OSTIM TECHNICAL UNIVERSITY
FACULTY OF ECONOMICS AND ADMINISTRATIVE SCIENCES
MANAGEMENT INFORMATION SYSTEMS DEPARTMENT
COURSE SYLLABUS FORM

MIS XXX Principles of Cloud Computing							
Course Name	**Course Code**	**Period**	**Hours**	**Application**	**Laboratory**	**Credit**	**ECTS**
Principles of Cloud Computing	MIS XXX	6	3	0	0	3	3

Language of Instruction	English
Course Status	Compulsory
Course Level	Bachelor
Learning and Teaching Techniques of the Course	Lecture, Question-Answer, Problem Solving, Project

Course Objective
In this course we plan to give students an overview of the field of Cloud Computing, and an in-depth study into its enabling technologies and main building blocks. Students will gain hands-on experience solving relevant problems through projects that will utilize existing public cloud tools. It is our objective that students will develop the skills needed to become a practitioner or carry out research projects in this domain.

Learning Outcomes
The primary learning outcomes of this course are five-fold. Students will be able to: 1)Explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing. 2) Apply fundamental concepts in cloud infrastructures to understand the tradeoffs in power, efficiency and cost, and then study how to leverage and manage single and multiple datacenters to build and deploy cloud applications that are resilient, elastic and cost-efficient. 3) Discuss system, network and storage virtualization and outline their role in enabling the cloud computing system model. 4) Illustrate the fundamental concepts of cloud storage and demonstrate their use in storage systems such as Amazon S3 and HDFS. 5) Analyze various cloud programming models and apply them to solve problems on the cloud.

Course Outline
Articulate the main concepts, key technologies, strengths, limitations of cloud computing and the possible applications for state-of-the-art cloud computing. Identify the architecture and infrastructure of cloud computing, including cloud delivery and deployment models. Analyze the core issues of cloud computing such as security, privacy, and interoperability. Identify problems, analyze, and evaluate various cloud computing solutions. Analyze appropriate cloud computing solutions and recommendations according to the applications used.

Weekly Topics and Related Preparation Studies		
Weeks	**Topics**	**Preparation Studies**
1	Definition and evolution of Cloud Computing	– Essential characteristics, Architectural Influences, Technological Influences, and Operational Influences.
2	Enabling Technologies, Service and Deployment Models	–The topics of cloud infrastructures, virtualization, software defined networks and storage, cloud storage, and programming models.
3	Popular Cloud Stacks and Use Cases Benefits, Risks, and Challenges of Cloud Computing	–Cloud Delivery models, The SPI Framework, Cloud Software as a Service (SaaS), Cloud Platform as a Service(PaaS)
4	Economic Models and SLAs Topics in Cloud Security	–Cloud Information Security Objectives, –Confidentiality, Integrity, Availability, Cloud Security Services, Relevant Cloud Security Design Principles, Secure Cloud Software Requirements, Secure Development practices, Approaches to Cloud Software Requirement Engineering, Cloud Security Policy Implementation.
5	Historical Perspective of Data Centers Datacenter Components: IT Equipment and Facilities Design Considerations: Requirements, Power, Efficiency, & Redundancy	–Cloud Infrastructure as a Service (IaaS), –Cloud deployment models, Public Clouds, Community Clouds, Hybrid Clouds, Alternative Deployment models, Expected benefits.
6	Power Calculations, PUE and Challenges in Cloud Data Centers Cloud Management and Cloud Software Deployment Considerations Virtualization (CPU, Memory, I/O)	–The CIA Traid, Privacy and Compliance Risks, Threats to Infrastructure, Data and Access Control
7	Case Study	–Amazon Web Services and Microsoft Azure
8	**MIDTERM EXAM**	
9	Software Defined Networks (SDN)	
10	Software Defined Storage (SDS)	– Cloud storage systems
11	Introduction to Storage Systems	–Architectural Considerations, General Issues, Trusted Cloud Computing, Secure Execution environments and Communications, Micro architectures.
12	Cloud Storage Concepts Distributed File Systems (HDFS, Ceph FS) Cloud Databases (HBase, MongoDB, Cassan	– Identity Management and Access Control, Autonomic Security.
13	Robotics (Chapter 26)	–
	Cloud Databases (HBase, MongoDB,	–Security Policy Implementation, Policy Types, and Computer Security Incident

14	Cassandra, DynamoDB) Cloud Object Storage (Amazon S3, OpenStack Swift, Ceph)	Response Team (CSIRT).
15	Distributed Programming for the Cloud Data-Parallel Analytics with Hadoop MapReduce (YARN) Iterative Data-Parallel Analytics with Apache Spark Graph-Parallel Analytics with GraphLab 2.0 (PowerGraph)	–Cloud Access Control Issues, Cloud Service Provider Risks.
16	**FINAL EXAM**	

Textbook(s)/References/Materials:		
Textbook: Ronald L. Krutz, Russell Dean Vines, “Cloud Security A comprehensive Guide to secure Cloud Computing” Wiley.		
Supplementary References: John W. itinghouse james F.Ransome, “Cloud Computing Implementation, Management and Security” , CRC Press. Borko Furht. Armando Escalante, “Handbook of Cloud Computing”, Springer		
Other Materials: Charles Badcock, “Cloud Revolution” , TMH		
Assessment		
Studies	**Number**	**Contribution margin (%)**
Attendance		
Lab		
Class participation and performance	**1**	**10**
Field Study		
Course-Specific Internship (if any)		
Quizzes / Studio / Critical	**5**	**10**
Homework		
Presentation		
Projects		**10**
Report		
Seminar		
Midterm Exam/Midterm Jury	**1**	**20**
General Exam / Final Jury	**1**	**50**
Total		**100**
Success Grade Contribution of Semester Studies		**50**
Success Grade Contribution of End of Term		**50**
Total		**100**

ECTS / Workload Table			
Activities	**Number**	**Duration (Hours)**	**Total Workload**
Course hours (Including the exam week): 16 x total course hours)	16	3	48
Laboratory			
Application			
Course-Specific Internship (if any)			
Field Study			
Study Time Out of Class	8	2	16
Presentation / Seminar Preparation			
Projects			
Reports			
Homework			
Quizzes / Studio Review			
Preparation Time for Midterm Exams / Midterm Jury	1	20	20
Preparation Period for the Final Exam / General Jury	1	20	20
Total Workload	**(104/30 = 3,46)**		**104**

Course' Contribution Level to Learning Outcomes							
Nu	**Learning Outcomes**	**Contribution Level**					
		1	**2**	**3**	**4**	**5**
LO1	Explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing.					X
LO2	Apply fundamental concepts in cloud infrastructures to understand the tradeoffs in power, efficiency and cost, and then study how to leverage and manage single and multiple datacenters to build and deploy cloud applications that are resilient, elastic and cost-efficient.					X
LO3	Discuss system, network and storage virtualization and outline their role in enabling the cloud computing system model.					X
LO4	Illustrate the fundamental concepts of cloud storage and demonstrate their use in storage systems such as Amazon S3 and HDFS.					X
LO5	Analyze various cloud programming models and apply them to solve problems on the cloud.					X

	Relationship Between Course Learning Outcomes and Program Competencies (Department of Management Information Systems)								
Nu	**Program Competencies**	**Learning Outcomes**							**Total Effect (1-5)**
		LO1	**LO2**	**LO3**	**LO4**	**LO5**	**…**	…	
1	Recognize and distinguish the basic concepts such as data, information, and knowledge in the field of Management Information Systems and know the processes to be followed for data acquisition, storage, updating, and security.		x	x		x			**3**
2	Develop and manage databases suitable for collecting, storing, and updating data.			x	x	x			**3**
3	As a result of his/her ability to think algorithmically, easily find solutions to the problems concerning the basic business functions.		x	x		x			**3**
4	Learn programming logic, have information about current programming languages.		x		x				**2**
5	Be able to use up-to-date programming languages.		x	x					**2**
6	Be able to take part in teamwork or lead a team using knowledge of project management processes.	x			x				**2**
7	Know ethical and legal rules, use professional field knowledge within the scope of ethical and legal rules.			x	x	x			**3**
8	Have knowledge in the fundamental areas of business administration namely management and organization, production, finance, marketing, numerical methods, accounting, etc., and have the knowledge and skills to work in-depth in at least one of them.	x	x	x					**3**
9	Be able to solve the problems encountered in the field of internet programming by designing web applications.	x	x	x		x			**4**
10	Develop and manage logistics and supply chain management activities		x	x	x	x			**4**
11	Adapt his/her theoretical knowledge and the experience he/she will gain through practice at the departments of businesses such as information technologies, R&D, and management to real life.		x	x		x			**3**
	Be able to develop strategies that will provide a competitive advantage with			x		x			**2**

12	his/her advanced knowledge of management strategies and management functions.								
13	Develop a business idea, commercialize the business idea, and design and manage his/her own venture using entrepreneurial knowledge.				x	x			**2**
14	By using English effectively, they can follow, read, write, speak and communicate universal information in the field of management information systems in a foreign language with professional competence.	x	x	x		x			**4**
Total Effect									**40**

Policies and Procedures
Web page: https://www.ostimteknik.edu.tr/management-information-systems-english-1241/915
Exams: The exams aim at assessing various dimensions of learning: knowledge of concepts and theories and the ability to apply this knowledge to real-world phenomena, through analyzing the situation, distinguishing problems, and suggesting solutions. The written exams can be of two types, ie. open-ended questions, which can also be in the form of problems or multiple-choice questions.
Assignments: Quizzes and Homework (Assignments) might be applicable. Scientific Research Ethics Rules are very important while preparing assignments. The students should be careful about citing any material used from outside sources and reference them appropriately.
Missed exams: Any student missing an exam needs to bring an official medical report to be able to take a make-up exam.
Projects: A group project with teamwork is welcome.
Attendance: Attendance requirements are announced at the beginning of the term. Students are usually expected to attend at least 70% of the classes during each term.
Objections: If the student observes a material error in his/her grade, he/she has the right to place an objection to the Faculty or the Department. The claim is examined and the student is notified about its outcome.