SVEUČILIŠTE U RIJECI
ODJEL ZA MATEMATIKU

Sveučilište u Rijeci •Odjel za matematiku
Radmile Matejčić 2 • 51 000 Rijeka • Hrvatska
T: (051) 584-650 • F: (051) 584-699
http://www.math.uniri.hr• e-adresa: math@math.uniri.hr

COURSE SYLLABUS

General information		
Course title	Design and analysis of experiments	
Study programme	Graduate course Discrete Mathematics and Its Applications	
Year of study	2nd	
Course status	Compulsory	
Course homepage	https://moodle.srce.hr/	
Language of instruction	English	
Credit values and modes of instruction	***ECTS credits / student workload***	6
	Hours (L+E+S)	30+15+15
Lecturer	***Name and surname***	Danijel Krizmanić
	Office	O-312
	Office hours	By appointment
	Phone number	584-664
	E-mail	dkrizmanic@math.uniri.hr
Teaching assistant	***Name and surname***	Emma Šepić
	Office	O-318
	Office hours	Wednesday, 9:00-10:00
	Phone number	584-682
	E-mail	emma.sepic@math.uniri.hr

1. COURSE DESCRIPTION

1.1. Course objectives

The main course objective is to get students familiar with the procedures for designing and analysing experiments and enable them to carry out these procedures in specific situations. For this purpose, it is necessary within the course to:

- describe basic principles and methods for designing experiments,
- define and analyse some standard experimental designs,
- describe and analyse a model for designs with one source of variation,
- describe and analyse contrasts,
- define and compare methods of multiple comparisons,
- analyse methods for checking model assumptions,
- analyse experiments with two or more crossed treatment factors,
- define and analyse complete block designs,
- update the knowledge about basic notions from design theory,
- describe and analyse basic notions in statistical design theory.

1.2. Course prerequisites

1.3. Learning outcomes

After completing this course, the students are expected to:

- describe and apply with understanding the basic principles and methods for designing and analysing experiments to particular examples in this field (A7, B7, E5, F5),
- analyse the model for designs with one source of variation (A7, B7, E4, F5),
- analyse and apply with understanding the methods of multiple comparisons (A7, B7, E4, F5),
- analyse models for two treatment factors (A7, B7, E4, F5),
- use the appropriate software package for solving problems in this field (A7, B7, E4, F5),
- analyse basic notions in statistical design theory (A7, B7, E4, F5),
- apply and use basic notions in statistical design theory to particular examples (A7, B7, E4, F5),
- mathematically prove validity of all procedures and formulas that are used within the course (A7, B7, E4, F5).

1.4. Course content

Basic principles and techniques for designing experiments. Planning experiments. Some standard experimental designs. Designs with one source of variation. Contrasts. Methods of multiple comparisons. Checking model assumptions. Experiments with two or more crossed treatment factors. Complete block designs. Statistical design theory.

1.5. Modes of instruction	☒ lectures ☒ seminars and workshops ☒ exercises ☒ e-learning ☐ field work	☒ independent work ☒ multimedia and the internet ☐ laboratory ☐ tutorials ☐ mentoring work ☒ consultative teaching ☐ other
1.6. Comments		

1.7. Student requirements

Students are required to actively participate in classes. They are required to achieve a certain number of points during the semester and to pass the final exam.

2. GRADING POLICY

2.1. Grading of students' work during the semester and on the final exam

Students' work will be evaluated and assessed during the semester and on the final exam. The total number of points a student can achieve during the semester is 70. To approach the final exam, students are required to achieve at least 50% of the total points during the semester, that is, 35 out of 70 points (with at least 15 points at the seminar). The maximum number of points that can be achieved on the final exam is 30, while the passing score is 50%. The final exam is an oral and/or written exam.

MIDTERM EXAMS (40 points)

During the semester 2 written midterm exams will be conducted. On each of these exams a student can achieve at most 20 points. If the necessity arises, there will be one make-up midterm exam, in the very end of the semester, on which a student can attempt to achieve a better score, replacing a bad score on only one of the above mentioned midterm exames. If a student decides to use the make-up midterm exam, the grade on the make-up exam will be considered as the final one for that exam, regardless whether it is better or worse than the grade the student was trying to repair.

SEMINAR PAPER (30 points)

Each student chooses one particular experiment, conducts it in accordance with the techniques and methods covered in the course, submits a written paper on the implementation of the experiment and the obtained results, and then presents it at seminars at the agreed time. A maximum of 30 assessment points can be achieved with such a seminar.

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FINAL EXAM (30 points)
The final exam is an oral and/or written exam and the maximum number of points that can be achieved is 30. Passing score is 50%.

2.2. Minimal requirements for access to the final exam / passing grade

ACTIVITY	MINIMAL NUMBER OF POINTS REQUIRED
Midterm exams	-
Seminar paper	15
TOTAL:	35
OTHER REQUIREMENTS:	

2.3. Final grade – grading scale

GRADE	POINTS
Excellent (5) , A	90% - 100%
Very good (4), B	75% - 89,9%
Good (3), C	60% - 74,9%
Sufficient (2), D	50% - 59,9%
Insufficient (1), F	0% - 49,9%

3. LITERATURE

3.1. Required literature

1. A. Dean, D. Voss, Design and Analysis of Experiments, Springer, 1999.
2. D.C. Montgomery, Design and Analysis of Experiments, 5th edition, J. Wiley, 2004.

3.2. Recommended literature

4. ADDITIONAL INFORMATION

4.1. Class attendance

Students are reqired to inform themselves about the lectures they did not attend. It is not tolerated to disturb classes and to use phones during the classes.

4.2. Informing students

All relevant course information will be posted on the course homepage. It is the student's personal responsibility to be regularly informed.

4.3. Other relevant information

Students are expected to have a high degree of independence and responsibility in their work. During the course, active learning will be present.

While performing the tasks specified within the course curriculum, students must represent their own work, and they are not allowed to use someone else's text as their own. Submitting without citation work that incorporates someone else's ideas is considered as stealing intellectual property and can be punished according to the regulations. Students should prepare their work according to the instructions given during the classes.

4.4. Assessment of quality and performance for the course

Quality of the lectures is assessed in accordance with the regulations of the Department of Mathematics and the University of Rijeka. At the end of the semester, an anonymous survey will be conducted, in which

students will evaluate the quality of the lectures. Additionally, the department will conduct the analysis of the examination results.

4.5. Examination period

Final exam (1st examination period)	February 9, 2022
Final exam (2nd examination period)	February 23, 2022
Final exam (3rd examination period)	March 21, 2022

5. COURSE OUTLINE*

DATE	*TIME*	*MODE OF INSTRUCTION*	*TOPIC*	*GROUP*	*LECTURE HALL*
5.10.2021.	*9:15-12:00*	*L*	*Introduction to the Course. Basic principles and techniques. Planning experiments*	*All*	*O-355*
12.10.2021.	*9:15-12:00*	*L*	*Designs with one source of variation*	*All*	*O-355*
13.10.2021.	*12:15-14:00*	*E*	*Designs with one source of variation*	*All*	*O-364*
19.10.2021.	*9:15.12:00*	*L*	*Contrasts*	*All*	*O-355*
26.10.2021.	*9:15-12:00*	*L*	*Methods of multiple comparisons*	*All*	*O-355*
2.11.2021.	*9:15-12:00*	*L*	*Checking model assumptions*	*All*	*O-355*
3.11.2021.	*12:15-14:00*	*E*	*Contrasts. Methods of multiple comparisons*	*All*	*O-364*
9.11.2021.	*9:15-12:00*	*L*	*Experiments with two crossed treatment factors*	*All*	*O-355*
10.11.2021.	*12:15-14:00*	*E*	*Checking model assumptions*	*All*	*O-364*
16.11.2021.	*9:15-12:00*	*L*	*Experiments with several crossed treatment factors*	*All*	*O-355*
17.11.2021.	*12:15-14:00*		*First Midterm Exam*	*All*	*O-364*
23.11.2021.	*9:15-12:00*	*L*	*Complete block designs*	*All*	*O-355*
24.11.2021.	*12:15-14:00*	*E*	*Experiments with two crossed treatment factors*	*All*	*O-364*
30.11.2021.	*9:15-12:00*	*L*	*Statistical design theory I*	*All*	*O-355*
1.12.2021.	*12:15-14:00*	*E*	*Experiments with several crossed treatment factors*	*All*	*O-364*
7.12.2021.	*9:15-12:00*	*L*	*Statistical design theory II*	*All*	*O-355*
8.12.2021.	*12:15-14:00*	*E*	*Statistical design theory I*	*All*	*O-364*
14.12.2021.	*9:15-12:00*	*S*	*Student presentations*	*All*	*O-355*
15.12.2021.	*12:15-14:00*	*E*	*Statistical design theory II*	*All*	*O-364*
21.12.2021.	*9:15-12:00*	*S*	*Student presentations*	*All*	*O-355*
11.1.2022.	*9:15-12:00*	*S*	*Student presentations*	*All*	*O-355*

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12.1.2022.	***12:15-14:00***		***Second Midterm Exam***	***All***	***O-364***
18.1.2022.	***9:15-12:00***	***S***	***Student presentations***	***All***	***O-355***
19.1.2022.	***12:15-14:00***		***Make-up Midterm Exam***	***All***	***O-364***
25.1.2022.	***9:15-12:00***	***S***	***Student presentations***	***All***	***O-355***

**Minor changes are possible.*

L – lectures
E – exercises
S – seminars