Microbiology and Basic Molecular Biology HT21

15 ECTS. (5MO103, 3MB036)

30 August –1 November 2021

Course leader:

Felipe Cava (FC), felipe.cava@umu.se

Department of Molecular Biology, Building 6L

Additional lecturers:

Ellen Bushell (EB)

Barbara Sixt (BS)

Jennifer Pentz (JP)

David Cisneros (DC)

Johan Henriksson (JH)

Annika Bindler (AB), Studieverkstaden/Academic Research Centre.

Laboratory assistants:

David Cisneros (DC), david.cisneros@umu.se, main assistant

Barbara Riztl (BR)

Course administrator:

Lina Helgesson and Ingela Nilsson, studieadm.molbiol@umu.se. ,
Department of Molecular Biology, Building 6L

Medical library: Merja Ylioikarainen,
merja.ylioikarainen@umu.se; lillemor.lyren@umu.se (LL)

Course content

I. Material produced by the department

II. Literature/text books:

N. Parker, M. Schneegurt, A.T Tu, B. M. Forster, P. Lister (2016) "Microbiology" OpenStax

https://openstax.org/details/books/microbiology

Freely available as online version, pdf, print copy (order from amazon.co.uk or amazon.de) and iBook.

III. Contents of lectures and seminars

IV. Journal club - **MANDATORY (part of PPT 2 points)**

V. Individual seminars – **MANDATORY (part of PPT 2 points)**

VI. Labs: **ALL LABS ARE MANDATORY! (5 points)**

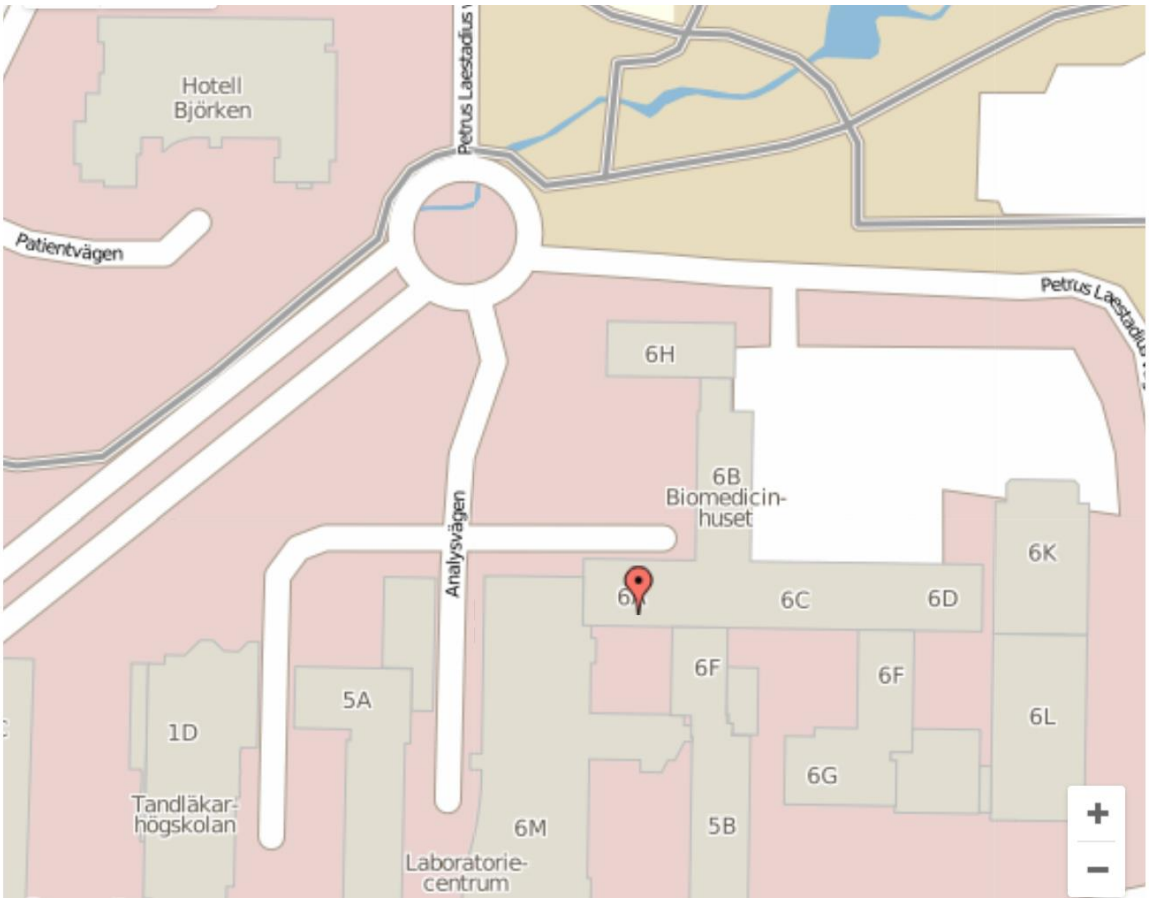
Mandatory exercises:

Labs, journal club and seminars are mandatory. Absence from lab course or other obligatory exercises due to illness should be reported to the course administrator immediately.

Organization
Due to the COVID-19 pandemic and according to the guidelines of Umeå University, all lectures and the article discussion will be conducted by Zoom. The laboratories and oral presentations will be held onsite. All presentations and additional resources will be uploaded to Canvas.

Oral presentations: Astrid Fagraeus Hörsal A 103 Unod R 1 (A103). Building 6A
Laboratory: The laboratories will be held onsite at the Red and Green labs (Address: Försörjningsvägen 2B. 6L building, entrance (målpunkt): J. Floor: 1. Door: J11.), following all the necessary safety guidelines to ensure social distancing and reduced virus spread. Guidelines for the lab work will be provided during the "Lab introduction and safety" lecture.

Campus map: http://www.umu.se/english/about-umu/campus-maps



Exams

Mid-term exam (Dugga): Thursday 23 September (8:00-10:00). Östra paviljongen (ÖP) (see map below). Not mandatory but recommended.

Exam: Friday 29 October. (time and location to be defined)

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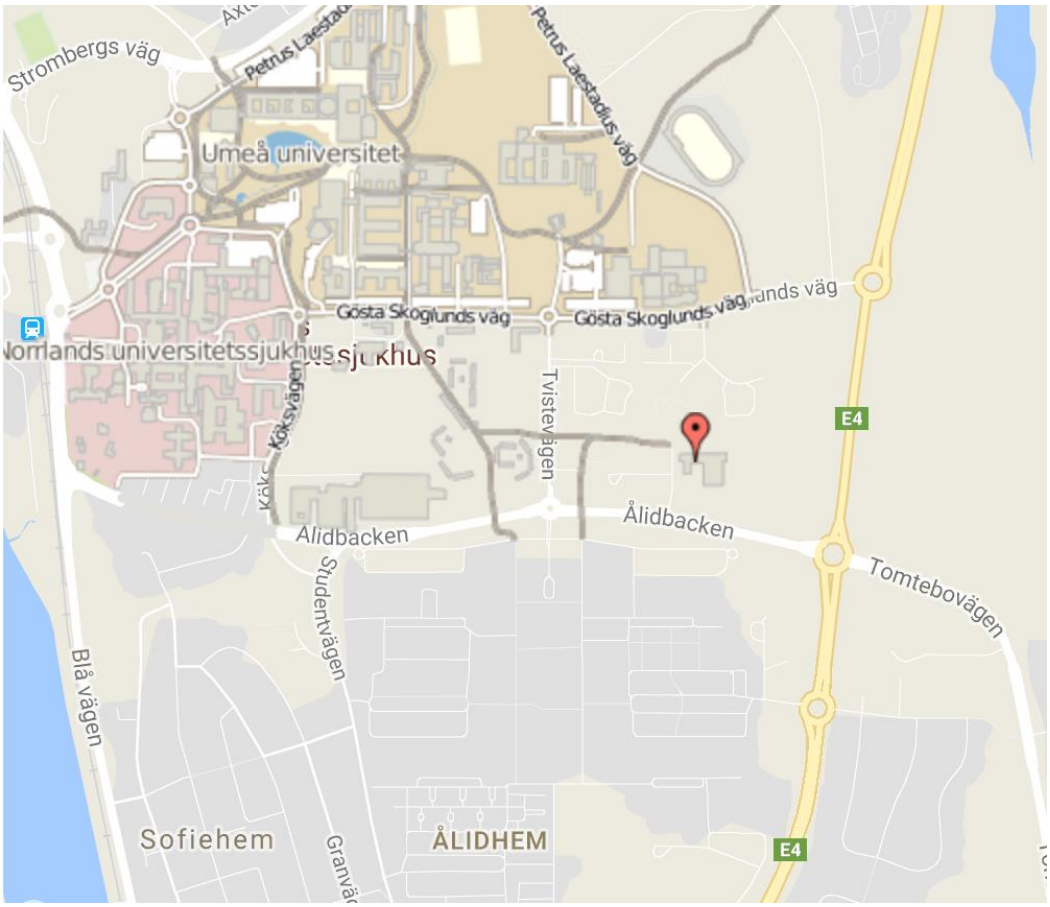
Re-exam: Saturday 11 December. (time and location to be defined)

IMPORTANT: Register no later than 10 working days before in Student web! (https://www.umu.se/en/student/my-studies/examination/)

You need to be the exam location at least 15 minutes before start. Bring valid photo ID!



Course goals (Expected study results, FSRs)

- Describe structure and function of prokaryotic and eukaryotic cells, and bacteriophages. Describe differences.
- Describe nutritional and energy requirements for cells (metabolism) and the principles underlying cell growth. How to measure cell growth.
- Describe the processes in the central dogma for information flow in the cell and provide examples of their regulation
- Describe the genetic material of bacteria and the mechanisms behind the origin of genetic variation and its consequences with regards to for example emergence and spread of antibiotic resistance and the evolution of pathogens
- Show theoretical knowledge and practical skills in basic microbiological and molecular methodology for safe work in a laboratory environment and avoidance of spreading microorganisms to the environment
- Within given time frames, search, collect, assess and critically interpret relevant scientific original literature in microbiology and molecular biology. Summarize and present results from original literature both in oral and written form.

Canvas – www.canvas.umu.se
Canvas is the learning platform used for this course. Here you can find information about the course, course materials and announcements.
Questions about Canvas:
https://www.umu.se/en/student/we-can-assist-you/it-services/canvas/

Student web
In Student Web you will find your study records, your student e-mail, the consent service to get access to student discounts, the degree application service and many of the services provided by the University Library (UB). More information is available at
https://www.umu.se/en/student/my-studies/how-to-use-the-student-web/

Zoom links: https://umeauniversity-my.sharepoint.com/:w:/g/personal/feca0003_ad_umu_se/EYFzYS1BEy5MuWkdap1W-qEBYOVp1jxtkYTc-Vc3xamxXQ?e=XIHVlf

OneNote questions and answers link:
https://umeauniversity-my.sharepoint.com/:o:/g/personal/feca0003_ad_umu_se/EltIlo10yOZKuTstjzqv03QBrOAGn7N3Mu7GFQGFAIPNSA?e=nnSdzU

Schedule Microbiology and Basic Molecular Biology 5MO103/3MB036, 31 August –1 November 2020

DATE	TIME	LEARNING ACTIVITY	TEACHER	ROOM	MANDATORY
Week 35					
Mon 30/8	9:00-12:00	Introduction to course and roll call.	FC	Zoom/Canvas	**Mandatory**
		1. Introduction to microbiology and molecular biology	FC	Zoom/Canvas	
		2. Microscopy	FC	Zoom/Canvas	
Tue 31/9	09:00-12:00	3. Microbial growth and methodology	FC	Zoom/Canvas	
		4. Cell structure	FC	Zoom/Canvas	
Wed 1/9	09:00-12:00	5. Central dogma I. Replication and DNA	FC	Recorded at Canvas	
		6. Central dogma II. Transcription and RNA	FC	Recorded at Canvas	
Thu 2/9	09:00-12:00	7. Central dogma III. Translation and proteins	FC	Recorded at Canvas	
		8. Central dogma IV. Regulation of translation, transcription, translation, growth	FC	Recorded at Canvas	
Fri 3/9		Self-study			
Week 36					
Mon 6/9	9:00-12:00	9. Regulation of gene expression	EB	Zoom/Canvas	
		10. Mutation	EB	Zoom/Canvas	
Tue 7/9	9:00-11:30	Central dogma seminar ***Seminar topics***	FC	Zoom/Canvas	

Wed 8/9	8:30-10:00	GROUP 1. Searching literature databases (ENGLISH)	LL	Zoom	
	10:30-12:00	GROUP 2. Söka i litteraturdatabaser (SVENSKA)	LL	Zoom	
Thu 9/9	8:30-10:00	GROUP 3. Searching literature databases (ENGLISH)	LL	Zoom	
	10:30-12:00	GROUP 4. Söka i litteraturdatabaser (SVENSKA)	LL	Zoom	
	14:00-15:30	11. Bacterial genetics and transfer of genetic materials	EB	Zoom/Canvas	
Fri 10/9	10:00-12:00	12. Microbial metabolism, Prokaryotic diversity and evolution ***Seminar topics***	EB	Zoom/Canvas	
	14:00-15:00	13. Reading scientific literature and writing abstracts	FC	Zoom/Canvas	
Week 37					
Mon 13/9	9.00-11:00	14. Antimicrobials, mechanisms of action	BS	Zoom/Canvas	
	13:00-15:00	16. Labs intro	BR/DC	Zoom/Canvas	**Mandatory**
Tue 14/9	9:00-12:30	Lab 1	BR, DC	Red/Green labs	**Mandatory**
Wed 15/9	Sport day				
Thu 16/9	9:00-15:30	Lab 1	BR, DC	Red/Green labs	**Mandatory**

Fri 17/9	9:00-15:30	Lab 1	BR, DC	Red/Green labs	**Mandatory**
Week 38					
Mon 20/9	9:00-11:00	17. Genetic engineering	DC	Zoom/Canvas	
Tue 21/9	13:00-15:00	18. Signal transduction, chemotaxis	DC	Zoom/Canvas	
Wed 22/9		Self-study midterm exam			
Thu 23/9	8:00-10:00	**Midterm exam**		ÖP	
Fri 24/9		Self-study - lab report writing			
Week 39					
Mon 27/9	9.00-12.00	19. Antimicrobial resistance	BS	Zoom/Canvas	
		20. Factors contributing to AMR, Risks to society	BS		
		antimicrobial resistance seminar part 1	BS		
	13.00-16.00	Self-study Antimicrobial resistance			
Tue 28/9	9:00-12:30	Lab 2	BR, DC	Red/Green labs	**Mandatory**
Wed 29/9	9:00-15:30	Lab 2	BR, DC	Red/Green labs	**Mandatory**
Thu 30/9	9:00-15:30	Lab 2	BR, DC	Red/Green labs	**Mandatory**
Fri 1/10	9.00-12.00	21. Alternatives to antimicrobials	BS	Zoom/Canvas	
		Seminar Antimicrobial resistance part 2	BS		
Week 40					

Mon 4/10	9:00-12:00	22. Biofilms and quorum sensing	JP	Zoom/Canvas	
		23. Microbial genomics	JP	Zoom/Canvas	
Tue 5/10	9:00-12:00	24. Eukaryotic microbes and differences from prokaryotes	EB	Zoom/Canvas	
		25. Viruses, phages, prions	EB	Zoom/Canvas	
Wed 6/10	9:00-11:00	26. Bacterial physiology, pathogenicity and host interactions	JP		
	13:00-14:30	15. Oral presentation	AB	Zoom/Canvas	
Thu 7/10		Self-study lab report, abstracts presentations		Zoom/Canvas	
Fri 8/10	9:00-11:00	Lab reports 1 and 2 seminar (questions and answers).	DC	Zoom/Canvas	
		Self-study (Journal club. Article reading)			
Week 41					
Mon 11/10		Self-study lab report, abstracts, presentations			
		Deadline lab report 1 and 2 (1st submission)			**Mandatory**
Tue 12/10	9:00-12:00	Article discussion all groups	FC/EB	Zoom/Canvas	**Mandatory**
Wed 13/10	13:00-15:00	27. Bioinformatics	JH	Zoom/Canvas	
Thu 14/10	13:00-16:00	28. Bioinformatics seminar	JH	Zoom/Canvas	
Fri 15/10	14:00	**Deadline seminar abstracts**			
Week 42					

Mon 18/10	12.00-15.00	Oral presentations 1/2	FC	A103	**Mandatory**
Tue 19/10	9:30-12.00	Oral presentations 3/4	FC	A103	**Mandatory**
Wed 20/10	9:30-12.00	Oral presentations 5/6	FC	A103	**Mandatory**
Thu 21/10	9:30-12.00	Oral presentations 7/8	FC	A103	**Mandatory**
Fri 22/10	9:30-12.00	Oral presentations 9/10	FC	A103	**Mandatory**
Week 43					
Mon 25/10		**Deadline lab report 1 and 2 (2nd submission)**			**Mandatory**
Tue 26/10		Self-study exam			
Wed 27/10		Self-study exam			
Thu 28/10		Self-study exam			
Fri 29/10	TBD	**Exam**		TBD	
Mon 1/11		**Deadline self-reflection**			**Mandatory**
Mon 8/11		**Deadline lab report 1 and 2 (3rd submission)**			**Mandatory**
Sat 11/12	TBD	**Re-exam**		TBD	