

# Biopolymers

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## CHEM-E2155

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Michael Hummel

*michael.hummel@aalto.fi*



Aalto University  
School of Chemical  
Engineering

# Course description

This Graduate level course deals with the general topic of *biopolymers*. In this context, this is an **introductory course** in which *Biopolymers* indicate those **derived from renewable resources (bio-based)**, either biodegradable or non-biodegradable, **and polymers derived from non-renewable resources that are biodegradable**.

It also includes those **polymers produced by biological systems** such as microorganisms, plants, or animals, or obtained by chemical synthesis. Fundamentals of the physical chemistry are brought to life with **examples from such fields as biotechnology, paper science, biomaterials**, etc. Topics include synthetic biopolymers, biodegradation, etc.



# Learning Outcomes

After the course the student

- knows the most common natural and synthetic biodegradable polymers.
- can define what is biodegradation and how it is measured.
- can describe the synthesis methods of synthetic biodegradable polymers.
- knows the application areas and particular requirements of biodegradable polymers.



# Text Sources

Primary source material: Research and review articles dealing with “biopolymers” as well as book chapters, all provided as PDF files

MyCourses online system: Above material and all lecture slides will be available online for students during the period of their enrollment.

# Online tools

- **Zoom:** for lectures
- **MyCourses:** contains lecture slides, reading materials, assignments and announcements
- **Padlet:** online canvas to write your reading summaries

# Class arrangements

- All lectures are via Zoom:

<https://aalto.zoom.us/j/65287418944?pwd=NndKNXZmK0w5YUI5UnYyblNaQmNNZz09>

- Attendance is necessary since all lectures require your active participation in the discussion parts
- Please read the material provided before each lecture; you will find it in MyCourses:

<https://mycourses.aalto.fi/mod/folder/view.php?id=1138023>



# Class arrangements

## Lecture style:

- Each unit will consist of a lecture part and a discussion part.
- During the discussion part, you are assigned to breakout rooms to discuss the reading assignment within your group. Turn on your camera in the breakout rooms!
- Together, you should write a short summary of the topic using Padlet:  
[https://padlet.com/michaelhummel/CHEME2155\\_2024](https://padlet.com/michaelhummel/CHEME2155_2024)



# Class arrangements

## Group discussion:

- You will remain in the same group of 5 throughout the course
- You will peer-grade your participation in the discussion
- If you would like to be in the same group with certain students, please send me an email until Wednesday Jan 10<sup>th</sup> and I will try to take your wishes into account when forming the groups
- Also, indicate if you would prefer to be in a group that meets physically
- You will then get a spreadsheet to grade you peers anonymously





# Assignments - mandatory

Due date	
Assignment 1	January 22 <sup>nd</sup> 23:59
Assignment 2	February 12 <sup>th</sup> 23:59
Assignment 3	March 11 <sup>th</sup> 23:59



# Schedule

**\*Discussion days require your presence!**

Day	Subject of lecture	Discussion part
08 January	Introduction to the course	
15 January	Biopolymers overview	Reading 1
22 January	Biopolymers for packaging	Reading 2
29 January	Discussion day*	Reading 3 & Assignment 1
05 February	Biodegradation 1	Reading 4
12 February	Biodegradation 2	Reading 5
26 February	Discussion day*	Reading 6 & Assignment 2
04 March	Chitin, alginates and others	Reading 7
12 March	Proteins	Reading 8
19 March	Discussion day*	Reading 9 & Assignment 3
25 March	TBD	Reading 10

# Work load

Online lectures	20 h
Independent studying	95 h
Preparation for final assignment	20 h
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	135 h = 5 cr

# Final assignment

Due on 11 April, (Thu) at 23:59

Grading	
Each course assignment 20% of final grade	3 x 15% = 45%
Padlet summaries of group Reading assignments	15%
Peer-grading from group discussion	10%
Final assignment	30%

The detailed instructions for the final assignment will be provided ca. 1 month before the due date

**You cannot pass the course if you fail to submit the final assignment**

# Introduce yourself in Padlet

1. Introduce yourself within the group in your breakout room
2. Discuss the term “Biopolymer”
3. Write a short introduction of your group and summarize your discussion. Paste a screenshot of your Zoom screen to capture your faces
4. Save your introduction as picture or pdf file
5. After that, go to the Padlet webpage and upload your file in the first column:

[https://padlet.com/michaelhummel/CHEME2155\\_2024](https://padlet.com/michaelhummel/CHEME2155_2024)