

**COURSE INFORMATION: Cell and Tissue Engineering Spring Period IV – E3225**  
**Katrina Nordström 12.3.2019**

THE COURSE WILL BE AT THE CHEM Building and the Design Factory (Betonimiehenkuja 5).

The location of Design Factory, Betonimiehenkuja 5 (BUILDING 25) can be found on this map:

[http://www.aalto.fi/en/midcom-serveattachmentguid-1e552d6b98976c252d611e5b59c0360c3243ac33ac3/otaniemi\\_campus\\_map\\_2015.pdf](http://www.aalto.fi/en/midcom-serveattachmentguid-1e552d6b98976c252d611e5b59c0360c3243ac33ac3/otaniemi_campus_map_2015.pdf)

**The space is STUDIO – to your left from the entrance..**

Responsible teacher: professor Katrina Nordström ([Katrina.nordstrom@aalto.fi](mailto:Katrina.nordstrom@aalto.fi))

Timetable; spaces and activities

Tuesday 16.4. 12-16 Ke 5/CHEM (Lectures )  
 Wednesday 17.4. 12-16 Ke 5/CHEM (Lectures )  
 Thursday 18.4. 12-16 Ke 5/CHEM (Lectures )

Tuesday 23.4. 12-16 Design Factory STUDIO (group work)  
 Wednesday 24.4. 12-16 Design Factory STUDIO (group work)  
 Thursday 25.4. 9-12 Design Factory STUDIO (group work +mini-seminar)

**Cell and Tissue Engineering E-3225: What does this give you ?**

1. Lectures	2. Group work	3. Mini-seminar	5.What do you learn from the course ?
16.4. 12-16 17.4. 12-16 18.4. 12-16	23.4. 12-16 24.4. 12-16 25.4. 9-12 (mini-seminar)	25.4.	1) A focused view into Cell and Tissue Engineering covering aspects of biology, methods, materials, supports, other technologies needed. 2) An understanding of case examples highlighting challenges of making products 3) Reflecting on questions that arise from the course; allows you to present your learning - not through trying to guess exam questions
<b>What does this give you (the student) ?</b>	<b>25.4. Start to prepare for seminar</b>	<b>What does this give to you ?</b>	
Basics of cells and tissues that you need in order to understand what kinds of cells can be used and how they are used to generate new tissues or organs. Also – background on scaffolds, materials, bioreactors	Group work will help you understand the real challenges of applying the theory (from lectures) to real life products and treatments We will use different ways of practically illustrating the products	Critical view of the key issues that regulate the use of Cell and Tissue engineering and products thereof, gives a perspective on the supply chain, the reimbursement, the regulations and risk vs. benefit	

4. Home Exam questions available on 16.4. deadline for return is 31.5. Questions cover 1) Lectures, 2) Reading materials (book see MyCourses), which covers the lecture topics and the group work

## 1. REQUIREMENTS

### Requirements for the course and assessment:

1. Lectures
2. Group work
3. Mini-Seminar (see instructions below)
4. Home Exam (Questions are available as of 16.4., completion of exam deadline is 31.5.), see instructions below.

The textbook for the course is: Birla, R. (2014) Introduction to Tissue Engineering: Applications and Challenges. Wiley & Sons. The textbook is in MyCourses as a pdf file.

Reading materials for the exam include also the 5 articles that are covered in the seminar and are in MyCourses as pdf.

## 2. GRADING

Lecture attendance  $6 \times 1 = 6$  points (each lecture on 16.4., 17.4. and 18.4. accounts for 2 points)  
+ 2 extra points for attending all

Group work  $6 \times 2 = 12$  points

Seminar = 20 points (see seminar instructions for grading criteria)

Home Exam: 40 (see home exam instructions for grading criteria)

Grading scale (preliminary)

55 - 60 = 5

49 - 54 = 4

40 - 48 = 3

31 - 39 = 2

22 - 30 = 1

21 or below = fail

What	Points	Total max
Lecture attendance	6 x 1 point (each session)	6 + 2 for attending all
Group work	6 x 2 = 12 points (each session)	12
Seminar	3-10	10
Exam Note that points will be deducted for missing the return deadline of 31.5. , 0.5. points per day of delay is deducted,	6 x 5	30

## 3. LECTURE (Course) TOPICS

These will be covered as of 16.4. onwards, we will aim to cover these during 16.4. – 18.4., however, there may be some topics that will need to be continued during 23.4. – 25.4.

TOPIC 1: Introduction to Tissue Engineering

TOPIC 2: (Stem) Cells for Tissue engineering (including points on the ECM)

TOPIC 3: Selected Cell – ECM (Extra-Cellular Matrix) interactions with implications for growing cells and tissues

TOPIC 4: Culturing (stem) cells for tissue engineering

TOPIC 5: Biomaterials (and scaffolds) for tissue engineering

TOPIC 6: Bioreactors for Tissue Engineering

**These will be covered during 23.4. – 25.4.**

TOPIC 7: Bioethics: Questions and issues

TOPIC 8: Health Care products – legal and regulatory aspects

TOPIC 9: Hypes and Hopes of Tissue Engineering.

#### **4. GROUP WORK (Design Factory, STUDIO)**

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##### **23.4 (12.15 – 16.00)**

##### **12.15 – 13:30 Start and assignment for Group Work**

**TOPIC: Tissue Fabrication Technology (Birla Chapter 4)** In this group work, you will read Chapter 4 and answer questions, and make a final presentation (to be done with modelling clay on 24.4.)

1. Read sections 4.1. – 4.9 (as far as you get to)
2. Answer Questions 1 and 2 (write down your answers)

##### **13.30. – 13.45 Break**

**13.45 – 14.30 TOPIC 7: Bioethics: Questions and issues (Katrina) and TOPIC 8: Health Care products – legal and regulatory aspects (Katrina)**

14.30 – 15.30 Continue with Group Work

1. Continue reading and
2. Answer questions 5, 8 and 14 (write down your answers)

15.30 – 16.00 Each group presents their progress for the day (5 min each)

Present your answers for the questions (each group presents 1 of their answers, we will decide who presents what)

##### **24.4. (12.14 – 16:00)**

12.15 – 13:30 Continue with Group Work and plan your presentation (summary) for today

Your assignment for today is:

Using modelling clay – illustrate

Group 1: Figure 4.5

Group 2: Figure 4.6.

Group 3: Figure 4.7

Group 4: Figure 4.8.

Group 5: Figure 4.9.

##### **13.30. – 13.45 Break**

**13.45 – 14.15 TOPIC 9: Hypes and Hopes of Tissue Engineering (Katrina)**

14.15 – 15.00 Each group presents a summary (10 minutes) of their Group Work

15:00 – 16:00 Preparation for mini-seminar You will read the paper assigned to you and make a preliminary plan for presenting this on 25.4.

## Mini - SEMINAR preparation and presentations 25.3. 9-12 (STUDIO)

### 25.4. (9.00 – 12.00) Preparation for seminar

Thursday: 25.4. You should **make 3 power points** and present these today in a mini-seminar.

9:00 – 10.30 Continue Work on your paper and make the power points of your mini-seminar.

10.30 – 10.45 Break

### 10:45 – 12.00 Mini-seminar presentations:

10.45 – 10.55 Group 1

11.00 – 11.10 Group 2

11.15 – 11.25 Group 3

11.30 – 11.40 Group 4

11.45 – 11.55 Group 5

Grading of the seminar presentation:

**Excellent /very good (10):** the presentation by the group demonstrates:

- excellent/very good understanding of the scientific content of the topic
- excellent/very good grasp of the subject, as they are able to communicate to others in a clear and logical manner

**Good (5):** the presentation by the group demonstrates:

- good understanding of the scientific content of the topic
- BUT
- it is apparent that the group has some problems to communicate to others in a clear and logical manner, which shows that the understanding of the scientific content is not at a very deep level

**Satisfactory (3):** the presentation by the group demonstrates that

- the scientific understanding of the topic is at a superficial level
- AND
- it is apparent that the group has significant difficulties in communicating to others in a clear and logical manner, which shows that the understanding of the scientific content is not at the expected level (Master's level) and needs improvement.

The questions for the home exam will be posted into MyCourses on 16.4. so you can start to do it as soon as you wish.

## 6. LECTURES, COURSE BOOKS, HOME EXAM

The home exam will cover the lecture topics and contents, including the reading material and articles that the lecturer has placed in MyCourses. The textbook for the course is: Birla, R. (2014) Introduction to Tissue Engineering: Applications and Challenges. Wiley & Sons. The textbook is in MyCourses as a pdf file. The 5 articles that are covered in the seminar and are in MyCourses as pdf.

The questions for the home exam will be posted into MyCourses on 16.4. so you can start to do it as soon as you wish. The deadline for returning the home exam is 31.5. through MyCourses.

## **Assessment / grading of the home exam (7 questions, max 5 points each = 40 max)**

### **Excellent (5)**

- Exceptionally high quality, for all characteristics nearly flawless
- The answer demonstrates significant scientific understanding/knowledge
- The student has shown significant ability to provide personal insights and understanding of the topic
- Use of scientific literature (and lecture materials) and other scientific sources is of exceptionally high quality and the student shows the ability to interpret the scientific context
- The use of terminology is excellent and shows perfect command, with no errors
- Excellent presentation of what is relevant and categorizing of personal knowledge and skills within the given timeframe
- Excellent (near perfect) professional command of the topic

### **Very good (4)**

- Some of the criteria for grade 5 have been met, and all the criteria for the grade good (3) have been met. In addition the answer/work includes features that are very good, and therefore above the average grade 3, for example:
- Very good scientific knowledge
- Very good professional command
- Very good command of the area covered
- Very good use of the literature (as well as lecture materials) and other background materials
- The use of terminology is mostly excellent, but not perfect, there are minor/few misinterpretations

### **Good (3)**

All the criteria for the average grade of 3 have been met

- The answer/work shows the development of professional command of scientific reasoning
- The relevant goals set by the question/assignment have been met
- Good use of the literature (as well as lecture materials) and other background materials
- There are no major weaknesses in the structure of the answer/work
- There are no major weaknesses in the use of terminology
- There are no major linguistic weaknesses

### **Very satisfactory (2)**

The answer/work presents what has been asked, but fulfilling of the basic criteria for the grade (3) good have not been achieved as follows:

- There are inconsistencies /hesitation in the interpretation of scientific facts and understanding of terminology
- The presentation is unclear and does not proceed logically
- The use of literature (and lecture materials) is slim

### **Satisfactory (1)**

The answer/work does not fulfill the requirements, with major flaws as follows:

- The understanding of the student (at the scientific level and the ability to connect knowledge and information ) is poor
- The answer/work does not address the issue/question/set assignment
- The scientific level needs significant improvement