Handlingsplan for kursus under Det Naturvidenskabelige Studienævn

Kursuskode og navn	DM560 — Introduction to Programming in C++
Semester (Efterår/forår og årstal)	Efterår 2018
Undervisningsansvarlig	Marco Chiarandini
Øvrige undervisere	Troels Risum Vigsøe Frimer (instructor)
Antal tilmeldte studerende til kurset	15 in BlackBoard 14 in the protocol
Antal studerende, som har deltaget i evalueringen	7 Svarprocent:ca. 50%
På hvilke studieretninger og semestre indgår kurset	The course is elective in the second year of the Physics and Chemistry curriculum. In addition, this year there were three exchange Computer Science students and one Applied Mathematics student
Hvilken evalueringsform har været anvendt	classical eletronic questionnaire
Har der været foretaget en midtvejsevaluering på kurset?	yes, with the Delphi method

Beskriv evalueringens resultater — f.eks. indenfor:

Kursets opbygning og placering, emner, undervisningsformer, fordeling af øvelsestimer, forelæsninger og e-timer mv, de studerendes arbejdsbelastning, undervisningsmaterialet, delprøver og forudsætningsprøver, sammenhæng med studiet, de enkelte læreres undervisning:

The course ran this year for the second time. It gives 5 ECTS and it is supposed to be an introductory course in programming assuming no previous knowledge. The course was designed to be an elective course for Physicist. The choice of using the programming language C++ was taken by the FKF department. This programming language is suitable for scientific computing due to its presumed efficiency and safeness against possible bugs. Probably due to a flaw in the system, the course had this year also 3 exchange students in Computer Science and an Applied Math student.

The course run from October to December, thus it was spread more around the semester than done the previous year.

The text book was the same as the previous year. The course followed the text book closely and presented the programming language C++ in a modern way, that is, leaving memory management at the last and using vectors from the standard library as the main type to avoid issues with memory management. The contents of the course were shrunk removing the part on the graphics library.

There were scheduled 14 introductory classes of two hours and 10 training sessions. In addition, there were 2 class tests that were part of the final project and thus obligatory for the final pass/fail assessment. I held a flipped classroom class, which was recognised as useful by the students but few prepared for it. I used in class a reduced set of slides with respect to those later published for the students, in order to give more emphasis on the important aspects. In the training classes, students had to work at a few exercises that were given in advance to let them prepare at home. Several activities were planned as group work and particularly work in pairs.

The issues related with the working environment (Windows and Visual C++), which caused several problems the previous year, were partially improved by using command line tools (for building programs), simpler text editors and Windows Subsystem for Linux. However, students still claim to miss a introduc-

tion to command line and unix tools, such as remote connection to Linux machines for exchanging the files, running the code, etc.

The final project consisted in implementing one of four different programs of varying complexity. The choice was left to the students. They all ended up choosing the easiest. The intention with alternative programs was to motivate the students and to meet the needs for different levels.

The time allocated for carrying out the project was close to one month after the course ended. A deadline extension was asked a few days before the deadline and it was declined.

The course materials are available at: http://www.imada.sdu.dk/ marco/DM560/.

In the course evaluation via electronic questionnaire, there were 5 respondents from Physics and Chemistry, and 2 from Computer Science. The outcome can be interpreted as follows.

- The students declare to have spent in average less than 10 hours per week on this course.

- The course is perceived between average and very difficult.

- Some students comment that the course was for Computer Scientists rather than for physicists due to the perception that a certain knowledge of programming was assumed and that more emphasis was given to understanding how things work rather than just making them work. For these reasons, the course has been perceived as challenging and overall not satisfactory for the final outcome.

- Some students, presumably the Physicists, report that the reasons for not attending classes have been:

    - overlaps with other courses in the semester;
    - high workload during the semester (apparently all 30 ECTS, 5 courses, were overlapping);
    - burden of going to classes without having prepared due to the requirement of a certain degree of active participation;
    - difficulty to recover from have lagged behind and feeling of being judged in class.

- There are constantly two modes (satisfied and not satisfied) in the distribution of students about the information available before the course, the prerequisites, the motivations and the organization of the course. Most likely the two modes are due to the Physics students being dissatisfied, and the Computer Science students being satisfied.

- The distribution of students about the relevance of the course and the pedagogical competences of the teacher have long tails but peak on dissatisfaction. The preparation, knowledge, commitment, respect and understanding of the teacher are assessed as satisfactory.

- It was not clear what was expected from the final project. There is disagreement about the class test. It was asked whether it gave the opportunity to test the understanding of what was learned and to bring one self up-to-date with the contents of the course but no clear assessment arose. The exercises in class seem well chosen and beneficial although the calculator example was deemed difficult and shorter exercises would be preferred.

- From the general comments it arises that: more summaries and setting in perspective are desired. More time should be dedicated to installation and preparation of the environment, including an introduction to linux.

- There is a general satisfaction with the instructor.

- The course web page outside BlackBoard is assessed as helpful.

Giver evalueringen anledning til justering af undervisning mv.:
Hvis ja, beskriv hvilke:

- The main changes from the previous edition have been recognized as valid by the students and they will therefore be kept. Hence, there will be no treatment of the graphics library and there will be two class tests. However the class tests will be made optional and used only for self assessment so as to avoid the feeling of being judged. They will not be linked to the final assessment.

  It will be made clear that questions of any type during classes are welcome.

- The course will be scheduled even more spread throughout the semester running in parallel with the other semester courses. This should give a slower pace which perhaps suits better with a semester that is tough for Physicists. A version of this course condensed in half semester has already been tried and it did not work. More lectures will be allocated in the first weeks to ensure everybody has a working environment up and running.

- The adoption of a different text book will be considered. The example on the calculator that is a central part of the current text book is perceived as difficult. Ideally, a new text book should be more concise, and give less emphasis to memory management and error handling. These will be in any case the aims in the organization.

- More time will be spent to introduce the working environment and ensure that the students are settled with it. An announcement will be sent a couple of weeks before the course, welcoming to the course and inviting students to prepare their computers by either installing recent versions of the operating systems and other tools or getting acquainted with the computer lab machines. Specific instructions on this material will be made available from the course web page.

- The contents of the course will include clear structure and will be available from the start of the course, so students can see what they will learn in the course as well as be able to ask for adjustments of the content during the course.

- It will be made more clear what are the expectations from the final project. The description of the last year final projects will be made available from the start, so the students can see what they are expected to know. They could as well come with possible topics for the final projects themselves. In this way, they will be more interested and excited about learning.

- Before the class tests, examples from this year tests will be made available for the preparation. The questions in the class test will be made easier and such that only base knowledge is tested.

- The slides will be restructured possibly making a condensed version of them in order to make it easier to find content in preparation to classes and during practice.

- In the introductory classes live coding will be used and the whole work flow for building a program shown several times. It arose from the final project that there were still lacks in this fundamental step.

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- The training sessions will contain shorter and easier exercises to start with. Pair work will still be recommended as a work mode.

Giver evalueringen anledning til ændring i kursusbeskrivelsen?
Hvis ja; beskriv hvilke:
Nej.

Behandlet af undervisningsudvalget på:	**Dato:**