Program of Studies for the specialized Master’s and PhD degrees in Climate Sciences

10th November 2011

Preamble

By implementing common courses of studies in the field of climate sciences, the ETHZ and the University of Bern, as well as the departments and institutes involved, wish to express their intention to extend the cooperation and mutual consultation in research initiated by the National Centre of Competence in Climate Research (“NFS Klima”) to the area of programs of studies and in this way – together and in mutual agreement – to strengthen their international influence as research and teaching institutions. The following program description is an integral part of this common endeavour.

The Faculty of Natural Sciences of the University of Bern,

on the basis of article 10, paragraph 2 and article 30, paragraphs 2 and 3 of the University Legislation dated 5th September 1996 (Universitätsgesetz, UniG), article 115 and 117 of the University Decree dated 27th May 1998 (Universitätsverordnung, UniV) and article 44 of the Statute of the University of Bern dated 7th June 2011 (Universitätsstatut, UniSt), the regulations concerning study and examinations in the Faculty of Natural Sciences (Studiengang der Phil. Naturwissenschaften, RSL Phil.-nat. [RSL05]), the principles governing the doctoral program of the University of Bern dated 16th December 2008, as well as the regulatory framework of the Oeschger Centre for Climate Change Research (OCCR) issued by the University administration on 20th September 2007 and the agreement between the University of Bern and the Swiss National Science Foundation SNF dated 2nd May 2005,

establishes the following program of studies:

I. General

Scope

Art. 1 This program of studies governs academic training in the Graduate School of Climate Sciences and applies to all students enrolled at the University of Bern in courses of study leading to
an MSc in Climate Sciences, University of Bern, or a PhD of Science in Climate Sciences, University of Bern.

2 PhD students of other faculties of the University of Bern can also complete the PhD program of the Graduate School of Climate Sciences. This promotes interdisciplinary and interfaculty cooperation within the Oeschger Centre.

**Aims**

Art. 2 1 The Master's program provides general academic training in the field of climate sciences as well as promoting in-depth knowledge in an individually chosen area of specialization as set out in article 3 and enables students to conduct independent scientific work. This program also promotes interdisciplinary cooperation and teamwork as well as experience in other scientific fields.

2 The Master's program enables successful candidates to undertake scientific work or to gain entrance to a profession.

3 The doctoral program introduces students to independent scientific investigation and enables them to assume scientific responsibility.

**Degrees**

Art. 3 1 The Master's program leads to the degree of MSc in Climate Sciences with special qualification in ..., University of Bern. Choice of courses and of the Master's thesis topic leads to one of the following areas of specialization:

- a  Climate and Earth System Science,
- b  Atmospheric Science,
- c  Economics,
- d  Economic, Social and Environmental History,
- e  Statistics.

2 After completion of the PhD program, doctoral candidates in the Faculty of Natural Sciences receive the degree of PhD in Climate Sciences, University of Bern.

3 After completion of the doctoral program in Climate Sciences, doctoral candidates of other faculties receive a Diploma Supplement of the Graduate School of Climate Sciences.

**II. Organization**

**Graduate School Commission**

Art. 4 1 The subject areas and departments participating in the program of studies comprise the permanent Graduate School Commission.

2 The Graduate School Commission consists of one representative from each of the disciplines and departments substantially involved in the program of studies as well as the Graduate School Director. The participating disciplines, departments and institutes are as follows:
a Geosciences,
b Physics,
c Mathematics,
d Chemistry,
e Biology,
f Economics,
g History.

3 The President of the Commission is elected from among its members.

4 The Graduate School Commission decides upon the admission of candidates for the Master's program after consultation with the Graduate School Directorate.

5 The Graduate School Commission is also the advisory body for the Graduate School Directorate. In this capacity it performs the following specific tasks:
   a It oversees the implementation of the curriculum, audits the strategic direction of the various courses of study and concerns itself with any difficulties that may occur in the realization of the program.
   b It supports the Directorate in the coordination of the School's courses of study.
   c It designs the program of studies and proposes any changes to the Faculty.
   d It compiles and submits the course list to the Faculty (Appendix 1).
   e It compiles and submits to the Faculty the list of staff authorized to supervise Master's theses and PhD dissertations (supervisors and co-supervisors, in accordance with art. 16 RSL05).
   f It recommends the admission of external supervisors and co-supervisors (in accordance with art. 16, para. 2 RSL05) and of advisors on Master's theses and external co-examiners for PhD dissertations.
   g It supports the Directorate regarding coordination with the ETH Zurich, in particular regarding the organization of common compulsory courses.
   h It can assign further responsibilities to the Directorate.
   i It issues guidelines on the qualitative requirements for admission (interview, minimum grade, minimum ECTS credits).
   j It nominates the Graduate School Director and submits her/his name to the Faculty for approval (art. 33, para. 1 RSL05).

**Graduate School Directorate**

**Art. 5**

1 The Graduate School Directorate consists of the Graduate School Director and a secretariat.

2 The Graduate School Director is nominated by the Graduate School Commission and recommended to the Faculty for approval. (art. 33, para. 1 RSL05).

3 The Graduate School Directorate has the following specific responsibilities:
   a It coordinates courses in the Graduate School of Climate Sciences within the University of Bern.
   b It coordinates cooperation with the ETH Zurich in consultation with the Graduate School
c  It ensures the exchange of examination results between the ETH Zurich and the University of Bern.

d  It organizes the common compulsory courses in cooperation with the ETH Zurich.

e  It organizes the final Master's examinations (art. 33, para. 2 RSL05).

f  It maintains an information and advisory service in the form of consultation hours and a website.

g  It receives funding from the University Administration within the framework of the Oeschger Centre for Climate Change Research expressly for the management of the common compulsory block courses with the ETH Zurich, for the support of student mobility and for the appointment of specific teaching staff according to the regulations governing the Oeschger Centre dated 20th September 2007.

4 The Graduate School Directorate carries out additional duties assigned to it by this Program.

III. Master's Program

Admission

Art. 6 1 Admission to the specialized Master's degree program in Climate Sciences is governed by guidelines laid down in art. 4 RSL05 and art. 43 RSL05.

2 For the areas of specialisation of Economics as well as Economic, Social and Environmental History in the Master's program, a university level bachelor's degree in the relevant field (e.g., BA in History, BSc in Economics) is a recognized qualification.

3 Admission to the Master's program can be made contingent upon proof of additional knowledge and skills that were not acquired by the candidate in his/her bachelor degree program. These must be acquired via extracurricular study or training. The maximum value of such additional study or training is 60 ECTS credits (art. 43 RSL05).

4 The Graduate School Directorate, in consultation with the Graduate School Commission as well as with the candidate, determines the required additional study or training.

5 In accordance with the ‘Regulations for Admission to Specialized Master's Programs at Swiss Universities’ of the CRUS, dated 16th September 2005, the Graduate School Commission can issue guidelines regarding the qualitative requirements for admission (art. 4, para. 5, i). The Faculty can issue quantitative restrictions on admission which must, however, be approved by the University.

6 The final decision on admission depends on the result of an interview with the prospective supervisor of the Master's thesis, the Graduate School Director or the Director of the Oeschger Centre. The Graduate School Commission issues relevant guidelines (art. 4, para. 5, i) and comes to a decision on the basis of a proposal from the Graduate School Directorate. Admission rejections are issued by the Dean of the Faculty in the form of a contestable decision.

Duration of studies

Art. 7  The normal duration of studies for full-time students is 4 semesters, but can be extended in accordance with art. 7 RSLO5.
Structure of studies

Art. 8 ¹ The Master's program consists of 120 ECTS credits, of which 60 ECTS credits come from lectures, seminars, laboratory exercises, practical training and colloquia, and 60 ECTS credits from the thesis, the final examination and its preparation.

² The 60-credit Master's thesis can be divided up into a 30 ECTS-credit external practicum and a 30 ECTS-credit Master's thesis.

Selection of courses, courses at the ETHZ, common courses

Art. 9 ¹ Courses in the Specialized Master's Program in Climate Sciences of the University of Bern (Appendix 1) as well as courses offered in the MSc in Atmospheric and Climate Science of the ETH Zurich are open to candidates in the Master's program.

² Course selection is carried out, preferably at the beginning of the program, in consultation with the thesis supervisor (art. 15, para. 2) or the Directorate. The topic of the thesis and the candidates' prior knowledge influence the choice of courses. Candidates' preferences are to be respected wherever possible.

³ Participation in courses offered within the framework of the MSc in Atmospheric and Climate Science of the ETHZ is expressly recommended to candidates.

⁴ Courses offered together with the ETHZ as well as other courses set out in Appendix 1 are compulsory and comprise a module.

⁵ Non-compulsory courses (Appendix 1) are grouped together in a required elective module, but performance in them is examined individually. The courses of the MSc in Atmospheric and Climate Science of the ETHZ are also grouped together in a module (required elective module ETHZ). Performance in them is also examined individually.

⁶ The courses are normally given by the participating institutes and departments of the University of Bern as well as by those disciplines of the ETHZ involved in the MSc in Atmospheric and Climate Science.

⁷ Courses offered by other universities as well as other departments of the University of Bern and the ETH Zurich may be recognized by the Graduate School Directorate as counting toward credit requirements up to a total of 10 ECTS credits. Any such credits that exceed 10 ECTS must be referred for approval to the appropriate body determined by the Faculty regulations.

⁸ A list of courses of the University of Bern and the ETH Zurich attracting ECTS credits that may be counted toward the degree is drawn up by the Graduate School Commission. The list of courses of the University of Bern (Appendix 1) is approved by the Faculty of Natural Sciences.

⁹ The Faculty of Natural Sciences also recognises the list of ETHZ courses offered within the framework of the MSc in Atmospheric and Climate Science.

¹⁰ The course list may also contain courses from Bachelor's programs in order to give candidates access to areas of academic inquiry outside those covered by the program and to enable them to fill in gaps in prior knowledge.

Practicum

Art. 10 ¹ Candidates can, in the course of the program, undertake a 30 ECTS-credit practicum outside their institute with the aim of obtaining a practical insight into an area of potential
professional employment, of participating in an exchange with an external research group or of working for a time in a specialized laboratory.

2 The choice of where the practicum is to take place and what type of activity is to be undertaken is to be discussed with the thesis supervisor. The practicum must be approved by the Graduate School Directorate.

3 Time spent on the practicum is deducted from the time allotted for the Master's thesis.

4 A written report on the practicum is to be submitted to the thesis supervisor. The practicum counts as passed and is given a grade when it has been accepted by the thesis supervisor after consultation with the practicum advisor.

5 Work experience of at least 2 years duration in an area relevant to the program of studies may, upon request and at the absolute discretion of the Graduate School Commission, count as a 30 ECTS-credit practicum. In this case the practicum is not assigned a grade.

6 The practicum may also be undertaken in the 4th semester as a research practicum in preparation for a PhD program.

Language of instruction

Art. 11 The language of instruction in courses and in examinations is, as a rule, English. German or French may be chosen as the language of instruction if this is desired by all course participants. The language of examinations is governed by article 11 UniG and article 24 RSL05.

Accreditation of hours of study

Art. 12 1 Accreditation of hours of study is calculated according to the European Credit Transfer and Accumulation System. One ECTS credit corresponds to the learning outcomes that may be attained in 25-30 hours of study.

2 Grades and other measures of student performance (ECTS credits) from the ETH Zurich earned within the MSc in Atmospheric and Climate Science program are transferable.

Examinations

Art. 13 1 Courses are assessed according to departmental regulations and examined by the members of staff authorized to do so.

2 The compulsory course module (Appendix 1), which is monitored by the Graduate School Directorate, is a pre-requisite for registration for the final Master's examination and is examined together with it. Provided that an overall passing grade is obtained in the final Master's examination, the ECTS credits gained in the compulsory module and the grade obtained in the final Master's examination both count toward the degree requirements.

Master's examination

Art. 14 1 The Master's examination consists of a public lecture on the topic of the Master's thesis and a question and answer session on the topic of the Master's thesis as well as on the obligatory courses. The duration of the examination is 60 minutes. A 60-minute oral examination may also be conducted.
As a rule, the Master's examination takes place in the 4th semester of the program.

Subject to consultation with and permission of the thesis supervisor, the examination can be held up to 2 months before the submission of the thesis.

The examination is conducted by the thesis supervisor and at least one co-examiner.

Registration for the Master's examination with the Graduate School Directorate is subject to written agreement by the supervisor of the Master's thesis as well as attendance at the compulsory courses (Module, Appendix 1)

Candidates must register with the Graduate School Directorate at least 4 weeks before the examination.

The grade obtained in the Master's examination must be satisfactory.

**Master's thesis**

**Art. 15** 1 The Master's thesis can be undertaken in the following institutes and departments of the University of Bern:

- a Physics Institute or Institute of Applied Physics,
- b Department of Chemistry and Biochemistry,
- c Institute of Mathematical Statistics and Actuarial Science,
- d Institute of Plant Sciences,
- e Institute of Geological Sciences,
- f Institute of Geography,
- g Institute of Economics,
- h Institute of History.
- i World Trade Institute

2 The Master's thesis is supervised by one or more members of staff eligible to do so in accordance with article 16 RSL05 (supervisor; co-supervisor), possibly supported by one or two advisors. Advisors are involved to a considerable extent in the supervision of the Master's thesis, but do not need to come under the eligibility criteria of article 16 RSL05. The supervisor, co-supervisors as well as advisors constitute the supervising committee. The supervising committee consists of at least two members.

After consultation with the Graduate School Directorate, work for the Master's thesis can also be carried out in a department other than the ones mentioned above if a suitable topic, a supervisor authorized in accordance with art. 16, para. 3 RSL05 and a supervising committee (art. 15, para. 2) can be found.

The topic of the Master's thesis should be chosen in the first or second semester and discussed with the thesis supervisor and the supervising committee. In 1st semester candidates can commence preliminary research on the topic and set up a plan of work.

The plan of work is normally evaluated and approved by the thesis supervisor and the supervising committee in 2nd semester.

Candidates form part of the thesis supervisor's research group.
7 The Master's thesis must be completed in a maximum of 18 months and is normally submitted by the end of the 4th semester at the latest. The starting date must be submitted to the Graduate School Directorate in writing.

8 If there are significant reasons why the Master's thesis cannot be finalised on time, an extension can be granted by the Directorate in accordance with art. 7 RSL05 (Duration of Studies).

9 Generally speaking, the Master's thesis is to be written in English. It can consist of articles already submitted for publication, in which case they must be summarized and discussed in an introduction.

10 A copy of the Master's thesis (in both hard copy and digital form) must be submitted to the thesis supervisor, to each of the members of the supervising committee and to the Graduate School Directorate.

11 Master's theses will only count for credit if they receive a satisfactory grade; otherwise a thesis with a new topic must be completed. In such a case, an application can be made to the appropriate body determined by the Faculty regulations for an extension to the duration of studies for the thesis.

Grading of student performance

Art. 16 1 The final overall grade is calculated from the weighted arithmetic mean of all grades obtained in individual examinations, with the weighting of the grade depending on the number of ECTS credits allocated. Grades are awarded in accordance with the grading scale set out in article 19, paragraph 3 RSL05. They are rounded in accordance with article 19, paragraph 7 RSL05.

2 Examinations which result in unsatisfactory grades, including those of the Master's thesis and the Master's examination, can be repeated once (art. 21, para. 1 RSL05).

3 Examinations in the required elective module which result in unsatisfactory grades can be compensated for up to a limit of 6 ECTS credits.

4 The grade awarded for the Master's examination is calculated from the arithmetic mean of the grades awarded by the examiners.

5 The Master's thesis is to be evaluated within 4 weeks by the thesis supervisor and one or two advisors, submitted to the Graduate School Commission and the final grade calculated from the arithmetic mean of the two grades. The Graduate School Commission forwards the evaluation and the calculated grade to the appropriate body determined by the Faculty regulations.

6 When the evaluation and grade of the Master’s thesis have been ratified by this body, the candidate is notified.

7 The grades for both the Master's thesis and the Master's examination must be satisfactory (minimum grade: 4). A practicum, if undertaken, must likewise have been awarded a passing grade.

8 The Master's program is successfully completed (art. 51 RSL05) if:

a the weighted mean of the grades awarded for all individual examinations of the Master's program, weighted according to their ECTS credits, is at least 4.0 (overall grade: satisfactory),

b failed examinations (article 22 RSL05) have been compensated for,

c the Master's thesis is awarded a grade of at least 4,
the components of any required supplementary study or training undertaken in accordance with article 6, paragraph 4 are awarded a satisfactory grade.

**Program completion and final overall grade**

**Art. 17** Upon successful completion of the Master's program, the Faculty of Natural Sciences confers the degree of Master of Science in Climate Sciences with special qualification in ..., University of Bern (with an area of specialization in accordance with art. 3, para. 1, a - e) with an overall grade in accordance with article 52 RSL05.

**IV. PhD program**

**Admission**

**Art. 18** ¹ For admission to the PhD program leading to the degree of PhD of Science in Climate Sciences, University of Bern, (art. 1, para. 1), a Master's degree from the Faculty or another degree recognized as equivalent is required (art. 54 RSL05).

² Persons in accordance with para. 1 for whom a supervisory committee has been appointed in accordance with art. 56, para. 3 of RSL05 are accepted as PhD candidates.

**Admission of PhD candidates of other faculties of the University of Bern**

**Art. 19** The Graduate School of Climate Sciences can also admit PhD students of other faculties of the University of Bern if they are members of the Oeschger Centre for Climate Change Research. These PhD students are studying for the PhD in Climate Sciences, are thus following the above Program of Studies, are subject to the regulations of the relevant faculties and are also enrolled in the relevant faculties.

**Conditions**

**Art. 20** If PhD students covered under art. 18, para. 1 do not have knowledge or skills which are required for the PhD program, the Dean can impose conditions on their admission to the doctoral program.

**Structure (PhD program)**

**Art. 21** The PhD program comprises courses totalling 12 ECTS (Appendix 2) as well as a doctoral thesis and has a normal duration of 3 to 4 years.

² The Graduate School Commission can determine certain courses to be obligatory.

³ The courses promote:

   - improved individual competence in speaking, discussion and presentation,
   - acquisition of tertiary-level educative competence,
   - active membership of networks (active participation in congresses and conferences), as well as
   - acquisition of skills in the area of research and project development.
Dissertation

Art. 22 ¹ PhD candidates must register the starting date of their dissertation with the Graduate School Directorate. The Directorate then reports this to the Dean's office.

² At the commencement of work on the doctoral thesis, supervisors and PhD candidates agree on a doctoral contract. A copy of this is to be provided to the Graduate School Directorate.

³ At least 1 year before completion of the dissertation and in consultation with the candidate, the supervisor selects an external examiner and notifies the Dean's office of the selection.

⁴ The evaluation of the dissertation is conducted in accordance with art. 58 RSL05.

PhD examination and overall level of honours

Art. 23 ¹ The PhD examination, examiners and passing grades are set out in articles 59 - 61 RSL05.

² The examiners are to determine the result of the examination and the level of honours immediately after the examination has ended.

³ The examiners must agree on a grade for the examination.

⁴ The level of honours is based on a weighting of 75% for the grade awarded for the dissertation and 25% for the grade awarded for the examination.

Program completion

Art. 24 ¹ Upon successful completion of the PhD program, the Faculty of Natural Sciences confers upon students enrolled in this Faculty the degree of PhD of Science in Climate Sciences, University of Bern, together with a Diploma Supplement.

² Upon successful completion of the PhD program, doctoral candidates of other faculties receive a Diploma Supplement of the Graduate School of Climate Sciences.

V. Legal issues

Complaints procedures

Art. 25 These are governed by the determinations of RSL05.

VI. Interim and final provisions

Changes to the Program of Studies

Art. 26 Changes to the program are subject to approval by the University Administration. This does not apply to changes to the Appendix, which lie within the competence of the Faculty.

Interim provisions

Art. 27 ¹ Students who began their studies under the program of studies dated 1st September 2008 will continue their studies under the present program with all credits earned under the previous program being transferred. An exception to this is set out in paragraph 2.
PhD candidates who began their studies under the 2008 program of studies are not affected by article 21 and article 22, paragraph 2.

**Effective date**

**Art. 28** After approval by the University Administration, this Program of Studies takes effect retrospectively from 1st February 2012.

Bern, 10th November 2011  For the Faculty of Natural Sciences:

The Dean:

Prof. Dr. Silvio Decurtins

Approved by the University Administration:

Bern, 21st February 2012  The Rector:

Prof. Dr. Martin Täuber
### Übersicht über die Lehrveranstaltungen
*(Revision November 2017)*

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Advanced Lab Methods Paleogeocology and Soils 2.5
Climate Risk Assessment 3.0
Seminar in Climatology and Climate Risks 5.0
Philosophical issues in understanding global change (together with ETHZ) 2.0

Institute of Mathematical Statistics and Actuarial Science
Statistical Methods in Climate Sciences I 5.0
Statistical Methods in Climate Sciences II 5.0
Multivariate Statistics 6.0
Linear Models and Regression I 6.0
Linear Models and Regression II 6.0

Physics Institute/Institute of Applied Physics
Introduction to Climate and Environmental Physics 4.0
Stable Isotopes 4.0
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Introduction to Climate Modelling including Computer Lab 4.0
Carbon Cycle 4.0
Atmospheric Physics 4.0
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Department of Economics
Environmental Economics for Non-Economists 4.5
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Seminar: Economic Analysis of Extreme Climate Events 6.0
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Institute of Political Sciences
Water Policy 6.0
Climate and Energy Policy 6.0

Institute of History
Introduction into Historical Climatology 5.0

World Trade Institute
International Environmental Law 5.0

MODUL: Freie Leistungen
Modul "MSc in Atmospheric and Climate Science" (ETHZ)

Bern, 22. November 2017

Der Studienleiter Klimawissenschaften

Prof. Dr. Martin Grosjean

Vom Studienausschuss genehmigt:

Bern, 28. November 2017

Im Namen der Phil.-nat Fakultät
Der Dekan:

Prof. Dr. Gilberto Colangelo
Anhang 2: Übersicht über die Lehrveranstaltungen
(Revision November 2017)

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<td>Kolloquia und/oder Oeschger Seminar Series (6 Semester)</td>
<td>3.0</td>
</tr>
<tr>
<td>Internationale Wissenschaftliche Konferenz</td>
<td>2.0</td>
</tr>
<tr>
<td>OCCR Young Researchers Meeting</td>
<td>1.0</td>
</tr>
</tbody>
</table>

**Wahlpflicht (3 ECTS)**
Anhang 1 des SP Klimawissenschaften oder aequivalent mit Bewilligung der Studienleitung Klimawissenschaften

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Bern, 22. November 2017

Der Studienleiter Klimawissenschaften

Prof. Dr. Martin Grosjean

Vom Studienausschuss genehmigt:

Bern, 28. November 2017

Im Namen der Phil.-nat Fakultät
Der Dekan:

Prof. Dr. Gilberto Colangelo