



Basic Information and List of Courses

Data Science and Artificial Intelligence (DSAI) at the Faculty of Electrical Engineering, University of Sarajevo

The website will soon be available at <http://dsai.etf.unsa.ba>.

BASIC INFORMATION

Program name: "*Data Science and Artificial Intelligence*" (DSAI)

Type and level: The program is designed as a **first-cycle Bachelor's level program** for students from Bosnia and Herzegovina, Southeast European countries, the European Union, and other global regions.

Objective: The objective of the Bachelor's program is to equip students with specialised theoretical and practical knowledge within the subject area, while also providing insights into comparative advantages and exemplary practices from diverse countries. Education in this field involves acquiring fresh knowledge.

According to „*Study regulations for the first and second cycle of studies, integrated, specialist, and professional studies at the University of Sarajevo*“ (from September 27th, 2023), Article 12, cyclic, professional, and specialist studies can be realised as a) **regular studies**, and b) **part-time studies**.

Regular studies are organised and conducted with the full schedule of hours specified by the study program. Part-time studies are organised and conducted as a special form of study adapted by the implementation plan for students who are unable to attend regular studies. For part-time students, classes are organised with the full schedule of hours specified by the study program, with at least one-third of the classes conducted in the classroom, while the rest can be organized in the classroom, remotely, or through a combination of these two models.

The "*Data Science and Artificial Intelligence*" program is organized as **regular and part-time studies** in a way that a portion of the part-time program is arranged as **distance learning**. This flexibility in program organization allows students to

choose between traditional full-time studies and part-time studies that include online (distance) learning.

Regular studies enable students to attend classes on campus, interact with professors and peers, and establish direct engagement with the learning process. On the other hand, part-time studies with elements of distance learning provide greater flexibility, especially for those who have work commitments or other obstacles that make it difficult to be present on campus. This type of study is also suitable for international students. This combination of traditional and online learning enhances the accessibility of high-quality education and enables us to attract students from diverse geographic areas and backgrounds. This approach reflects our commitment to diversity and inclusivity in education and supports our mission to shape future leaders and contribute to society through higher education and research.

Program administrator: The holder of the Bachelor's study is the Faculty of Electrical Engineering, with all its capacities (personnel, space, IT infrastructure, and others).

THE LIST OF COURSES

The Bachelor's program in Data Science and Artificial Intelligence at the Faculty of Electrical Engineering, University of Sarajevo, conducted in **English**, is designed to span **three academic years**. It comprises a total of **thirty-five courses**, or **forty-six including all elective courses**. A significant portion of the instruction involves practical assignments and analyses in the form of exercises, contributing significantly to the overall assessment.

The program includes thirty-five compulsory courses, ensuring a comprehensive foundation in the field. Additionally, a diverse array of elective courses are made available, allowing students to select four elective courses during the final semester to tailor their education to their specific interests.

Upon completing the program and successfully passing the required exams, students embark on the culminating phase, involving the formulation, application, and defense of their Bachelor's thesis. The bachelor's thesis is valued at 9 ECTS credits.

Tables below present a list of subjects with their respective ECTS credits and contact hours.

Semester: First semester

List of Courses								
No.	Course name	Course Code	ECTS	H/S	L	T	E	S
1.	Fundamental Concepts of Artificial Intelligence	ETF FCAI I-1150	5	50	30	0	20	0
2.	Programming in Python	ETF PP I-1180	8	80	50	0	30	0
3.	Mathematics for AI I	ETF MAI-I I-1170	7	70	50	20	0	0
4.	Introduction to Autonomous Systems	ETF IAS I-1150	5	50	30	0	20	0
5.	Foundations of Innovation	ETF FI I-1130	3	30	30	0	0	0
6.	Business English	ETF BE I-1120	2	20	0	0	0	20
Total:			30	300				

Legend:

H/S - Total number of hours

L - Lectures

E - Exercises

T - Tutorials

S - Seminar

Semester: Second semester

List of Courses								
No.	Course name	Course Code	ECTS	H/S	L	T	E	S
1.	Practical Application of Artificial Intelligence	ETF PAAI I-1250	5	50	30	0	20	0
2.	Algorithms and Data Structures I	ETF ADS-I I-1250	5	50	30	0	20	0
3.	Probability and Statistics for AI	ETF PSAI I-1250	5	50	30	10	10	0
4.	Mathematical Logic	ETF ML I-1250	5	50	30	20	0	0
5.	Mathematics for AI II	ETF MAI-II I-1270	7	70	40	30	0	0
6.	Financing of Innovation	ETF FI I-1230	3	30	30	0	0	0
Total:			30	300				

Legend:

H/S - Total number of hours

L - Lectures

E - Exercises

T - Tutorials

S - Seminar

Semester: Third semester

List of Courses								
No.	Course name	Course Code	ECTS	H/S	L	T	E	S
1.	Artificial Intelligence	ETF AI I-2350	5	50	30	0	20	0
2.	Algorithms and Data Structures II	ETF ADS-II I-2350	5	50	30	0	20	0
3.	Introduction to Data Analysis and Visualisation	ETF IDAV I-2350	5	50	30	0	20	0
4.	Mathematics for AI III	ETF MAI-III I-2370	7	70	50	20	0	0
5.	Basic Scientific and Soft Skills	ETF BSSS I-2330	3	30	0	0	0	30
6.	Machine Learning: Supervised Techniques	ETF ML-ST I-2350	5	50	30	0	20	0
Total:			30	300				

Legend:

H/S - Total number of hours

L - Lectures

E - Exercises

T - Tutorials

S - Seminar

Semester: Fourth semester

List of Courses								
No.	Course name	Course Code	ECTS	H/S	L	T	E	S
1.	Seminar in AI	ETF SAI I-2440	4	40	0	0	0	40
2.	Computational Data Analytics	ETF CDA I-2450	5	50	30	0	20	0
3.	Formal Models	ETF FM I-2450	5	50	30	0	20	0
4.	Numerical Optimization	ETF NO I-2460	6	60	40	0	20	0
5.	Machine Learning: Unsupervised Techniques	ETF ML-UT I-2450	5	50	30	0	20	0
6.	Machine Learning and Pattern Recognition	ETF MLPR I-2450	5	50	30	0	20	0

	Total:		30	300				
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Legend:

H/S - Total number of hours

L - Lectures

E - Exercises

T - Tutorials

S - Seminar

Semester: Fifth semester

List of Courses								
No.	Course name	Course Code	ECTS	H/S	L	T	E	S
1.	Applied AI	ETF AAI I-3570	7	70	0	0	0	70
2.	Learning from User-Generated Data	ETF LUGD I-3550	5	50	30	0	20	0
3.	Dynamic Modeling and Simulation	ETF DMS I-3550	5	50	30	0	20	0
4.	Responsible AI	ETF RAI I-3530	3	30	0	0	0	30
5.	Robotics Fundamentals	ETF RF I-3550	5	50	30	0	10	10
6.	Reinforcement Learning	ETF RL I-3550	5	50	30	0	20	0
	Total:		30	300				

Legend:

H/S - Total number of hours

L - Lectures

E - Exercises

T - Tutorials

S - Seminar

Semester: Sixth semester

List of Courses								
No.	Course name	Course Code	ECTS	H/S	L	T	E	S
1.	Spectral Analysis and AI	ETF SAAI I-3630	3	30	20	0	10	0
2.	Elective course 1		5	50	30	0	20	0
3.	Elective course 2		5	50	30	0	20	0
4.	Elective course 3		5	50	30	0	20	0
5.	Elective Seminar		3	30	0	0	0	30
6.	Bachelor's Thesis	ETF BT I-3690	9	90	0	0	0	0

	Total:		30	300				
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Legend:

H/S - Total number of hours

L - Lectures

E - Exercises

T - Tutorials

S - Seminar

List of Elective Courses								
No.	Course name	Course Code	ECTS	H/S	L	T	E	S
1.	Multimedia Systems	ETF MS I-3650	5	50	30	0	20	0
2.	Functional Programming	ETF FP I-3650	5	50	30	0	20	0
3.	Introduction to Natural Language Processing	ETF INLP I-3650	5	50	30	0	20	0
4.	Introduction to Distributed Systems and Cloud Computing	ETF IDSCC I-3650	5	50	30	0	20	0
5.	RoboCup@Home	ETF RCH I-3650	5	50	30	0	20	0
6.	Introduction to the Theory of Computation	ETF ITC I-3650	5	50	30	0	20	0
7.	Databases Systems	ETF DS I-3650	5	50	30	0	20	0
8.	Embedded Systems	ETF ES I-3650	5	50	30	0	20	0
9.	Computational Geometry	ETF CG I-3650	5	50	30	0	20	0
10.	Information Theory	ETF IT I-3650	5	50	30	0	20	0

Legend:

H/S - Total number of hours

L - Lectures

E - Exercises

T - Tutorials

S - Seminar

List of Elective Seminars								
No.	Course name	Course Code	EC TS	H/S	L	T	E	S
1.	Entrepreneurship	ETF E I-3630	3	30	0	0	0	30
2.	AI in Marketing and Sales: Understanding Professional Users	ETF AIMS-UPS I-3630	3	30	0	0	0	30
3.	Data Protection and Privacy Regulation	ETF DPPL I-3630	3	30	0	0	0	30

4.	Societal Impact of AI	ETF SIAI I-3630	3	30	0	0	0	30
5.	Intellectual Property Fundamentals	ETF IPF I-3630	3	30	0	0	0	30

Legend:

H/S - Total number of hours

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E - Exercises

T - Tutorials

S - Seminar

Qualifications obtained upon program completion

Students who fulfill all the obligations set out in the curriculum of a three-year Bachelor's degree in „*Data Science and Artificial Intelligence*“ receive the professional title:

Bachelor of Engineering – Data Science and Artificial Intelligence.

The diploma will be issued in Bosnian language and English.

A person with a degree is a person who is qualified to work on complex jobs in a wide range of career opportunities in data science and artificial intelligence, in areas such as data analysis, machine learning, data engineering, data science consulting, research, and more.