

***ENGINE* Co-operation Model**

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1 Introduction

1.1 Background and RADICAL project

Increased demand of cruise ships, success of Finnish maritime industry in global competition and the complexity of the products have created a huge demand of skilled staff in the maritime cluster of Southwestern Finland. Scarcity of skilled personnel is a restriction to growth. Industrial Management Engineers including Sales Engineers have technical knowledge and commercial competencies as well as management and soft skills, which are all fundamental for maritime sector. The challenge is to increase the speed of getting students operational to companies to support the needs of the Finnish maritime cluster.

In 2017, four higher education institutes from Finland, Germany and France, together with industrial and institutional partners, submitted the proposal 'RADICAL - Filling Skills Gaps in Blue Industry by Radical Competence Boost in Engineering VET' project under the coordination of Turku University of Applied Sciences (TUAS) which is currently funded by the Erasmus+ program of the European Union. The objective of the project is to introduce a new educational approach in Finland – the possibility of making a Bachelor degree through workplace based learning –, so that almost half of the studies will be performed in industry.

The RADICAL project can be seen as a fundamental reformation of the industry-Higher Education Institution (HEI)-student cooperation in Finland. The project offers a new model for students and professionals in the career path towards new and better jobs, especially in the Blue Sector of Southwestern Finland. The core of the *ENGINE* (ENGINEERING Innopeda Education) model developed in the RADICAL project is a new regional implementation model for post-secondary engineering education supported by a business mentoring model. In this report, the *ENGINE* Co-operation model will be presented.

1.2 Steps in creating the *ENGINE* model

The starting point of the *ENGINE* model development were a benchmark of the academic-industrial cooperation models used at the project partners' HEIs in Germany and France as well as the vocational education apprenticeship model in Finland.

The next phase in the *ENGINE* model creation was interviewing selected regional companies as potential partners of the learning model pilot and offer. After the company interviews, other stakeholders were also met and inputs collected. These included e.g. the student counselling, UAS legal advisor and other staff members, RADICAL project institutional members and the head of the regional apprentice office in Turku.

The research was conducted during the 2nd quarter of 2018 by interviewing in total 14 companies within Southwest Finland (the 15th selected company did not want to participate) completed the benchmark. TUAS researchers conducted semi-structured interviews with company representatives. From the interviewed companies, five were micro and small sized companies employing up to 50 persons, three were medium sized companies employing between 51 and 200 employees, and six were large sized companies employing over 200 employees. From the interviewed companies, seven worked with manufacturing, five worked with designing and consulting and two with engineering and services.

Before finalizing the model, a pilot phase was carried out during the spring semester 2019. Two companies and three students tested the elements of the model and through their experiences and based on their feedback the model was developed to its current form. The results of the pilot are more explained in the project deliverable D3.4.

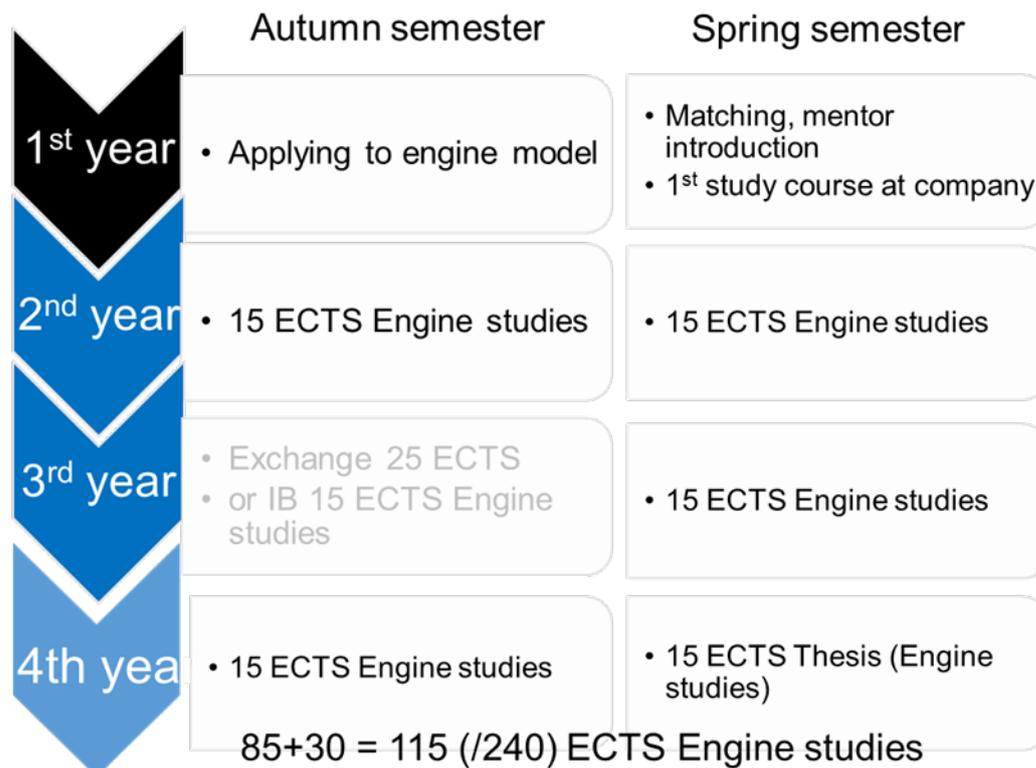
1.3 ENGINE model objectives

The objective is to provide high quality combination of higher education and work-based learning, leading students to have both a full bachelor's degree and in-depth practical experience at the workplace. The students will follow the same curriculum as the students studying with the traditional way and thus, they will have the same degree and studying content as in the traditional learning mode. However, the ENGINE model will provide the opportunity of alternating theory and practice simultaneously, as the student will spend part of the week at university and part of the week at the workplace.

In the next chapters, the elements of the ENGINE model will be explained: structure, application process, scheduling of studies, agreements, evaluation of studies and mentoring model. The mentoring model is explained in more details in project deliverable D2.2.

2 Structure of studies

Picture 1 shows the structure of the ENGINE studies based on TUAS' 'Bachelor of Engineering in Industrial Engineering and Management' degree. It consists of 240 ECTS. Within the ENGINE model, it is possible to acquire 115 ECTS at the workplace, including 30 ECTS for the three practical training periods (10 ECTS/study year, typically during the summer break). This represents thus almost half of the studies.



Picture 1. Structure of studies

The student will study the basic studies at the university during the first year. Workplace learning will start with one course in the spring term of the first year, then continuing with the practical training.

From second study year onwards, the student will study two days/week at the university and two-three days/week at the workplace.

3 Application Process

Majority of students will be admitted to TUAS' Industrial Management and Engineering degree program through the normal application process and fulfilling the admission criteria. Currently, there is an emphasis in selecting students based on their report cards and results in matriculation exam in the upper secondary school, but the admission criteria for students coming from elsewhere than upper secondary school are being developed. This may bring potentially more students suitable for the *ENGINE* learning model.

It is also possible to enter the studies via open study system. Open studies mean that you can enrol in individual courses and complete the first year of studies without being a degree program student. This alternative is also a great opportunity for companies to send their employees to study a degree within the *ENGINE* model. In practice this means, that a student will start the first study year with the open study system with a reasonable study fee, and after successfully passing first year's studies, the student can apply to become a degree program student through a separate application process.

During the first study semester, 20 students (from the intake of 86 in 2019) can compete to the *ENGINE* model through sending a CV and an application showing their motivation and suitability for this kind of learning.

4 Matching the student and company

Students will be sending their application to the *ENGINE* studies in November. This will be done after the companies involved have given their introduction to the students. The introduction will be done in an event organized for first year students and companies.

The application will be done in the form of a motivation letter, where the student will tell about his/her personal motivation and why he/she would like to work especially in this company. The student has to choose three companies that interest him/her most and give his/her arguments also.

A pre-matching will be done at TUAS and then the information about the applicants will be sent to companies.

Companies will invite the selected students to interview and selection will happen during January.

5 Scheduling of Studies

ENGINE model students will study in the same pace as the normal group, and the module timetable of TUAS enables this model well. During the study semester, *ENGINE* students will stay 2-3 days at TUAS and 2-3 days at work (totally 5 days/week). The student will get the academic basis from TUAS, and they learn the practical part at the company almost simultaneously.

During the first year, students will spend a majority of time at TUAS due to mandatory basic studies. From the second year onwards, the student will during the semester study two days per week at the university.

The student will carry out the annual practical training belonging to the degree program studies at his company. Normally the annual practical training takes 7 weeks and students following the traditional study program need time for introduction at the workplace. In the case of *ENGINE* model students, they become productive workforce much faster. The student's duties and responsibilities will become more demanding with the advancement of the studies.

6 Agreements

A cooperation agreement between HEI and the company defines roles and responsibilities of both sides. The company promises to give suitable learning tasks for the student throughout his/her studies.

Student and employer will sign a fixed-term employment contract. This is similar practice to current vocational education apprenticeship contracts. Each contract will be most probably done for one semester (+ summer period) or one year, i.e. six to twelve months. Students get a salary according to the agreement, most probably based on the experience of the student. The monthly salary will be formed according to working hours during the study period, e.g. two days corresponding to 16 hours per week.

7 Learning objectives and evaluation of learning

The learning objectives in the curriculum related to studies will be translated to a proposal for work content and responsibilities. Student and company will jointly set up a “work plan” for the next semester. Student will be responsible for getting the work content defined. TUAS will approve the plan in the beginning of semester.

The nominated mentor in the company will follow the progress of the work plan with the student in regular mentoring meetings. The actual work instructor at the company may be someone else than the mentor depending on the workplace learning task.

TUAS will evaluate acquired learning results in close cooperation with company representative at the end of each semester. Evaluation will be done against both learning objectives and knowledge of the process, methods, tools and theories. The student can demonstrate his/her knowledge with selected methods, depending on the course, e.g. by passing an exam, writing a report, doing an interview or making a presentation. TUAS representatives will always give the final grade marks.

8 Mentoring Model

The ENGINE model is supported with a mentoring model, which is explained in deliverable D2.2 in more detail. Each company will nominate an experienced representative as mentor for the student. Before the learning period at the workplace will start, TUAS will provide training about mentoring and the ENGINE model to all mentors. The mentoring model has two parts: the mentoring relationship including meetings between mentor and student, and the knowledge sharing workshops at TUAS each semester. The purpose of the workshops is to build a network among the ENGINE students and companies and also share learning experiences, share knowledge including tacit knowledge and good practices between ENGINE participants and also to TUAS. The ideology follows the SECI model introduced by Nonaka & Takeuchi and will enable knowledge building.

The mentoring relationship will have three phases: 1) start, 2) operation and 3) closing. In the starting phase, the mentor and mentee will get familiar with each other, agree on objectives for the mentoring, prepare a meeting plan and agree rules. After each mentoring meeting, the student will write a diary for himself about the discussions and results. In the closing phase, the partners agree about ending the mentoring relationship and make conclusions.

9 Conclusion

ENGINE model is a new way of studying a bachelor's degree in Finland. It covers the whole time of studies, four years, and the student and the company are attached to each other from the beginning of studies until graduation.

The model answers well the needs of companies, who need skilled workforce faster and the model also provides additional value to students who gain many practical skills and get to know company processes in depth. This will lead to better opportunities for their career development and naturally in getting their first permanent employment at the company, where they did their workplace studies.