

ECE 8408 (Mobile Computing & Wireless Networks) [Spring 2018]

Instructor: Sarvesh Kulkarni

1 General Information

Class: Thursday 3:00 pm - 5:30 pm, in CEER 314 and online (simultaneously)

Instructor: Sarvesh Kulkarni (sarvesh.kulkarni@villanova.edu)

Office: Tol 431A

Office Hours: Mon & Wed 11:30 am - 1:00 pm, Thu 5:30 - 6:00 pm, or by appointment

Phone: 610-519-6533

Study materials:

1. Selected research papers: references or download links will be provided as and when needed.
2. Supplementary notes for selected topics will be posted on the Blackboard e-learning site.

2 Student Evaluation and Grading Scheme

Grades will be awarded based on your performance on the following weighted components:

Midterm Exam: 20% total weightage

Final Exam: 25% total weightage

HW: 15% weightage

Design project: 20% weightage

Survey paper: 20% weightage

The class average corresponds to a **B** grade.

All HW and project assignments are to be uploaded to the **Blackboard** e-learning site on the due date, or handed-in during class hours. Late HW assignments will be assessed a 10% penalty per day, up to the cut-off date (usually three days later). After the cut-off date, assignments/projects WILL NOT be accepted. Questions in the exams will be based on the material taught in class, class discussions and homework assignments.

You will write a technical paper (**survey paper**) surveying a particular research area of interest in mobile networks. Topics for the paper will have to be pre-approved by the instructor. This is a challenging task and you will not do a good job if you write the paper the night (or even the week) before it is due. More instructions on how to proceed will be provided as the semester progresses.

3 Course Information

3.1 Course topics

The list of course topics is given below, not necessarily in order. We may make additions or deletions to this list as the course proceeds depending on students' interests. This course will benefit

greatly from active students interaction.

1. Introduction to wireless systems, including cellular systems.
2. Protocol challenges in designing wireless and mobile systems:
 - 2.1 Static, dynamic and hybrid channel allocation (without contention).
 - 2.2 MAC algorithms for channel access (contention-based).
 - 2.3 Performance considerations in using the TCP/IP stack in wireless hosts.
 - 2.4 Modification of TCP for mobile environments.
3. Mobile IP: concepts, scheme, roaming and handoffs.
4. Select routing algorithms for mobile ad hoc networks (MANETs).
5. Sensor networks.
6. Satellite systems, Cross-layer design, if time permits.

3.2 Course Objectives

At the conclusion of this course, students will have a broad understanding of:

1. the different aspects and challenges of wireless network protocol design,
2. protocol design concepts,
3. steps in implementing routing protocols for current and future wireless systems, and
4. detailed routing solutions for 1-hop and multi-hop mobile networks.

4 Policy on Academic Integrity

You are allowed to discuss problem-solving techniques with your classmates, in *general terms only*. However you may not discuss the specifics of your problem solution with your peers, or ask them to review your solutions, nor ask them to show you their solutions. Furthermore, all deliverables must be *in your own words*. Similarly, you are allowed to seek help from others in trying to understand the research papers that you read for writing your “survey paper.” However, the survey paper must be *in your own words, the way you understood the material*. Of course, during examinations, you may not collaborate with anyone at any level, or use any materials or devices that are not authorized by the instructor.

The College of Engineering is committed to creating an environment of academic integrity and ethical decision-making that we hope is reflected in the actions of our students and graduates. As Villanova students, integrity is central to the University mission. As engineers, our code of conduct requires us to place honor and integrity at the forefront of everything we do. As engineering students, it is expected that you will begin to adopt these values and instill them into your work habits. Students violating the academic integrity policy **will receive a zero** on that assignment or examination and the violation **will be reported** to the Associate Dean for Academic Affairs for disciplinary action.

The University’s academic integrity policy can be found here:

<https://www1.villanova.edu/villanova/provost/resources/student/policies/integrity.html>

5 Examination Conduct Guidelines

The College of Engineering has adopted the following exam guidelines:

1. Students must arrive before the start of the exam. Under exceptional circumstances a student may need to arrive late, but he/she can enter the examination venue no later than 5 minutes after the start of the examination.
2. All cell phones and smart watches (except Fitbits) must be turned off and stored away until the student exits the examination room.
3. The official Villanova class attendance policy must be followed when requesting excuses for absences or lateness to an examination.
4. Each student must write and sign the following statement, “I have neither given nor received any unauthorized assistance in the completion of this examination”.

6 Other Administrative Information and Special Accommodations

Make-up examinations requested by students due to business trips shall be on **PRIOR** arrangement and shall usually be taken **EARLIER** than the one on our regular schedule. Make-up examinations due to health reasons and unforeseen circumstances will be administered on a case by case basis, if suitable and compelling documentation is provided.

It is the policy of Villanova to make reasonable academic accommodations for qualified individuals with disabilities. If you are a person with a disability please contact me after class or during office hours to make arrangements. If you have a non-physical disability you need to register with the Learning Support Office by contacting 610-519-5176 or at learning.support.services@villanova.edu as soon as possible. Registration is needed to receive accommodations.

The Office of Disability Services collaborates with students, faculty, staff, and community members to create diverse learning environments that are usable, equitable, inclusive and sustainable. The ODS provides Villanova University students with physical disabilities the necessary support to successfully complete their education and participate in activities available to all students. If you have a diagnosed disability and plan to utilize academic accommodations, please contact and register with Gregory Hannah, advisor to students with disabilities @ 610-519-3209 or visit the office on the second floor of the Connelly Center.