Alternative Course Guide
Master Courses Period 4

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Onderwijscommissie der U.A.V.

Content

About the Alternative Course Guide

This is the course guide made by students of the Education Committee of the study association U.A.V. It serves as an alternative for the official course guide which can be found on Osiris. Here you can read the positive and negative experiences of students, stories of students that tell which course fitted in their track and which didn't, and all important points from the evaluations, for example the work load. The alternative course guide is updated every period by the committee for education of the U.A.V. It is not complete yet, but we hope you nevertheless can use it to make better choices for your master's program. The data received from the evaluation forms you fill in after every exam can be found on Blackboard. On the homepage, click on 'My Communities' and then click 'Cursusevaluaties Geowetenschappen - Course-evaluations Geosciences'.

The different tracks and different programs are partly overlapping. This means that one course can be part of more than one program. The students which evaluated the courses are part of only one track and therefore their experience might be slightly different than that of a student following the same course in a different track. Did you read something which is incomplete? Do not hesitate to contact us!

GEO4-1424a Applied Geophysics

Overview

Timeslot A: MO.-morning, TUE-afternoon, WED-morning

Teachers:

- Prof. Dr. J.A. Trampert (j.a.trampert@uu.nl)
- W.W.W. Beekman
- Dr. E.N. Ruigrok

Mean rating in 2015: 8.2

Mean work load in 2015: 11-15 hours a week (large spread between 5-20 hours a week)

Students who passed without a re-examination: 6 out of 6.

Foreknowledge: It is strongly advised to have followed the course Data processing and inverse theory (GEO4-1415) and Introduction to seismology (GEO3-1312)

Acquired knowledge and skills

The goal is to understand the fundamental concepts of geophysical exploration techniques and being able to put these concepts into practice. Geophysical techniques are widely used in civil engineering, in environmental monitoring and of course in oil and mineral prospecting. We will give an overview of the classical potential field and seismic methods. The course will review the basic physical principles underlying the various exploration techniques and will show how the field data are acquired and interpreted. During the computer practicals the students will solve a range of realistic problems. Students will acquire an appreciation for which techniques are appropriate for which application. There will also be a seismic filed work during the last 2 weeks of the course.

GEO4-1427 Computational Geophysics

Overview

Timeslot D: WED-afternoon, WED-later afternoon, FRIDAY
Teachers:

- Dr. C. Thieulot (c.thieulot@uu.nl)
- Dr. A.P. van den Berg

Mean rating in 2015: 7.7
Mean work load in 2015: >20 hours a week
Students who passed without a re-examination: 10 out of 11.
Foreknowledge: Differential equations in Earth Sciences (GEO2-1301), Linear algebra and vector analysis (GEO2-1201) & Programming & modelling earth process (GEO3-1320).

Acquired knowledge and skills

The goal is to learn the basic concepts of numerical modelling of (geo)physical processes. Learn to develop simple numerical models for a range of geophysical applications, obtain hands-on experience and develop a critical attitude in evaluating numerical modelling results in general.

Contents

Numerical solution of the important partial differential equations in geophysics.
Finite difference and finite element methods for potential problems, finite element methods for:

- mechanical problems described by equations for elastostaic, elastodynamic and elasto- viscous configurations. (e.g. elastic plates and elastic wave propagation):
- the Stokes equation for creeping viscous flow; the convection-diffusion equation for heat and mass-transport; equations for flow in prous media.

A computer practical is included were hands-on experience will be obtained in a set of geophysical modelling problems.

GEO4-1420 Organic Geochemistry

Overview

Outside of a timeslot
Teacher: prof. dr. J.S. Sinninghe Damste (J.S.SinninghеDamste@uu.nl)
Mean rating in 2016: 7.3
Mean workload in 2016: 16-20 hours a week
Students that passed without a re-examination in 2014: 13 out of 15

Foreknowledge: Essential background: BSc. or equivalent degree in Earth Sciences or a related field; basic knowledge of general chemistry. Useful background: basic knowledge of geochemistry, sedimentary geology and (paleo)oceanography. No specific courses are mentioned.

Acquired knowledge and skills

Knowledge: An introduction into organic geochemistry. You learn what happens to organic material when it enters the sediment column (ie. diagenetic processes), and how it is useful in reconstructing paleo-climates and environments. The lectures consist of an overview of different biomarkers.
Skills: You learn the chemical background / structures of the biomarkers (which are used for the paleoclimatic and paleoenvironmental reconstructions). Furthermore, there are a few lab sessions during the course in which you can acquire some lab-experience in this field.

Assessment, structure and work load

The course is full-time (about 4 days a week, but the schedule varies) for only the first half of the 4th period. This is so that this course can easily be combined with fieldwork courses in the second half of the 4th period. The course mainly consists of lectures but there are a few practical aspects too (presentation, lab session, excursion to Shell). The course has a fast pace and a high information density. However, as this course is the only one you will follow these few weeks, you have enough time to keep up too.

Experiences

I really enjoyed this course. It opened a new window for me – in which biomarkers can also be used for paleoclimatic reconstructions. This field is relatively new and quickly evolving, which makes it an exciting environment to discover. Also, the overlap with other courses was very limited and almost all study material was new for me, which made me feel that this course was very valuable to follow. Just before the exam, there was also the possibility to visit Shell in Rijswijk as a career orientation and to see how organic geochemistry is used in the oil industry. This was a great opportunity to broaden my view of this discipline.

GEO4-1430 Field Research Instruction Geology

Overview

Timeslot: full-time during second half of period 4

Teachers:

- J.H.P de Bresser (j.h.p.debresser@uu.nl)
- F.J. Hilgen
- Liviu Matenco

Entry requirements: you have to be registered as a student of the master Earth, Structe and Dynamics or of the master Earth, Life and Climate

Foreknowledge: The field course is open to students with background knowledge sufficient to give a good chance of successful completion of the course. This will be assessed on the basis of the personal study plan of the student, approved by the student's advisor. The study plan should contain an overview of previous field experience as well as details of the relevant master courses to be followed preceding the field course.

Acquired knowledge and skills

For this field course, the amount and type of acquired knowledge and skills depends very much on the individual motivation of the students and the specific research topic. In general, every student learns how to formulate a preliminary research question, how to approach solving this question in his/her own research area, and to write a scientific report about the results. Since you pick your own topic, you can make it fit to your track. Knowledge and skills of other courses will be applied during the field research.

Osiris shows the basic set-up and planning, however, all detailed information about logistics, research topics etc. will be provided during a short meeting organized by Hans de Bresser before the course enrollment for period 4 has started.

Assessment, structure and work load

This course has a very high work load, since as much learning as possible is crammed into only 7.5 ECTS. The structure and assessment is as follows:

<u>May</u>

After emailing your preferences to the staff, they compile a list of teams, research topics + area and bus division. In general, there are four areas to stay (in alphabetical order):

1. Carboneras: mainly structural geology, fault kinematics, also sedimentation & tectonics, volcanics
2. Lubrin: high PT structural geology, ductile deformation, metamorphic terrains
3. Sorbas: mainly biostratigraphy and astronomical tuning, also sedimentology & tectonics
4. Tabernas: sedimentology & tectonics, sedimentology

Housing is managed and paid for by students. Normally you share apartments/houses with 4 – 8 persons. Also food is paid by yourself. Transport to and in Spain happens with 8-person minibuses arranged by the UU, with students driving. You should prepare for the fieldwork by searching and reading relevant literature.

<u>June</u>

30 days traveling and fieldwork in the Betic Cordillera, SE Spain with approximately the following aspects: It starts with a 3 day field excursion with all staff and students to get an impression of the regional geology. The other ~3.5 weeks you do fieldwork in teams of two in your own research area of which 3-4 times accompanied by one of the staff members. It is your own responsibility how much time you spend in the field and in the evening processing the results. Halfway there is a 1 day volcanics excursion with the whole group.

July & September

Writing a short/paper style scientific report with your fieldwork partner about your research.

Schedule (based on fieldwork 2013):

- Deadline first version: beginning 2nd week of July
- Reviewed: beginning of September
- Deadline final version: third week of September
- Reviewed & graded: before end of September

Experiences

Most students experience the fieldwork time as an exciting, tiresome, interesting key element of their Earth Science study. The teachers do their utter best and know a lot about the fieldwork area. The atmosphere in the whole group (students ánd staff) is always great. The field research is challenging and requires a high level of commitment. You will receive a lot of feedback on the 1st version of the report, since the staff sets high standards.

GEO4-1431 Field Research Instruction Geochemistry

Overview

Timeslot: full-time during second half of period 4
Mean grade in 2016: 8.3
Coordinator: Dr. Thilo Behrends (t.behrends@uu.nl)
Students that passed without a re-examination in 2014: 13 out of 15
This course does not have any entry requirements. Maximum of 15 participants. Your grade consists of presentation in preparation stage (30%), two final reports (25% each) and (field) performance (20%).

Acquired knowledge and skill

In this course you will become familiar with key processes controlling nutrient dynamics in aquatic environments.

- General to advanced aquatic chemistry processes from the student presentations. In some there can be overlap with the geochemistry courses from both the Earth Sciences bachelor and master programs (e.g. GEO3-1308 Geochemical processes of the earth's surface or GEO4-1440 Microbes and biochemistry), but this is generally not a problem.
- Laboratory skills: you learn multiple procedures for nutrient analysis and general skills in a geochemistry lab
- Setting up a field campaign

Assessment, structure and workload

The course consists of three stages: 1 week of preparation in Utrecht, 3 weeks field campaign and the final 2 weeks for data interpretation and writing of two reports. The preparation stage consists of 1) some introductory lectures by Thilo, 2) two presentations (30% of final grade) by each student: one about last year's results and one about governing nutrient dynamics in a certain aquatic environment (estuaries, lakes and rivers) and 3) preparing multiple techniques to analyze nutrient content in water samples (e.g. phosphate, silica, and nitrate content). The last few years the field campaign was taking place in Brest (Brittany, France).

You will be working in groups of 2-4 students on two separate projects: a self-designed (incubation) experiment and a field campaign. You will be working on the field campaigns of all aquatic environments, however, you are responsible with your group for one certain aquatic environment on which you will write a report.

During the field campaign you will visit a host institute where you will perform all laboratory experiments and measurements. In Brest, this is Institut Universitaire Européen de la Mer (IUEM). For the field campaign you should prepare for (very) long days, 12 hours is no exception. Most days consist of checking your experiments in the lab, going into the field to collect samples, working on your samples back in the lab and checking your experiments again at the end of the day. In Brest the accommodation was at a holiday park at 15 minutes from the institute.

The last stage in Utrecht consists mainly of interpreting your data and writing a report (in teams of 2-3 students) for both the experiment that you conducted and the results of your field campaign of the aquatic environment of your group (i.e. lakes, rivers or estuary).

Experiences

Overall this course is a very good alternative to the Physical Geography or Geology field excursion if you are interested in geochemistry. The full lab experience is very useful, as this is missing from many geochemistry courses. Naturally, the field campaign is the most fun part of the course. The small size

of the group, driving around in mini-vans, the pleasant accommodation near the beach make up for the long hours. Also, the broad variety of subjects and endless enthusiasm of Thilo contribute greatly to the positive experience of this course. Not only for the track Environmental Geochemistry, but also if you are integrating geochemistry in another track in any way, following this course is an absolute no brainer.

GEO4-1432 Environmental Hydrogeology

Overview

Timeslot: full-time during the first half of period 4
Mean rating in 2016: 8.4
Teachers:

- A. Raoof (a.raoof@uu.nl)
- prof. dr. ir. S.M. Hassanizadeh
- prof. dr. R.J. Schotting
- Guest lecturers

Mean workload in 2016: >25 hours
Students who passed without a re-examination in 2016: 100%
Entry requirements: successfully completed the following courses:

- AW-Hydrogeological transport phenomena (GEO4-1433)
- AW-Principles of groundwater flow (GEO4-1434)

Acquired knowledge and skills

Knowledge: The course continues where Hydrogeological transport phenomena and Principles of groundwater flow stop. Lectures are given on several topics, such as the transport of organic liquids, viruses and heat. Also the basis of multiphase flow and remediation techniques are treated.
Skills: Students have to work with modeling programs Hydrus 1D and PMWIN Modflow.

Assessment, structure and work load

The course is full-time, which means almost every day you have a lecture of a couple of hours. Next to several small exercises, one big modeling exercise has to be done in groups of three with Modflow. For this exercise you first go on an “excursion” to a pollution site. You thus have to model a real part of the soil, so you also have to deal with not knowing required parameters etc. Next to the large modeling exercise (25% of your grade), you have to do a presentation about your thesis subject (together with homework 25% of grade) and a take home exam (50%). The work load increases during the five weeks of the course.

Experiences

The variety of lectures and practicals and all different teachers and subjects is appreciated. It feels like applying your knowledge that you gained in other courses to real problems. The take home exam last year didn’t cover all subjects, which was a pity and therefore a little easy.

GEO4-1437 Sustainable and Unconventional Resources

Overview

Timeslot: full-time during the first half of period 4
Mean rating in 2016: 8.0
Teachers:

- Dr. W.W.W. Beekman (w.w.w.beekman@uu.nl)
- J. Limberger
- Dr. L.C. Matenco
- Prof. Dr. C.J. Spiers

Mean workload in 2016: 21-25 hours
Students who passed without a re-examination in 2016: 37 out of 38
Foreknowledge can be gained by following the courses: GEO4-1441 Reflection seismics & Petroleum systems, GEO4-1517A Geology and Petroleum Geology of the North Sea, GEO4-1425 Earth Resources (all useful but not essential).

This course is the only option ESD students have for attending in a regular schedule before the MSc Fieldwork. It is a condensed course of four weeks, before the field work.

Acquired knowledge and skills

The course focusses on deep (>1km) geo-energy resources, with significant future growth potential including geothermal energy, CO2 and underground gas storage, shale oil and gas. The course is taught by lecturers from both UU and external organisations.
Assessment and workload
The course consists of lectures and practicals, both of which are obligatory to attend. The grade is based on a final exam.

Experiences

The students appreciate the level of the course, significance of its value, understanding to the subject, the Blackboard environment, the supervision during the course, the quality of practicums and assessments. However, students suggest improvements in the reading material, stimulation, didactic quality of the lecturers, distribution of the workload, feedback on practicums and assessments. In particular the students were critical on the didactic quality of external lecturers. There is a lack of coherency between the lectures and some overlap with the other M-Profile courses, which has been noted by some students and the lecturers are already aware of this problem.

GEO4-4418 MSc Excursion Physical Geography

Overview

Timeslot: Full-time during first half of period 4
Mean rating in 2016: 7.8
Teachers:

- Prof Dr. Piet Hoekstra
- Dr. M. van der Perk
- Contact: J. Beltman (j.beltman@uu.nl)

Students who passed without re-examination: 100%

Note on forehand

The excursion is in the even years to Denmark and led by Prof. Dr. Piet Hoekstra and is focused on glacial, coastal, sedimentary and some fluvial processes. The excursion in the odd years takes place in the upper Rhine and Germany under the jurisdiction of Dr. M. van der Perk and focusses on hydrological, fluvial and soil processes. The cost of both excursions is around 450 euros. The excursion is mostly for students of physical geography and their associated track. In case of a high amount of participants, as happened in 2012 and 2014, the teachers can decide to select on the followed track and courses.

Acquired knowledge and skills

Apart from the difference in subjects, which are described on the Osiris page, the gained knowledge and skills are mostly practical. During the excursion students learn to recognize different features in real life and understand the spatial- and timescales of different processes. Some small scale field days lead to some experience on collecting data in the field with various tools.

Assessment, structure and work load

The excursion typically takes place in the first two weeks of May. During these weeks the days are mostly spend in the field on various sites. Active participation of the students is a requirement during the day, one oral presentation is obligatory during the excursion and is assigned randomly. After the excursion a paper about an excursion site is the final part of the pass or no pass grade of the course. Compared to the other fieldworks this is a relatively easy course with a fairly low work load but with a high amount of information.

Experiences

The excursion is typically rated as fairly easy and somewhat cheap study points (despite the payment). However, the subjects are found to be very interesting with a high amount of information. This is mainly due to the visible link between processes and their results. The atmosphere is, like most excursions and fieldwork, excellent and is a major plus for the excursion.

GEO4-4423 Hydrology, Climate Change and Fluvial Systems

Overview

Timeslot
Mean rating in 2016: 6.8
Teachers:
- W.W. Immerzeel (w.w.immerzeel@uu.nl) (new for this course since 2015)
- Prof dr. H. Middelkoop
- Many guest lecturers

Mean workload in 2016: 16-20 hours per week
Students who passed without a re-examination in 2016: 23 out of 27
Entry requirements: successfully completed one of the following courses:
- Principles of groundwater flow (GEO4-1434)
- Land surface hydrology (GEO4-4404)
- Unsaturated zone hydrology (GEO4-4417)

Foreknowledge: Essential: BSc. or equivalent degree in Earth Sciences or related field; desirable: having followed Principles of Groundwater Flow, Land Surface Hydrology and Unsaturated zone hydrology or equivalent Master's level courses. Please note: It is not allowed to register for course GEO4-4423 and also for course GEO4-2327!

Acquired knowledge and skills

Knowledge: The course focuses on the connection of climate (change) with hydrology. Students get to know the most recent research on climate, and the effect of climate change on hydrological patterns (evaporation, precipitation, ice melt) and vice versa (via feedback loops). Also research methods are treated (remote sensing, measurement equiptment etc).
Skills: Depending on your paper subject. You are free to choose every subject relating to climate and/or hydrology. You can also choose a model study or a small fieldwork (which you have to arrange yourself).

Assessment, structure and work load

This course is a series of colloquia, with many lectures of guest speakers. Every morning (9:30-12:00) students are required to be present at the lectures. There are three computer practicals which have to be handed in to be graded, but most of the time these practicals are in the morning, too. You have to write a course synopsis at the end. The grading differs: For 4 ECTS: course synopsis (50%) and computer practicals (50%); For 7.5 ECTS: course synopsis (25%), computer practicals (25%), paper (50%). In practice almost every student writes a paper (of which the deadline is end of September).

Experiences

The experiences differ per day, as the quality of the teachers and the background knowledge of the students differ per subject. Lectures about the atmospheric system are quite new, whereas students already know much of other subjects. Overall, the work load depends on your own choice, as you don’t need to do much if you don’t spend much time on the paper.