Media Processing (B-KUL-T46MP0)

5 ECTS English 54 First term Cannot be taken as part of an examination contract

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OC Elektronica-ICT - Campus Groep T Leuven

Aims

Students should be able to select and motivate the best suited option from the broad range of possibilities of the C++ language. (MK1, MK2, MI1, MI2). Using this knowledge they are able to develop in team an optimal software application. (MP1, MG3, MG4) Optimal is used in a broad sense: minimal CPU load, efficient memory use... till most suited hardware platform. Great importance is attached to the new features introduced bij the new C++11 standard. (MK1, MK2) Students have some introductionary knowledge about parallel processing. (MK1)
Students should be able to use the generic programming tools from the Standard Template Library. (MG1) Students are familiar with widespread development tools like coupling with external API's, using a versioning system, a profiler and a debugger. (MP1)

Previous knowledge

- OO principles
- basic knowledge of C
- use of an IDE

Order of Enrolment

Mixed prerequisite:
You may only take this course if you comply with the prerequisites. Prerequisites can be strict or flexible, or can imply simultaneity. A degree level can be also be a prerequisite.
Explanation:
STRICT: You may only take this course if you have passed or applied tolerance for the courses for which this condition is set.
FLEXIBLE: You may only take this course if you have previously taken the courses for which this condition is set.
SIMULTANEOUS: You may only take this course if you also take the courses for which this condition is set (or have taken them previously).
DEGREE: You may only take this course if you have obtained this degree level.

STRICT(T34SP0) OR STRICT(T34SPE)

The codes of the course units mentioned above correspond to the following course descriptions:
T34SP0 : Systeemprogrammatuur
T34SPE : System Software

Is included in these courses of study

Master in de industriële wetenschappen: elektronica-ICT (Leuven) (Optie Internet Computing) 60 ects.
Master of Electronics and ICT Engineering Technology (Leuven) (Option Internet Computing) 60 ects.

Activities

2.5 ects. Media Processing: Lectures (B-KUL-46hMP)

2.5 ECTS English Format: Lecture 24 First term

Desmet Stef

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Content

Starting from a short historical background to understand the reason for a lot of features, the course covers the amount of possibilities given by C++. Students have already a background in C and OO principles, so the starting point is defining classes. A next step is to encode all possible UML relations into equivalent code. More in

detail, the mechanisms by-value, by-reference and by-pointer are examined to be able to apply them in the most appropriate way. Afterwards the containers and generic algorithms of the Standard Template Library(STL) are covered. A last part is devoted to the development of high performance applications: compiler options, profiling and development rules. Extensive usage is made from the new features of the C++11 standard.

Next topic is about the use of the Qt API. This is more than a simple class library, Qt has been developed for platform independent development with a set of highly efficient classes. We focus on the techniques that make this possible.

A third part covers the strategies to develop efficient architectures. Focus is here on extendability, maintainability, documentation, testing. A short introduction towards parallel programming possibilities is given.

Course material

- slides on Toledo
- some examples of possible study books (any advanced book on C++): first 2 are used as inspiration for the examples

- Beginning C++17 From Novice to Professional, Ivor Hortoan and Peter Van Weert, Apress, ISBN 9781484233655
- C++ High Performance, Viktor Sehr, Björn Andrist, Pack, ISBN 9781787120952
- C++17 In Detail, Bartłomiej Filipek, e-book on leanpub.com
- Professional C++, Marc Gregoire, Wrox, ISBN 1118858050
– The C++ Standard Library (2nd edition), Nicolai M. Josuttis
- *Head First Design Patterns, Eric Freeman & Elisabeth Freeman, O'Reilly, ISBN 0596007124*

- example code on Toledo

Format: more information

Blended learning

During part of the lectures, code is developed in cooperation with the students.

2.5 ects. **Media Processing: Lab Sessions** (B-KUL-46pMP)

2.5 ECTS English **Format: Practical** 30 **First term**

Desmet Stef | **Cauwerts Yuri** (cooperator) | **Wauters Jeroen** (cooperator)

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Content

The lab sessions brings the students in touch with a well equiped development environment having following components:

* QtCreator as IDE, gdb as debugger and gprof as profiler
* Qt API
* CVS using Gitlab

Since all these components exists on all major operating system, it is multi-platform, but the labs are executed on a Linux environment.
First sessions cover the implementations of a number of smaller tasks to familiarize with the syntax and the development environment: simple class, inheritance, dynamic memory management, templates and dynamic binding.
The last lab sessions cover a "bigger" project in which students need to develop a computation-intensive application with a GUI using Qt.

Course material

assignments and example code on Toledo

Format: more information

all labs are done on PC in teams of 2 to 3 students.

Evaluation

Evaluation: Media Processing (B-KUL-T70401)

Type : Partial or continuous assessment with (final) exam during the examination period

Description of evaluation : Written, Practical exam, Project/Product, Presentation, Process evaluation

Type of questions : Multiple choice, Open questions

Learning material : Course material, Computer, Reference work

Explanation

If the university decides that it is confronted with situations of general force majeure or situations where the safety and health of members of the academic community of KU Leuven may be endangered and changes to the teaching and evaluation activities occur as a result, these changes will be communicated via Toledo.

1. Calculation of the final mark

The final mark of this course is calculated based on the published component marks with the following weighting factors:

Component mark for lectures: 50%

Component mark for lab sessions: 50%

The only exception to this rule is described in the complementary regulation of the Faculty of Engineering Technology to article 66 in the Regulations on Education and Examinations.

2. Calculation of the published component marks

The component mark for 'lectures' is a whole number between 0 and 20. It is an evaluation of the student's performance based on the results of the exam:

- The exam is an "open book" on the computer. Students start from a given piece of code with errors (both syntax and logical). The first task is to make it compiling and running, resulting in the correct output. Afterwards they are asked to extend the given functionality with new methods, new classes... in an iterative and incremental way. The number of successfully implemented extensions defines the score for this part. The computer used for the exam will be in examination mode, so without network connection. Students are allowed to bring any resources on USB stick, external disk... as long as this device has no network connection on its own.

The component mark for the lab sessions is a whole number between 0 and 20. It is an evaluation of the student's performance based on the following weighted marks:

- 40% of the evaluation is based on some smaller assignments of which code and UML diagrams needed to be handed in on Toledo.
- The remaining 60% is given after the presentation and discussion of their final project. The final project is a bigger assignment which takes half of the lab sessions and extra work at home. Students start from a requirement description and need to generate a working solution. Code needs to be handed by a given deadline to have access to the presentation.

3. Absences

For absences during the teaching weeks, please contact the education ombuds on the first day of your absence. If you missed one or more obligatory sessions, please contact your professor as soon as possible and certainly within a week. For absences within the exam period, please contact the exam ombuds on the first day of your absence.

4. Partial transfers

Component marks of at least 10/20 published in the academic progress file are transferred to the next examination period within the same academic year and to the following academic years, except for temporary marks and marks for intermittent tests.

When needed, additional information on the evaluation activities is provided during the lessons and/or made available on the Toledo pages of the course.

Information about retaking exams

This course unit allows partial mark transfers in case of partial pass mark:

- 46hMP - Media Processing: Lectures (during and beyond academic year)
- 46pMP - Media Processing: Lab Sessions (during and beyond academic year)

The lecture exam is identical to the exam in the first examination period.

If students need to redo the lab in the 3rd examination period, they need to improve their final project and give again a presentation with discussion.

Required in stage	Optional in stage	First term	Second term	Both terms
This year	Next year	Alternating years	External	Prerequisites
Taught by	Language of instruction	Duration		

› Prepare your stay

QUICKLINKS

› Alumni
› International Office
› Student Services
› Pangaea
› LRD
› UZ Leuven
Jobs and Careers
› Libraries
› News and press
› Agenda
› Culture
› Sports
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INTERNAL TOOLS

› Toledo
› KU Loket
› Webmail
› Intranet
› Who's who
› Organisational chart

OTHER LANGUAGES

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