

ACM Data Science Task Force Course Example

*Cloud Computing Technology and Application
Hohai University, Nanjing
Ning Sun, Huiping Chen, Yongxia Jin*

<https://ktzxmooc.hhu.edu.cn/course/638996.html>

Knowledge Areas that contain competencies (knowledge, skills, and dispositions) covered in the course

Knowledge Area	Total Number of Contact Hours
Cloud computing	16
Software support for Big Data applications	4

Where does the course fit in your undergraduate Data Science curriculum?

This course is part of a major but not compulsory. It doesn't have pre-requisites or required following courses. Before learning this course, you should have the following pre-requisite knowledge: 1) Understand the basic knowledge of computer composition principles; 2) Have basic operating system knowledge, master basic Linux operating commands; 3) understand the basic principles of computer networks; 4) master the basic Java programming language. The students who take this course are mainly science and engineering students.

What is covered in the course?

The main content of the course includes: overview of cloud computing, key cloud computing technologies, cloud service systems, mainstream cloud computing solutions (Google cloud computing, Amazon cloud computing, Microsoft cloud computing, etc.), open source cloud computing and big data processing platforms (OpenStack, Docker) , Hadoop, etc.).

What is the format of the course?

The total class time of this course is about 20 hours. On the basis of introducing the history, development and trend of cloud computing, the "Cloud Computing Technology and Application" course focuses on the key technologies, infrastructure and various mainstream solutions of cloud computing. As cloud computing is a hotspot in the research and application of computer science and technology in recent years, and the technology platform is updated rapidly, this course will closely follow the mainstream cloud computing technology and development to broaden students' knowledge.

How are students assessed?

This course has three grades of passing (60-84 points), excellent (85-100 points) and failing (<60 points).

Total score (100 points system) = 50 points for unit test + 5 points for online discussion + 45 points for final online exam

The test questions of this course unit are mainly composed of objective questions such as single choice and multiple choice. The specific time will be reminded in the course announcement. Encourage students to actively participate in online communication and

discussion, and those who perform well can get a maximum of 5 points. After completing the course, complete the final exam with a total score of 45 points.

Course tools and materials

1. Reference materials

- Liu Peng, etc.: "Cloud Computing" (Third Edition), Electronic Industry Press, 2016.
- Kai Hwang et al.: "Cloud Computing and Distributed Systems", China Machinery Industry Press, 2013.
- Lin Ziyu: "Principles and Applications of Big Data Technology" (2nd Edition), People's Posts and Telecommunications Press, 2017.2.

2. Network resources

- Online link of Hehai Classroom: <https://ktzxmoooc.hhu.edu.cn/course/638996.html>
- Xiamen University's public service platform for big data courses <https://dmlab.xmu.edu.cn>
- China Cloud Computing <https://www.chinacloud.cn>
- CSDN cloud computing channel <https://cloud.csdn.net/>
- IBM developer works cloud computing channel <https://www.ibm.com/developerworks/cn/cloud/index.html>
- OpenStack community <https://www.openstack.org/>
- OpenStack Chinese community <https://www.openstack.org/>
- Docker community <https://www.docker.com/>
- Docker Chinese community <https://www.docker.org.cn/index.html>
- Hadoop community <https://hadoop.apache.org/>
- CSDN Hadoop community <https://hadoop.csdn.net/>
- Spark community <https://spark.apache.org/>

3. References

- Chinese version of Google paper:
 -"Bigtable: A Distributed Structured Data Storage System"
 -"The Google File System"
 -"Google MapReduce"

In addition, the open source cloud computing and big data processing platforms (OpenStack, Docker, Hadoop, etc.) used in the course are all free.

Why do you teach the course this way?

This course is mainly in the form of classroom face-to-face, interspersed with small class discussions, flip classes, and experiments. Classroom face-to-face teaching is mainly taught by teachers, as the most common form of teaching, can be more comprehensive and systematic transfer of the main knowledge points to everyone. Small class discussion can promote communication and exchange between students, the classroom face-to-face process of problems to focus on solving, timely answer questions and puzzles, so that students have a clearer understanding of knowledge, while in the process of discussion can deepen their understanding of the corresponding knowledge points, in order to achieve the new effect of warm knowledge.

Body of Knowledge coverage

KA	Sub-domain	Competencies Covered	Hours
----	------------	----------------------	-------

BDS	Cloud computing , Software support for Big Data applications	1) Understand the concept of cloud computing, understand the key technologies of cloud computing, focusing on the principles and applications of virtualization technology; 2) Make students understand the architecture of cloud services through specific case analysis; 3) In-depth understanding of cloud computing distributed file system, parallel processing framework, distributed lock service and distributed database technology, and through experiments to enable students to master the management and application of open source cloud computing platforms OpenStack and Hadoop.	20
-----	--	--	----