Prince Sultan University
College of Computer and Info Sciences / Department of Computer Science
Term 232
2nd Semester 2023 - 2024

COURSE SYLLABUS

1. Mission Statement of the Bachelor of Computer Science Program(s): Provide high quality, computer science education to prepare top graduates through an environment that promotes innovative thinking, ethical behavior, lifelong learning, research, and service to the community
2. Course number and name: CS435 Distributed System
3. Credits and contact hours: 3 credits and 4 contact hours (Lectures: 3 Tutorials:1)
4. Instructor's or course coordinator's name: Dr. Basit Qureshi and Dr. Lamia Berriche
   - Scheduled Office Hours: 10:00 am -11:00 am
   - Office Location: 2B 20 Building 105
   - Email: qureshi@psu.edu.sa
5. Text book, title, author, and year
   - Primary Text: [ST] Distributed Systems by Maarten van Steen and Andrew Tanenbaum; CreateSpace Independent Publishing Platform; 3rd edition (February 1, 2017); ISBN: 978-1543057386
   - Other References: [CD] Distributed Systems: Concepts and Design, 5th Ed. by George Coulouris, Jean Dollimore, Tim Kindberg, Gordon Blair, Pearson ISBN-13: 978-0132143011
   - Course Website: https://www.ieeepsu.org/basit/cs435
   - Learning Management System: Moodle available at https://lms.psu.edu.sa

5. Specific course information
   a. Brief description of the content of the course (catalog description): This course introduces students to distributed and parallel systems. It covers process distribution and communication, data distribution, scheduling, concurrency, resource sharing, synchronization, naming, abstraction and modularity, failure handling, distributed programming models, distributed file systems, virtualization, and the use of instrumentation, monitoring and debugging tools in problem solving. Students will learn the design and implementation of today's popular distributed system paradigms, such as Google File System and MapReduce.
   b. Prerequisites or co-requisites: CS330 Operating Systems and CS331 Comp. Networks
   c. Indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program: Required for CS. Elective for SE and IS.

6. Specific goals for the course
   a. Specific outcomes of instruction.
   At the end of the course, the student will be able to:
   CLO1: Demonstrate an understanding of the principles, architectures, and programming models used in distributed systems.
   CLO2: Describe various distributed algorithms for synchronization and concurrency, coordination, transactions, and replication.

CLO3: Analyze state-of-the-art distributed systems based on feature and performance criteria.
CLO4: Apply distributed systems techniques and methodologies in domain-specific applications.

b. Explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course. The course addresses ABET CS-SOs 1 and 2.

Course LOs #	Student Outcomes (SOs)
	Computer Science
1	SO 1
2	SO 1
3	SO 1
4	SO 6

7. Brief list of topics to be covered

Week No.	Topics	CLO(s) alignment	Assessments
1	Intro to Distributed Systems [ST 1]	1	
2	Dist. Systems Architectures [ST 2]	1	Assignment
3-4	Processes [ST 3]	2, 4	Quiz, Assignment
5-7	Coordination and Synchronization [ST 6]	2, 4	Assignment
8-9	Communication [ST 4]	2, 4	Quiz, Assignment
9-10	Consistency, Fault Tolerance [ST 7-8]	2, 4	Midterm Exam Monday April 22, 2024
11	Security [ST 9]	2, 4	Assignment
12	Distributed Memory and Storage [CD 12-13]	2, 3	
13-14	P2P systems, Hadoop, Spark, MapReduce, Docker, Kubernetes.	3	Assignment/ Project
15	Distributed Systems case studies, P2P systems [Readings]	3	

8. Weight of Assessments

Assessment	Assessment Task	Week Due	Proportion of Final Assessment
1	Midterm Exam	Week 11	20%

2	Course Project	Week 13-15	10%
3	4x Programming Assignments	Every few weeks	20%
4	2x Quizzes		5%
5	Attendance		5%
6	Final Exam	At the end of the semester	40%

9. Additional Information

Plagiarism and Academic Dishonesty: "Plagiarism can be defined as unintentionally or deliberately using another person's writing or ideas as though they are one's own. Plagiarism includes, but is not limited to, copying another individual's work and taking credit for it, paraphrasing information from a source without proper documentation, and mixing one's own words with those of another author without attribution. In addition, buying a paper or project, or downloading a paper from the Internet, and submitting them as your own are also plagiarism. The penalty for academic dishonesty will bring course expulsion and failure, or even suspension" (Academic Integrity and Syllabus Acknowledgement Form).

Attendance Policies: The University attendance policy will be strictly followed. Students are expected to attend all class sessions and be in class on-time. Missing a class session is a student's responsibility. Missed classes will not be repeated. A total of 16 absences ends in a denial grade DN. It is the student's responsibility to periodically check course website/Moodle for course content, projects assignments, updates and notifications. The CCIS additionally has penalties for missed classes as follows.

No of absences	4	7	10	13	15
Reduced score	1	2	3	4	5

Exam Policies: Major exams are unified among all sections (if applicable) and their dates are announced from the onset of the semester. Arrangements with the Registration Office and the department are made before the beginning of the semester so that all sections will take the same exam and during the same time. It is not possible to reschedule any major exam. No student is allowed to take any assessment with another section unless there is a strong argument and in limited cases, to be approved by the course coordinator at least two days BEFORE the quiz date of the original student section. If any student missed an assessment, the makeup will be at the end of the semester and all the materials are included (comprehensive assessment). Makeup exam will only be approved in limited cases as stipulated in the university bylaws. Generally, the final exam includes all material covered during the semester (comprehensive).

Assignment/Project Policies: Students are expected to actively participate in class discussion and activities. Students are expected to provide solution to the assignment questionnaire and submit the solution during the allowed time period. Late assignments are not accepted. It is the student's responsibility to check/test/verify/debug the code before submission. It is the student's responsibility to verify that all files have been uploaded to the LMS. After an assignment/project has been graded, re-submission with an intention to improve an assignments scores will not be allowed. After the

assignment/project has been graded, the instructor will post test-cases used for grading on the website. The instructor has the right to share project execution reports that may have been auto-generated on the course website.