COURSE DESCRIPTION CARD - SYLLABUS

Course name
Developing Data Science Applications [S1DSwB1>TADS]

Course

Field of study
Data Science in Business

Year/Semester
2/3

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
0

Other
0

Tutorials
30

Projects/seminars
0

Number of credit points

5,00

Coordinators

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Lecturers

Prerequisites

Students should have programming skills in Python, including procedural and object-oriented programming, working with data structures, file handling, and task automation. Basic knowledge of data analysis, code testing, and debugging is also required.

Course objective

Students should have programming skills in Python, including procedural and object-oriented programming, working with data structures, file handling, and task automation. Basic knowledge of data analysis, code testing, and debugging is also required.

Course-related learning outcomes

Knowledge:
Describes the architecture of web applications in Python and the principles of operation of frameworks like Flask, FastAPI, and Django in the context of Data Science [DSB1_W05].

Characterizes methods for creating and integrating REST APIs and mechanisms for user authorization and authentication in web applications [DSB1_W03].
Explains the process of deploying Data Science applications in a cloud environment and the principles of testing and debugging them [DSB1_W07].

Skills:
Designs and implements web applications for Data Science using frameworks like Flask, FastAPI, and Django [DSB1_U02].
Creates REST APIs, handles HTTP requests, and integrates applications with databases and external services [DSB1_U09].
Uses Jinja2 templates, forms, and authentication mechanisms to create interactive web applications [DSB1_U08].
Implements data visualizations and interactive dashboards in web applications using the Dash library [DSB1_U04].
Tests and deploys web applications in a cloud environment, ensuring optimization and security [DSB1_U07].

Social competences:
Collaborates in development teams, integrating Data Science applications with business systems [DSB1_K02].
Considers ethical aspects and data security when designing and deploying analytical applications [DSB1_K05].

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture:
There are two tests, each graded in the form of points-50 points per test. The final grade is determined by the sum of points from both tests. The first test takes place midway through the course, while the second is held at the end. The passing threshold is a total of 50 points from both tests.
Laboratories:
There are two tests, each graded in the form of points-50 points per test. The final grade is determined by the sum of points from both tests. The first test takes place midway through the course, while the second is held at the end. The passing threshold is a total of 50 points from both tests.

Programme content

The course covers the development of web applications for Data Science using the Flask framework, along with an introduction to FastAPI and Django. Students will learn the principles of handling HTTP requests, routing, Jinja2 templates, and integrating applications with databases. The course will cover user authentication, building REST APIs, and retrieving and visualizing data. Participants will also learn how to integrate applications with external services, test and debug code, and deploy solutions to the cloud. Additionally, topics related to interactive dashboards in Dash will be explored.

Course topics

Introduction to web application development in Python
Basics of Flask - first web application
Routing and handling HTTP requests in Flask
HTML templates and Jinja2 in Flask
Handling forms and user interactions in Flask
Working with databases in Flask applications
User authentication and authorization
Building REST APIs in Flask (Flask-RESTful, Flask-Swagger)
Data processing and visualization in Flask applications
Integrating Flask applications with external services and APIs
Testing and debugging Flask applications
Introduction to FastAPI - fast APIs for Data Science applications
Basics of Django for Data Science
Developing analytical applications with Dash

Deploying Flask and Django applications to the cloud

Teaching methods

Wykłady: wykład problemowy, prezentacja case studies
Laboratoria: zadania problemowe, studium przypadku, praca w grupach

Bibliography

Basic:
Grinberg, M. (2020). Flask. Tworzenie aplikacji internetowych w Pythonie. Wydanie II., Helion
Lubanovic, B. (2024). Szybki jak FastAPI: projektowanie aplikacji WWW w Pythonie, Helion

Additional:
Mele, A. (2025). Django 5. Praktyczne tworzenie aplikacji internetowych w Pythonie, Helion

Breakdown of average student's workload

	Hours	ECTS
Total workload	125	5,00
Classes requiring direct contact with the teacher	60	2,50
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	65	2,50