



COURSE SYLLABUS

Introduktion till Cloud Computing Introduction to Cloud Computing 7.5 credits (7,5 högskolepoäng)

Course code: DVI566

Main field of study: Computer Science, Technology

Disciplinary domain: Technology

Education level: First cycle

Specialization: G2F - First cycle, has at least 60 credits in first cycle course/s as entry requirements

Language of instruction: English

Applies from: 2023-08-28

Approved: 2023-01-25

1. Decision

This course is established by Dean 2017-02-21. The course syllabus is approved by Head of Department of Computer Science 2023-01-25 and applies from 2023-08-28.

2. Entry requirements

Admission to the course requires completed course in Programming, 15 ECTS credits and Datastructures and Algorithms, 6 ECTS credits and operatingsystems 6 ECTS credits.

3. Objective and content

3.1 Objective

The purpose of the course is to give students the basic concepts of distributed systems and cloud computing. The course cover theoretical and practical aspects with a focus on real examples. At the end of the course students are supposed to be capable to chose, setup and use basic cloud resources (e.g. computing and storage as a service) and to design and deploy scalable architectures and elastic applications.

3.2 Content

The course will cover the topics that follow.

- (1) Introduction to distributed sytems: Client-Server multilayer architectures; P2P architectures
- (2) Introduction to Cloud Computing: Origins and motivations, Service models, Deployment models, Elasticity, Scalability, SLA, Cloud Applications.
- (3) Virtualization: Virtualization, Paravirtualization, O.S. Level Virtualization (docker containers), Memory Virtualization, Storage Virtualization, VM migration.
- (4) Communication in distributed systems: RPC, Java RMI, Streaming, Multicast, ...
- (5) Cloud data storage systems: an overview on systems such as Amazon Dynamo DB, Google File System, Cassandra
- (6) Data Intensive computing: basic concepts of Map-reduce paradigm and stream processing paradigms

The course foreseen practical exercises (2 labs and 1 Projects) to experience the to use virtualized environments at infrastructure and platform layer. Labs and project will require the use of the amazon web service platform.

4. Learning outcomes

The following learning outcomes are examined in the course:

4.1 Knowledge and understanding

On completion of the course, the student will be able to:

On completion of the course the student will:

- be able to describe and explain the general concept related to distributed systems
- be able to describe and explain the concept of resource virtualization
- be able to describe and explain the general concept of cloud computing.

Skills and abilities

On completion of the course the student will:

- be able to write and present laboratory results in a short report

- be able to select, to configure and to run/launch cloud resources by using management GUI and API offered by IaaS providers
- be able to configure elastic infrastructure and to deploy elastic applications.

Approach and ability to evaluate

On completion of the course, the student will:

- be aware of the main service and deployment model for cloud computing
- be aware of the main type and models for virtualization
- be aware of the main cloud computing technologies
- be able to compare different cloud services/solutions and technologies.

5. Learning activities

The theoretical basics in the course is presented in lectures and / or exercises. The student is also expected to independently gain theoretical knowledge through independent study of relevant literature. Theoretical knowledge is then applied practical both in teacher-led mandatory laboratory exercises and partly in project assignments carried out individually or in groups within a given time frame.

6. Assessment and grading

Modes of examinations of the course

| Code | Module | Credits | Grade |
|------|--------------|-------------|-------|
| 1710 | Written exam | 2 credits | AF |
| 1720 | Laboratory 1 | 1.5 credits | GU |
| 1730 | Laboratory 2 | 1.5 credits | GU |
| 1740 | Project | 2.5 credits | AF |

The course will be graded A Excellent, B Very good, C Good, D Satisfactory, E Sufficient, FX Fail, supplementation required, F Fail.

The final grade for the course is determined as an average of the grades obtained in the Project and in the Exam. The final grade will only be issued when all components have been approved.

The information before a course occasion states the assessment criteria and make explicit in which modes of examination that the learning outcomes are assessed.

An examiner can, after consulting the Disability Advisor at BTH, decide on a customized examination form for a student with a long-term disability to be provided with an examination equivalent to one given to a student who is not disabled.

7. Course evaluation

The course evaluation should be carried out in line with BTH's course evaluation template and process.

8. Restrictions regarding degree

The course can form part of a degree but not together with another course the content of which completely or partly corresponds with the contents of this course.

9. Course literature and other materials of instruction

Main literature

Cloud Computing: Concepts, Technology & Architecture, Thomas Erl, Ricardo Puttini, Zaigham Mahmood, 2013, Prentice-Hall, ISBN: 9780133387520.

Reference literature

Mastering Cloud Computing: Foundations and Applications Programming Buyya, Rajkumar / Vecchiola, Christian / Selvi, 2013 ISBN13: 9780124114548.

Distributed and Cloud Computing: From Parallel Processing to the Internet of Things Hwang, Kai / Dongarra, Jack / Fox, Geoffrey C. , 2011 ISBN13: 9780123858801.

Cloud Computing: Principles and Paradigms, Rajkumar Buyya; James Broberg; Andrzej Goscinski, John Wiley & Sons, 2011, ISBN: 978-0-470-88799-8.

Dan Marinescu, Cloud Computing: Theory and Practice, Morgan Kaufmann, 2013.

Andrew S. Tanenbaum and Maarten van Steen, Distributed Systems: Principles and Paradigms - 2nd Edition, Pearson-Prentice Hall, 2007. ISBN13: 9780132392273.

For the labs and the final project will be used resources obtained joining the AWS learning program as BTH student member. This is for free, but require the use of a valid credit card number.