George Mason University  
Volgenau School of Engineering  
Department of Electrical and Computer Engineering  
ECE 499 002/ ECE 590 002  
Smart Grid and Cyber Security  
Course Syllabus – Spring 2020

Course Description

The course is concerned with smart grid and system security of the integrated cyber and physical power systems. The subjects to be covered include power system operation and control, smart grid technology, cyber power system security, vulnerability of the integrated system, intrusion detection, mitigation and defense, and system restoration. Field trips to industry facilities will be arranged and guest lectures will be invited as appropriate.

Instructor

Dr. Liling Huang  
3207 Nguyen Engineering Building  
(703) 993-1699  
lhuang20@gmu.edu

Lecture Time and Location

Wednesday: 4:30 PM – 7:10 PM (IN 208)

Prerequisite

ECE 499 002: ECE 286 Electric Circuit Analysis II

Recommended Reading


Topic Outline (might change slightly based on class improvements)

- Power system operation and control environment
- Introduction to Smart Grid
- Smart Grid Communication
- Supervisory Control And Data Acquisition (SCADA) and cyber systems in a power grid
- Integrated cyber-power system model
- Cyber-physical system security concept
- Vulnerability assessment methodology
- Cyber security and intrusions
- Anomaly detection at substations
- Defense methodology
- Mitigation
- Power system restoration
- SCADA/EMS/DMS/Smart Meters testbed environment
- Validation with a testbed
- Physical Security
- Future Control Centers

Grading

The course grade is based on the weighted sum of the following.

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Homework</td>
<td>40%</td>
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<tr>
<td>Exams</td>
<td>40%</td>
</tr>
<tr>
<td>Term Project</td>
<td>20%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
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Students in ECE 499 002 and ECE 590 002 will be assigned different sets of Homework assignments, Exams and Term Projects, respectively.

Final Course Grade will be assigned based on the following scale. **Homework and Term Project must be 50% or above in order to pass the course, regardless of your grade on the Total.**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
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<tbody>
<tr>
<td>A+</td>
<td>Total ≥ 97%</td>
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<tr>
<td>A</td>
<td>94% ≤ Total &lt; 97%</td>
</tr>
<tr>
<td>A-</td>
<td>90% ≤ Total &lt; 94%</td>
</tr>
<tr>
<td>B+</td>
<td>87% ≤ Total &lt; 90%</td>
</tr>
<tr>
<td>B</td>
<td>84% ≤ Total &lt; 87%</td>
</tr>
<tr>
<td>B-</td>
<td>80% ≤ Total &lt; 84%</td>
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<tr>
<td>C+</td>
<td>77% ≤ Total &lt; 80%</td>
</tr>
<tr>
<td>C</td>
<td>74% ≤ Total &lt; 77%</td>
</tr>
<tr>
<td>C-</td>
<td>70% ≤ Total &lt; 74%</td>
</tr>
<tr>
<td>D</td>
<td>60% ≤ Total &lt; 70%</td>
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<tr>
<td>F</td>
<td>Total &lt; 60%</td>
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**Homework Policies**

Students who turn in fewer than 50% of the homework assignments will receive an F for the course regardless of your grade on the Total.

**Examinations**

No makeup exams will be given, except in cases of verifiable personal or medical emergencies only. All exams are closed book and closed notes.

**Term Project**

Computer simulations may be required for power system modeling, design, or analysis. Further instructions will be given throughout the semester.

**GMU Email Account**

Students must use their MasonLive email account to receive important University information, including communications related to this class. Messages sent from or send messages to a non-Mason email address will not be responded.
Classroom Etiquette

Cellphones must be turned off during class. If you have an emergency and need to have a cellphone on, notify the instructor before the class.

Lectures may not be recorded in any form without written permission from the instructor.

Academic Integrity

Mason is an Honor Code university. Please see the Office for Academic Integrity for a full description of the code and the honor committee process. You are expected to abide by the Mason Honor Code. Violations of the Honor Code are taken very seriously and will be prosecuted to the fullest extent. This includes, but is not limited to, cheating on homework assignments, quizzes, projects, labs, and exams.

You are encouraged to share ideas about solutions to problems. However, you must submit your own work. Copying solutions from other students, or from the author’s solutions manual, is considered cheating and is a violation of the Honor Code.

Visit http://oai.gmu.edu/ for more information about Mason Honor Code and Mason Honor Committee.

Office of Disability Services

If you are a student with a disability and need academic accommodations, please contact the Office of Disability Services (ODS) at 993-2474. All academic accommodations must be arranged through the ODS. See http://ods.gmu.edu for more information.

Notice of Mandatory Reporting of Sexual Assault, Interpersonal Violence, and Stalking

As a faculty member, I am designated as a “Responsible Employee,” and must report all disclosures of sexual assault, interpersonal violence, and stalking to Mason’s Title IX Coordinator per University Policy 1412. If you wish to speak with someone confidentially, please contact one of Mason’s confidential resources, such as Student Support and Advocacy Center (SSAC) at 703-380-1434 or Counseling and Psychology Services (CAPS) at 703-993-2380. You may also seek assistance from Mason’s Title IX Coordinator by calling 703-993-8730 or emailing cde@mason.edu

University Police

Emergency: 911
Non-Emergency: (703)993-2810
Reporting a Crime (Crime Solvers Anonymous Tip Hot-Line): (703) 993-4111

University Policies

The University Catalog, http://catalog.gmu.edu, is the central resource for university academic affairs. Other polices are available at http://universitypolicy.gmu.edu/.