UNIVERSITY OF TUZLA UNIVERZITET U TUZLI

SYLLABUS

1. Course title:

Dynamics of Mechatronic Modules

2. Code:

3. Cycle of study:

(I)

4. ECTS credits:

3

5. Type of course:

Elective

6. Prerequisites:

No prerequisites

7. Class restrictions:

No restrictions

8. Duration / semester(s):

1	5

9. Weekly contact hours and student workload:

Semester (1)	5	Semester (2)		(for two-semester courses)	Workload: (hours)
9.1. Lectures	2			Classes:	33,75
9.2. Seminars	0			Individual work:	55,5
9.3. Laboratory / Practice classes	1			In total:	89,25

10. Faculty:

Faculty of Mechanical Engineering

11. Department/study program:

Mechatronics

12. Lecturer:

Mirza Bećirović, PhD

13. Course aims:

Aim is to acquire fundamental knowledge to solve engineering problems in the desgin of mechatronic modules

14. Learning outcomes:

At the end of the semester/course, successful students who have continuously fulfilled their obligations throughout the entire teaching period will be able to: demonstrate fundamental knowledge in the field of dynamic simulations of mechatronic modules.

15. Course content:

I – Introductory lecture: introducing students to the course syllabus, exam requirements, etc.
II – Description of mechatronic modules (mechanical, electronic, hydraulic, and pneumatic)
III – Concept of dynamic system models, classification of models
IV – Model structure selection, development of mathematical models, mathematical description of mechatronic module dynamics
V – Model structure selection, development of mathematical models, mathematical description of mechatronic module dynamics (continued)
VI – Development of simulation models
VII – Development of simulation models (continued)
VIII – Midterm knowledge assessment
IX – Model validation and verification techniques
X – Application of simulation in identifying the dynamics of mechatronic modules
XI – Dynamic analysis of mechatronic modules
XII – Simulation methods, tools, and software
XIII – Design and construction of a mechatronic module
XIV – Examples of mechatronic modules
XV – Midterm knowledge assessment

16. Learning methods:

- **Lectures – Theoretical lectures with active two-way communication between students and the professor; student attendance is mandatory.**
- **Auditory exercises – Solving problems and tasks related to the course topics, with active two-way communication between students and the teaching assistant; attendance is mandatory.**
- **Written exams – Covering both theoretical questions and problem-solving tasks.**
- **Seminar/graphical assignments – Independent student work focused on solving assigned problems.**
- **Consultations – Clarifying any uncertainties related to course topics.**

17. Assessment methods:

- **Presentation of seminar/graphical assignments – The student evaluates their work in front of the professor/teaching assistant by answering relevant questions.**
- **Written exam (theory and problems) – The student solves given questions/tasks within a specified time, related to the course content.**
- **Laboratory exercise report – Submission of a report on activities conducted during specific laboratory exercises, along with answers to the assistant's questions.**
- **Final exam – Oral examination in response to questions posed by the professor.**
- **Make-up exam (written) – Solving assigned questions/tasks within a specified time, related to the course content.**
- **Make-up exam (oral) – Oral answers to the professor's questions.**

Grading System: (5) + (10) + (40) + (45) = 100 points
Grading scale is as follows:

Grade	Description	Letter/Points
5 (five)	Does not meet minimum criteria	F <54
6 (six)	Meets minimum criteria	E 54-64
7 (seven)	Generally good, but with significant shortcomings	D 65-74
8 (eight)	Average, with noticeable errors	C 75-84
9 (nine)	Above average, with some errors	B 85-94
10 (ten)	Exceptional with no or minor errors	A 95-100

18. Assessment components:

Assessment will be based on the following activities:
- **Class attendance = 0 points**
- **Seminar/Graphical assignment = 20 points**
- **Problem-solving tests (2×15) = 30 points**
- **Theoretical tests (2×15) = 30 points**
- **Pre-exam obligations = 80 points**
- **Final exam = 20 points**

Total = 100 points

19. Mandatory reading list:

1. Alciatore, D.G., Histand, M.B.: Introduction to Mechatronics and Measurment System, Mc Graw-Hill, 2003.
2. Glöckler, M.: Simulation mechatronischer Systeme, Grundlagen und Beispiele für Matlab und Simulink, Springer Verlag, 2017.
3. Šarić, B., Osmanović A.: Mehatronički sistemi, aktuatori, Mašinski fakultet u tuzli, Univerzitet u Tuzli, 2016.

20. Additional reading list:

Brychta, P., Müller, K.: Technische Simulation, Vogel Fachbuch, Vogel Buchverlag, 2004.

21. Web sources:

https://ctms.engin.umich.edu/CTMS/index.php?aux=Home

22. Applicable from the academic year:

23. Adopted in the Faculty/Academy session: