

Detailed teaching plan for the course
Protein Research Methods
Metode istraživanja proteina

Academic year:	2026/2027
Study:	Biotehnologija u medicini Istraživanje i razvoj lijekova
Course code:	IRL103
ECTS points:	5
Language of the course:	English and Croatian
Teaching hours of the course:	50 hours (12 lectures + 19 seminars + 20 practical exercises)
Prerequisites for the course:	None
Course leader and contact:	
Title and name:	Izv.prof.dr.sc. Nicholas J. Bradshaw Izv. prof. dr. sc. Željka Maglica
Address:	Fakultet biotehnologije i razvoja lijekova O-226, O-201
E-mail:	nicholas.b@biotech.uniri.hr , zeljka.maglica@biotech.uniri.hr
Consulting hours:	By arrangement over email
Associates & teaching hours:	Izv. prof. dr. sc. Nicholas J. Bradshaw 5 hours lectures + 12 hours seminars Izv. prof. dr. sc. Željka Maglica 6 hours lectures + 6 hours seminars Izv. prof. dr. sc. Christian A. Reynolds 1 hour lecture + 1 hour seminar Dr. sc. Beti Zaharija 20 hours practical exercises Dr. Antony S. K. Yerabham 2 hours seminars Matea Kršanac 40 hours practical exercises

Required literature:

Scientific papers will be supplied during the course.

Optional literature:

None

Course description:

Proteins are fundamental to how all biological systems function, being the core molecules encoded for by our DNA, and essential for biological processes varying from cell structure and system transduction, to immunity. Protein research is therefore at the heart of investigations in to biology, while most biotechnology approaches revolve around the creation of proteins in artificial systems.

This course will help students to understand both how we study and how we make use of proteins in biotechnology. In lectures, students will learn about experimental approaches to studying proteins, via cell biology, proteomics, biophysics and structural biology approaches. This will be supplemented by computer-based seminars in which students get experience of handling data and investigating proteins through bioinformatics. Students will also study individual proteins in group work. Finally, students will gain laboratory experience at producing, purifying and testing recombinant proteins from bacteria, using a combination of previously covered and novel experimental techniques.

Detailed teaching plan (lectures, seminars, exercises):

A. Lectures (12 hours):

- P1. Overview of protein structure and function (1 hour)
- P2. Electrophoresis (1 hour)
- P3. Investigating protein-protein interactions (1 hour)
- P4. Mass spectroscopy analysis (1 hour)
- P5. Expression systems for studying proteins (1 hours)
- P6. Purifying proteins (1 hour)
- P7. Phage display (1 hour)
- P8. Fluorescence-based techniques (1 hour)
- P9. Biophysical approaches to studying proteins (1 hour)
- P10. Structural biology methods for studying proteins (2 hours)
- P11. Single molecule techniques (1 hour)

B. Seminars (18 hours):

- S1 & S2. Protein bioinformatics (2 hours each, 4 hours total)
- S3 & S4. Paper break down 1 (1 hour each – 2 hours total)
- S5, S6, S7 & S8. Protein presentations (2 hours each, 8 hours total)
- S9. Revision of techniques (1 hour)
- S10. Membrane protein purification: from lab bench to industry (2 hours)
- S11. Protein presentation finale (1 hour)

C. Practical exercises (20 hours):

- V1. Bacterial transformation (2 hours)
- V2. Liquid stock cultures (1 hour)
- V3. Test protein induction and expression (3 hours)
- V4. Western blotting (4 hours)
- V5. Antibody staining, and final culture set up (4 hours)
- V6. Protein purification (4 hours)
- V7. Protein concentrations & SDS-PAGE (3 hours)

Final exam and grading:

Continuous assessment during the course (50%)

70% of the final grade will come from continuous assessment, divided as follows:

Mid-course exam (*Kolokvij*) - 10%

Seminar work – 20%

 Bioinformatics seminar classwork (S1-S2) - 5%

 Protein presentations (S6-S9) - 10%

 Web pages (S10) – 5%

Practical exercises – 20%

 Entrance exams - 10% (2% each)

 Laboratory journal – 10%

Final exam – 50%

The final exam is 50% of the final grade. The exam will consist of multiple-choice questions and questions requiring short answers.

Exam times:

The 1st exam sitting will be on **18.05.2027**, 12.30-14.00, O-030.

The 2nd exam sitting will be on **14.06.2027**, 9.00-10.30, O-268

The 3rd and 4th exam sittings will be by arrangement with the course leader

Format of the final grade (according to the *Pravilniku o studijima Sveučilišta u Rijeci*):

Students can obtain a maximum of 50% of grade points from continuous assessment in class, and 50% from the final exam. Students who, during the continuous part of the class, achieved:

- from 0 to 24.9% of grade points cannot take the final exam
- more than 25% of grade points can take the final exam

According to the total number of grade points achieved, the following final grades are awarded:

Percentage of skills & knowledge acquired	ECTS score	Numerical score
90% - 100%	A	Excellent (5)
75% - 89.9%	B	Very good (4)
60% - 74.9%	C	Good (3)
50% - 59.9%	D	Satisfactory (2)
0% - 49.9%	F	Unsatisfactory (1)

The final grade is the sum of the points achieved during classes and the points achieved on the final exam, and the passing grades are excellent (5), very good (4), good (3) and satisfactory (2).

Academic integrity:

Students are obliged to respect the principles of academic integrity and refer to the documents of the University of Rijeka: the Code of Ethics of the University of Rijeka and the Code of Ethics for Students. All students are asked to respond to the evaluation of the quality of the teaching work of teachers and associates, so that the teaching in this course can be improved based on the assessments and suggestions. Evaluation of classes through the ISVU system is carried out using the "Studomat" application on a form defined at the University of Rijeka level, and the results are anonymous. You can find more information about all aspects of this process in the Handbook for Study Quality of the University of Rijeka.

Timetable

Timetable

Week 1

Date	Group	Time	Location	Teaching	Teacher
26.04.2027	All	9:00-9:45	O-339	P1	Nicholas Bradshaw
		10:00-10:45	O-339	P2	Nicholas Bradshaw
27.04.2027	All	11:00-11:45	O-339	P3	Željka Maglica
	1	9:00-11:00	O-339	S1	Nicholas Bradshaw
	2+3	12:00-14:00			
28.04.2027	All	11:00-11:45	O-339	P4	Christian Reynolds
	1	9:00-11:00	O-339	S2	Nicholas Bradshaw
	2+3	12:00-14:00			
29.04.2027	All	9:00-9:45	O-339	P5	Nicholas Bradshaw
	All	10:00-10:45	O-339	S3	Nicholas Bradshaw
30.04.2027	All	9:00-9:45	O-339	P6	Nicholas Bradshaw
	All	10:00-10:45	O-339	S4	Christian Reynolds

Week 2

Date	Group	Time	Location	Teaching	Teacher
03.05.27	All	9:00-10:00	O-339	Mid-course exam	
	All	10:00-10:45	O-339	P7	Željka Maglica
04.05.27	All	11:00-11:45	O-339	P8	Nicholas Bradshaw
	All	12:00-14:00	O-339	S5	Bradshaw / Maglica
	1	9:00-10:30	O-353	V1	Beti Zaharija Matea Kršanac
	2	9:00-10:30	O-352		
	3	14:30-16:00	O-353		
05.05.27	All	9:00-10:30	O-339	P9	Željka Maglica
	All	11:00-12:30	O-339	S6	Bradshaw / Maglica
06.05.27	All	11:00-11:45	O-339	P10	Željka Maglica
	All	12:00-13:30	O-339	S7	Bradshaw / Maglica
	3	10:00-10:45	O-353	V2	Beti Zaharija Matea Kršanac
	1	14:00-14:45	O-352		
	2	14:00-14:45	O-353		
07.05.27	All	9:00-9:45	O-339	P11	Željka Maglica
	All	10:00-11:30	O-339	S8	Bradshaw / Maglica

Week 3

Date	Group	Time	Location	Teaching	Teacher
10.05.27	All	12:00-12:45	O-269	S9	Željka Maglica
	2	9:00-12:00	O-353	V3	Beti Zaharija Matea Kršanac
	3	9:00-12:00	O-352		
	1	13:00-16:00	O-353		
11.05.27	1	9:00-13:00	O-353	V4	Beti Zaharija Matea Kršanac
	2	9:00-13:00	O-352		
	3	14:00-18:00	O-353		
12.05.27	All	16:00-18:00	Zoom*	S10	Antony Yerabham
13.05.27	3	9:00-13:00	O-353	V5	Beti Zaharija Matea Kršanac
	1	9:00-13:00	O-352		
	2	14:00-18:00	O-353		
14.05.27	2	9:00-13:00	O-353	V6	Beti Zaharija Matea Kršanac
	3	9:00-13:00	O-352		
	1	14:00-18:00	O-353		

*Lesson over Zoom will be held using this link:

<https://uni-bremen.zoom-x.de/j/7470547643?pwd=TmVkckJkMithWXQrWXo4MU5hN2NoZz09>

Meeting ID: 747 054 7643

Passcode: bioyufe

Week 4

Date	Group	Time	Location	Teaching	Teacher
17.05.27	All	12:00-13:00	O-339	S11	Bradshaw / Maglica
	1	9:00-12:00	O-353	V7	Beti Zaharija Matea Kršanac
	2	9:00-12:00	O-352		
	3	13:00-16:00	O-353		
18.05.27	All	12:30-14:00	O-030	Final exam (1 st sitting)	