ECE 3317
Applied Electromagnetic Waves
Fall 2021

Sections 18814

Note: Special COVID-19 information is given at the end of this document.

Class Time

Tu, Th 2:30-4:00 p.m., room W122-D3

Instructor

Prof. David R. Jackson, W318-D3, phone: 713-743-4426, fax: 713-743-4444, email: djackson@uh.edu. Office hours will be posted on the class Blackboard site and on the instructor's door. Information for the TA (grader) will be posted on the Blackboard site.

Blackboard

This class will use Blackboard for the distribution of class material and assignments. You are responsible for checking the Blackboard site often for important announcements (found under the "Announcements" link). You are responsible for any information that is posted there. All of the homework and handouts will be posted on the Blackboard site. The class lecture notes for this semester will also be posted on the Blackboard site on a continuing basis.

Email

In addition to checking the Important Announcements section of the Blackboard site, it is your responsibility to configure your UH email alias properly in myUH (PeopleSoft) to receive email from the university. The ECE department will use your UH email alias for all official correspondence. Occasionally the instructor will also send important emails to the class using the UH email aliases and it is your responsibility to make sure that you are able to receive these emails. The UIT website giving information about updating your UH email alias is:

http://www.uh.edu/infotech/services/accounts/email/update-student-address/index.php

Catalog Description

Applied Electromagnetic Waves. Cr. 3 (3-0). Prerequisites: Credit for or concurrent enrollment in ECE 3337. Maxwell's equations in time and frequency domains, Poynting's theorem, plane wave propagation, reflection and transmission in lossless and lossy media, transmission lines, waveguides and antennas.

Texts and Class Materials

The following texts are recommended:

- W. H. Hayt and J. A. Buck, Engineering Electromagnetics, 8th Edition, McGraw-Hill, 2012.

- L. C. Shen and J. A. Kong, Applied Electromagnetism, 3rd Edition, PWS, 1995.

If you are interested in renting or purchasing an electronic version of the Hayt & Buck book, please see the information on the blackboard site.

Reading assignments and optional homework problems will be posted on the class website from each of these books, so it is strongly recommended that you have at least one of them. They will also be on reserve in the Library (listed under ECE 3317). The Shen & Kong book is now out of print, so if you want to get this one, you will have to search for it yourself from Amazon or another book seller.

A set of class notes will be placed on the Blackboard site. The class notes are what will be presented in class during the lectures. The class notes are based on the textbooks, but there may be some differences between the class notes and the textbooks, e.g., in the notation that is used. Please note that the class notes are subject to change until after they have been completely presented in class.

If you would like to rent or purchase an electronic copy of the "Hayt & Buck" book, please see the information on the class Blackboard site.

Recommended Supplements

J. A. Edminister, *Schaum's Outline on Theory and Problems of Electromagnetics*, 4th Ed., McGraw-Hill, 2014.

S. A. Nasar, *Schaum's Outline on 2008+ Solved Problems in Electromagnetics*, McGraw-Hill, 2008.

H. M. Schey, *Div, Grad, Curl, and All That: an Informal Text on Vector Calculus*, 4th Ed., W. W. Norton and Company, 2005.

M. R. Spiegel, *Schaum's Outline on Vector Analysis*, McGraw-Hill, 1959.

D. Fleisch, *A Student's Guide to Maxwell's Equations*, Cambridge University Press, 2008.

These will be put on reserve in the Library (listed under ECE 3317).

Online Texts

In addition to the above traditional textbooks, an online textbook is available free of charge from the Open Textbook Library at the University of Minnesota. The textbook is: S. W. Ellingson, *Electromagnetics*, VT Publishing, Blacksburg, VA, 2018. The website is: https://open.umn.edu/opentextbooks/subjects/engineering.

Also, Students at UH have access to the McGraw-Hill online engineering library system

called *Access Engineering* at www.accessengineeringlibrary.com. One online book that may be found there is S. M. Riad and Iman M. Salama, *Electromagnetic fields and Waves: Fundamentals of Engineering*.

Prerequisites

You must have earned a C- or better in ECE 3337, or be taking it now. You must also have passed with a C- or better PHYS 1322 (University Physics II). A waiver of the prerequisite is only possible through a petition to the Director of Undergraduate Studies, Prof. Len Trombetta (ltrombetta@uh.edu).

Course Topics

- Complex vectors
- Maxwell's equations
- Transmission lines
- Smith charts
- Plane waves
- Reflection and transmission of plane waves
- Waveguides
- Antennas

Expected Course Outcomes

Students who successfully complete this course are expected to meet the following course outcomes:

1) Students will demonstrate their ability to apply knowledge of mathematics, science, and engineering in the area of electromagnetic theory. (ABET Program Outcome #a).
2) Students will show their ability to identify, formulate, and solve engineering problems in the area of applied electromagnetic waves. (ABET Program Outcome #e).
3) Students will develop good writing skills so that they are able to communicate technical material effectively and clearly through the assignment of written projects. (ABET Program Outcome #g).
4) Student will gain knowledge of contemporary issues that relate to electromagnetic engineering. (ABET Program Outcome #j).
5) Students will develop the ability to use the techniques, skills, and tools for engineering practice through the completion of special projects. (ABET Program Outcome #k).

Exams

There will (tentatively) be two regular exams and a comprehensive final exam. The dates and formats for the regular exams will be announced at least one week before they are given. The three-hour final exam will be given on Tuesday, Dec. 14, from 2:00 p.m. - 5:00 p.m. All exams will take place in the assigned classroom unless otherwise noted.

Grading Policy

The tentative grading scheme is shown below.

Homework	15%
Project	10%
Exam 1	20%
Exam 2	20%
Final exam	35%

Any items that require re-grading must be brought to the TA or the instructor within one week from the time the item is returned in class. After that, grades will not be changed.

Withdrawal Policy

The withdrawal dates are listed in the Academic Calendar. For fall 2021 the last day to drop a course without receiving a W grade is Sept. 8. After this date and before Nov. 4, you may drop with a W if you have not exceeded your total 6W limit. Do not assume that you will be dropped by the instructor if you stop attending class. You are responsible for completing the withdrawal procedure. After Nov. 4 you are not allowed to drop the class.

Please be aware that students are only allowed to attempt required engineering courses (which includes required ECE courses) two times. Staying in a course past the first drop deadline (Sept. 8) constitutes an attempt.

Grades of Incomplete (I) will be given only when a small portion of the course has not been completed for a good reason that can be documented, such as a medical emergency. If the material has been completed, an "I" grade cannot be given. Detailed information about these issues is available in the *UH Undergraduate Catalog:*

http://publications.uh.edu/content.php?catoid=34&navoid=12493&hl=%22INcomplete%22&returnto=search

Exam Policy

No make-up exams will be given. If an extreme emergency prevents you from taking the exam on exam day, you must notify the instructor immediately (within 24 hours at the most) and provide documentation to verify the emergency. If the emergency is legitimate and documented, then you may be allowed to replace the exam grade with an extrapolated grade based on the grade you receive on the other exam and the final exam, as the instructor deems appropriate. You must take the final exam in order to pass the course. After the exams have been graded and handed back to the class, students must see the instructor within one week if they wish to have any problem on their exam regraded.

Homework Policy

Students are expected to work individually on the homework. The homework that you turn in must represent your own work entirely. To not obtain answers from anyone, or give answers to anyone, and do not work together with anyone on the homework. Do not try to obtain answers from previous semesters. To do otherwise will be considered a violation of

the UH Academic Honesty Policy. Having discussions with others about general concepts and methods is fine, and is even encouraged, but what you put on your assignment must be completely your own work. Homework is due at the beginning of class on the due date. NO LATE HOMEWORK IS ACCEPTED.

Attendance Policy

Attendance at every class is expected. Class attendance may be taken at any time. If a student misses three classes they will be subject to being dropped or failing the class. It is possible that quizzes may be given out randomly as well, partly as a means of checking attendance.

Academic Honesty Policy

Students in this course are expected to follow the Academic Honesty Policy of the University of Houston. It is your responsibility to know and follow the policy, as described in the *UH Undergraduate Catalog:* http://www.uh.edu/academic-honesty-undergraduate

You must sign the *Academic Honesty and Syllabus Form* that is on the class Blackboard site and submit it to the instructor by Aug. 31, 2021. If you fail to do this you may be dropped from the course.

Responsibilities

All students must be thoroughly familiar with all the requirements, regulations, and responsibilities described in the UH Student Handbook. Unless otherwise specified, these provisions will be followed as described in the handbook.

Religious Holy Days

Students whose religious beliefs prohibit class attendance on designated dates may request an excused absence. To do this, you must request the excused absence by submitting a request to the instructor in writing, by Aug. 31, 2021. Please submit a written request to your instructor by this deadline to allow the instructor to make appropriate arrangements. For more information, see the online *Student Handbook*.

Students with Disabilities

Students with recognized disabilities will be provided reasonable accommodations, appropriate to the course, upon documentation of the disability with a Student Accommodation Form from the Justin Dart, Jr. Student Accessibility Center (formerly the Center for Students With Disabilities). To receive these accommodations, you must request them by submitting a request to the instructor in writing by Aug. 31, 2021. Students who fail to submit a written request will not be considered for accommodations. For more information, see the online *Student Handbook*.

Counseling and Psychological Services (CAPS)

Counseling and Psychological Services (CAPS) can help students who are having difficulties managing stress, adjusting to college, or feeling sad and hopeless. You can reach CAPS (http://www.uh.edu/caps) by calling 713-743-5454 during and after business hours for routine appointments, or if you or someone you know is in crisis. Also, there is no

appointment necessary for the “Let's Talk” program, which is a drop-in consultation service: https://uh.edu/caps/outreach/lets-talk/index.php#hours.

Important Dates

First day of classes: Aug. 23 (Monday)
Last day to add a course: Aug. 30 (Monday)
Labor Day Holiday: Sept. 6 (Monday)
Last day to drop (without receiving a W): Sept. 8 (Friday)
Last day to drop a course (with a W): Nov. 4 (Thursday)
Thanksgiving Holiday: Nov. 24–27 (Wednesday–Saturday)
Last day of classes: Dec. 4 (Saturday)
Final Exam: Dec. 14 (Tuesday) 2:00–5:00 pm

Useful Websites

Department of ECE: http://www.ee.uh.edu
College of Engineering: http://www.egr.uh.edu
University of Houston: http://www.uh.edu
Student Handbook: http://www.uh.edu/dos/resources/student-handbook
Undergraduate Student Catalog: http://publications.uh.edu/index.php?catoid=36
Course Listing: http://publications.uh.edu/content.php?catoid=31&navoid=11769
Academic Calendar: http://publications.uh.edu/index.php?catoid=42
Final Exam Schedule:
http://www.uh.edu/academics/courses-enrollment/final-exam-schedules

COVID-19 Information

These plans are tentative, and are subject to change. The pandemic situation is evolving, and we have to be prepared to adapt as the circumstances warrant.

Format of Class

The class is officially listed as being face-to-face. The class will be held face-to-face (F2F) in the scheduled room at the scheduled time. However, the class lecture will also be simultaneously delivered using Zoom, broadcasting from the classroom. That is, the instructor will sit at the front of the room and lecture from a computer at the front of the room, while broadcasting the class lecture on Zoom. (The Zoom link will be sent to the class and put on Blackboard before classes begin.) Each student is free to decide if they wish to attend in-person or online, and to switch back-and-forth as they prefer. For each class you are free to decide how you will attend. If you feel uncomfortable attending in-person, you are free to attend online at any time. Please do not come to the classroom if you are not feeling well; attend online if you feel up to it, and notify the instructor as soon as possible to get an excused absence. Recordings of the class lectures will be available on blackboard in case you wish to watch them again, on in case you miss the class lecture due to an excused absence.

Homework

Because students are being allowed to attend class in both F2F and online modes, and to minimize possible transmission of the virus, all homework assignments will be submitted electronically as pdf files on Blackboard. No late homework will be accepted.

Exams

The precise exam arrangements will be finalized later. The general plan is that the class exams will be given in-person (not online). It is anticipated that the exams will be given in the main scheduled classroom, but a policy will be developed to allow for social distancing. One possibility is that a second classroom will be reserved on the day of the exams, so that students who are not comfortable sitting in the main classroom with the rest of the class can take their exam in a different classroom. Another possibility is to split the class into two parts, and give one part of the class their exam on Tuesday and the other part of the class their exam on Thursday. In this case, the two exams would be different.

Social Distancing, Masks, and Vaccinations

For those students who choose to attend in-person, please try your best to maintain as much distance between yourself and your fellow classmates as possible. Do not congregate in the room or the halls, and do not approach fellow students without permission. Enter the classroom and get seated as quickly as possible, and exit the classroom in an organized fashion once the class lecture is over. Please do not all get up and attempt to leave the classroom at once. The first row of students should get up and leave the room first, followed by the second row, etc. Please do not physically approach the instructor either before, during, or after the class lecture.
Although the University does not require students to wear a mask, wearing one during the class lecture is strongly encouraged, both for your protection and the protection of those around you.

Similarly, although the University does not require students to be vaccinated against COVID-19, vaccinations are strongly recommended. That is the single best way to protect yourself and others. If you choose to not be vaccinated, or to not wear a mask, you are requested to sit in the rear of the classroom, in the backmost row(s), to give as much distance as possible between yourself and your fellow students. Alternatively, you may choose to listen to the class lectures online.

Office Hours

All of the office hours this semester will be conducted online using a Zoom session. More information about the office hours will be posted on Blackboard once this information is available.