EEEN3310 Electromagnetic Field Theory
Electrical Engineering Program, Department of Engineering
Spring 2020

A. COURSE INFORMATION

Course number/section: EEEN-3310_001
Class meeting time: TR 12:30-1:45PM
Class location: EL-110
Course Website: https://bb9.tamucc.edu

B. INSTRUCTOR INFORMATION

Instructor: Dr. Pablo Rangel
Office location: RFEB 308
Office hours: MWF 2:00 PM-4:00PM
Telephone: 825-3712
Email: pablo.rangel@tamucc.edu
Appointments: send an e-mail request for appointment, with proposed time.

C. COURSE DESCRIPTION

Catalog Course Description
(3 sem. hrs. 3:0) An introduction to the theory of static and dynamic electromagnetic fields with a focus on engineering applications. Principles will be illustrated with applications in various areas.

Extended Course Description
This course is an introduction to electromagnetic theory. Some of the topics to be covered are Coulomb’s law, Gauss’s law, energy and potential, conductors and dielectrics, capacitance, magnetic field, forces, materials and inductance, Maxwell’s equations, transmission lines, uniform plane wave, plane wave reflection and dispersion, guided waves, electromagnetic radiation and antennas.

D. PREREQUISITES AND COREQUISITES

Prerequisites
1. Prerequisite course required-PHYS2426 and Prerequisite course required-MATH2415 and Prerequisite course required-MATH3315 and Prerequisite course required-EEEN3315;

Corequisites
None

E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES

Optional Textbook(s) or Other References: None
F. STUDENT LEARNING OUTCOMES AND ASSESSMENT

By the end of this course, students should be able to:

- Perform mathematical operations and solve problems using vectors and vector calculus.
- Understand electrostatic principles and solve basic electrostatic problems.
- Understand magnetostatic principles and solve basic magnetostatic problems.
- Describe and analyze electromagnetic wave propagation.
- Describe and analyze transmission lines and associated problems.
- Understand the basics of waveguides and their applications.
- Understand the basics of antennas and their various forms.

G. INSTRUCTIONAL METHODS AND ACTIVITIES

Course will be based primarily on lectures, assignments, two midterms and final exam. Assignments will be given to review learning progress in general.

H. MAJOR COURSE REQUIREMENTS AND GRADING

Assessment is based on two midterm exams, in-class exercises, homework, projects, quizzes, and a final exam. Expect a quiz when homework is due. The final exam is comprehensive. You may examine the final exam within four weeks after the final grades are assigned.

Homework is due at the beginning of class on the classroom desk on the due date. Any time thereafter is considered late and will need to be accepted by instructor. A deduction of points may be given. Leaving it on my inbox does not guarantee it will be accepted. If submitting it early the assignment needs to be labeled clearly on front of it.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL</th>
<th>Total Score</th>
<th>Tentative Grade</th>
</tr>
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<tbody>
<tr>
<td>Homeworks/Projects</td>
<td>20</td>
<td>90 ≤ total</td>
<td>A</td>
</tr>
<tr>
<td>Quizzes/In-Class Exercises</td>
<td>20</td>
<td>80 ≤ total &lt; 90</td>
<td>B</td>
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<tr>
<td>Exam I</td>
<td>20</td>
<td>70 ≤ total &lt; 80</td>
<td>C</td>
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<tr>
<td>Exam II</td>
<td>20</td>
<td>60 ≤ total &lt; 70</td>
<td>D</td>
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<tr>
<td>Final Exam</td>
<td>20</td>
<td>total &lt; 60</td>
<td>F</td>
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<tr>
<td>TOTAL</td>
<td>100</td>
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I. COURSE CONTENT/SCHEDULE

Dates for exams are tentative, subject to change

<table>
<thead>
<tr>
<th>DATE (BY WEEK)</th>
<th>TOPIC</th>
<th>CHAPTER(S)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction / Vector Analysis Review</td>
<td>1</td>
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<tr>
<td>1</td>
<td>Coulomb’s Law and Electric Field Intensity</td>
<td>2</td>
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<tr>
<td>2</td>
<td>Electric Flux Density, Gauss’ Law, and Divergence</td>
<td>3</td>
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<tr>
<td>3</td>
<td>Energy and Potential</td>
<td>4</td>
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<tr>
<td>4</td>
<td>Conductors and Dielectrics</td>
<td>5</td>
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<td>5</td>
<td>Midterm Exam 1</td>
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<tr>
<td>5</td>
<td>Capacitance</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>Steady Magnetic Field</td>
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</tr>
<tr>
<td>6</td>
<td>Magnetic Forces, Materials, and Inductance</td>
<td>8</td>
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<tr>
<td>7</td>
<td>Time-Varying Fields and Maxwell’s Equations</td>
<td>9</td>
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<tr>
<td>8</td>
<td>Midterm Exam 2</td>
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</tr>
<tr>
<td>8</td>
<td>Transmission Lines</td>
<td>10</td>
</tr>
<tr>
<td>10</td>
<td>Uniform Plane Wave</td>
<td>11</td>
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<tr>
<td>11</td>
<td>Plane Wave Reflection and Dispersion</td>
<td>12</td>
</tr>
<tr>
<td>12</td>
<td>Guided Waves</td>
<td>13</td>
</tr>
<tr>
<td>13-14</td>
<td>Electromagnetic Radiation and Antennas</td>
<td>14</td>
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</tbody>
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Please consult the Academic Calendar for Holidays and class drop deadlines https://www.tamucc.edu/academics/calendar/2020_spring.html

<table>
<thead>
<tr>
<th>Final Exam: Wednesday May 14, 2020 11:00 am – 1:30 pm</th>
<th>Final Exam</th>
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<td><a href="https://registrar.tamucc.edu/Register%20for%20Classes/Final_Exams.html">https://registrar.tamucc.edu/Register%20for%20Classes/Final_Exams.html</a></td>
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Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

J. COURSE POLICIES

Attendance/Tardiness
- Students are expected to be in attendance, punctual, and prepared for class.

Late Work and Make-up Exams
- Late work is not going to be accepted. Make-up Exams are only arranged with 1 week prior notice. No make-up exam will be arranged after each exam.

Extra Credit
- Extra Credit questions/problems will be given in some of the tests and homework.
Cell Phone Use
- Please refrain from the use of electronic devices during class, as it is distracting to not only you, but also to your instructor and peers. Silence your phones and put them away so you are not tempted to stray off task.

Laptop Use
- Laptops will be permitted for particular activities as deemed appropriate.

Food in Class
- No food or drinks are allowed during class.

Missed Exam
- If you have a conflict with an exam date, please let me know as soon as you know about the conflict.

Participation
- In-group and individual activities on a regular basis will count towards your final grade.

Others
- All work submitted for grading must be the student's own work. Plagiarism will result in a score of 0 (zero) for the work or dismissal from the course and the Dean of Students office will be notified. No copying from another student's work of any type is allowed. It is the student's duty to allow no one to copy his or her work.

K. COLLEGE AND UNIVERSITY POLICIES

- **Academic Integrity (University)**
  University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

- **Classroom/Professional Behavior**
  Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

- **Statement of Civility**
  Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational
experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

- **Deadline for Dropping a Course with a Grade of W (University)**
  I hope that you never find it necessary to drop this or any other class. However, events can sometimes occur that make dropping a course necessary or wise. **Please consult with your academic advisor, the Financial Aid Office, and me, before you decide to drop this course.** Should dropping the course be the best course of action, you must initiate the process to drop the course by going to the Student Services Center and filling out a course drop form. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Please consult the Academic Calendar ([http://www.tamucc.edu/academics/calendar/](http://www.tamucc.edu/academics/calendar/)) for the last day to drop a course.

- **Grade Appeals (College of Science and Engineering)**
  As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at [http://www.tamucc.edu/provost/university_rules/index.html](http://www.tamucc.edu/provost/university_rules/index.html), and the College of Science and Engineering Grade Appeals webpage at [http://sci.tamucc.edu/students/GradeAppeal.html](http://sci.tamucc.edu/students/GradeAppeal.html). For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**
  The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116. If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816. [http://disabilityservices.tamucc.edu/](http://disabilityservices.tamucc.edu/)

- **Statement of Academic Continuity**
  In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi;
this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

L. OTHER INFORMATION

• Academic Advising
  The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

• Assigned readings and quizzes, as discussed in class and usually found in Blackboard, should be completed before coming to the next class.
• You are expected to read the textbook.
• Quizzes will be frequent.

GENERAL DISCLAIMER

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled lecture periods.