COURSE PROFILE

Course Name	Code	Semester	Term	Theory+PS+Lab (hour/week)	Local Credits	ECTS
Storage Preliminaries For Cloud Computing	IT531	Fall	1	3 + 0 + 0	3	8

Prerequisites	None

Course Language	English
Course Type	Departmental Elective
Course Lecturer	Assist Prof. Dr. Cüneyt Sevgi
Course Assistant	None
Course Objectives	This class covers several systems topics in cloud computing, including • various cloud definitions, cloud system architecture, deployment models and Cloud characteristics • virtualization technologies, • cloud architectures, • learning about some of the newer techniques on storage and filesystems • programming models, • understanding some of the major security challenges of cloud computing
Course Learning Outcomes	After successfully completing the course, the student will have the ability to: • Identify and differentiate various infrastructure components of classic and virtualized data centre. • Discuss effective cloud computing deployment models for businesses/IT organizations. • Understand and address security concerns commonly found in Cloud computing environments. • Formulate high-level cloud migration strategy and best practices.
Course Content	The Evolution of Cloud Computing, Overview of cloud computing (A Top-Down Approach), Cloud definitions, Deployment models, Cloud characteristics, Cloud service delivery models, Storage System, Storage Networking Technologies, Classic Data Centre (CDC), Virtualized Data Centre (VDC), Hypervisors, Business Continuity in VDC, Cloud Security, Cloud Migration Considerations

COURSE CONTENT

Week	Subjects	Related
1	The Evolution of Cloud Computing Overview of cloud computing (A Top-Down Approach)	
2	Cloud definitions System architecture Deployment models Cloud characteristics	
3	Cloud Computing Primer Papers & Discussion	
4	Cloud service delivery models • Infrastructure as a Service (IaaS) • Platform as a Service (PaaS) • Software-as-a-Service (SaaS)	
5	Storage System • Introduction to information storage, virtualization and cloud computing • Key data center elements • Compute, application, and storage virtualization • Disk drive & flash drive components and performance • RAID • Intelligent storage system and storage provisioning (including virtual provisioning)	
6	Storage Networking Technologies • Fibre Channel SAN components, FC protocol and operations • Block level storage virtualization • iSCSI and FCIP as an IP-SAN solutions • Converged networking option - FCoE • Network Attached Storage (NAS) – components, protocol and operations • File level storage virtualizations • Object based storage and unified storage platform	
7	Classic Data Center (CDC) Virtualized Data Center (VDC) • Compute - Storage -Networking	
8	Virtualized Data Center (VDC) • Desktop and Application	
9	Guest Speaker Presenting Hypervisors -EMC VMWare	

10	Midterm	
11	Business Continuity in VDC • Backup, Archive, and Replication • Business continuity terminologies, planning and solutions • Clustering and multipathing architecture to avoid single points of failure • Backup and recovery – methods, targets and topologies • Data deduplication and backup in virtualized environment • Fixed content and data archive • Local replication in classic and virtual environments • Remote replication in classic and virtual environments • Three-site remote replication and continuous data protection	
12	Cloud Security	
13	Cloud Security	
14	Cloud Migration Considerations	

Course Textbook	EMC2Cloud Infrastructure and Services (CIS) Lecture Notes
Recommended References	Cloud and Virtual Data Storage Networking, CRC Press, Greg Schulz, 2012. Cloud Computing, Data-Intensive Computing and Scheduling, CRC Press Taylor & Francis Group, Frédéric Magoulès, Jie Pan, and Fei Teng, 2013. Information Storage and Management Storing, Managing, and Protecting Digital Information in Classic, Virtualized, and Cloud Environments 2nd Edition Edited by Somasundaram Gnanasundaram Alok Shrivastava, EMC Education Services Wiley Publishing, 2012. Cloud Computing Implementation, Management, and Security John W. Rittinghouse James F. Ransome, CRC Press, 2010. Cloud Computing For Dummies, Wiley Publishing, Inc., Judith Hurwitz, Robin Bloor, Marcia Kaufman, and Dr. Fern Halper 2010.

Semester Requirements	Number	Percentage of Grade
Attendance/Participation		
Laboratory		
Application		
Special Course Internship (Work Placement)		
Quizzes/Studio Critics		
Homework Assignments		15
Presentation		
Project		
Seminar/Workshop		20
Midterms/Oral Exams/Review		30
Final/Resit Exam		35
Total		100

PERCENTAGE OF SEMESTER WORK		65
PERCENTAGE OF FINAL WORK		35
Total		100

Course Category	Core Courses	
	Major Area Courses	X
	Supportive Courses	
	Media and Management Skills Courses	
	Transferable Skill Courses	

COURSE'S CONTRIBUTION TO PROGRAM

#	Program Qualifications / Outcomes	* Level of Contribution				
		1	2	3	4	5
1	An ability to use the theoretical and applied foundations in mathematics and basic sciences acquired in the undergraduate level to the solutions of problems in information technology area		X			
2	An ability to analyze a graduate level problem, identify and define the computing requirements appropriate to its solution, to understand, select and use appropriate technology, tools, standards, protocols, building blocks, and components to solve the problem			X		
3	An ability to propose, analyze, design, develop, test and maintain an information technology system including software solutions, security model, computer and network infrastructure, information systems etc. to solve graduate level information technology problems			X		
4	An ability to analyze and communicate local and global impact of computing on individuals, organizations and society; and the ability to apply information technology techniques, skills, and tools for regular computing practices as well as to improve effectiveness of current methodologies			X		
5	An ability to effectively communicate in oral and written media with all kinds of related audiences, prepare documentation for this purpose; and acquire academic writing skills in a foreign language	X				
6	An ability to understand and teach professional, ethical, legal, and social issues and responsibilities of information technology profession and research		X			
7	An ability to gain knowledge and conduct research on topics inside and outside the requirements of the information technology profession, and the ability to lead and work within heterogeneous teams of people from different research areas to accomplish interdisciplinary research			X		
8	An ability to engage in life-long learning and professional development for personal improvement to follow contemporary information technology research	X				

*1 Lowest, 2 Low, 3 Average, 4 High, 5 Highest

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION

Activities	Number	Duration (Hours)	Total Workload
Course Hours (Including Exams)	14	3	42
Tutorials			
Laboratory			
Application			
Special Course Internship (Work Placement)			
Field Work	7	3	21
Study Hours Out of Class	14	5	70
Presentations / Seminar	1	3	3
Project			
Preparatory reading	14	5	70
Homework Assignments	4	3	12
Quizzes			
Midterm Exams	1	3	3
Final / Resit Exam			
		Total Workload	221

COURSE CATEGORY

ISCED GENERAL AREA CODES	GENERAL AREAS	ISCED BASIC AREA CODES	BASIC EDUCATIONAL AREAS	
1	Education	14	Teacher Training and Educational Sciences	
2	Humanities and Art	21	Art	
2	Humanities and Art	22	Humanities	
3	Social Sciences, Management and Law	31	Social and Behavioural Sciences	
3	Social Sciences, Management and Law	32	Journalism and Informatics	
3	Social Sciences, Management and Law	38	Law	
4	Science	42	Life Sciences	
4	Science	44	Natural Sciences	
4	Science	46	Mathematics and Statistics	10
4	Science	48	Computer	30
5	Engineering, Manufacturing and Civil	52	Engineering	60
5	Engineering, Manufacturing and Civil	54	Manufacturing and Processing	
5	Engineering, Manufacturing and Civil	58	Architecture and Structure	
6	Agriculture	62	Agriculture, Forestry, Livestock, Fishery	
6	Agriculture	64	Veterinary	
7	Medicine and Welfare	72	Medical	
7	Medicine and Welfare	76	Social Services	
8	Service	81	Personal Services	
8	Service	84	Transport Services	
8	Service	85	Environment Protection	
8	Service	86	Security Services	