At least one day per week has to be reserved for mentoring during the semester.

Duration: at least 3 years, but generally approximately 4 years, except if you have a really ingenious idea in the first six months.

Amount of work: unlimited; research is conducted worldwide with enormous personal investment. It is practically impossible to avoid overtime, particularly during the semester.

Style of work: heavily dependent on the professor and his or her group, partly good personal supervision, partly almost no interaction. Working autonomously is, in contrast to the school-like study programmes, in great demand.

Highlights: The doctoral thesis itself does not necessarily occupy the foreground, but is rather regarded as a necessary evil by successful graduates. What prevails are publications in international journals and contributions at international conferences. Travel expenses for conferences are partly covered by the professorship, which gives you the opportunity to visit foreign countries despite low wages.

What professorship to choose for your doctoral studies? You should get in touch with doctoral students by all means, consult the citation index (this index reveals nothing about the quality of publications, but it gives an idea of the research group's activity) and bear future prospects in mind. Is there at least a minimal demand for the topic in industry if a career in industry is not ruled out after the doctorate? The group's research area has to be appealing; the first suggestion for a topic may sound interesting, but it may prove not to be feasible. In that case, you have to be able to fall back on an alternative solution.

7 Tips and first-hand experience

Here you can find a list of general tips in random order, which could not be integrated in the actual description of the degree programme. These are all hints from N students.

- Look for friends in the lecture hall and have discussions with them; this raises relevant questions and makes possible an efficient exchange of experience.
- Exams: Talk to fellow students, get hold of former exams at the VMP, VCS and VeBiS, and ask assistants for advice. Do not hesitate to ask professors.
- Try to do as many exercises as possible because they define the subject matters which will be examined.
- Make use of the office hours offered by the lecture assistants if you have difficulty understanding something. Note: There are no stupid questions, but only stupid answers.
- It is worth taking all exams as early as possible. Make sure that you know exactly what will be examined and study what is required - no more and no less. Before starting the preparation of your exams, it may be useful to take one or two weeks off (It does not make sense and is not advisable to take schoolbooks with you on your holiday).
- A bad result in your first-year examinations is not a catastrophe: "Passing!" is the name of the game.
- For students of the Physical-Chemical direction: A thorough knowledge of theoretical physics is essential for a future physicist. It is therefore advisable that the majority of the following lectures will be attended: Mathematical Methods of Physics, Mechanics, Quantum Mechanics, Electrodynamics and Theory of Heat.
- The freedom of choice in the degree programme Interdisciplinary Sciences requires self-discipline and perseverance. In all major disciplines (physics, chemistry and biology), there are key subjects which are compulsory for subject-specific reasons. Those who duck out will shoot themselves in the foot. You should consider thoroughly which subjects to select for your study plan as from your second year of studies and maybe discuss your ideas with lecturers and more experienced students at the N meetings.
- It is advisable to do a semester project in a research group instead of a traineeship during your Bachelor's studies.
- The interpretation of NMR, IR and mass spectra (important basic skills of all chemists) is taught and extensively trained in the course "Analytische Chemie". Should you be interested in specialising in a chemical discipline or take a holiday job in a chemical company, attending the said lecture is recommended.
- A good command of English is advantageous; you should thus not shy away from English textbooks.
- Should you have difficulty taking a decision as to what subjects to choose, you can attend many lectures at the beginning of the semester and then select some lectures based on your impressions of the first weeks.
- The PC lectures as from the third year of studies are self-contained as regards their content so that they can be attended in random order.

- A major issue are the many overlaps in the schedules as from the second year of studies. As basically all lectures take place on the same weekday at the same time every year, it is advisable to draw up a study plan for the coming four semesters after the first year.
- Try to figure out as early as possible what the examination requirements for the Bachelor's and Master's exams are by asking the lecturers or the study advisor, respectively. Also take into account the minimum requirements.

8 Appendix

8.1 Model study plans of the Chemical-Physical direction (in German)

Fächerpaket Interdisziplinäre Naturwissenschaften (BSc)
Physikalisch-Chemische Fachrichtung Modellfächerpaket Nr. PC-1

Name: **Vorname:** **Stud. Nr.**

Nummer VVZ	Fach	Dept.	KP
	Grundpaket: Chemie & Physik		**27+**
529-0441-00L	Messtechnik	D-CHAB	6
529-0432-00L	Physikalische Chemie IV: Magnetische Resonanz	D-CHAB	4
529-0434-00L	Physical Chemistry V: Spectroscopy	D-CHAB	4
529-0121-00L 529-0132-00L	Anorganische Chemie I Anorganische Chemie III: Metallorganische Chemie u. Homogenkatalyse	D-CHAB D-CHAB	3 4
529-0221-00L 529-0222-00L	Organische Chemie I Organic Chemistry II	D-CHAB D-CHAB	3 3
	Akzentuierung: Quantenchemie		**58+**
402-0205-00L	Quantenmechanik I	D-PHYS	10
529-0474-00L	Quantenchemie	D-CHAB	6
252-0002-00L	Datenstrukturen & Algorithmen	D-INFK	8
252-0027-00L	Einführung in die Programmierung	D-INFK	7
529-0002-00L	Algorithmen und Programmentwicklung in C++	D-CHAB	6
402-0811-00L	Programming Techniques for Scientific Simulations I	D-PHYS	5
402-0810-00L	Computational Quantum Physics	D-PHYS	8
402-0809-00L	Introduction to Computational Physics	D-PHYS	8
	Obligatorische Fächer		**68+**
 529-0422-00L 529-0431-00L 402-2883-00L	Obligatorische Fächer gemäss 3.1 - Physikalische Chemie II: Chemische Reaktionskinetik - Physikalische Chemie III: Molekulare Quantenmechanik - Physik III		 4 4 7
	Praktika, Semesterarbeiten, Proseminare (mind. 32 KP)		32+
	Wissenschaft im Kontext (Science in Perspective/SiP)		6
	Bachelorarbeit		15
	TOTAL		**140+**

Datum: Unterschrift Student/in:

Datum: Unterschrift Studiendirektor:

Fächerpaket Interdisziplinäre Naturwissenschaften (BSc)
Physikalisch-Chemische Fachrichtung Modellfächerpaket Nr. PC-2

Name: **Vorname:** **Stud. Nr.**

Nummer VVZ	Fach	Dept.	KP
	Grundpaket: Chemie & Physik		**27+**
529-0441-00L	Messtechnik	D-CHAB	6
529-0432-00L	Physikalische Chemie IV: Magnetische Resonanz	D-CHAB	4
529-0434-00L	Physical Chemistry V: Spectroscopy	D-CHAB	4
529-0121-00L 529-0132-00L	Anorganische Chemie I Anorganische Chemie III: Metallorganische Chemie u. Homogenkatalyse	D-CHAB D-CHAB	3 4
529-0221-00L 529-0222-00L	Organische Chemie I Organic Chemistry II	D-CHAB D-CHAB	3 3
	Akzentuierung: Materialien & Analyse		**39+**
529-0051-00L 529-0058-00L	Analytische Chemie I Analytische Chemie II	D-CHAB D-CHAB	3 3
402-0255-00L	Einführung in die Festkörperphysik	D-PHYS	10
327-0301-00L 327-0401-00L	Materialwissenschaft I Materials Science II (im FS21 vorauss. zum letzten Mal)	D-MATL D-MATL	3 3
529-0122-00L 529-0131-00L	Inorganic Chemistry II Inorganic Chemistry IV: (Nano-)Materials; Synthesis, Properties and Surface Chemistry	D-CHAB D-CHAB	3 4
327-0104-00L 529-0039-00L	Kristallographie Grundlagen der Kristallstrukturanalyse	D-MATL D-CHAB	3 6
 529-0042-00L 529-0144-00L 529-0041-00L	*Wähle mind. eine Option:* Structure Elucidation by NMR UND/ODER NMR Spectroscopy in Inorganic Chemistry UND/ODER Moderne Massenspektroskopie, gekoppelte Analysemethoden, Chemometrie	 D-CHAB D-CHAB D-CHAB	 4 7 6
	Obligatorische Fächer		**68+**
 529-0422-00L 529-0431-00L 402-2883-00L	Obligatorische Fächer gemäss 3.1 - Physikalische Chemie II: Chemische Reaktionskinetik - Physikalische Chemie III: Molekulare Quantenmechanik - Physik III		 4 4 7
	Praktika, Semesterarbeiten, Proseminare (mind. 32 KP)		32+
	Wissenschaft im Kontext (Science in Perspective/SiP)		6
	Bachelorarbeit		15
	TOTAL		**134+**

Datum: Unterschrift Student/in:

Datum: Unterschrift Studiendirektor:

Fächerpaket Interdisziplinäre Naturwissenschaften (BSc)
Physikalisch-Chemische Fachrichtung Modellfächerpaket Nr. PC-3

Name: **Vorname:** **Stud. Nr.**

Nummer VVZ	Fach	Dept.	KP
	Grundpaket: Chemie & Physik		**27+**
529-0441-00L	Messtechnik	D-CHAB	6
529-0432-00L	Physikalische Chemie IV: Magnetische Resonanz	D-CHAB	4
529-0434-00L	Physical Chemistry V: Spectroscopy	D-CHAB	4
529-0121-00L 529-0132-00L	Anorganische Chemie I Anorganische Chemie III: Metallorganische Chemie u. Homogenkatalyse	D-CHAB D-CHAB	3 4
529-0221-00L 529-0222-00L	Organische Chemie I Organic Chemistry II	D-CHAB D-CHAB	3 3
	Akzentuierung: Biophysik & Organische Chemie*		**48+**
551-0307-00L 551-0307-01L 551-1601-00L	Molecular and Structural Biology I: Protein Structure and Function Molecular and Structural Biology II: Molecular Machines and Cellular Assemblies Biophysics of Biological Macromolecules	D-BIOL D-BIOL D-BIOL	3 3 6
551-0105-00L 551-0106-00L	Grundlagen der Biologie IA Grundlagen der Biologie IB	D-BIOL D-BIOL	5 5
529-0231-00L 529-0232-00L	Organic Chemistry III: Introduction to Asymmetric Synthesis Organic Chemistry IV: Physical Organic Chemistry	D-CHAB D-CHAB	4 4
529-0732-00L	Proteins and Lipids	D-CHAB	6
529-0731-00L	Nucleic Acids and Carbohydrates	D-CHAB	6
529-0240-00L	Chemical Biology – Peptides	D-CHAB	6
	Obligatorische Fächer		**68+**
 529-0422-00L 529-0431-00L 402-2883-00L	Obligatorische Fächer gemäss 3.1 - Physikalische Chemie II: Chemische Reaktionskinetik - Physikalische Chemie III: Molekulare Quantenmechanik - Physik III		 4 4 7
	Praktika, Semesterarbeiten, Proseminare (mind. 32 KP)		32+
	Wissenschaft im Kontext (Science in Perspective/SiP)		6
	Bachelorarbeit		15
	TOTAL		**140+**

*Zur Qualifikation in der Organischen Chemie gehört die Belegung eines entsprechenden Praktikums (ACOCP (Mezzetti)).

Datum: Unterschrift Student/in:

Datum: Unterschrift Studiendirektor:

Fächerpaket Interdisziplinäre Naturwissenschaften (BSc)
Physikalisch-Chemische Fachrichtung Modellfächerpaket Nr. PC-4

Name: **Vorname:** **Stud. Nr.**

Nummer VVZ	Fach	Dept.	KP
	Grundpaket: Chemie & Physik		**27+**
529-0441-00L	Messtechnik	D-CHAB	6
529-0432-00L	Physikalische Chemie IV: Magnetische Resonanz	D-CHAB	4
529-0434-00L	Physical Chemistry V: Spectroscopy	D-CHAB	4
529-0121-00L 529-0132-00L	Anorganische Chemie I Anorganische Chemie III: Metallorganische Chemie u. Homogenkatalyse	D-CHAB D-CHAB	3 4
529-0221-00L 529-0222-00L	Organische Chemie I Organic Chemistry II	D-CHAB D-CHAB	3 3
	Akzentuierung: Umweltwissenschaften & Physikalische Chemie		**39+**
701-0023-00L	Atmosphäre	D-USYS	3
701-0471-01L	Atmosphärenchemie	D-USYS	3
701-0475-00L	Atmosphärenphysik	D-USYS	3
701-0412-00L	Klimasysteme	D-USYS	3
701-1233-00L	Stratospheric Chemistry	D-USYS	4
529-0442-00L	Advanced Kinetics	D-CHAB	6
529-0051-00L 529-0058-00L	Analytische Chemie I Analytische Chemie II	D-CHAB D-CHAB	3 3
529-0037-01L	Grundlagen der Umweltchemie und Ökotoxikologie	D-CHAB	4
529-0580-00L	Sicherheit, Umweltaspekte und Risikomanagement	D-CHAB	4
701-0998-00L	Environmental and Human Health Risk Assessment of Chemicals	D-USYS	3
	Obligatorische Fächer		**68+**
 529-0422-00L 529-0431-00L 402-2883-00L	Obligatorische Fächer gemäss 3.1 - Physikalische Chemie II: Chemische Reaktionskinetik - Physikalische Chemie III: Molekulare Quantenmechanik - Physik III		 4 4 7
	Praktika, Semesterarbeiten, Proseminare (mind. 32 KP)		32+
	Wissenschaft im Kontext (Science in Perspective/SiP)		6
	Bachelorarbeit		15
	TOTAL		**134+**

Datum: Unterschrift Student/in:

Datum: Unterschrift Studiendirektor:

Fächerpaket Interdisziplinäre Naturwissenschaften (BSc)
Physikalisch-Chemische Fachrichtung Modellfächerpaket Nr. PC-5

Name: **Vorname:** **Stud. Nr.**

Nummer VVZ	Fach	Dept.	KP
	Grundpaket: Physik & Physikalische Chemie		**37+**
401-2333-00L 401-2334-00L	Methoden der mathematischen Physik I Methoden der mathematischen Physik II	D-MATH D-MATH	6 6
402-2203-01L	Allgemeine Mechanik	D-PHYS	7
402-0205-00L	Quantenmechanik I	D-PHYS	10
529-0432-00L	Physikalische Chemie IV: Magnetische Resonanz	D-CHAB	4
529-0434-00L	Physical Chemistry V: Spectroscopy	D-CHAB	4
	Akzentuierung: Theoretische Physik		**33+**
402-0206-00L	Quantum Mechanics II	D-PHYS	10
402-0204-00L	Elektrodynamik	D-PHYS	7
401-2303-00L	Funktionentheorie	D-MATH	6
402-2214-00L UND/ODER 402-0255-00L	Theorie der Wärme Einführung in die Festkörperphysik	D-PHYS D-PHYS	10 10
	Obligatorische Fächer		**68+**
529-0422-00L 529-0431-00L 402-2883-00L	Obligatorische Fächer gemäss 3.1 - Physikalische Chemie II: Chemische Reaktionskinetik - Physikalische Chemie III: Molekulare Quantenmechanik - Physik III		 4 4 7
	Praktika, Semesterarbeiten, Proseminare (mind. 32 KP)		32+
	Wissenschaft im Kontext (Science in Perspective/SiP)		6
	Bachelorarbeit		15
	TOTAL		**138+**

Datum: Unterschrift Student/in:

Datum: Unterschrift Studiendirektor:

Fächerpaket Interdisziplinäre Naturwissenschaften (BSc)
Physikalisch-Chemische Fachrichtung Modellfächerpaket Nr. PC-6

Name: **Vorname:** **Stud. Nr.**

Nummer VVZ	Fach	Dept.	KP
	Grundpaket: Physik & Physikalische Chemie		**37+**
401-2333-00L 401-2334-00L	Methoden der mathematischen Physik I Methoden der mathematischen Physik II	D-MATH D-MATH	6 6
402-2203-01L	Allgemeine Mechanik	D-PHYS	7
402-0205-00L	Quantenmechanik I	D-PHYS	10
529-0432-00L	Physikalische Chemie IV: Magnetische Resonanz	D-CHAB	4
529-0434-00L	Physical Chemistry V: Spectroscopy	D-CHAB	4
	Akzentuierung: Experimentelle Physik		**36+**
529-0441-00L UND/ODER 529-0442-00L	Messtechnik Advanced Kinetics	D-CHAB D-CHAB	6 6
 402-0255-00L UND/ODER 402-0275-00L UND/ODER 402-0266-00L	*Wähle mind. zwei Optionen:* Einführung in die Festkörperphysik Quantum Electronics Einführung in die Kern- und Teilchenphysik	 D-PHYS D-PHYS D-PHYS	 10 10 10
402-0206-00L	Quantum Mechanics II	D-PHYS	10
	Obligatorische Fächer		**68+**
 529-0422-00L 529-0431-00L 402-2883-00L	Obligatorische Fächer gemäss 3.1 - Physikalische Chemie II: Chemische Reaktionskinetik - Physikalische Chemie III: Molekulare Quantenmechanik - Physik III		 4 4 7
	Praktika, Semesterarbeiten, Proseminare (mind. 32 KP)		32+
	Wissenschaft im Kontext (Science in Perspective/SiP)		6
	Bachelorarbeit		15
	TOTAL		**140+**

Datum: Unterschrift Student/in:

Datum: Unterschrift Studiendirektor:

Fächerpaket Interdisziplinäre Naturwissenschaften (BSc)
Physikalisch-Chemische Fachrichtung Modellfächerpaket Nr. PC-7

Name: **Vorname:** **Stud. Nr.**

Nummer VVZ	Fach	Dept.	KP
	Grundpaket: Physik & Physikalische Chemie		**37+**
401-2333-00L 401-2334-00L	Methoden der mathematischen Physik I Methoden der mathematischen Physik II	D-MATH D-MATH	6 6
402-2203-01L	Allgemeine Mechanik	D-PHYS	7
402-0205-00L	Quantenmechanik I	D-PHYS	10
529-0432-00L	Physikalische Chemie IV: Magnetische Resonanz	D-CHAB	4
529-0434-00L	Physical Chemistry V: Spectroscopy	D-CHAB	4
	Akzentuierung: Nano- & Materialwissenschaften		**38+**
529-0121-00L 529-0122-00L 529-0132-00L 529-0131-00L	Anorganische Chemie I Inorganic Chemistry II Anorganische Chemie III: Metallorganische Chemie u. Homogenkatalyse Inorganic Chemistry IV: (Nano-)Materials; Synthesis, Properties and Surface Chemistry	D-CHAB D-CHAB D-CHAB D-CHAB	3 3 4 4
402-0255-00L	Einführung in die Festkörperphysik	D-PHYS	10
402-0275-00L	Quantum Electronics	D-PHYS	10
 402-0468-15L 376-1103-00L 529-0134-00L	*Wähle mind. eine Option:* Nanomaterials for Photonics UND/ODER Frontiers in Nanotechnology UND/ODER Functional Inorganics	 D-PHYS D-MATL D-CHAB	 6 4 7
	Obligatorische Fächer		**68+**
 529-0422-00L 529-0431-00L 402-2883-00L	Obligatorische Fächer gemäss 3.1 - Physikalische Chemie II: Chemische Reaktionskinetik - Physikalische Chemie III: Molekulare Quantenmechanik - Physik III		 4 4 7
	Praktika, Semesterarbeiten, Proseminare (mind. 32 KP)		32+
	Wissenschaft im Kontext (Science in Perspective/SiP)		6
	Bachelorarbeit		15
	TOTAL		**140+**

Datum: Unterschrift Student/in:

Datum: Unterschrift Studiendirektor:

8.2 Model study plans of the Biochemical-Physical direction (in German)

Fächerpaket im Studiengang Interdisziplinäre Naturwissenschaften (Bachelor)
Modellfächerpaket Nr. B1

Name: **Vorname:** **Stud.Nr.**

Akzentuiertes Gebiet: Biochemie **Studienrichtung: Biochemisch-Physikalische Richtung**			
Nummer	**Fach**	**Dep.**	**KP**
	Grundlagen der Biologie 3: Mehrzellige Organismen	D-BIOL	8
	Genetics and Genomics	D-BIOL	5
	Biochemical processes and molecular machines	D-BIOL	5
	Systems Biology	D-BIOL	5
551-0319-00L	Cellular Biochemistry (Part I)	D-BIOL	3
551-0320-00L	Cellular Biochemistry (Part II)	D-BIOL	3
529-0051-00L	Analytische Chemie I	D-CHAB	3
529-0058-00L	Analytische Chemie II	D-CHAB	3
529-0231-00L	Organic Chemistry III: Introduction to Asymmetric Synthesis	D-CHAB	4
529-0232-00L	Organic Chemistry IV: Physical Organic Chemistry	D-CHAB	4
529-0240-00L	Chemical Biology – Peptides	D-CHAB	6
529-0731-00L	Nucleic Acids and Carbohydrates	D-CHAB	6
529-0732-00L	Proteins and Lipids	D-CHAB	6
752-4001-00L	Mikrobiologie	D-BIOL	2
529-0432-00L	Physikalische Chemie IV: Magnetische Resonanz	D-CHAB	4
529-0434-00L	Physical Chemistry V: Spectroscopy	D-CHAB	4
	Total Fächerpaket (obligatorische Fächer gemäss 3.2)		**71 (26)**
	Mögliche Praktika (minimal 32 KP)		**32+**
	Systems Biology	D-BIOL	2
	Epigenetics, human genetics, evolution of genomes	D-BIOL	2
551-0104-00L	Grundlagen der Biologie II (4. Sem.)	D-BIOL	8
529-0054-00L	Physikalische und Analytische Chemie (4. Sem.)	D-CHAB	10
529-0229-00L	Praktikum Organische Chemie (für Biol./Pharm.Wiss.)	D-CHAB	8
	Semesterarbeit (max. eine, 5. Sem. oder Semesterferien)		18
	Blockkurse (nach Angebot)		
	Wissenschaft im Kontext (Science in Perspective/SiP)		6
	Bachelorarbeit		15
	TOTAL		**140+**

Datum: Unterschrift Student/in:

Datum: Unterschrift Studiendirektor:

Fächerpaket im Studiengang Interdisziplinäre Naturwissenschaften (Bachelor)
Modellfächerpaket Nr. B2

Name: **Vorname:** **Stud.Nr.**

Akzentuiertes Gebiet: Chemie und Materialwissenschaft **Studienrichtung: Biochemisch-Physikalische Richtung**			
Nummer	**Fach**	**Dep.**	**KP**
529-0051-00L	Analytische Chemie I	D-CHAB	3
529-0058-00L	Analytische Chemie II	D-CHAB	3
327-0103-00L	Einführung in die Materialwissenschaft	D-MATL	3
327-0301-00L	Materialwissenschaft I	D-MATL	3
327-0401-00L	Materials Science II (wird im FS2021 vorauss. zum letzten Mal stattfinden)	D-MATL	3
529-0122-00L	Inorganic Chemistry II	D-CHAB	3
529-0131-00L	Inorganic Chemistry IV: (Nano-)Materials; Synthesis, Properties and Surface Chemistry	D-CHAB	4
327-0104-00L	Kristallographie	D-MATL	3
529-0039-00L	Grundlagen der Kristallstrukturanalyse	D-CHAB	6
529-0659-00L	Elektrochemie	D-CHAB	6
327-0504-00L	Materials Characterisation Methods	D-MATL	3
529-0432-00L	Physikalische Chemie IV: Magnetische Resonanz	D-CHAB	4
529-0434-00L	Physical Chemistry V: Spectroscopy	D-CHAB	4
	Total Fächerpaket (obligatorische Fächer gemäss 3.2)		**48 (26)**
	Empfohlene Fächer: Physik I+II+III (D-PHYS, 7+7+7 KP), Einführung in die Festkörperphysik (10 KP) **Zusätzlich mögliche Fächer:** siehe Wegleitung „Liste Wahlfächer“ unter D-MATL, z.B. Metalle I+II (3+3 KP), Keramik I (3 KP), Verbundwerkstoffe (3 KP)		
	Mögliche Praktika (minimal 32 KP)		**32+**
327-3001-00L	Kristallographisches Grundpraktikum	D-MATL	2
529-0054-00L	Physikalische und Analytische Chemie (4. Sem.)	D-CHAB	10
529-0230-00L	Anorganische und Organische Chemie I	D-CHAB	8
	Semesterarbeit (max. eine, 5. Sem. oder Semesterferien)		18
	Wissenschaft im Kontext (Science in Perspective/SiP)		6
	Bachelorarbeit		15
	TOTAL		**127+**

Datum: Unterschrift Student/in:

Datum: Unterschrift Studiendirektor:

Fächerpaket im Studiengang Interdisziplinäre Naturwissenschaften (Bachelor)
Modellfächerpaket Nr. B3

Name: **Vorname:** **Stud.Nr.**

Akzentuiertes Gebiet: Physikalische und analytische Chemie **Studienrichtung: Biochemisch-Physikalische Richtung**			
Nummer	**Fach**	**Dep.**	**KP**
529-0051-00L	Analytische Chemie I	D-CHAB	3
529-0058-00L	Analytische Chemie II	D-CHAB	3
529-0041-00L	Moderne Massenspektroskopie, gekoppelte Analysemethoden, Chemometrie	D-CHAB	6
529-0042-00L	Structure Elucidation by NMR	D-CHAB	4
529-0432-00L	Physikalische Chemie IV: Magnetische Resonanz	D-CHAB	4
529-0434-00L	Physical Chemistry V: Spectroscopy	D-CHAB	4
327-0104-00L	Kristallographie	D-MATL	3
529-0039-00L	Grundlagen der Kristallstrukturanalyse	D-CHAB	6
327-0504-00L	Materials Characterisation Methods	D-MATL	3
529-0441-00L	Messtechnik	D-CHAB	6
529-0442-00L	Advanced Kinetics	D-CHAB	6
	Total Fächerpaket (obligatorische Fächer gemäss 3.2)		**48 (26)**
	Auswahl aus folgenden Schwerpunkten (ca. 15 KP):		
	Organic Chemistry III+IV	D-CHAB	4+4
	Anorganische Chemie I+III and Inorganic Chemistry II+IV	D-CHAB	3+4+3+4
	Physik III (Wahl von Physik I+II (D-PHYS, 7+7 KP) als Voraussetzung stark empfohlen)	D-PHYS	7
	Mögliche Praktika (minimal 32 KP)		**32+**
551-0104-00L	Grundlagen der Biologie II (4. Sem.)	D-BIOL	8
529-0054-00L	Physikalische und Analytische Chemie (4. Sem.)	D-CHAB	10
529-0449-00L	Spektroskopie	D-CHAB	13
701-1331-00L	Trace Elements Laboratory	D-USYS	3
	Semesterarbeit (max. eine, 5. Sem. oder Semesterferien)		18
	Wissenschaft im Kontext (Science in Perspective/SiP)		6
	Bachelorarbeit		15
	TOTAL		**127+ (+15)**

Datum: Unterschrift Student/in:

Datum: Unterschrift Studiendirektor:

Fächerpaket im Studiengang Interdisziplinäre Naturwissenschaften (Bachelor)
Modellfächerpaket Nr. B4

Name: **Vorname:** **Stud.Nr.**

Akzentuiertes Gebiet: Physikalische Chemie **Studienrichtung: Biochemisch-Physikalische Richtung**			
Nummer	**Fach**	**Dep.**	**KP**
529-0432-00L	Physikalische Chemie IV: Magnetische Resonanz	D-CHAB	4
529-0434-00L	Physical Chemistry V: Spectroscopy	D-CHAB	4
402-2883-00L	Physik III (Wahl von Physik I+II (D-PHYS, 7+7 KP) als Voraussetzung stark empfohlen)	D-PHYS	7
529-0474-00L	Quantenchemie	D-CHAB	6
402-0275-00L 402-0255-00L	Quantum Electronics ***oder*** Einführung in die Festkörperphysik	D-PHYS	10
529-0441-00L	Messtechnik	D-CHAB	6
529-0442-00L	Advanced Kinetics	D-CHAB	6
529-0051-00L	Analytische Chemie I	D-CHAB	3
529-0058-00L	Analytische Chemie II	D-CHAB	3
551-1402-00L	Molecular and Structural Biology VI: Biophysical Analysis of Macromolecular Mechanisms	D-BIOL	4
	Total Fächerpaket (obligatorische Fächer gemäss 3.2)		**53 (26)**
	Auswahl aus folgenden Fächern (ca. 10 KP): Einführung in die Festkörperphysik ***oder*** Quantum Electronics Organic Chemistry III+IV Anorganische Chemie I+III und Inorganic Chemistry II+IV	 D-PHYS D-CHAB D-CHAB	 10 4+4 3+4+3+4
 529-0054-01L 529-0449-00L 402-0000-01L 402-0000-04L	**Mögliche Praktika (minimal 32 KP)** Physikalische Chemie (4. Sem.) Spektroskopie Physikpraktikum 1 Physikpraktikum 2 Semesterarbeit (max. eine, 5. Sem. oder Semesterferien)	 D-CHAB D-CHAB D-PHYS D-PHYS	**32+** 6 13 5 6 18
	Wissenschaft im Kontext (Science in Perspective/SiP)		6
	Bachelorarbeit		15
	TOTAL		**132+ (+10)**

Datum: Unterschrift Student/in:

Datum: Unterschrift Studiendirektor:

Fächerpaket im Studiengang Interdisziplinäre Naturwissenschaften (Bachelor)
Modellfächerpaket Nr. B5

Name: **Vorname:** **Stud.Nr.**

Akzentuiertes Gebiet: Chemie und medizinische Chemie **Studienrichtung: Biochemisch-Physikalische Richtung**			
Nummer	**Fach**	**Dep.**	**KP**
	Grundlagen der Biologie 3: Mehrzellige Organismen	D-BIOL	8
	Genetics and Genomics	D-BIOL	5
	Biochemical processes and molecular machines	D-BIOL	5
	Systems Biology	D-BIOL	5
529-0231-00L	Organic Chemistry III: Introduction to Asymmetric Synthesis	D-CHAB	4
529-0232-00L	Organic Chemistry IV: Physical Organic Chemistry	D-CHAB	4
535-0230-00L	**Medizinische Chemie I	D-CHAB	2
535-0231-00L	**Medizinische Chemie II	D-CHAB	2
551-0317-00L	Immunology I*	D-BIOL	3
551-0318-00L	Immunology II*	D-BIOL	3
376-0151-00L	Anatomie und Physiologie I	D-HEST	5
376-0152-00L	Anatomie und Physiologie II	D-HEST	5
551-0110-00L	Grundlagen der Biologie II: Mikrobiologie	D-BIOL	2
551-0309-00L	Concepts in Modern Genetics	D-BIOL	6
529-0731-00L	Nucleic Acids and Carbohydrates	D-CHAB	6
529-0732-00L	Proteins and Lipids	D-CHAB	6
529-0432-00L	Physikalische Chemie IV: Magnetische Resonanz	D-CHAB	4
	Total Fächerpaket (obligatorische Fächer gemäss 3.2)		**75 (26)**
	Mögliche Praktika (minimal 32 KP)		**32+**
	Systems Biology	D-BIOL	2
	Epigenetics, human genetics, evolution of genomes	D-BIOL	2
529-0229-00L	Praktikum Organische Chemie (für Biol./Pharm.Wiss.)	D-CHAB	8
551-0104-00L	Grundlagen der Biologie II (4. Sem.)	D-BIOL	8
551-0396-01L	Immunology I (*Voraussetzung: Immunology I+II)	D-BIOL	6
535-0239-00L	Praktikum Medizinische Chemie (**Voraussetzung: Medizinische Chemie I+II)	D-CHAB	3
	Semesterarbeit (max. eine, 5. Sem. oder Semesterferien)		18
	Wissenschaft im Kontext (Science in Perspective/SiP)		6
	Bachelorarbeit		15
	TOTAL		**140+**

Datum: Unterschrift Student/in:

Datum: Unterschrift Studiendirektor:

Fächerpaket im Studiengang Interdisziplinäre Naturwissenschaften (Bachelor)
Modellfächerpaket Nr. B6

Name: **Vorname:** **Stud.Nr.**

Akzentuiertes Gebiet: Umweltwissenschaften & Physikalische Chemie **Studienrichtung: Biochemisch-Physikalische Richtung**			
Nummer	**Fach**	**Dep.**	**KP**
701-0023-00L	Atmosphäre	D-USYS	3
701-0471-01L	Atmosphärenchemie	D-USYS	3
701-0475-00L	Atmosphärenphysik	D-USYS	3
701-0412-00L	Klimasysteme	D-USYS	3
701-1233-00L	Stratospheric Chemistry	D-USYS	4
529-0432-00L	Physikalische Chemie IV: Magnetische Resonanz	D-CHAB	4
529-0434-00L	Physical Chemistry V: Spectroscopy	D-CHAB	4
529-0442-00L	Advanced Kinetics	D-CHAB	6
402-2883-00L	Physik III (Wahl von Physik I+II (D-PHYS, 7+7 KP) als Voraussetzung stark empfohlen)	D-PHYS	7
529-0051-00L	Analytische Chemie I	D-CHAB	3
529-0058-00L	Analytische Chemie II	D-CHAB	3
529-0037-01L	Grundlagen der Umweltchemie und Ökotoxikologie	D-CHAB	4
529-0580-00L	Sicherheit, Umweltaspekte und Risikomanagement	D-CHAB	4
701-0998-00L	Environmental and Human Health Risk Assessment of Chemicals	D-USYS	3
	Total Fächerpaket (obligatorische Fächer gemäss 3.2)		**54 (26)**
	Zusätzliche Fächer aus dem Bereich Biogeochemie, die von Interesse sein könnten:		
701-0533-00L	Bodenchemie	D-USYS	3
701-0501-00L	Pedosphäre	D-USYS	3
701-0201-00L	Introduction to Environmental Organic Chemistry	D-USYS	5
701-0423-00L	Chemie aquatischer Systeme	D-USYS	3
701-0216-00L	Biogeochemische Kreisläufe	D-USYS	3
701-1234-00L	Tropospheric Chemistry	D-USYS	3
701-1239-00L	Aerosols I: Physical and Chemical Principles	D-PHYS	4
701-1314-00L	Environmental Organic Chemistry	D-USYS	3
701-1317-00L	Global Biogeochemical Cycles and Climates	D-USYS	3

Modellfächerpaket Nr. B6 (Seite 2)

	Mögliche Praktika (minimal 32 KP)		**32+**
529-0054-00L	Physikalische und Analytische Chemie (4. Sem.)	D-CHAB	10
529-0449-00L	Spektroskopie	D-CHAB	13
701-0460-00L	Praktikum Atmosphäre und Klima	D-USYS	7
701-0420-01L	Praktikum Biogeochemie	D-USYS	7
701-1262-00L	Atmospheric Chemistry Lab Work	D-USYS	2.5
701-1238-00L	Advanced Field and Lab Studies in Atmospheric Chemistry and Climate	D-USYS	3
701-1331-00L	Trace Elements Laboratory	D-USYS	3
701-1333-00L	Isotopes and Biomarkers in Biogeochemistry Laboratory	D-USYS	3
701-1332-00L	Analysis of Organic Pollutants	D-USYS	3
701-1330-00L	Molecular Ecotoxicology	D-USYS	3
	Semesterarbeit (max. eine, 5. Sem. oder Semesterferien)		18
	Wissenschaft im Kontext (Science in Perspective/SiP)		6
	Bachelorarbeit		15
	TOTAL		**133+**

Datum: Unterschrift Student/in:

Datum: Unterschrift Studiendirektor:

Fächerpaket im Studiengang Interdisziplinäre Naturwissenschaften (Bachelor)
Modellfächerpaket Nr. B7

Name: **Vorname:** **Stud.Nr.**

Akzentuiertes Gebiet: (Bio-)Informatik **Studienrichtung: Biochemisch-Physikalische Richtung**			
Nummer	**Fach**	**Dep.**	**KP**
	Grundlagen der Biologie 3: Mehrzellige Organismen	D-BIOL	8
	Genetics and Genomics	D-BIOL	5
	Biochemical processes and molecular machines	D-BIOL	5
	Systems Biology	D-BIOL	5
252-0027-00L	Einführung in die Programmierung	D-INFK	7
252-0002-00L	Datenstrukturen & Algorithmen	D-INFK	8
529-0002-00L	Algorithmen und Programmentwicklung in C++	D-CHAB	6
551-1299-00L	Introduction to Bioinformatics	D-BIOL	6
227-1037-00L	Introduction to Neuroinformatics	D-HEST	6
376-1305-01L	Neural Systems for Sensory, Motor and Higher Brain Functions	D-HEST	3
376-1305-00L	Development of the Nervous System	UZH	3
529-0474-00L	Quantenchemie	D-CHAB	6
	Total Fächerpaket (obligatorische Fächer gemäss 3.2)		**68 (26)**
	Auswahl aus folgenden Fächern (ca. 8 KP):		
	Organic Chemistry III+IV	D-CHAB	4+4
	Physikalische Chemie IV und Physical Chemistry V	D-CHAB	4+4
	Inorganic Chemistry II+IV	D-CHAB	3+4
	Mögliche Praktika (minimal 32 KP)		**32+**
	Systems Biology	D-BIOL	2
	Epigenetics, human genetics, evolution of genomes	D-BIOL	2
529-0229-00L	Praktikum Organische Chemie (für Biol./Pharm.Wiss.)	D-CHAB	8
551-0104-00L	Grundlagen der Biologie II (4. Sem.)	D-BIOL	8
529-0054-00L	Physikalische und Analytische Chemie (4. Sem.)	D-CHAB	10
	Semesterarbeit (max. eine, 5. Sem. oder Semesterferien)		18
	Wissenschaft im Kontext (Science in Perspective/SiP)		6
	Bachelorarbeit		15
	TOTAL		**140+ (+8)**

Datum: Unterschrift Student/in:

Datum: Unterschrift Studiendirektor: