SYLLABUS

1. Course title:

INFRARED THERMOGRAPHY

2. Code:

3. Cycle of study:

I

4. ECTS credits:

3

5. Type of course:

Elective

6. Prerequisites:

None

7. Class restrictions:

None

8. Duration / semester(s):

1 VIII

9. Weekly contact hours and student workload:

	Semester (1)	Semester (2)	(for two-semester courses)	Workload: (hours)
9.1. Lectures	2		Classes:	22,50
9.2. Seminars	0		Individual work:	56,33
9.3. Laboratory / Practice classes	0		In total:	78,83

10. Faculty:

Faculty of Mechanical Engineering

11. Department/study program:

Energetics and Thermal-fluid engineering

12. Lecturer:

PhD, Fikret Alić, Full Professor

13. Course aims:

To introduce students to the basic concepts and methods in thermography, the importance of thermography, methods of application and processing of thermograms using modern software. Active and passive thermography in correlation with numerical simulation should complete the understanding of processes and phenomena in thermofluid technology.

14. Learning outcomes:

After completing the course, students will be able to:-
analyze and evaluate which thermography method to apply in a real example
- create a thermogram and identify certain anomalies in it
- compare the results obtained by simulation software with a thermogram obtained by a thermal camera
- examine certain energy machines and recognize anomalies in their operation

15. Course content:

1.Introduction to infrared thermography. Temperature measurement options, advantages and disadvantages of thermography.
2. Electromagnetic spectrum and basics of thermal radiation.
3. Visible and infrared part of the spectrum. Radiation laws. Areas of application of thermography.
4. Qualitative and quantitative thermography. Passive and active thermography.
5. Application of passive and active thermography.
6. Thermogram and thermogram analysis techniques.
7. Knowledge test.
8. Procedure for determining the surface emissivity factor. Tools for processing thermograms.
9. Environmental influence - reflections of radiation from the environment. Thermographic measurement procedure.
10. Object-target of thermographic measurement. Apparent reflected temperature.
11. Types of thermographic cameras. Parameters affecting the thermogram.
12. Thermographic report.
13. 3D Thermography.
14. Thermography: Machine components and systems. Non-destructive testing. Research and development.
15. Knowledge test.

16. Learning methods:

The following methods will be used in the course of the course in order to effectively conduct classes and achieve the set objectives of the course and student competencies:
• lectures with the use of multimedia tools with active participation and discussions of students,
• presentation in a real environment.

17. Assessment methods:

The concept of knowledge assessment is based on continuous work with students throughout the semester. Knowledge assessment methods include: assessment of both individual and group activities during the semester, preparation of a seminar paper, and final knowledge assessment in written and/or oral form. This ensures equal treatment (written and/or oral knowledge assessment) for all students with different affinities.

Grade	described	by letter	points
5 (five)	Does not meet minimum criteria	F;FX	<54
6 (six)	meets the minimum criteria	E	54 -64
7 (seven)	Generally good, but with significant flaws	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 success without mistakes or with minor mistakes	A	95-100

18. Assessment components:

The exam grade is based on the total number of points that the student has earned by completing the pre-exam requirements and taking the exam and contains a maximum of 100 points, according to the following scale
Student obligations
Points
Lecture attendance 5
Test I 25
Test II 25
Total pre-exam requirements 55
Final exam 25 - 45

19. Mandatory reading list:

1.Andrassy A., Boras I., Švaić S. (2010), Osnove termografije s primjenom, Zagreb, FSB
2.Holman J.P. (2008), Heat Transfer, International Student Edition, Mc Graw-Hill.
3. F.Alić (2019), 2D/3D Termografija, Tuzla, Soreli

20. Additional reading list:

21. Web sources:

http://www.energy.gov/energysaver/articles/thermographic-inspections

22. Applicable from the academic year:

23. Adopted in the Faculty/Academy session: