

Jackson State University
Department of Computer Science
CSC 435/524 Computer Networks
Spring 2020

Instructor: Dr. Natarajan Meghanathan

Office: ENB 275

Phone: 601-979-3661

Email: natarajan.meghanathan@jsums.edu

Class Room: ENB 212

Class Time: R 6 PM to 8.50 PM

Office Hours: TR 11.30 AM to 12 PM

T 5.50 PM to 7.40 PM

R 5.50 PM to 6 PM

Also, TR 3 PM to 6 PM

Catalog Description

CSC 435 (3) Computer Networks; Prerequisites: CSC 323 and CSC 325. The CSC 435 course will primarily focus on the following five layers of the TCP/IP protocol stack: Physical, Link, Network, Transport and Application layers. Topics to be covered include: Physical Layer: encoding and decoding data for short-distance and long-distance communications; Link Layer: local area network technologies and their extension using interconnection devices; Network Layer: routing protocols, IP addressing, subnets, datagram forwarding, fragmentation and other auxiliary network-level communication protocols; Transport Layer: UDP and TCP and Application Layer: Socket programming. The course will also cover appropriate security aspects for each of the above layers. (F, S).

Course Outcomes

Each student who successfully completes this course should be able to:

CO-1: Analyze the different aspects of physical layer such as encoding standards, transmission order, modulation and multiplexing techniques

CO-2: Describe the working of local area network (LAN) technologies for wired and wireless networks as well as analyze the working of virtual LANs and different networking devices

CO-3: Construct and use routing tables for datagram forwarding and study the different categories of Internet routing protocols

CO-4: Describe the responsibilities of the different layers of TCP/IP protocol stack as well as the use of different fields in the packet headers corresponding to these layers

CO-5: Explain the different classes of IP addresses as well as apply strategies such as subnetting and CIDR for efficient IP address assignment

CO-6: Analyze end-to-end transport layer protocols like TCP and UDP, including the flow control and congestion control algorithms

CO-7: Explore the classical network attacks, their causes and analyze solutions to combat those attacks

Course Textbook

J. F. Kurose and K. W. Ross, "Computer Networking: A Top-Down Approach," 7th Edition, Prentice Hall, 2016, ISBN: 0133594140.

Course Website

<http://www.jsums.edu/nmeghanathan/csc435-sp2020/>

<http://www.jsums.edu/nmeghanathan/csc524-sp2020/>

Students are required to attend every class and frequently check the course website for latest updates regarding the course. All announcements, lecture materials for all chapters, lab projects, reading assignments

and quiz solutions will be posted in the course website. Note that the course website can also be accessed by visiting the link <http://www.jsums.edu/nmeghanathan> and clicking on the CSC 435/CSC 524 Course link in the list of courses for Spring 2020.

Canvas

Students are required to check the Canvas site for the course. Some of the quizzes and exams would need to be answered through Canvas. All the project submissions should be done through Canvas. NO LATE SUBMISSIONS will be accepted for any reason.

Evaluation

Exams – 75% (5 Exams; 15% for each Exam)

Assignments – 25% (5 Assignments; 5% for each Assignments): An assignment could be either an in-class quiz or an online quiz taken in Canvas or a project (programming, hands-on tools based, etc). All assignments are to be done individually.

Assignments and Exams Calendar: Unless otherwise notified, we will stick on to the following dates for the assignments and exams. An in-class quiz/assignment could be conducted any time during the class. So, students need to be present on-time at the beginning of the class and stay till the end of the class.

	Thursday
Week 1	01/16
Week 2	01/23
Week 3	01/30
Week 4	02/06
Week 5	02/13, Assignment 1
Week 6	02/20, EXAM 1
Week 7	02/27, Assignment 2
Week 8	03/05, EXAM 2
Week 9	03/12, Spring break, No class
Week 10	03/19, Assignment 3
Week 11	03/26, EXAM 3
Week 12	04/02, Assignment 4
Week 13	04/09, EXAM 4
Week 14	04/16, Assignment 5
Week 15	04/23, EXAM 5: FINAL EXAM

Assignment Report Submissions: All assignment reports should be submitted through Canvas. For some assignments, you will probably have to record a video of your presentation to demonstrate the working of the assignment and submit the video through GoogleDrive (using your JSU student account) or through Canvas.

Program Outcomes

Each student who graduates from the Undergraduate program in Computer Science will be able to:

- (1) Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
- (2) Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.
- (3) Communicate effectively in a variety of professional contexts.

- (4) Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
- (5) Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
- (6) Apply computer science theory and software development fundamentals to produce computing-based solutions.

Mapping of CSC 435 Course Outcomes to Program Outcomes

	CO-1	CO-2	CO-3	CO-4	CO-5	CO-6	CO-7
(6)	X	X	X	X	X	X	X

Course Outline (Tentative)

Week #	Topics to be Covered	Course Outcomes
Week 1	Module 1: IP/MAC Addresses and TCP/IP Suite MAC Address; Class-based IP Addresses and Private IP Address	CO-5
Week 2	Module 1: IP/MAC Addresses and TCP/IP Suite Subnetting	CO-5
Week 3	Module 1: IP/MAC Addresses and TCP/IP Suite CIDR; End-to-end Packet Transmission in the Internet; ISO/OSI model and TCP/IP model	CO-5
Week 4	Module 2: Socket Programming in Java Connectionless sockets, Connection-oriented sockets, Multicast sockets	
Week 5	Module 3: Physical Layer Signal levels; Baud rate and bit rate; Channel encoding standards; Transmission order of bits and bytes; Modulation techniques; Multiplexing techniques	CO-1
Week 6	Module 4: Local Area Networks (LANs), VLANs and Networking Devices LAN topologies, Ethernet and Wireless LANs; Networking Devices: Repeater, Hub	CO-2
Week 7	Module 4: Local Area Networks (LANs), VLANs and Networking Devices Networking Devices: Bridge, Switch, Router, Virtual LANs	CO-2
Week 8	Module 5: Routing Protocols Principles of Routing in the Internet; Distance Vector Routing; Link State Routing Protocol	CO-3
Week 9	SPRING BREAK	
Week 10	Module 5: Routing Protocols Routing across Autonomous Systems; Multicast routing protocols	CO-3
Week 11	Module 6: Internet Layer IP Header; IP Datagram Forwarding; IP Datagram Fragmentation	CO-4
Week 12	Module 6: Internet Layer IP Auxiliary protocols and Technologies	CO-4
	Module 7: Transport Layer User Datagram Protocol (UDP)	CO-6

Week 13	Module 7: Transport Layer TCP Header and Connection establishment; TCP flow control and congestion control	CO-6
Week 14	Module 8: Network Security Classical denial of service attacks; Defense using cryptography	CO-7
Week 15	Module 8: Network Security IPSec; Firewalls	CO-7

Grading Scale

90 – 100	A
80 – 89	B
70 – 79	C
60 – 69	D
Below 60	F

Reference Books

No.	Book Title/ Edition, Year	Authors	Publisher	ISBN
1	Computer Networks: A Systems Approach, 4th Edition, March 2007	March Peterson and Davie	Morgan Kaufmann	0123705487
2	Computer Networks, 4th Edition, August 2002	A. S. Tannenbaum	Prentice Hall	0130661023
3	Computer Networking: A Top-Down Approach, 6 th Edition, 2013	J. F. Kurose and K. W. Ross	Prentice Hall	0132856204
4	TCP/IP Illustrated, Vol. 1: The Protocols, January 1994	W. Richard Stevens	Addison Wesley	0201633469
5	Internetworking with TCP/IP, July 2005	D. E. Comer	Prentice Hall	0131876716
6	Interconnections: Bridges, Routers, Switches, and Internetworking Protocols, 2nd Edition, September 1999	Radia Palmer	Addison Wesley	0201634481
7	Network Analysis, Architecture and Design, 2nd Edition, May 2003	James D. McCabe	Morgan Kaufmann	1558608877
8	TCP/IP Sockets in Java, 2nd Edition: Practical Guide for Programmers, February 2008	K. L. Calvert and M. J. Donahoo	Morgan Kaufmann	0123742551
9	Java Network Programming, 3rd Edition, October 2004	E. R. Harold	O'Reilly	0596007213
10	Distributed Computing: Principles and Applications, June 2003. (for Socket programming)	M. L. Liu	Addison Wesley	0201796449

ADA Statement

Compliance with the Americans with Disabilities Act: "It is the university policy to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities that may affect their ability to participate in course activities or to meet course requirements. Students with disabilities are encouraged to contact their instructors to discuss their individual needs for

accommodations.” If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and ADA Coordinator (as early as possible in the term) located in the Jacob L. Reddix Building (old student union), rooms 101 and 102. The office hours are: 8:00 a. m. to 5:00 p.m., Monday through Friday. The telephone number is (601) 979-3704 or (601) 979-6919 (TTY) and the facsimile number is (601) 979-6918. The mailing address is: Office of Support Services for Students and Employees with Disabilities, P.O. Box 17156, Jackson State University, Jackson MS 39217.

Diversity Statement

Jackson State University is committed to creating a community that affirms and welcomes persons from diverse backgrounds and experiences and support the realization of their potential. We recognize that there are differences among groups of people and individuals based on ethnicity, race, socioeconomic status, gender, exceptionalities, language religion, sexual orientation, and geographical area. All persons are encouraged to respect the individual difference of others.

Collegiate Code of Conduct

Jackson State University students are expected to dress in a manner representative of higher education institution. More information on Dress Code; Verbal and/or Physical Harassment; Indecent, Obscene, Immoral Behavior and/or Profanity is available in the JSU Student Handbook. The JSU Student Handbook is available at <http://www.jsums.edu/~studentlife/handbook.pdf>

Dropping a course

The last day to drop a course with no grade: January 27, 2020
 The last day to drop a course with “W” grade: March 27, 2020

Course Policies

Note: The course policies will be strictly adhered to. Students are expected to be aware of the course policies throughout the semester.

Exam/ Assignment Dates

- Unless otherwise notified, we will stick on to dates for the assignments and exams listed in Page 2 of this syllabus. A Quiz could be conducted any time during the class. So, students need to be present on-time at the beginning of the class and stay till the end of the class.

Projects

- **Late submission of projects will not be accepted.**
- It is the responsibility of the student to make sure he/she can print the project reports before the due date /time. No excuse will be given for lack of computer access, printers to print the document.

Make-up Quizzes and Exams

- No Make-up Quizzes will be given. If a student misses a quiz for ANY reason, the student gets a score of ‘zero’ for the quiz and no make-up quiz will be given.
- **No make-up examinations will be given except for emergencies such as death in the family or serious illness. The instructor must be informed, through e-mail or a written request, BEFORE the time of the examination that is to be missed.** The instructor will make a decision on the make-up examination after verifying the appropriate written documentation. Failure to furnish, written, verifiable documentation will result in a grade of zero for the missed examination.
- **Any make-up exam for a missed exam has to be taken before the next class meeting time.**
- **A make-up exam will be different and will be relatively tough compared to the actual missed exam.**
- **NO MAKE-UP EXAM WILL BE GIVEN FOR THE FINAL EXAM. Students are required to take the final exam during the date and time specified by the university.**

Contesting Grades

- Grades for a particular exam or quiz can be contested only within a week after the grades for that exam/quiz are announced.
- Grades for the final exam will have to be contested within two days after the exam.
- The grade for the overall course will have to be also contested within two days after the final exam. Any change of grade requested 48 hours after the completion of the final exam will not be considered.

Maintaining Registration Status

- It is the duty of the student to make sure that he/she stays registered in the course throughout the semester. If a student sees he/she is dropped from the course, the student should notify the instructor before the next meeting of the class.
- A student cannot attend a class or take an exam/quiz if the student is not registered for the course at that point of time.

Dropping the Course

- The last date to drop the course without any grade is January 27, 2020. The last date to drop the course with a “W” grade is March 27, 2020.
- The instructor will not assist in any way to get the student dropped with no grade or “W” grade after the above dates.

Anticipated Leave

- If a student is anticipating any medical emergency (like surgery, pregnancy, etc.), conference participation, game participation, etc. during the course of the semester, the student should furnish the appropriate medical documents, conference registration receipt, letter from the coach, etc, and discuss with the instructor within the first two weeks of the course on how to make up for the classes/exams/assignments that will be missed.
- The instructor will make a decision on the make-up examination after verifying the appropriate written documentation. Failure to furnish, written, verifiable documentation will result in a grade of zero for the missed examination.
- The instructor will give a different set of assignments, projects and make-up exams than the ones given in class.
- **The student is responsible for the materials covered in a class that he/she misses.**

Other Course Policies

- Turn off your cell phone in class. **Use of a cell phone or a laptop computer is not allowed in class.**
- If a student leaves the classroom during a quiz or exam for any reason, the student’s exam paper will be collected, and thus he/she will not be able to resume the testing after coming back to the room. Inform the instructor if any health problem prevents you from remaining in the classroom until you complete the quiz or exam.

Student Conduct and Class Attendance Policy

Students at Jackson State University must fully commit themselves to their program of study. One hundred percent (100%) punctual class attendance is expected from each student for all the scheduled classes and activities. The instructor will be maintaining the attendance record and any absence of a student without providing any written official excuse, is counted as an unexcused absence. Irrespective of the type of excuse (i.e., official or unofficial), the student is responsible for the work required during their absences.

The instructor will call the roll at the beginning of the class. Also, the instructor will pass an attendance sign-up sheet to each student. Students coming late to the class by more than 10 minutes will be marked “Absent”.

Students may be officially excused from class for attendance at University approved functions provided the sponsor properly executes a Student Affairs Leave Form. The instructor shall accept such excuses. The Dean of the School or the Vice President for Academic Affairs may also officially excuse students for certain campus activities. Students must submit written documentation to Student Affairs to obtain official excuses for absences due to illness or other emergency situations. Students who willfully miss class face serious consequences. After being absent four times in a 80-minute class, one time immediately before or after a scheduled recess/holiday, the instructor shall report the next unexcused absence to the Dean of University College for freshmen and sophomores and to the School Dean and Department Chair for Juniors and Seniors. The Dean/Chair or designee will counsel with the student and in concert with the instructor, may require the student complete complimentary course assignments. If a student does not respond well to the counsel or with the assignments, the instructor may impose a grade penalty on the student. Unexcused absences that exceed the equivalency of four 80-minute sessions may lead to an “F” for the course.

Academic Honesty

All acts of academic dishonesty (e.g., cheating on exams, plagiarizing – presenting another person’s work as one’s own, having another person write one’s paper, making up research data, presenting excuses which are untrue for failing to meet academic and professional standards) are a violation of engineering values, ethics, and University policy, which will entail appropriate penalties.

Policy Regarding Course Incompleteness

Incomplete is the designation used to indicate failure to complete assignments or other course work including final or other examinations, by the end of the term in which the student is enrolled. The grade of incomplete “I” is recorded when the student has not completed the course due to some unavoidable reason that is acceptable by the instructor. An incomplete grade “I” is to be considered only when the majority of the course requirements and the assignments have been successfully completed and there is a documented crisis situation of illness, accident, or other occurrence which prevents a student from completing the remaining requirements before the school term ends. The incomplete grade “I” is not a substitute for the failure grade “F”.

The instructor is required to indicate on the grade sheet the grade the student should receive if the incomplete is not removed within the prescribed time. If the student fails to complete the course requirements satisfactorily within the specified time, the alternate grade will be recorded as the grade of record.