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Category: Programming

# Backend Web Development #080240

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Das Training findet sich täglich vom 08:30 bis 17:00 statt.

Trainings-Dauer: 15.06.2026 bis zum 26.06.2026

Die ersten 3 Tage finden sich am Ort in Circle 6 am Zürich Flughafen statt.

Das Training in den Resttagen (bis zum 26.06.2026) findet sich nur Online statt.

## The minimum hardware requirements for Training Students:

- 1 GHz single-core processor,
- 2 GB of RAM,
- 10 GB of free disk space,

## Prior Knowledge Requirements / Anforderungen

- At least 1 year programming (preferably in python)
- Prior knowledge of Unix / Bash is helpful
- Prior knowledge of SQL or relational databases is useful

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| Key Learnings | • Backend Fundamentals<br>• Programming Basics for Backend<br>• Web Framework Basics<br>• Working with Databases<br>• Building APIs (Core Skill)<br>• Authentication & Security Basics<br>• Error Handling & Debugging<br>• Environment & Tooling<br>• Deployment Fundamentals<br>• Best Practices & Mindset<br>.....<br>Training Outcome (Beginners):<br><br>After completing the training, participants are able to:<br><br>• Build a simple backend web application<br>• Create and test REST APIs<br>• Connect a backend to a database<br>• Implement basic authentication<br>• Deploy a small backend project |

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## Content / Inhalt

| Wk. 1 | |
|---|---|
| Mon | (08:30) 1 hour lecture on Python, Git, and version control.<br>(09:30) 30 min Practice with Python and Git & 30 min solutions.<br>(10:30) 1 hour (coding together) tutorial: Setting up SSH Keys, the Project Repository, and exercise repository.<br>(11:30) Independent work on Homework, reading course materials and "warm-up" exercises. |
| | (13:00) 1 hour Introduction Python, Git, Unix., Bash<br>(14:00) 30 min setup of git repo on remote and local servers.<br>(14:30) 1 hour (coding together) tutorial on Git Flow and Management of Merge Conflicts.<br>(11:30) Independent work on Homework and exercises. |
| Tue | (08:30) 1 hour introduction to PostgreSQL and ORM<br>(09:30) 30 min exercises on DataBase Query Optimization<br>(10:30) 1 hour (coding together) tutorial in execution of SQL queries in python<br>(11:30) 1 hour Home exercises and coding practice. |
| | (13:00) 1 hour lecture SQLAlchemy, Foreign Keys, Joins and more advanced data types<br>(14:00) 30 min exercises & 30 min solutions and explanations on database query optimization<br>(14:30) 1 hour (coding together) tutorial on construction of models and optimization of queries<br>(15:30) 1 hour Home exercises and coding practice. |
| Wed | (08:30) 1 hour lecture on Indexes, and multi-dimensional indexes<br>(09:30) 30 min exercises & 30 min solutions and explanations on construction of database indexes<br>(10:30) 1 hour (coding together) tutorial nearest-neighbor-search with FAISS<br>(11:30) 1 hour Home exercises and coding practice. |
| | (13:00) 1 hour lecture Introduction to FastAPI<br>(14:00) 1 hour exercises and solutions on database query optimization<br>(15:00) 1 hour (coding together) workshop: Building an API to access User Class<br>(16:00) 1 hour Project Work and Questions |

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| Thur | (08:30) REST: Get, Put, Post, Delete<br>(09:30) 30 min exercises to create an api and access it..<br>(10:30) 1 hour (coding together) accessing various APIs online<br>(11:30) 1 hour Project Work & Questions |
| | (13:00) 1 hour lecture on advanced api topics: headers, json data format<br>(14:00) 30 min exercises & 30 min solutions and explanations & 1 hour (coding together) tutorial on authentication & User Management<br>(14:30) 1 hour (coding together) tutorial on implementing robust api handles<br>(15:30) 1 hour Project Work & Questions |
| Fri | (08:30) (lecture) Error handling<br>(09:30) 30 min exercises & 30 min solutions of overrunning a server with requests<br>(10:30) 1 hour (coding together) tutorial on implementing robust error handling<br>(11:30) 1 hour Project Work & Questions |
| | (13:00) (lecture): Logging and python wrapper functions<br>(14:00) 1 hour exercises + solutions for file read and write in python<br>(15:00) 1 hour (coding together) creating a logger class<br>(16:00) 1 hour Project Work & Questions |

| Wk. 2 | |
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| Mon | (08:30) Intro to Redis<br>(09:30) Exercises in data caching: When should you cache?<br>(10:30) 1 hour (coding together) tutorial: Setting up a Redis Cache for your application<br>(11:30) Independent work on Projects |
| | (13:00) AWS: Introduction -- IAM roles and S3<br>(14:00) Exercises using boto3<br>(15:00) 1 hour (coding together) data storage and retrieval from S3<br>(16:00) 1 hour Project Work & Questions |
| Tue | (08:30) Docker<br>(09:30) 1 hour exercises Containerizing applications<br>(10:30) 1 hour (coding together) Prepare a docker image for deployment<br>(11:30) 1 hour Project Work & Questions |

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| | (13:00) 1 hour lecture on AWS -- Deploy an application to AWS with docker image<br>(14:00) 1-hour exercises on manipulation of dependant datasets<br>(15:00) 1 hour (coding together) tutorial on docker deployment<br>(16:00) 1 hour Project Work & Questions |
| Wed | (08:30) 1 hour lecture on AWS Lambda<br>(09:30) 1-hour exercises execution of lambda functions<br>(10:30) 1 hour (coding together) regularly caching data to redis with lambda<br>(11:30) 1 hour Project Work & Questions |
| | (13:00) Advanced Concepts in SQL Alchemy: Session Management<br>(14:00) 30 min exercises + 30 min solutions Classification Accuracy (Predicted vs. Observed, ROC, MSE)<br>(15:00) 1 hour (coding together) tutorial: Setting up a classification pipeline<br>(16:00) 1 hour project work and questions |
| Thu | (08:30) Advanced Concepts in SQL Alchemy: Ownership and hierarchy<br>(09:30) 30 min exercises + 30 min solutions of ownership, hierarchy and scopes<br>(10:30) 1 hour (coding together) tutorial: Preparing data for Random Forest<br>(11:30) Project work and questions |
| | (13:00) Introduction to Pydantic<br>(14:00) 30 min exercises + 30 min solutions on Machine Learning: how to use machine learning methods ?<br>(15:00) 1 hour (coding together) tutorial: Setting up a machine learning model<br>(16:00) 1 hour project work and questions |
| Fri | (08:30) Introduction to Alembic<br>(09:30) Database migration exercises<br>(10:30) 1 hour (coding together) managing a test database and prod database with alembic<br>(11:30) 1 hour Project Work & Questions |
| | (13:00) LONG TUTORIAL: Integration of Alembic and Pydantic with your FastAPI application<br>(15:00) 1 hour Project Work & Questions |