Periodical course report

COURSE GEO4120, «Environmental Geophysics», Spring 2012.

1. 1. Course content

The course gives an introduction to geophysical methods for mapping and monitoring the physical properties of the ground at shallow depths, with specific focus on environmental, geohazard, water resources and engineering applications. Emphasis is given to 3 main methods of wide use in the previous applications, i.e., seismic, ground-penetrating radar (GPR) and electrical methods (ERT), while other methods are briefly presented (gravity, geomagnetism, and electromagnetism). A short equipment demo on seismic refraction, GPR and resistivity is given, if possible, beside 3 assignments with commercial software (one assignment for each of the main methods).

1.2. Teaching

Teaching was carried out 3 hours in a row once a week, from January to June (Thursday morning; 14 days). This included lectures, 3 written assignments (fail/pass) and a short equipment demo. Short exercises in plenum were taken for key elements of the course. Each assignment was presented during the lecture and the written reports were commented in plenum after delivery, electronic documents with the required answers being provided.

Due to limited time to prepare before teaching start in January (contract signed end of November 2011), material provided by the former teachers but adapted to the latest version of the reference book (2011). An assistant was of great help for quality-control of teaching (some slide preparation) and for the assignments. All lectures were given by the teacher in charge, except for 1 day where the assistant taught 2 of the methods, for practice, in the presence of the main lecturer.

1.3. Resources

Most lectures were carried out in Auditorium 1 using PowerPoint presentations and other electronic documents. The student PC room was used once, for the 1st assignment, in order to let the students try the software but, due to change of teacher, no specific reservations had been made in time for the data lab which was thus impossible to get when needed. This will be better planned for spring 2013 based on 2012 experience. UiO geophysical equipment was sometimes used for presentation, beside a short outdoors demo during the last lecture day. Fronter was chosen as the information channel (clearly stated to the students) but e-mails were also used when necessary to secure relaying important information to all.

1.4. Exam

The written exam was given on June 12 during 3 hours. The responsible teacher and the assistant were the 2 censors. Previous exam texts were used to get an idea of the level of questions, in addition to discussions with the former teacher in charge. The 2012 version was rather like former ones (all students were given access to the latter as some had already got them from previous students). As a new element, students were however asked to develop very basic seismic equations, which had been presented in plenum with emphasis given again and again at that time on the necessity of being able to develop such equations.

2. Learning outcome

After the course, students should be familiar with the most common geophysical methods applied in environmental, geohazard, water resources and engineering studies. They should understand which physical parameters are measured in each method and how they may relate to soil and ground properties of interest in each domain of application. They should also understand the principles of the key acquisition, processing and interpretation methods, especially for seismic refraction, GPR and resistivity. Finally, they should be able to perform elementary processing steps of each method mentioned above, using quite standard software, and interpret the final results keeping in mind possible geophysical limitations.

3.1 Statistics

At course start, 22 students had registered but some stopped quite early on or never showed up. 17 were granted access to the final written exam (based on delivered assignments), 16 passed and 1 failed. Of those who passed, 6% got A, 19% got B, 50% got C, 19% got D and 6% got E.

3 students (2 with C and 1 with D) asked for explanations of their grade, 2 being satisfied with the answers per e-mail, while the 3rd decided to go to appeal after a direct meeting. The latter student is working at a research institute and plans to register for a PhD program, so a D was a problem. He finally acknowledged explanations of his grade (he had made the choice of not answering all questions, somehow gambling on the relative importance of each…), but still decided to go to appeal because feeling that he had nothing to lose. If the grade does not get upgraded to C during the appeal process, he may consider taking the exam again next year and he will not have to do assignments again.

3.2 Evaluation from students (*provided by UiO adm*)

The evaluation of the course was carried out in May 2012, and 9 out of a total of 22 students responded, giving a response rate at 41 %. The response rate is then low, and the data should be interpreted with carefulness. Four of the students followed the master study programme (direction) *Geosciences - Environmental Geology and Geohazards*. The rest were on another geosciences programme direction, while two students were on another programme. Most of the students are in the first or second semester.

Most of the students evaluate the information about the course content/subject, learning objectives, recommended and formal prerequisites on web as good. The information about teaching methods was also mainly evaluated as good. This course used Fronter, which gives an online "classroom" for exchanging documents, e-mails etc. Seven students evaluated the use of Fronter as "Very good". Some students gave good to use of the courses website for information exchanging, but 5 students answer that they did not use this channel. Most of the students stated that e-mail and oral information during lectures, exercises, etc., functioned well. The students preferred channels were: *Fronter (8), oral information (3), and E-mail (7*). Information from the Studies administration was evaluated as good.

The students were mainly satisfied with the teaching, which most of them agree was conducted in an engaging way. Most of them agreed that the recommended prerequisites was adequate for the curriculum, and that the teaching methods covered the course's content well. Six of the students agreed that the teaching were well structured, while three students disagree. All agreed in that the curriculum corresponded well with the course content and

learning objectives. Most of the students state that the lessons hours were just right, and that the course workload was right. Two students gave additional comments that they wanted more lessons! Another commented that assignments should be given back with comments. Seven students agreed on that reading the curriculum was very rewarding and meaningful, and five students evaluated the lectures as interesting and useful, but three students partially disagree. Four students answered that handing in assignments took too much time, but opposite five students disagree. Most of them state that work in the PC-room and Fronter was useful in their studies.

The learning environment was evaluated as good, and most of the students think that it was properly arranged for cooperation in the class, and that collaboration worked well. It was also clear to all who they should address when they had questions, and it was easy to ask the teacher academic questions. Most of the students agree that the teaching facilities were good.

Unfortunately not all the students answered in the evaluation section of laboratory exercises. Three students agree that the laboratory exercises worked well, and that the exercises did make them understand the course subject better. But also some students disagree. Three students stated that the number of hours in the laboratory was just right, but three disagreed. Two students gave additional comments to improve the lab exercises: 1) need of one hour extra with teacher present when they start on an assignment, to have the opportunity to ask questions, 2) increase the number of hours in laboratory or field.

Most of the students agree in that the evaluation methods gave them the possibilities to show what they have learned, and they did not think it was too much evaluation in this course.

3.3. Master-study program

GEO4120 is part of the master study program *Geosciences - Environmental Geology and Geohazards*. The lectures are therefore in part adapted to applications relevant to the program, especially for environment and geohazards, but they do offer a general introduction to near-surface geophysics. Teaching materials used the last 10 years was mostly re-used (but upgraded to the latest version of the reference book). But discussions with UiO colleagues involved in that master program will be carried on during fall 2012 to further adapt the course.

3.4 Teaching semester

GEO4120 has always been taught in spring time and this seems to be best with respect to master student level.

3.5 Course definition

The actual information indicates «Introductory course in mathematics and physics» as formal prerequisites. This is indeed a minimum to ask for and this 1st experience with the course does show a huge difference in background between students. Some students were even struggling with elementary mathematics (unit issues, trigonometry, etc). But that course is still meant as an «introductory» one as not all students intend to become geophysicists and are planning to work in other geoscience domain. So a balance is to be found to accommodate both students with solid mathematic/physic background and those with a more elementary one (but still basic minimum). This will be highly considered when updated the course material during fall 2012.

4. Previous evaluations

The responsible teacher taught this course for the first time and is therefore not aware of any previous evaluations.

5. Proposals for improvements

As earlier mentioned, the course material will be reviewed during fall 2012. Being better aware of the background of the students, and in cooperation with the colleagues involved in that master program, changes will be made to secure balanced course content.

Some students expressed their disappointment because no real fieldwork was planned. The former teachers had earlier on a 1-day equipment demo on a site in or near Oslo, but this had not happened the last years. A short outdoors demo was organized during the last lecture day in May (in front of NGI), but only a few students showed up and not much could be done, having only 2-3 hours for that. We could consider for the next course a full day in field near Oslo, on a known site, to practice GPR, seismic and ERT, but this will require preparations with preliminary fieldwork, hence resources.

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