

COURSE DESCRIPTION FORM: CS-4075: Cloud Computing

INSTITUTION FAST School of Computing, National University of Computer and Emerging Sciences, Islamabad Campus

BS-CS: Fall-2025

PROGRAM(s) TO BE EVALUATED

Course Description

Course Code	CS-4075	
Course Title	Cloud Computing	
Credit Hours	3	
Course Instructors	Dr. Basharat Hussain	
Grading Policy	Absolute Grading	
Policy about missed assessment items in the course	<p>Retake of missed assessment items (other than sessional/ final exam) will not be held. Student who misses an assessment item (other than sessional / final exam) is awarded zero marks in that assessment item i.e., late submission will not be accepted.</p> <p>For missed sessional/ final exam, exam retake/ pretake application along with necessary evidence are required to be submitted to the department secretary. The examination assessment and retake committee decides the exam retake/ pretake cases.</p>	
Course Plagiarism Policy	<p>Plagiarism in project or sessional/ final exam will result in F grade in the course.</p> <p>Plagiarism in an assignment will result in zero marks in the whole assignments category.</p>	
Prerequisites by Course(s) or Topics		
Assessment Instruments with Weights (homework, quizzes, sessional exams, final exam, assignments, etc.)	Assessment with weight.	
	Assessment Type	Weight
	Quiz (≥ 3)	10
	Assignment (≥ 3)	10
	Sessional Exams 1	12
	Sessional Exams 2	12
	Hands-on Labs	8
	Project	8
	Final Exam	40
Course Coordinator	Mr. Basharat Hussain	
URL (if any)		

Course Catalog Description	Introduction to Cloud Computing; Cloud Service and Deployment models; Different Cloud Frameworks; Cloud Compute Services; Cloud Networking and Content Delivery; Cloud Storage; Cloud Databases; Cloud Security; Various Cloud Features and Services (Scalability, load balancing, etc.); Role of cloud computing in emerging technologies (AI/ML, IoT, Big Data and Analytics, etc.)																																			
Textbook(s)	Cloud Computing: Concepts, Technology & Architecture (1st Edition) by Thomas Erl (Author), Ricardo Puttini (Author), Zaigham Mahmood (Author)																																			
Reference Material	AWS Foundations courseware																																			
Course Goals	<table><tr><td colspan="3">A. Course Learning Outcomes (CLOs)</td></tr><tr><td colspan="3">After course completion, the students shall be able to:</td></tr><tr><td colspan="3">1. Describe the basics of cloud computing and related services (2)(1)</td></tr><tr><td colspan="3">2. Apply cloud computing knowledge in various real world use cases (situations) (4)(3)</td></tr><tr><td colspan="3">3. Analyze and architect a cloud-based solution in a real-world use case (3) (4)</td></tr><tr><td colspan="3">4. Get an industry recognized Cloud Certification (4)(10)</td></tr></table> <table><tr><td colspan="3">B. Program Learning Outcomes (PLOs)</td></tr><tr><td>PLO 1</td><td>Academic Education</td><td>Completion of an accredited program of study designed to prepare graduates as computing professionals</td></tr><tr><td>PLO 2</td><td>Knowledge for Solving Computing Problems</td><td>Apply knowledge of computing fundamentals, knowledge of a computing specialization, and mathematics, science, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements</td></tr><tr><td>PLO 3</td><td>Problem Analysis</td><td>Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines</td></tr><tr><td>PLO 4</td><td>Design/ Development of Solutions</td><td>Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations</td></tr></table>			A. Course Learning Outcomes (CLOs)			After course completion, the students shall be able to:			1. Describe the basics of cloud computing and related services (2)(1)			2. Apply cloud computing knowledge in various real world use cases (situations) (4)(3)			3. Analyze and architect a cloud-based solution in a real-world use case (3) (4)			4. Get an industry recognized Cloud Certification (4)(10)			B. Program Learning Outcomes (PLOs)			PLO 1	Academic Education	Completion of an accredited program of study designed to prepare graduates as computing professionals	PLO 2	Knowledge for Solving Computing Problems	Apply knowledge of computing fundamentals, knowledge of a computing specialization, and mathematics, science, and domain knowledge appropriate for the computing specialization to the abstraction and conceptualization of computing models from defined problems and requirements	PLO 3	Problem Analysis	Identify, formulate, research literature, and solve complex computing problems reaching substantiated conclusions using fundamental principles of mathematics, computing sciences, and relevant domain disciplines	PLO 4	Design/ Development of Solutions	Design and evaluate solutions for complex computing problems, and design and evaluate systems, components, or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations
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	PLO 5	Modern Tool Usage	Create, select, adapt and apply appropriate techniques, resources, and modern computing tools to complex computing activities, with an understanding of the limitations
	PLO 6	Individual and Team Work	Function effectively as an individual and as a member or leader in diverse teams and in multi-disciplinary settings
	PLO 7	Communication	Communicate effectively with the computing community and with society at large about complex computing activities by being able to comprehend and write effective reports, design documentation, make effective presentations, and give and understand clear instructions
	PLO 8	Computing Professionalism and Society	Understand and assess societal, health, safety, legal, and cultural issues within local and global contexts, and the consequential responsibilities relevant to professional computing practice
	PLO 9	Ethics	Understand and commit to professional ethics, responsibilities, and norms of professional computing practice
	PLO 10	Life-long Learning	Recognize the need, and have the ability, to engage in independent learning for continual development as a computing professional
	C. Mapping of CLOs to PLOs (CLO: Course Learning Outcome, PLOs: Program Learning Outcomes)		

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Topics covered in the course (assume 15-week instruction and 3 contact hours per week)	1. Topics to be covered:			
	List of Topics	No. of Weeks	Contact Hours	CLO(s)
	Introduction Teacher, Course, Rules and Policies Introduction to Cloud Computing NIST Definition	1	3	1
	Cloud Service and Deployment models IaaS, PaaS, SaaS Public, Private, Hybrid Cloud Frameworks Openstack AWS Core Services (networking, compute, storage, database, security)	1	3	1,2
	Cloud Compute Services EC2 Containers (Kubernetes, Dockers) Serverless Computing (Lambda)	2	6	2,3
	Cloud Networking and Content Delivery Virtual Servers, subnets DNS and Content Delivery (Route 53, CloudFront), Cloud resource sharing and networking (Peering, Transit Gateway, VPN)	2	6	2,3
	Cloud Storage	1.5	4.5	2,3

	Block Storage, File Storage, Object Storage				
	Cloud Database Relational Database service (managed, unmanaged) Non-relational databases	1.5	4.5	2,3	
	Cloud Security Identity and Access Management Shared responsibility model Compliance and Certification Monitoring (CloudTrail, CloudWatch, AWS Config)	2	6	2,3	
	AWS Services Load balancing, AWS Organizations, AWS Global infrastructure, AWS billing and support, Cloud Formation	3	9	1,2,3	
	Cloud and Emerging Technologies (Student led Presentations) AI, ML, IoT, Big Data and Analytics, Blockchain and Cryptocurrency	1	3	4,5	
	Total	15	45		
Programming Language for Assignments (if any)	There are 2 main evaluations that will be done based on AWS activity. 1. Each AWS module ends with a knowledge check self quiz. Each knowledge quiz will carry 2 marks if done on time, zero otherwise. These quizzes will be added-up to make 1 assignment marks (10 quizzes * 2 marks). Marks of this AWS assignment will be uploaded at the end of the semester. 2. There will be around 7 lab activities. Each lab activity will have 5 marks. Full marks will be given if a lab is completed in time and 2 marks will be given if it is done after deadline (within 3 days). No credit will be given if lab is done after 3 days of the deadline.				
Class Time Spent (in percentage)	Theory	Problem Analysis	Solution Design	Social and Ethical Issues	
	55	25	15	5	
Oral and Written Communications	Every student is required to submit at least 3 written reports (assignments) and make 1 oral presentation on the role of cloud computing in emerging technologies.				



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