ENTS 659M Special Topics in Communications: Intelligent Wireless Technologies

Spring 2018 Syllabus

Course Description: Communications principles for adaptive intelligent systems. This course will cover the physical layer communications components of Machine-to-Machine (M2M) technologies, Intelligent Transportation Systems (ITS), and Smart Grid Systems. Within M2M, students will learn about the Internet of Things (IoT) peer discovery, spectrum resource allocation, interference coordination and management, internet geolocation, and location-based services. The course will then focus on ITS, automotive control area networks (CAN), road-based vehicular ad-hoc network (VANET), and inter-vehicle communication systems. The final segment of the course will turn to Smart Grid, narrowband power line communication in smart grid applications, event-driven and hybrid communication between meters, data traffic scheduling, and capacity of a wireless backhaul for the distribution level, and data aggregation. This course will emphasize lower layer communications, and students will participate in two simulation projects in Matlab.

Time and place of lecture: Mondays 5:30PM – 8:15PM, JMP 1202

Instructor: Alejandra Mercado (mercado@umd.edu, office: AV Williams Building 1365)
Office Hours: Mondays 2PM – 4PM (always set up appointment online, here)

Logging in to the Course for announcements, instant messaging, documents, articles, etc.:
Go to http://elms.umd.edu. Login with your Maryland Directory ID and password.

Grading
Attendance quiz: 4%
Project & report: 32%
Project & report: 32%
Final Exam: 32%
Total: 100%

Final Grading will be determined using the following scale based on the overall average score:
Threshold for A-, A, A+: 90 %
Threshold for C-, C, C+: 70 %
Threshold for B-, B, B+: 80 %
Threshold for D-, D, D+: 60 %
Threshold for F: everything else

A± denotes excellent mastery of the subject and outstanding scholarship.
B± denotes good mastery of the subject and good scholarship.
C± denotes acceptable mastery of the subject and the usual achievement expected.
D± denotes borderline understanding of the subject and marginal performance.
F denotes unsatisfactory performance.
XF denotes failure due to academic dishonesty.
**Tentative Course Schedule**

The instructor reserves the right to make schedule changes based on the needs of the students and class progress.

<table>
<thead>
<tr>
<th>Week Number</th>
<th>Date</th>
<th>Lecture Topic from text</th>
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<tbody>
<tr>
<td>1</td>
<td>Jan 29</td>
<td>Introduction to the course. ATTENDANCE QUIZ (<em>late arrivals will be counted as 0%</em>)</td>
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<td><strong>Unit 1: M2M and Internet of Things</strong></td>
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<td>2</td>
<td>Feb 5</td>
<td>Phy for Bluetooth &amp; WIFI</td>
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<td>3</td>
<td>Feb 12</td>
<td>Service and Peer Discovery, Spectrum Resource Allocation, Interference Coordination and Management</td>
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<td>4</td>
<td>Feb 19</td>
<td>Internet Geolocation And Location-Based Services</td>
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<td>5</td>
<td>Feb 26</td>
<td><strong>Project &amp; report: Unit 1 (due in April)</strong></td>
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<td>6</td>
<td>Mar 5</td>
<td>Unit 2: ITS and Smart Cars</td>
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<td>7</td>
<td>Mar 12</td>
<td>Automotive Control Area Network (CAN)</td>
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<td>8</td>
<td>Mar 19</td>
<td>SPRING BREAK (no classes)</td>
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<tr>
<td>9</td>
<td>Mar 26</td>
<td>Road-based vehicular ad-hoc network (VANET), Inter-vehicle Communication Systems</td>
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<td>10</td>
<td>Apr 2</td>
<td>PHY layer connectivity</td>
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<td>11</td>
<td>Apr 9</td>
<td><strong>Project &amp; report: Unit 2 (due in May)</strong></td>
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<td>12</td>
<td>Apr 16</td>
<td>Unit 3: Smart Grid</td>
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<td>13</td>
<td>Apr 23</td>
<td>Narrowband Power Line Communication In Smart Grid Applications</td>
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<td>14</td>
<td>Apr 30</td>
<td>Event-Driven and Hybrid Communication between Meters in Smart Grid, Data Traffic Scheduling</td>
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<td>15</td>
<td>May 7</td>
<td>Phasor Measurement Units: Communication Links, Data Availability, Capacity of a Wireless Backhaul for the Distribution Level, Data Aggregation</td>
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<tr>
<td>16</td>
<td>May 11</td>
<td>Reading Day (no lectures)</td>
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</table>

- May 14-18 | Finals week (*Final not comprehensive; it covers only Unit 3*)

**A. Requirements**

Students are expected to be on time, attend all class meetings and lab sessions, and complete all assignments and all assessments of their knowledge and understanding of the class material.

**B. Assignments**

Any assignment that is turned in should be complete, and represent the student’s individual and original work. Turn in your assignment at the beginning of the class. Late assignments will not be accepted, as this would place an unfair burden on students who hand in their work in a timely manner.

**C. Make-up Policy**

In the case of an excused absence (such as a disabling medical emergency with a letter from a physician on official letterhead, or a death in the immediate family with proper documentation), the instructor will redefine the grading distribution in accordance with what assessment was lost.

Excused Absence: If you miss an assessment (test or project), contact me as soon as possible. You may receive an excused absence for such things as: medical emergencies, or death of an immediate relative. Unexcused absences will result in a grade of zero for the missed assessment.

Religious Observance: The student should inform the instructor at the beginning of the semester about any absences due to religious observances. We will make appropriate arrangements for the missed assessment. This must be NO LATER than the second week of classes.

**D. Audit Policy**

Audit students must participate fully in the course and follow all policies and procedures to audit the course. Exception: exams and reports are not required.
E. Academic Integrity
The maintenance of the highest standards of intellectual honesty is the concern of every student and faculty member at the University of Maryland. Plagiarism, which is defined as appropriating or closely imitating another person's work or ideas and representing them as one’s own original work, is strictly prohibited. Use of phones, tablets or other electronic devices during a test is not allowed. Talking or whispering during exams or quizzes is never allowed. Academic Dishonesty or Misconduct can occur in many ways. Some examples are:

a) Plagiarizing from written, video, or Internet resources
b) Forgery
c) Submitting materials that are not the student’s own work, such as Matlab code
d) Taking examinations in the place of another student, including assessment tests
e) Assisting others in committing academic dishonesty
f) Copying from another student during an examination or on a homework assignment.

Failure to abide by the rules of Academic Integrity (which, in addition to the described above is detailed in http://www.president.umd.edu/policies/docs/III-100A.pdf) will result, at the very least, in a grade of XF: the grade appears on the student's transcript with the notation "Failure due to academic dishonesty," as well as further disciplinary actions.

F. Taping and/or Distributing Course Materials Forbidden
All course materials (lecture slides and other materials provided to you) are to be considered copyrighted by the University of Maryland – and may not be reproduced for anything other than personal use without written permission from your instructor and the College Dean. Video-taping, photographing, or audio-taping lectures is forbidden. If you publicly post or share course materials, and especially any solutions for homework, exams, quizzes, project, etc., you will be in violation of U.S. Copyright Law, University of Maryland policies, as well as the Code of Academic Integrity.

G. Support Services
Disability Support Services (DSS): Any student who may need an accommodation due to a disability should contact DSS offices at 0106 Shoemaker Building (301.314.7682) A letter from DSS authorizing your accommodations will be needed. For a complete list of other student support services, please refer to the Student Handbook.

H. Cancellation of Classes
If inclement weather forces the campus to suspend classes or close, public service announcements will be provided to local radio and television stations as early as possible. Assume that classes will be held unless you read or hear otherwise from the university web page or radio or television.

You may also call check the UMCP web page at http://www.umd.edu/emergencypreparedness/weather_emer/

Check the canvas (ELMS) course site frequently and always before coming to campus for lecture, as instructor will post announcements there about class cancellations or other course-related matter.

CONTACTS:
Students learn best from each other when studying together. Also, class contacts are useful in the event you miss a class. In that vein, I encourage you to meet your neighbors, and get some contact information.

Name: __________________________    Name: __________________________

Email: __________________________    Email: __________________________

Phone: __________________________    Phone: __________________________
Contact the instructor: The best ways to reach me is via email. Please only use your UM email address; due to privacy issues I will not read mail from personal email addresses.

VETERANS
If you are a veteran or on active or reserve status and you are interested in information regarding opportunities, programs and/or services, please visit the University of Maryland Veterans Program Office website at http://registrar.umd.edu/veteran-benefits.html