A PROJECT BY THOMAS MORE, KU LEUVEN, UPORTO, THE HAGUE UAS, UNIVERSITY WEST AND RVO-SOCIETY

D7.1 Description of the postgraduate curriculum

september 2014

Community Service Engineering

Lifelong Learning Programme

CONTENTS

1.Detailed course information

1.1 Course content

The course in Community Service Engineering consists in total of five course units with two educational activities each.

They can be found via this link in the KU Leuven program book: http://onderwijsaanbod.kuleuven.be/opleidingen/e/CQ_52939941.htm

There are **four broadening course** units with specific topics for the program:

Vulnerable groups in society

Organizations in the social profit sector

Technology and the social profit

Interdisciplinary – Building bridges

The **5th course unit project work** is an advanced unit in which the learners are expected to integrate the knowledge, skills and attitudes that have been the subject of the broadening course units.

The four broadening course units are each split into two educational activities as follows:

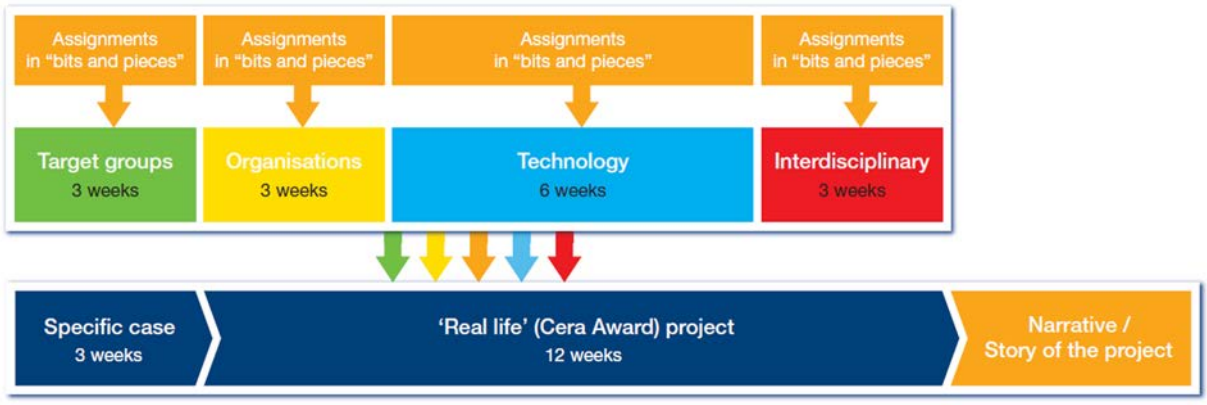
Face-to-face activities: Here all lectures are pooled.

Virtual classroom activities - group work: Here the group assignments related to the face-to-face activities are collected. This group work is mainly carried out in the virtual learning environment. The group work is part of what we call 'assignments in bits and pieces' in the figure. Students learn from each other for their project work.

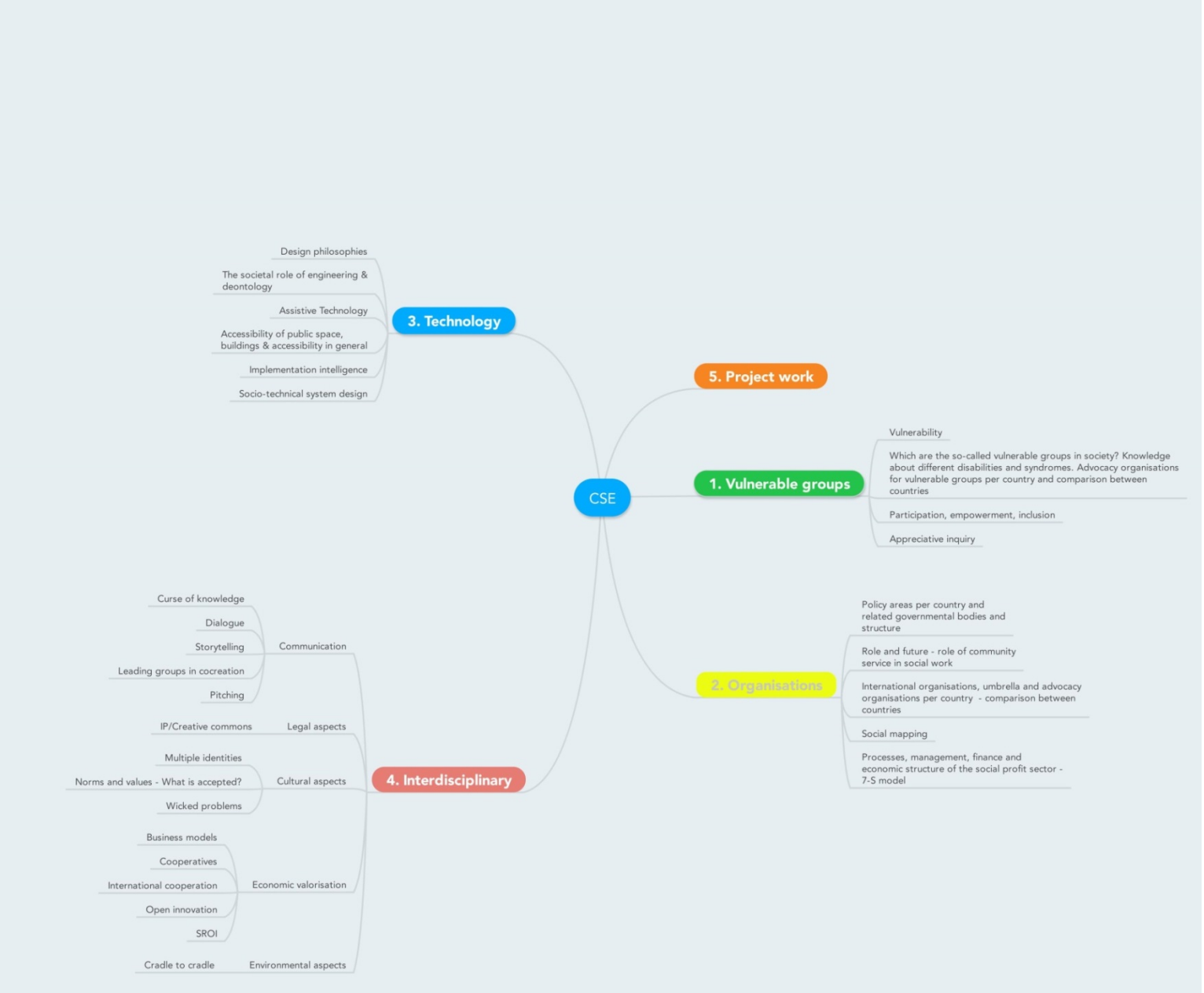
The course unit project work is divided into two educational activities as follows:
1. Project work: the technical component: Here the technical side of the project work is supervised and evaluated.
2. Project work: Supporting individual assignments in bits and pieces (process): Here the process of the project work is supervised and evaluated. In a structured way, the learners get step by step individual tasks that draw their attention towards important steps in the

development process. The individual tasks are also part of what we call in the figure 'assignments in bits and pieces'.

The entire program is summarized in this figure:



A summary of the topics in the four broadening course units is given in the following mind map:



Project work

In the curriculum project work gives the opportunity to undertake a challenge for the public and in the context students choose for themselves (out of the variety of audiences and organizations in the social profit sector). Two frames visualize the context and options. The project work is divided into two parts in the curriculum. Part 1 are warming up exercises. In part 2 of the project work students choose a 'real life' project proposal submitted via the Cera Award or another organization. These proposals are presented during the kick off days (3th and 4th of October). They can be consulted as well in a database of project proposals. The engineers can choose to undertake a project individually or in team (maximally 3 team members).

After the kick off days students have 3 weeks the time to make their choice.

Students are expected to deliver an end result according to the descriptions in the project proposal. These may be:

A model or prototype

The refinement of existing technology

Changes or services to lower the thresholds for the use of existing technology

The design of systems or infrastructure (accessibility and system design within a social profit organization)

...

Project ideas are evaluated according to the criteria for a 'good project proposal' in the curriculum. These are:

1. It fits within the context of Community Service Engineering (abbreviation CSE): technology that either directly benefits a " vulnerable group " (FRAME 1) in the social profit sector or technology strengthening a social profit organization as an entity (FRAME 2).

2. The proposal allows frequent interaction with representatives of a social profit organization and/or end users for technology since in the curriculum interaction with various stakeholders while developing the technical end result is of key importance. The engineers work independently or in group.

1.2 Delivery & dates

The first year (year of the pioneers) started on **Friday October 3rd 2014** and lasts until **Friday May 22nd 2015**.

KU Leuven is the Flemish offshoot of the oldest university in the Lower Countries which was originally founded in 1425. KU Leuven holds all engineering degrees whose students can apply for the new curriculum, i.e.: Masters of Engineering Technology, Masters of Engineering Science, Masters of Engineering Science: Architects, BioScience Engineers and Business Engineers.

KU Leuven is responsible for **the academic level of the educational program**. KU Leuven clearly brings in knowledge of great value in regard to technological topics, technological guidance of students and topics related to humanities. The Academic Development and Support Unit within the Teaching and Learning Department has an important role to support in an integrated and interdisciplinary way the curriculum, with a focus on pedagogical, media, technological and organisational aspects.

The curriculum is organised in collaboration with **Thomas More's group of Biomedical, Behavioural and Social Sciences**. The domains of social work and occupational therapy are the closest involved. It operates from Geel, a city that has a history of inclusion. The domain of social work was recently declared best social work training in Flanders, because of its closeness to the work field and its good internationalization practices. Thomas More offers its network and expertise and involves its students in the shaping of the 'real life' projects. Thomas More is experienced in developing a virtual campus. This

expertise was important to set up the blended learning environment.

The institutions in charge of the organization:

KU Leuven

a) Faculty of Engineering Technology

Celestijnenklooster

W. de Croylaan 6 bus 2000

3001 Heverlee (Belgium)

http://iiw.kuleuven.be/english

b) Faculty of Engineering Science

Kasteelpark Arenberg 1 bus 2200

3001 Heverlee (Belgium)

Tel. +32 16 32 13 50 or +32 16 32 13 51

http://eng.kuleuven.be/english

Organizing team:

Prof. Dr. Bart Vanrumste	Faculty of Engineering Technology	Bart.Vanrumste@kuleuven.be Program Director
Prof. Dr. Wim Van Petegem	Faculty of Engineering	

	Technology	
Prof. Dr. Luc Labey	Faculty of Engineering Technology	
Prof. ir. Jeroen Buijs	Faculty of Engineering Technology	
Prof. Dr. Em. Joos Vandewalle	Faculty of Engineering Science	
Prof. Dr. Sabine Van Huffel	Faculty of Engineering Science	
Prof. Dr. Em. Jan Engelen	Faculty of Engineering Science	
Prof. Dr. Jean-Ma Aerts	Faculty of Bioscience Engineering	

Thomas More (Group of Health, Wellbeing and Teacher Training)

Domain of Social Work and Occupational Therapy

Kleinhoefstraat 4

2440 Geel (Belgium)

Tel + 32 (0)14 56 23 10

https://www.thomasmore.be/

Organising team:

Inge Vervoort	Group of Health, Wellbeing and Teacher Training	inge.vervoort@thomasmore.be 0032 498 46 40 78
Ir. Jan Dekelver	Group of Health, Wellbeing and Teacher Training	
Dr. Aleidis Devillé	Group of Health, Wellbeing and Teacher Training	
Wim Wouters	Group of Health, Wellbeing and Teacher Training	

Face-to-face meetings are organized in Geel and Heverlee (Leuven).

1.3 Examination methods

All course units will be evaluated in the two educational activities for 5. project work. The other course units of the curriculum are not evaluated separately but contribute to the final viva (oral examination). For the summative assessment both the (technical) end result of the project is important as well as the narrative that tells about the way the project was undertaken (process). Upon the summative assessment students get a 'pass or fail' as a final score (without further refinement of the score).

a) Pass/fail – motivation

The curriculum focusses primarily on engineers who already have some work experience, cf. adult students. Pass/fail is also used in doctoral programs. The inspiration was found there.

The following criteria for evaluation will be provided to the members of the jury (promoter, mentor and a third person involved).

Technical considerations are important. A proper technical end result is what the student aimed for. This might be:

- A model or prototype
- The refinement of existing technology
- Changes or services to lower the thresholds for the use of existing technology
- The design of systems or infrastructure (accessibility and system design within a social profit organization)

The following criteria will be used for the evaluation of the technical end result of the projects:

The projects' technical end result …	**Strongly agree**	**Agree**	**Disagree**	**Strongly disagree**
is imaginative,				

interesting and thoughtful				
is cost efficient				
is appropriate to task, audience and purpose				
has the potential to be sustainable in the future; be taken up by the market				
Meets the technical requirements that were put ahead				

These criteria for evaluation will be provided to the members of the jury.

The narrative of the project

The **process** of every student will be evaluated based on the narratives.

Participation is a must in order to learn. When a student does not participate actively in the program, the organizing team will decide what the consequences will be in terms of evaluation.

Students are expected to demonstrate a positive **attitude** and engagement towards other participants. In case of a problem or an incident, it is the responsibility of the student to openly express his/her concerns and to engage in handling the situation. Every student's attitude will be taken into account for the final evaluation.

The presence of all the students during all the activities of the programme is recommended.

The following criteria will be used for the evaluation of the narratives of the projects:

The projects' narratives …	**Strongly agree**	**Agree**	**Disagree**	**Strongly disagree**

Demonstrate that research at the start that was carried out thoroughly				
Demonstrate that different options were considered (analysis) and that the decision for the chosen technical solution was well thought trough				
Demonstrate that users and other stakeholders were involved in the design process and that human centred design or participatory design were put into practice				
Demonstrate professional project management				
Demonstrate an active interest in and research towards the context in other countries				
Demonstrate an open and positive attitude towards the other students of the programme				
Demonstrate an open and positive attitude towards students and stakeholders of other disciplines (beside				

engineering)				

These criteria for evaluation will be provided to the members of the jury.

The active participation of the student

The student…	**Strongly agree**	**Agree**	**Disagree**	**Strongly disagree**
was present and participated actively throughout the curriculum				

The organising partners will evaluate presence and participation

b) Next to his final judgment the student gets an overall qualitative commentary.

The jury will formulate a qualitative commentary. To invite the jury to draw this commentary a template will be made (with space to go into strengths and weaknesses). The jury will also be asked to formulate some "evidences". (I agree because + description of what was observed).

c) Who sits in the jury? To what extent are promoters and mentors present in it? Do they have a recall option or are their contributions restricted to the evaluation criteria specified under 'end result' and 'narrative'?

Each student is appointed a promoter and a mentor. The promoter is the one who initiated the project idea. The mentor is the coach, employee of the university (KU Leuven).
Their joint role is:

- To help to delineate the project idea
- To facilitate networking, helping to build meaningful contacts with the potential for value co-creation in mind
- To monitor the progress of the project work
- To take part in the final evaluation of the student

There is an additional role for mentors (KU Leuven personnel):

- Experience shows that the expectations of "promoters" towards CSE students/engineers are high. They want to have achieved as much as possible within one project. Mentors have the role to define what result is achievable for 15 ECTS credits (see project idea delineation) and to continuously monitor that the focus is maintained throughout the project duration (cq. safeguard that not too many 'nice to haves' are added).
- Mentors guard the 'scientific/academic' substructure of the projects. The result is important, but equally important is the learning process that the student goes through.

The jury will be organized during the first year for all five students on the same day. All promoters and mentors are invited. Per student a third person with expertise on the project topic is invited. All attendees participate in the appraisal of each student (basis for comparison between students) based on the template. The final judgment pass or fail is given by the promoter, mentor and 3rd invitee for a specific student. The jury has a recall option.

Students can fail based on poor participation in activities. The three sections of the evaluation are equivalent. The students have to have 3 times a pass (good or excellent), in order to succeed (global pass). The SEC (Standing Educational Committee) chooses not to give a detailed description of each of the evaluation criteria, neither does the SEC find it relevant to make a mathematical assessment of the criteria towards each other. Students need a global positive qualitative assessment, not a quantitative assessment. To achieve a pass the jury has to answer the next question in a positive way: "Would I hire this person as a potential employer as "a Community Service Engineer"? Each criterion can be an exclusion criterion. So 3x pass is needed to succeed. The following questions should therefore be each answered positively: "Is the technical project result satisfactory?" "Is the portfolio with which the student illustrates the process that he went through satisfactory? ''Can the student through self-reflection convince the jury adequately of his active participation during the curriculum?"

Try-outs for the final presentation are built into the curriculum. During these try-outs students present the status of their project work. The coordinator gives an indication of their chances for success: green (everything is OK), orange (specific risks), red (currently it looks like the chances of success are small).

1.4 Work placement information (Project Work)

Project Work is seen in the curriculum as an opportunity to undertake a challenge for the public and in the context students choose for themselves (out of the variety of audiences and organizations in the social profit sector). Undertaking the projects asks for an approach in which students integrate and apply the knowledge, insight and attitude they acquired inter alia through the course contents. For the project work it is important that the theories of human/user centered design or participatory design are put into practice.

Project work allows to provide depth in the field of Community Service Engineering.

We believe in 'real life' project work as the perfect learning environment for CSE students.

Before the start of each academic year, **ideas for 'real life' project work** are gathered among social profit organizations, research groups, companies in assistive technology,…

Part of these ideas are detected thanks to the close collaboration between CSE and Cera Award. Cera Award is Flemish program that stimulates technological innovation in the social profit sector and has 15 years of experience.

The ideas to choose from are presented in **a compendium** at the kick-off of the curriculum (example annex 1). The idea owners (promoters) **pitch** the challenge in front of the students.

Subsequently students have three weeks the time to identify the project idea they would like to work with. They are invited to reformulate the initial idea into a **project launch document**

and a first action plan (see annex 2) and discuss this with their promoter and mentor.

As an assignment next to executing the projects, students are asked to gradually tell and visualize the story of their ‘real life’ project.

Differently formulated: the technical project result is important as well as the process that students go through.

An assignment for each course content is to describe the part of the project that is related that specific course content (e.g. getting to know the context, co-creating technology, technical criteria, user criteria, implications to other fields,…). This is what we name assignments in “bits and pieces” (see annex 3). The result of the sum of all these assignments will contribute to the story/narrative of the project work that is delivered on a Weebly website (see annex 4).

The narrative serves as a basis for (online) interaction during the course contents part. Students can bring their ‘real life’, ‘just met’ examples to the course. The narrative is the element that unifies the curriculum and makes the link between the course contents and the project work part of the curriculum.

Narratives have a lot of advantages for learning. In the curriculum we use the narratives as a mode of reflection.

1.5 Recognition

The postgraduate program consists of 30 ECTS credits. At the end of the curriculum there is a viva about the project work for a professional jury. The processes and work done throughout the year are equally important as the project’s technical end result. Students report on their progress and demonstrate that they acted as a socially aware engineer. If they pass, they receive the official certificate ‘Postgraduate Course in Community Service Engineering’ from KU Leuven.

1.6 Job Opportunities

In our folder to promote the postgraduate course it has been formulated as follows:

Engineers with the additional profile of 'Community Service Engineering' can play a role in:

- the social profit sector itself
- companies in assistive technology
- companies that seek market and/or product potential in the social profit sector

Based on their projects' end results, graduate engineers can start their own business in an international niche market or perform consultancy assignments for the social profit sector.

Socially aware engineers are particularly widely employable in the labor market, because they have been trained at the crossroads between different disciplines and have interacted with a range of audiences and organizations. Thanks to these contacts with partners in the field, our graduates build an extensive network within the field of Community Service Engineering.

We have identified several engineers currently working in the social profit sector. These engineers could be looked at as role models for CSE. We have interviewed them and they admit this course would have been of value to them when they started working in the social context. Moreover they said they would want to engage our graduates in case of a job opportunity in their organization.

A description of the different kinds of 'role models'; engineers that apply their engineering skills to improve societal coherence :

1. Bart Noé (Jabbla) is an **entrepreneur**; creating tools or an accessible infrastructure for vulnerable groups in society.
2. Tim Vannieuwenhuyse (Group Waak) **manages a social profit organization** or a collaboration between social profit organizations.
3. Marc Wouters (VAPH) uses his **analytical skills** to help to take the right (political) decisions in the social domain.

4. Ann Heylighen (KU Leuven, Fac. Engineering Science Dept. Architecture) is doing **research** to promote accessible buildings.

John R. Platt has written about job opportunities for engineers in the not for profit sector; eg. the article 'Non-Profits Offer Profitable Engineering Jobs'. His articles have also been published by IEEE. IEEE (Institute of Electrical and Electronics Engineers) is the world's largest professional association dedicated to advancing technological innovation and excellence for the benefit of humanity.

In the curriculum various guest lecturers have been invited and they have acknowledged similar opportunities.

Technology in the social profit sector is emerging, as can also be derived from this page with bookmarks.

Community Service Engineering emphasizes on User Centered Design as a design philosophy. This philosophy contributes to the projects result (invention) being implemented (innovation).

If we analyze businesses active in the **broad welfare sector** it becomes apparent that not only the mere fact of applying User Centered Design or Participatory Design techniques in the development of the technology promotes the use and longevity of the product or service developed.

It is also true that collaboration between social-profit and businesses is important to create a **sustainable business model** in the sector.

In 'Community Service Engineering' we have seen examples from Jabbla, Senso-Care, Robot Zora, Ottobock, Sels Instruments, Essers Logistics, Sensotec, VRT and Audiodescription,… who all spoke about win-wins they seek in the collaboration between their businesses and social profit partners.

The next paragraphs punctuate the statement in our folder (mentioned above) that 'Socially aware engineers are particularly widely employable in the labor market, because they have been

trained at the crossroads between different disciplines and have interacted with a range of audiences and organizations.' Community Service Engineering indeed allows engineers to acquire the so-called 21th century skills and be ready for the Networked Economy.

The strategic question is not whether to collaborate but rather **how to co-create more value** for organizations, individuals and society. Therefor we need understanding of where value comes from, how it is generated, what forms it takes, and who benefits. To deepen the comprehension and management of these critical issues the Collaborative Value Creation Framework is a part of the CSE curriculum.

The framework provides a theoretically informed and practice-based approach to analyzing and **creating greater collaborative value**. A 2010 survey revealed that 87% of nongovernmental organizations (NGO's) and 96% of businesses consider partnerships with each other are important. The growing complexities and magnitude of the economic, social, and environmental problems faced by societies exceed the capacities of individual organizations.

2. A multi-campus set-up, using online blended learning tools

ECTS is the abbreviation of European Credit Transfer and Accumulation System. It is a standard for comparing the study attainment and performance of students of higher education across the European Union and other collaborating European countries and it is used to facilitate transfer and progression throughout the Union.

The Postgraduate Course of Community Service Engineering accounts for 30 ECTS credits. Each ECTS credit accounts for approximately 28 hours of workload. The course is spread in time over 30 weeks.

On average 8 hours per week will be organised in **a physical setting**. Students are expected to devote per week 20 hours of

their time to group collaboration, individual assignments, project work and self-study.

To become a Community Service Engineer many activities are organized serving as input for students. We offer a mixture of:

- **Lectures:** The lectures are part of the course content modules and are divided into 4 main topics: vulnerable groups, organizations, technology and interdisciplinary. Theses lectures are mainly organized on a face-to-face basis and take place at the campuses of KU Leuven both in Geel and Leuven. The location is indicated on the program per day.
- **Field visits:** During the course students visit to field-work organizations who will show their good practice.
- **Testimonials:** During this course students meet representatives of the vulnerable groups and organizations of the social profit sector.
- **Interdisciplinary learning activities:** During this course students are asked to work together with or seek input from mixed disciplines of students.
- **Group interaction and individual assignments** (including feedback) are organized mainly virtually. The group composition will vary per topic to maximize the contact between students and to maximize the learning potential from each other. Students working in a group can make their own arrangements per week. Students can work at a time, place and pace that is convenient for them. Furthermore you will be able to read one another's entries and learn from each other.
- **International learning activities** (e.g. students originating from a different country questioning the engineers on the narratives) can make out additional virtual learning activities.

Readings are offered on a ‘nice to know’ and ‘need to know’ basis in order to complete student’s insight.

A **virtual learning environment** is the central meeting point within the curriculum. The KU Leuven association uses **Blackboard (Toledo)** as a virtual learning platform.

Learning activities are organised across physical and virtual spaces.

Face-to-face meetings are important for kick off and team building. Experts in the course contents modules will mostly give face-to-face lectures. Other physical learning activities are field visits, testimonials and interdisciplinary learning activities.

Group interaction and individual assignments (including feedback) are mainly organised on a virtual basis.

For the virtually organised part of the curriculum, students are asked to engage in and are offered a variety of online learning activities and tools.

Students watch web lectures and relevant existing video material individually.

Students use blogs, wiki's, mindmaps, shared document creation, image creation and editing tools,… for group collaboration.

For the narratives (story telling) students are asked to build their own website (in Weebly) and visualise the process of their 'real life' project. They can include video material, presentations (via Prezi) or other tools and share it on the virtual learning platform. To make students aware of the possibilities "A Framework for Web 2.0 Learning Design" is available as reading material on the VLE, where they can find a lot of tools to choose from.

In the virtual learning environment information is structured per course topic and project work. Weekly programmes tell students what is expected from them per week. On the VLE they find a complete overview of tasks and assignments throughout the curriculum. These tasks and assignments are additionally communicated to students per week via weekly announcements. They are asked to post all their individual assignments on their Weebly website that is accessible for the other students.

For the project work module both technological and social guidance is offered to students. This support can be face-to-face

or virtual depending on the agreements made between student(s) and mentor(s).

Material (need and nice to know) is offered virtually.