Course ID: HFHxxx	**Course name:** **MODERN SYSTEMS FOR ENERGY CONVERSION AND STORAGE**		
Cycle: SECOND	**Year: FIRST**	**Semester: I**	**ECTS credits: 4**
Course status: ELECTIVE		**Total course hours: 60** Lectures: 30 Laboratory: 30	

Teaching participants:	**Teachers and associates with expertise in the field to which the subject belongs**
Prerequisite for enrollment:	-
Course aims:	Introduction of basic knowledge about modern systems for energy conversion and storage.
Thematic course units:	1.Definitions, basic types of storage and conversion systems 2. Electrochemical systems for hydrogen production 3. Membrane separation 4. Fuel cells – principles of operation. 5. Fuel cells – contemporary systems 6. Fuel cells – challenges 7. Alkali metal based thermoelectrochemical convertors. 8. Batteries – principles of operation. 9. Batteries – basic parameters. 10. Primary and secondary batteries – contemporary systems. 11. Lithium-ion batteries. 12. Metal-air batteries, lithium-sulfur batteries, fluoride batteries. 13. Supercapacitors
Learning outcomes:	Students will have knowledge in construction, principle of operation and application of different energy storage and conversion systems. **Knowledge:** Acquired knowledge on energy conversion and storage systems. **Skills:** Students will be able to prepare and characterize different energy storage and conversion systems. **Competences:** Application of specific knowledge in other branches of chemistry.
Teaching methodology:	Lectures (Oral presentation and interactive teaching) Laboratory exercises

Assessment methods and grading system[1]:

Grading criteria		
Criteria	Maximal score	Required score
1. Class attendance	5	3
2. Class activities	15	8
3. Midterms	2 × 20	2 × 11
4. Final exam	40	22
Total	100	55

Scores and grading		
Score	Grade (B&H)	Grade (ECTS)
< 55	5	F, FX
55–64	6	E
65–74	7	D
75–84	8	C
85–94	9	B
95–100	10	A

Literature[2]:

Mandatory literature:

1. R.-S. Lui, L. Zhang, X. Sun, H. Lui, J. Zhang, Electrochemical Technologies for Energy Storage and Conversion, Wiley-VCH 2011
2. J. Garcia-Martinez, Nanotechnology for the Energy Challenge, Wiley-VCH 2010
3. K. Ozawa, Lithium Ion Rechargeable Batteries - Materials, Technology, and New Applications, Wiley-VCH 2009
4. D. Stolten, Hydrogen and Fuel Cells - Fundamentals, Technologies and Applications, Wiley-VCH 2010

[1] The grading structure for each subject is determined by the Council of the organizational unit before the beginning of the academic year in which the subject is taught as per Article 64, paragraph 6 of the Law on Higher Education of Sarajevo Canton

[2] The Senate of the higher education institution, as an institution, or the Council of the organizational unit of the higher education institution, as a public institution, determines by a special decision, which is published on its website before the beginning of the academic year obligatory, mandatory and recommended textbooks and manuals, as well as other recommended literature based on which exams are prepared and taken as per Article 56, paragraph 3 of the Law on Higher Education of the Sarajevo Canton