

CSC 641 Network Science

Instructor: Dr. Natarajan Meghanathan, Professor of Computer Science

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Catalog Description

CSC 641 (3 Hours) Network Science. Topics covered include the measurement and structure of networks, methods for analyzing network data, including methods developed in physics, statistics, and sociology, graph theory, computer algorithms, mathematical models of networks, including random graph models and generative models, and theories of dynamical processes taking place on networks..

Pre-requisite: Graduate student status in Computer Science or CDSE

Course Outcomes

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

CO-1: Analyze the characteristics of complex networks using graph theoretic metrics and paradigms

CO-2: Compare and contrast the properties of random networks with those of real-world networks

CO-3: Apply various centrality metrics and related algorithms to determine the topological significance of the nodes in a network

CO-4: Extract clusters of related nodes using efficient community detection algorithms

CO-5: Analyze how node behavior and topology structure affect information diffusion and opinion formation in a network

CO-6: Use hands-on tools to analyze and predict relationships/patterns in complex networks

Required Textbook

K. Erciyes, "Complex Networks: An Algorithmic Perspective," 1st Edition, CRC Press, ISBN: 9781466571662, September 2014.

Course Modules (Tentative)

Module 1: Graph Theory Basics

Module 2: Centrality Measures

Module 3: Community Detection Algorithms

Module 4: Diffusion

Module 5: Random Networks

Module 6: Scale-Free Networks

Module 7: Small-World Networks

Evaluation: Projects – 20% (2 Projects); Quizzes – 20 % (3 Quizzes); Exams – 60% (3 Exams)

Grading

90 - 100: A

80 - 89: B

70 - 79: C

60 - 69: D

Below 60: F

Course Website: <http://www.jsums.edu/nmeghanathan/csc-641-network-science-fall-2015/>

Dropping a course

The last day to drop a course with no grade:

September 8, 2015

The last day to drop a course with "W" grade:

October 26, 2015

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 (Exam 3). Students are required to take the final exam during the date and time specified by the university.**

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 without his/her knowledge, 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.

ADA Statement

Compliance with the Americans with Disabilities Act: 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 most recent version of JSU Student Handbook is available at <http://www.jsu.edu/studentlife/pdf/2010book.pdf>

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 of all students in all scheduled classes and activities. Instructors keep attendance records and any absence for which a student does not provide written official excuse is counted as an unexcused absence. Students must understand that even with an official excuse of absence, they (students) are responsible for the work required during their absence.

Students may be officially excused from class for attendance at University approved functions, provided the sponsor properly executes a Student Affairs Leave Form. Such excuses shall be accepted by the instructor. Students may also be officially excused by the Dean of their School or the Vice President for Academic Affairs 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 three times in a 50-minute class, three hours in a class that meets longer than one hour, or 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 freshman 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 to complete complementary 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 six 50-minute Sessions may lead to an "F" for the course.