

CHEM-E3225, Cell- and Tissue Engineering, 5 cr (2019)

Introduction to Tissue Engineering Katrina Nordström, professor <u>katrina.nordstrom@aalto.fi</u> (room D413b) CHEM

Nordström 2019

Course requirements – what is expected of you

Workload Total 135 h = 5cr

- 1. Lectures 16.4., 17.4., 18.4. (TOPICS 1-6)
- 2. Work on projects in groups of 5 together during 23.4., 24.4. and present your work on 25.4. (Also short lectures on TOPICS 7-9)
- 3. Seminar start on 25.4. in groups of 5 to prepare for seminar
- 4. Seminar day is 7.5. only and presentation, no written work
- 5. Home exam questions are available in MyCourses as of 16.4., deadline for returns is 31.5.



Instructions and grading

- Lecture attendance 6 x 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 = 10 points (see seminar instructions for grading criteria)
- Home Exam: 30 (see home exam instructions for grading criteria)
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- Grading scale (preliminary)
- 55 60 = 5
- 49 54 = 4
- 40 48 = 3
- 31 39 = 2
- 22 30 = 1
- 21 or below = fail



Instructions and grading

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



Learning outcomes: After the course you can:

1. Describe major classes of human stem cells with potential for use for cell-based and tissue – engineering products

2. Present theory for culturing techniques, growth requirements in vitro and differentiation and generation of pluripotent stem

- 3. Discuss the interactions of cells and implantable biomaterials
- 5. Present the culturing of cells in a bioreactor and on different scaffolds
- 6. Present the challenges in prevention of contamination and aseptic techniques when working with cells in reactors
- 7. Discuss the product development process and comment on the challenges of bringing products to the market



Lecture topics 16.4. – 18.4.

12-16 KE 4 (so we will cover several topics each day)

16.4. 2019

TOPIC 1: Introduction to Tissue Engineering TOPIC 2: (Stem) Cells for Tissue engineering (also covers issues related to ECM)

17.4. 2019

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

18.4. 2019TOPIC 4: Culturing (stem) cells for Tissue EngineeringTOPIC 5: Biomaterials (and scaffolds) for Tissue Engineering

18.4. / 23.4. continued if needed TOPIC 6: Bioreactors for Tissue Engineering



Group work (STUDIO, Design Factory)

23.4 (12.15 – 16.00)

12.15 –12.45 Group work (see instructions for more details)

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

- 14.30 15.30 Continue with Group Work
- 15.30 16.00 Each group presents their progress for the day (5 min each)

24.4. (12.14 – 16:00)

12.15 – 13:30 Continue with Group Work and plan your presentation (summary) for today 13.30. – 13.45 Break

13.45 – 14.30 TOPIC 9: Hypes and Hopes of Tissue Engineering (Katrina)

14.30 – 15.00 Presentations

15.00 – 16.00 Starting to work on mini-seminar for 25.4.



25.4. (9.00 – 12.00) Mini-Seminar day. The preparation for the seminar will start on 24.4. The plan is to have 5 groups with 4 students, but this depends on the final number of participants.

Thursday: 24.4. You will read the paper assigned to you and make a preliminary plan for presenting this on 25.4 You should make 3 power points.

9:00 – 10.45 working on the mini-seminar in groups 10.45– 12.00 10 minute presentations

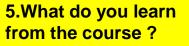


Cell and Tissue Engineering E-3225: What does this give you ?

1. Lectures		2. Group work			Ce		
					Er		
16.4.	12-16	23.4.	12-16		as		
17.4.	12-16	24.4.	12-16	Mini-Seminar 25.4.	m		
18.4.	12-16	25.4 <u>.</u>	9-12		Su		
What does this give you (the student) ?		24.4. Start to prepare for seminar		teo 2)			
		What does this give you ?		What does this give to	²⁾ ca		
you (ino o		initiat doc		you ?	hig		
Basics of cells and		Group work will help you		•	of		
tissues that	t you need in	understan	d the real	Critical view of the key	3)		
order to understand what		challenges of applying the		issues that regulate the	qu		
kinds of ce	lls can be	theory (fro	om lectures) to	use of Cell and Tissue	the		
used and h	now they are	real life pr	oducts and	engineering and products	pr		
used to ge	nerate new	treatments	S	thereof, gives a	no		
	organs. Also –	We will us	e different ways	perspective on the supply	gu		
background on scaffolds, of practically illustrating the		chain, the reimbursement,					
materials, l	bioreactors	products		the regulations and risk			
4. Home Exam questions availble on 16.4. deadline for return is 31.5. Questions cover 1) L							

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 also the lecture topics and the group work and the 5 articles





1) A focused view into

ell and Tissue ngineering covering spects of biology, nethods, materials, upports, other echnologies needed.) An understanding of ase examples ighlighting challenges f making products)Reflecting on uestions that arise from ne course; allows you to resent your learning ot through trying to uess exam questions

What are the main goalsof this course ?

- To Learn what you learn from this course depends on what you give to this course
- To develop skills on working with people from different disciplines
- To give you an in-debth understanding of the key issues in cell and tissue engineering, it will not cover everything

