



# Roadmap Backend Engineer (18 Bulan)

## Tahap 1: Fundamental Backend + Database (3 bulan)

### Fokus:

- HTTP, client-server, REST API konsep.
- SQL (PostgreSQL/MySQL): table, join, transaction, indexing.
- Dasar Linux + Git workflow (branching, merge, PR).

### Project:

#### Buat "**Library Management System**" (REST API)

- CRUD untuk buku, user, peminjaman.
- Pakai PostgreSQL/MySQL.
- Implementasikan authentication sederhana (login/registrasi).

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## Tahap 2: Backend dengan Python (3 bulan)

### Fokus:

- Python backend: **FastAPI** (modern & async) atau **Django** (full framework).
- ORM (SQLAlchemy/Django ORM).
- Unit testing (pytest/unittest).

### Project:

#### "**Task Management API**" (mirip Trello-lite)

- User bisa bikin project, task, assign user.
- Authentication pakai JWT.

- Pagination & search API.
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## Tahap 3: Backend dengan Java (4 bulan)

### Fokus:

- Spring Boot: controller, service, repository pattern.
- JPA/Hibernate ORM.
- Exception handling, validation, DTO.
- Testing (JUnit, Mockito).

### Project:

#### 👉 "E-commerce Backend"

- User CRUD + Authentication (JWT).
  - Product catalog + category.
  - Shopping cart + checkout + order history.
  - Relational database dengan PostgreSQL.
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## Tahap 4: Advanced Backend Concepts (3 bulan)

### Fokus:

- API Design Best Practices.
- Caching (Redis).
- Asynchronous jobs (Celery/RabbitMQ/Kafka basics).
- File upload (AWS S3 / MinIO).
- Security (rate limiting, input validation, CORS, CSRF, TLS).

### Project:

#### 👉 "Video Sharing Platform (Backend only)"

- User upload video metadata.
- Async job to "process" video (simulasi transcoding).

- Redis caching for popular videos.
  - Rate limit API (misalnya max 100 req/hour per user).
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## Tahap 5: Deployment & DevOps (3 bulan)

### Fokus:

- Docker & Docker Compose.
- Basic CI/CD (GitHub Actions).
- Deploy ke cloud (AWS/GCP/Azure, atau minimal DigitalOcean).
- Monitoring (logs dengan ELK atau Prometheus+Grafana basics).

### Project:

👉 Deploy salah satu project sebelumnya (misalnya e-commerce backend) ke cloud:

- API bisa diakses publik.
  - Database di cloud.
  - Logging dasar.
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## Tahap 6: Capstone Project (2 bulan)

### Project Besar:

#### 👉 "Online Learning Platform (Backend System)"

- Multi-role (Admin, Instructor, Student).
  - Course CRUD (create, update, delete).
  - Payment simulation.
  - Video hosting (pakai S3/MinIO).
  - Caching popular courses.
  - Notification system (email/queue).
  - Deploy di cloud (Dockerized + CI/CD).
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## Estimasi Durasi

- Tahap 1 → 3 bulan
- Tahap 2 → 3 bulan
- Tahap 3 → 4 bulan
- Tahap 4 → 3 bulan
- Tahap 5 → 3 bulan
- Tahap 6 (Capstone) → 2 bulan

**Total = 18 bulan**

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## Short Summary

- Mulai dari **fundamental (HTTP, SQL, Git, Linux)**.
  - Belajar **Python (FastAPI/Django)** → lalu **Java (Spring Boot)**.
  - Kuasai **caching, async jobs, security**.
  - Belajar **deployment & DevOps**.
  - Tutup dengan **Capstone Project = Online Learning Platform**.
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👉 Prompt yang nanti kamu bisa minta detail:

- "Jelaskan detail roadmap tahap 1, beserta step belajar dan contoh kode kecil"
  - "Buatkan step-by-step untuk proyek Library Management System pakai Python/Java"
  - "Jelaskan bagaimana cara deploy proyek ke cloud dengan Docker + GitHub Actions"
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