## Cover Sheet: Request 12364

**EEL4473 Electromagnetic Fields and Applications 2**

### Info

<table>
<thead>
<tr>
<th>Process</th>
<th>Course</th>
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<th>Ugrad/Pro</th>
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<td>Status</td>
<td>Pending at PV - University Curriculum Committee (UCC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Submitter</td>
<td>Shannon Chillingworth <a href="mailto:schill@ece.ufl.edu">schill@ece.ufl.edu</a></td>
<td></td>
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<tr>
<td>Created</td>
<td>2/28/2018 2:24:13 PM</td>
<td></td>
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<tr>
<td>Updated</td>
<td>4/4/2018 4:42:42 PM</td>
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<tr>
<td>Description of request</td>
<td>Update course title and description</td>
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### Actions

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<tr>
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<tr>
<td>Department</td>
<td>Approved</td>
<td>ENG - Electrical and Computer Engineering 011905000</td>
<td>Robert Fox</td>
<td>Updating course title and description</td>
<td>2/28/2018</td>
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EEL4473_EM_Fields_UCC2_Syll.docx | 2/28/2018 |

College | Approved | ENG - College of Engineering | Heidi Dublin | Approved by HWCOE Curriculum Committee 4/4 | 4/4/2018 |

No document changes

| University Curriculum Committee | Pending | PV - University Curriculum Committee (UCC) | 4/4/2018 |

No document changes

| Statewide Course Numbering System | |

No document changes

| Office of the Registrar | |

No document changes

| Student Academic Support System | |

No document changes

| Catalog | |

No document changes

| College Notified | |

No document changes
Course|Modify for request 12364

Info

Request: EEL4473 Electromagnetic Fields and Applications 2
Description of request: Update course title and description
Submitter: Shannon Chillingworth schill@ece.ufl.edu
Created: 2/28/2018 2:20:10 PM
Form version: 1

Responses

Current Prefix: EEL
Course Level: 4
Number: 473
Lab Code: None
Course Title: Electromagnetic Fields and Applications 2
Effective Term: Earliest Available
Effective Year: Earliest Available
Requested Action: Other (selecting this option opens additional form fields below)
Change Course Prefix? No

Change Course Level? No

Change Course Number? No

Change Lab Code? No

Change Course Title? Yes
Current Course Title: Electromagnetic Fields and Applications 2
Proposed Course Title: Electromagnetic Fields and Applications
Change Transcript Title? Yes
Current Transcript Title: ELECTROMAG FLDS 2
Proposed Transcript Title: ELECTROMAG FLDS apps
Change Credit Hours? No

Change Variable Credit? No

Change S/U Only? No

Change Contact Type? No

Change Rotating Topic Designation? No

Change Repeatable Credit? No

Maximum Repeatable Credits: 0
Change Course Description? Yes
Current Course Description: Maxwell's equations, electromagnetic wave propagation in different media, antennas, waveguides, numerical methods and electromagnetic coupling.
Proposed Course Description: Rigorous development of fundamental electrostatic, magnetostatic, and electromagnetic behavior, with special attention toward practical applications. Electrostatics: Gauss' law, electric fields, scalar potential, and energy in simple media. Magnetostatics:
Ampère’s law, Faraday’s law, magnetic fields, vector potential, and energy in simple media. Electromagnetics: Maxwell’s equations, time-varying fields, and Poynting’s theorem.

**Change Prerequisites?** No

**Change Co-requisites?** No

**Rationale** Updated title and course description more accurately reflect course content.
Electromagnetic Fields and Applications
EEL 4473, section XXXX
Class Periods: TBD
Location: TBD
Academic Term: TBD

Instructor
- Name: Robert Moore
- Email Address: moore@ece.ufl.edu
- Office: NEB 557
- Office Hours: Friday 12:45-2:45 pm

Teaching Assistants
There are no teaching assistants for this course.

Course Description
(3 credits)
Rigorous development of fundamental electrostatic, magnetostatic, and electromagnetic behavior, with special attention toward practical applications. Electrostatics: Gauss’ law, electric fields, scalar potential, and energy in simple media. Magnetostatics: Ampère’s law, Faraday’s law, magnetic fields, vector potential, and energy in simple media. Electromagnetics: Maxwell’s equations, time-varying fields, and Poynting’s theorem.

Course Pre-Requisites / Co-Requisites
EEL 3472C or equivalent

Course Objectives
Students will develop advanced skills in vector calculus and a physical intuition that are necessary for proper evaluation of electrical and magnetic systems. These include techniques to determine the resistance, capacitance, and inductance of non-trivial problems involving mixed-media and multiple conductors.

Required Textbook
- Title: Electromagnetic Fields (2nd edition)
- Author: Roald K. Wangsness
- Publisher: John Wiley & Sons, Inc.

Materials and Supply Fees
No additional course materials or supplies are needed.

Professional Component (ABET)
In contribution to meeting the professional components of an ABET-accredited degree, this course consists of 3 credits of Engineering Science.

Relation to Program Outcomes (ABET)
Engineering Criteria
  a - an ability to apply knowledge of mathematics, science, and engineering
  e - an ability to identify, formulate, and solve engineering problems
  g - an ability to communicate effectively

EE Program Criteria
  EE2 - knowledge of mathematics, basic and engineering sciences necessary to analyze and design complex systems
  EE3 - knowledge of advanced mathematics including linear algebra, complex variables and discrete mathematics
### Course Schedule

**Week 1:**
- Aug 21  Monday  Chapter 1, Vectors
- Aug 23  Wednesday  Chapter 1, Vectors
- Aug 25  Friday  Chapter 1, Vectors

**Week 2:**
- Aug 28  Monday  Chapter 2, Coulomb’s Law
- Aug 30  Wednesday  Chapter 3, The Electric Field
- Sep 1  Friday  Chapter 4, Gauss’ Law

**Week 3:**
- Sep 4  Monday  *Holiday (no class)*
- Sep 6  Wednesday  Chapter 5, The Scalar Potential  
  -------------------------  Homework 1 due
- Sep 8  Friday  Chapter 5, The Scalar Potential

**Week 4:**
- Sep 11  Monday  Chapter 6, Conductors in Electrostatic Fields
- Sep 13  Wednesday  Chapter 6, Conductors in Electrostatic Fields  
  ------  Homework 2 due
- Sep 15  Friday  Chapter 7, Electrostatic Energy

**Week 5:**
- Sep 18  Monday  Chapter 8, Electric Multipoles
- Sep 20  Wednesday  Chapter 8, Electric Multipoles  
  -------------------------  Homework 3 due
- Sep 22  Friday  Chapter 9, Boundary Conditions at a Surface of Discontinuity

**Week 6:**
- Sep 25  Monday  Chapter 10, Electrostatics in the Presence of Matter
- Sep 27  Wednesday  Chapter 10, Electrostatics in the Presence of Matter  
  Homework 4 due
- Sep 29  Friday  Chapter 11, Special Methods in Electrostatics

**Week 7:**
- Oct 2  Monday  Chapter 11, Special Methods in Electrostatics
- Oct 4  Wednesday  Chapter 11, Special Methods in Electrostatics  
  ------  Homework 5 due
- Oct 6  Friday  *Homecoming (no class)*

**Week 8:**
- Oct 9  Monday  Chapter 12, Electric Currents
- Oct 11  Wednesday  Review of Chapters 1-12, and graduate seminar  
  --  Homework 6 due
- Oct 13  Friday  Review of Chapters 1-12, and graduate seminar

**Week 9:**
- Oct 16  Monday  **Exam 1 (Chapter 1-12)**
- Oct 18  Wednesday  Chapter 13, Ampère’s Law
- Oct 20  Friday  Chapter 14, The Magnetic Induction

**Week 10:**
- Oct 23  Monday  Chapter 15, The Integral Form of Ampère’s Law
- Oct 25  Wednesday  Chapter 16, The Vector Potential  
  -------------------------  Homework 7 due
- Oct 27  Friday  Chapter 17, Faraday’s Law of Induction
Attendance Policy, Class Expectations, and Make-Up Policy

Attendance is not explicitly required; however, homework assignments must be turned in by the beginning of class on the day that they are due, and exams will be taken in-class. Laptops with all sounds disabled may be used in class, provided they do not distract other students. Requests to re-schedule an exam must be brought to the instructor's attention at least 1 week before the scheduled exam date. Excused absences are consistent with university policies in the undergraduate catalog (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx) and require appropriate documentation.

Evaluation of Grades:
A total of 11 homework assignments and 2 exams will be given throughout the semester. Homework assignments and exams will be graded primarily on the ability of the student to demonstrate they understand the relevant fundamental concepts. Significant credit will be given to:

(1) The written setup of each assigned problem, including figures/diagrams when appropriate and a clear declaration of the problem statement (e.g., specifications, initial assumptions, problem goal, etc.);

(2) A qualitative approach and methodology to the problem solution that demonstrates an understanding of the relevant physics.

Homework assignments are due at the beginning of class. Late homework assignments will be penalized by 15%, with an additional 15% for every additional late day.
For **undergraduate** students, the final grade will comprise a weighted mean of the homework and exam scores, with the set of homework assignments comprising 30% of the final grade, and each exam comprising 35% of the final grade.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Percentage of Final Grade</th>
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<tbody>
<tr>
<td>Homeworks (11)</td>
<td>30%</td>
</tr>
<tr>
<td>Exam 1</td>
<td>35%</td>
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<tr>
<td>Exam 2</td>
<td>35%</td>
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Note: This course is co-listed with the graduate class. Graduate students will be additionally required to present two seminar-style talks on academic publications in peer-reviewed journals—each graduate student will be assigned to give a talk during week 8 and week 13. Selected articles must be approved by the instructor at least 1 week prior to the assigned presentation time. Additionally, graduate students must submit a two-page summary report of their chosen article prior to their assigned presentation time. Seminar talks and summary reports will be graded based upon the student’s ability to convey the scientific/engineering context, merit, and significance of the journal article.

For **graduate** students, the final grade will comprise a weighted mean of the homework, seminar, and exam scores, with the set of homework assignments comprising 10% of the final grade, each seminar comprising 10% of the final grade, and each exam comprising 35% of the final grade.

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Percentage of Final Grade</th>
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<tr>
<td>Homeworks (11)</td>
<td>10%</td>
</tr>
<tr>
<td>Seminar talk/report (2)</td>
<td>20%</td>
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<tr>
<td>Exam 1</td>
<td>35%</td>
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<tr>
<td>Exam 2</td>
<td>35%</td>
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**Grading Policy:**

<table>
<thead>
<tr>
<th>Percent</th>
<th>Grade</th>
<th>Grade Points</th>
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<tbody>
<tr>
<td>90 - 100</td>
<td>A</td>
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</tr>
<tr>
<td>87 - 89</td>
<td>B+</td>
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<tr>
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<td>C</td>
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<tr>
<td>67 - 69</td>
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<tr>
<td>60 - 66</td>
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</tr>
<tr>
<td>0 - 59</td>
<td>E</td>
<td>0.00</td>
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In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better).

More information on UF grading policy may be found at: [https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx](https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx)

**Students Requiring Accommodations**

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, [https://www.dso.ufl.edu/drc](https://www.dso.ufl.edu/drc)) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.
Course Evaluation
Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu/evals. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.

University Honesty Policy
UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Software Use
All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Campus Resources:

Health and Wellness

<table>
<thead>
<tr>
<th>U Matter, We Care:</th>
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<tbody>
<tr>
<td>If you or a friend is in distress, please contact <a href="mailto:umatter@ufl.edu">umatter@ufl.edu</a> or 352-392-1575 so that a team member can reach out to the student.</td>
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</tbody>
</table>

| Counseling and Wellness Center: [http://www.counseling.ufl.edu/cwc](http://www.counseling.ufl.edu/cwc), and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies. |

<table>
<thead>
<tr>
<th>Sexual Assault Recovery Services (SARS)</th>
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<tbody>
<tr>
<td>Student Health Care Center, 392-1161.</td>
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| University Police Department at 392-1111 (or 9-1-1 for emergencies), or [http://www.police.ufl.edu/](http://www.police.ufl.edu/). |

Academic Resources

| E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. [https://lss.at.ufl.edu/help.shtml](https://lss.at.ufl.edu/help.shtml). |

| Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. [https://www.crc.ufl.edu/](https://www.crc.ufl.edu/). |

| Library Support, [http://cms.uflib.ufl.edu/ask](http://cms.uflib.ufl.edu/ask). Various ways to receive assistance with respect to using the libraries or finding resources. |
Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. 
https://teachingcenter.ufl.edu/.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
https://writing.ufl.edu/writing-studio/.

Student Complaints Campus: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf