

## INTERNATIONAL SEMESTER 2018–2019

### Chemical Engineering

### SPRING SEMESTER 2019

#### Future Materials and processes semester: Applied Materials Sciences semester

(Up to **30 ECTS** for the spring semester + optional courses)

*Please note that the available courses are subject to change.*

Course name	ECTS
Chemical engineering project + working English	5
Innovation project	10
Module (a, b or c) a) Biomaterials and bioprocesses 1 b) Materials technology 1 c) Food engineering 1	15

#### Course descriptions:

##### Chemical Engineering project + Working English (5 ECTS)

The students design, implement and report on a chemical engineering project. They are able to use relevant field-specific information sources and perform the needed chemical or biochemical analyses, understanding the operation principles of the equipment used. Project topics vary according to ongoing research group work. The unit includes working and reporting with a focus on professional communication in English.

##### Innovation project (10 ECTS)

Innovation project is typically a development project implemented in co-operation with a company or another external customer. However, the project may also be a part of Turku University of Applied Science's internal research and development activities or it can be based on a student's or student team's own project or business idea. Also development projects related to different student competitions are applicable.

The final extent, detailed contents, student workload and learning outcomes of the course will be defined on a project basis.

#### MODULE (a, b or c)

##### a) Biomaterials and bioprocesses 1 (15 ECTS)

- different biomaterials and their applications
- basics of tissue engineering
- basics and basic techniques of genetic engineering
- essentials of diagnostics
- concepts and methods in diagnostics

The participants are able to describe specific features of different biomaterials and their applications. The participants understand the basic principles of tissue engineering and they are able to describe specific features of biomaterials used in tissue engineering. The participants are able to describe the essentials of diagnostics and basic concepts and methods of diagnostics and genetic engineering. The participants know the basic principles and methods of genetic engineering. If the participant enrolls only in the spring semester the first part of the module provided in the autumn (5 ECTS) is conducted by reading the text provided and passing an exam.

### **b) Materials Technology 1 (15 ECTS)**

The Materials Technology I Semester focus on understanding the structure of different materials and how it affects to properties. After completing the semester the participants are able to describe the micro and macro molecular structures' effect on material characteristics and behavior and are able to describe the special features of a material. The participants are also able to describe manufacturing techniques and are able to choose the appropriate technique. Furthermore, the participants are able to select the most suitable materials to each application from ecological and resource efficient aspects. The semester includes laboratory analyses and project work. If the participant enrolls only in the spring semester the first part of the module provided in the autumn (5 ECTS) is conducted by reading the text provided and passing an exam.

**Prerequisites:** No required prerequisites

### **c) Food Engineering 1 (15 ECTS)**

The participants are able to describe main ingredients and composition of food products. The participants know the legislation regarding the composition, serving, packaging and labelling of food. The participants are able to describe food manufacturing processes from farm to fork. The participants are able to describe the requirements regarding the hygienic food processing. The participants are able to use different food processing equipment and are able to analyze the product using different analysis methods. The participants are to describe how different products stimulate senses and they are able to execute sensory evaluation tests.

Contents:

Part 1: Food ingredients and raw materials

Part 2: Food processes and manufacturing & hygiene in food processing

Part 3: Laboratory works and analysis of food products

**Prerequisites:** No required prerequisites

## **Optional courses**

<b>Optional courses</b>	<b>ECTS</b>
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<a href="#">Get Finternational</a>	3