# SYLLABUS

**1. Course title:**

RENEWABLE ENERGY SOURCES

**2. Code:**

**3. Cycle of study:**

I

**4. ECTS credits:**

5

**5. Type of course:**

Mandatory

**6. Prerequisites:**

None

**7. Class restrictions:**

None

**8. Duration / semester(s):**

I VI

**9. Weekly contact hours and student workload:**

| | Semester (1) | Semester (2) | (for two-semester courses) | Workload: (hours) | |
|---|---|---|---|---|---|
| 9.1. Lectures | 2 | | | Classes: | 45,00 |
| 9.2. Seminars | 1 | | | Individual work: | 95,83 |
| 9.3. Laboratory / Practice classes | 1 | | | In total: | 140,83 |

**10. Faculty:**

Faculty of mechanical engineering

**11. Department/study program:**

Energetics and thermo-fluid engineering

**12. Lecturer:**

dr.sc. Indira Buljubašić, Prof.

**13. Course aims:**

• Understand the role of renewable energy sources in achieving sustainable development. Become familiar with the basic principles and methods of energy conversion from various renewable sources. Understand the concept of diversification in the use of renewable energy sources, taking into account the individual advantages and disadvantages of each source.

**• Become familiar with the positive effects of using renewable energy sources, primarily in terms of reduced negative impacts on the environment. Become familiar with the economic and sociological effects that the use of our own renewable energy sources has on society.**

## 14. Learning outcomes:

**• Ability to independently or in a team analyze problems caused by the excessive use of fossil fuels, and offer appropriate solutions in the form of more intensive use of renewable energy sources.**
**• The ability to independently or in a team project new solutions in the form of diversification of the use of renewable energy sources.**

## 15. Course content:

**Dynamics of teaching units by week:**
**1. General about energy, renewable energy sources and their role in achieving sustainable development locally, regionally and globally.**
**2. Solar energy. Availability and ways of using solar energy.**
**3. Solar power plants. Working principle and classification.**
**4. Wind energy. Availability and method of using wind energy.**
**5. Wind power plants. Working principle and classification.**
**6. Geothermal energy. Availability and method of utilization of geothermal energy.**
**7. Geothermal power plants. working principle and classification.**
**8. Energy from biomass, methods of utilization.**
**9. Biomass energy plants.**
**10. Energy of water streams, seas and oceans.**
**11. Hydrogen energy.**
**12. Energy from the environment. Test with assignments.**
**13. The future of renewable energy sources, new technologies and materials.**
**14. Positive effects on the environment as a result of the use of renewable energy sources.**
**15. Economic and sociological effects of the use of renewable energy sources.**

## 16. Learning methods:

**Lectures using multimedia tools, active learning techniques with active participation and discussions of students. Preparation of assignments and preparations for other assigned activities as part of the exercises. In addition to the above, students have access to consultations with the subject teacher/associate during lecture/exercise periods as well as during certain consultation periods.**

## 17. Assessment methods:

**Pre-exam requirements - In the second part of the semester, a test of assignments is taken, and if at least 50% of the points are scored on the test, the test is passed. If the assignments are not passed on the test, the test is taken during the final exam period and the expected part of the points is transferred and scored during the final exam period. As part of the pre-exam requirements, students are required to prepare an individual seminar paper that includes a brief calculation of the availability of renewable energy sources for the construction of a plant at a given location. The seminar paper must be sent to an assistant for review, who helps with advice and review, and when the work is completed, the assistant scores it and then the student can present and defend it in front of the professor. In order for the seminar to be considered completed, the student must receive at least 50% of the points expected for the preparation, and at least 50% of the points expected for the defense. The student can also earn some points based on attendance at classes and exercises.**
**Final exam - The exam consists of a part in which assignments are completed (for those who did not pass the test) and a theoretical part. The exam is considered passed if a minimum of 50% of points are achieved in the assignments and a minimum of 50% of points in the theory.**

**Scoring scale:**

| Rating | Described | Verbally | Points |
|---|---|---|---|
| 5 (five) | Does not meet the minimum criteria | F, FX | < 54 |
| 6 (six) | Meets the minimum criteria of | 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:

**Pre-exam requirements (points):**
**-Lecture attendance 2.5**
**-Exercise attendance 2.5**
**-Seminar paper 15 writing + 15 defense = 30**
**-Test with tasks 20**

**Pre-exam requirements - total points: 55**
**Final exam- total points 45**
**TOTAL: 100 points**

### 19. Mandatory reading list:


**1. Buljubašić I., Osmić M.: Elektrane i okolina, Soreli d.o.o. Tuzla, 2020.**
**2. Đonlagić M.: Energija i okolina, Tuzla, 2005.**
**3. Zeljković Č.: Obnovljivi izvori energije-solarna energetika, ETF Banja luka, 2018.**


### 20. Additional reading list:


**1. Z.Zavargo: Održive tehnologije, TEMPUS, Novi Sad, 2013.**
**2. P. Breeze: Power Generation Technologies, Elsevier, 2019.**
**3. G.Boyle: Renewable Energy- power for a sustainable future, Oxford, (2004) 2012.**
**4. M.Ebrahimi: Power Generation Technologies- Foundations, Design and Advances, Elsevier, 2023.**
**5. Y.Zang et.al: Advances in ultra low emission control technologies for coal-fired power plants, Elsevier, 2019.**


### 21. Web sources:

**https://www.iea.org/**
**https://commission.europa.eu/topics/energy_hr**
**https://www.energy-community.org/**

### 22. Applicable from the academic year:

**2025/26.**

### 23. Adopted in the Faculty/Academy session: