JÖNKÖPING UNIVERSITY
School of Engineering

COURSE SYLLABUS

Scalable and Fault Tolerant Systems, 7.5 credits

Skalbara och feltoleranta system, 7.5 högskolepoäng

Course Code:	TSFN14	Education Cycle:	First-cycle level
Confirmed:	Nov 15, 2023	Disciplinary domain:	Technology
Valid From:	Jan 18, 2027	Subject group:	Computer Technology
		Specialised in:	G2F First cycle, has at least 60 credits in first-cycle course/s as entry requirements
		Main field of study:	Computer Engineering

Intended Learning Outcomes (ILO)

On completion of the course the student shall:

Knowledge and Understanding

- demonstrate knowledge of technologies for distributing data and computations over multiple computers in parallel (MapReduce, data sharding, distributed file systems, etcetera) and corresponding constraints/prioritizations (CAP, PACELC, ACID, etcetera).

Skills and Abilities

- demonstrate the ability to develop multithreaded software in a high level language
- demonstrate the ability to apply established system architectures and design patterns for developing scalable and fault-tolerant systems for a cloud provider platform
- demonstrate the ability to implement continuous testing and deployment pipelines for deployment to a cloud provider
- demonstrate the ability to apply techniques for loads measurements and automatic scaling of systems for a cloud provider platform.

Judgement and Approach

- demonstrate the ability to assess, recommend, and implement appropriate techniques, components and architectures for a given development project.

Content

The purpose of the course is to teach students how to develop scalable and fault-tolerant backend services for deployment to cloud services providers. The course builds on previous knowledge of programming, methods for software development and testing, and the web as an application platform. The course also gives a broad understanding of developing parallel and distributed systems.

The course includes the following elements:

- Parallel programming (threads/processes, locking, mutexes, semaphores, etcetera)
- Distributed system architectures
- Design patterns for cloud computing
- Integration testing
- Load testing and cost calculations for cloud services
- Container orchestration

Type of Instruction

Lectures, exercises, and laboratory work.

Language of instruction is Swedish but English may occur.

Entry Requirements

General entry requirements and taken first-cycle courses of 60 credits, including Programming Web Applications, 7.5 credits, and Software Development, 7.5 credits or the equivalent.

Examination and Grades

The course is graded 5, 4, 3 or U.

Registration of examination:

Name of the Test	Value	Grading
Examination [1]	3.5 credits	5/4/3/U
Laboratory	4 credits	G/U

[1]Determines the final grade of the course, which is issued only when all course units have been passed.

Course Literature

Please note that the course literature may be revised up to eight weeks before the start of the course.

Title: Distributed Systems, 4th ed.,
Author(s): M. van Steen and A.S. Tanenbaum
Publisher: distributed-systems.net, 2023

Title: Azure Application Architecture Guide
https://azure.microsoft.com/en-us/blog/azure-application-architecture-guide/
Publisher: Microsoft Press, 2022