

SYLLABUS

ECSE 2100 – FIELDS AND WAVES I

COVID-19 VERSION – FALL 2022

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Basic Overview Section

INSTRUCTOR:

Prof. James J.-Q. Lu, luj@rpi.edu; WebEx Meeting link: <https://rensselaer.webex.com/meet/luj>

Office Hours: WebEx Teams Office Hours Space or by appointment

Course Homepage: <http://www.ecse.rpi.edu/courses/F22/ECSE-2100/>

CLASS/LAB TIME AND LOCATION:

Monday & Thursday Lecture:	CII-4050 / WebEx Teams Lecture Space: <u>4:00 p.m. - 5:50 p.m.</u>
Lab/Open-Shop Hours:	JEC-4107 / WebEx Lab Space: <u>2:00 p.m. - 3:50 p.m., Wednesday</u>
Office Hours:	WebEx / JEC-4107: <u>2:00 p.m. - 3:50 p.m., Wednesday</u>
Test block (TBD)	WebEx Teams Exam Space: <u>TBD</u>
* Extra time students please contact me ASAP for accommodations!	
Notes:	
<ul style="list-style-type: none"> ● We planned to teach in-person, while all live lectures are recorded; recordings will be available on the WebEx Lecture space. ● The lab and open-shop sessions will be in-person with a dedicated WebEx space for just in case of COVID-19 outbreak. 	

TAs & UG-SAs:

Name	Email	Hours
TBA	TA1@rpi.edu	20
TBA	SA1@rpi.edu	
TBA	SA2@rpi.edu	

OVERVIEW – Catalog Description:

Development and application of Maxwell's equations in free space and within materials. Introduction to vector calculus and computer-aided analysis and design methods in electromagnetics. Applications include calculation of lumped circuit elements from field theory, plane wave propagation in various materials, and reflection from boundaries. Transmission line concepts, Smith charts, and other design tools for distributed circuits.

GOALS & TOPICS:

To prepare Electric Engineering students to utilize basic electromagnetic field and wave concepts, with the following topics:

- Transmission Lines
- Electrostatics
- Magnetostatics
- ElectroMagnetodynamics,
- Plane Electromagnetic Waves

PREREQUISITES:

ECSE 2010 - Electric Circuits; MATH 2010 - Multivariable Calculus and Matrix Algebra.

TEXTBOOK:

Fawwaz T. Ulaby and Umberto Ravaioli, "Fundamentals of Applied Electromagnetics" 8th Edition, Prentice Hall, 2020

SUPPLEMENTAL MATERIALS:

Course Homepage: <http://www.ecse.rpi.edu/courses/F22/ECSE-2100/>

LMS Course Homepage.

STUDENT LEARNING OUTCOMES:

The students who finish this course in a satisfactory manner will be able to demonstrate:

- i) an ability to obtain solutions to electrostatic and magnetostatic fields for typical configurations of materials and sources;
- ii) an ability to determine the capacitance of simple practical systems of conductors;
- iii) an ability to determine the self and mutual inductance of simple practical current carrying systems;
- iv) an ability to apply the basic principles of electromagnetic motors and generators;
- v) an ability to determine the transmission of power by low loss TEM transmission lines from a simple source to a passive load;
- vi) an ability to determine the reflection and transmission of TEM waves for uniform plane waves incident on planar material boundaries for low loss or conducting media

STUDENT ASSESSMENT MEASURES:

More details and schedules can be found on Course Homepage.

The course grade weightings are as follows:

- 3 MidTerm Quizzes 34.5%
- 8 Homework Assignments 18.4%
- 22 Online Quizzes 12.6%
- 2 Design Projects 11.5%
- Final Exam 23%

Grading Policy (Subject changes due to COVID-19 pandemic):

- Homework and project reports submitted after the due date will receive no credit.
- Attendance to the 3 MidTerm Quizzes and Final Exam is mandatory; there will be NO MAKE-UP tests or final exam.
- The MidTerm quizzes and final exam will be in-person with formula sheets provided by the instructor. Students are allowed to use a calculator and pens, but any other items, such as crib sheets prepared by yourselves, books, phones and any other communication devices are not allowed to use.
- Collaboration: (i) Absolutely no collaboration is allowed during quizzes, tests and final exam; (ii) Students are encouraged to work with others on homework and design problems, but the paper submitted must be the student's own work. Simple copying of other's work without an honest effort to learn does not qualify as collaboration.
- If there are any problems with the grading of assignments or exams, students should submit the paper along with a written statement describing the points in question. Papers submitted more than 2 weeks after grading is finished will not be considered.

ONLINE RESOURCES: The table below includes the online resources for this course. Please be sure that you are signed into each resource. **If you cannot get access to any of the online resources, please contact the instructor or TA as soon as possible.**

Online Tool	Purpose	Website link:
Course Homepage	Course information	http://www.ecse.rpi.edu/courses/F22/ECSE-2100/
LMS	Course management – grades, announcement, lecture quizzes, exams	http://lms.rpi.edu/
WebEx Teams / Meetings	Live lectures, exams, office hours, quick messages	TBA
Piazza	assignment/exam-related discussion forum, Q&As	https://piazza.com/class/l6twl4bbihn2ld
Gradescope	submissions and grading of assignments/exams	https://www.gradescope.com/courses/418119

Policy Section

FERPA STATEMENT:

The online tools in the table above provide a service designed to assist schools, teachers and other educational partners to improve student learning outcomes. In some circumstances, these online tools may receive personally identifiable information about students (“Student Data”) from the instructor in the course providing this service. For example, an instructor will provide a class roster, email addresses of all students in the class, as well as coursework data that may be linked to a particular student. All listed online resource companies used by the instructor consider Student Data to be strictly confidential and have physical, administrative, and technical security protections in place to protect such data. They do not use personally identifiable Student Data for any purpose other than to provide the services to the instructor, and they do not share personally identifiable Student Data with any third party except as authorized or required by the instructor. The online tools above may collect, analyze, and share anonymized or aggregated data or data derived from Student Data for certain purposes, but only if the disclosure of such data could not reasonably identify a specific individual or specific School. Collection and use of Student Data provided by the instructor is governed by Terms of Service for each platform and by the provisions of the Family Educational Rights and Privacy Act (FERPA). Student Data is provided and controlled by the instructor. If you have questions about reviewing, modifying, or deleting personal information, please contact Rama Hamarneh hamarr@rpi.edu and cc luj@rpi.edu.

Students will be asked to sign this statement to agree to the use of these online tools and to acknowledge understanding of their use to facilitate online content for the course.

COLLABORATION AND ACADEMIC DISHONESTY:

Intellectual integrity and credibility are the foundation of all academic work. A violation of Academic Integrity policy is, by definition, considered a flagrant offense to the educational process. It is taken seriously by students, faculty, and Rensselaer and will be addressed in an effective manner. If found responsible for committing academic dishonesty, a student may be subject to one or both types of penalties: an academic (grade) penalty administered by the professor and/or disciplinary action through the Rensselaer judicial process.

The Rensselaer Handbook of Student Rights and Responsibilities defines the full list of forms of Academic Dishonesty and you should make yourself familiar with these. In this class, all assignments that are turned in for a grade must represent the student’s own work. In cases where help was received, or teamwork was allowed, a notation on the assignment should indicate your collaboration. If you have any questions concerning this policy before submitting an assignment, please ask for clarification.

Some assignments, like exams, have a clearly marked place on the front page that requires a signature confirming academic integrity. If you forget to sign the document before submitting it, a TA or Prof. will contact you directly to ask you to sign before grading your assignment. I expect that you’ll take exams without speaking to other students via another communication channel. I expect you to use the crib sheet handwritten by yourself. You

cannot interact with Chegg.com or any other online/internet assignment sharing system for any graded assignment. Interaction with it results in an automatic failure for the entire course. A result of the violation using online resources to assist in graded assignments will result in a formal report. As a warning, there are ways that I can easily detect your use of these online resources that compromise academic integrity.

INCLUSIVITY AND ACCESSIBILITY STATEMENT

Rensselaer Polytechnic Institute strives to make all learning experiences as accessible as possible. I will strive to provide an environment that is equitable and conducive for learning for all students. Please contact me as soon as possible if you:

- 1) live in a distant time zone and may need accommodations for exams. Course material is available online at course homepage, LMS and WebEx Teams. You may set up lab sessions with partners during times that best fit your schedule. For additional help, please be proactive about attending open hours and office hours.
- 2) have internet accessibility issues where you live at any time during the semester. Contact me directly if events cause disconnection for any important portion of the course. If you know this will be a consistent problem, please contact me early in the semester.
- 3) anticipate or experience academic barriers based on a disability, please let me know immediately so that we can discuss your options. To establish reasonable accommodations, please register with The Office of Disability Services for Students. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. To receive any academic accommodation, you must be appropriately registered with DSS.

DSS contact information: dss@rpi.edu ; 518-276-8197, 4226 Academy Hall.

Flexibility, accountability, and communication is built into the Fields and Waves (F&W) community experience. Designated assignments including homework and labs have two submission deadlines. The first deadline is at the close of business 5 pm EST on the due date. The second, late deadline is at 11:59 p.m. EST on the due date. While submitting at 5pm ensures that you are on track and ready to learn additional material, the midnight deadline gives you some flexibility if events occur that prohibit your close of business submission. During Fall 2020, submitting at the late deadline will NOT be penalized. However, after this late deadline assignments will not be accepted unless an official excuse is provided. Please plan accordingly and communicate directly with me via email if serious circumstances prevent you from completing the assignments that keep you on track with the course.

Assessment/Assignment Section

Refer to Course Homepage for more information.

ASSESSMENT SUMMARY:

MidTerm Quizzes (3)	100 points each	300 points
Homework (8)	20 points each	160 points
Lecture Quizzes (Best 22)	5 points each	110 points
Projects (2)	50 points each	100 points
Final	200 points	200 points
Total		870 points

There will be opportunities to add extra credit points in the homework.

ELECTRONIC SUBMISSIONS AND GRADING:

All team assignments, homework assignments, and lab reports will be submitted by you, the student, via Gradescope. The file format must be PDF or Word document; do not submit images because it takes a very long time to upload the large file-size images with a limited bandwidth provided to the course by Gradescope. Make sure before submitting any assignment that all of your work is legible and easy to read after scanning. Most submission can be scanned from your smart phone with an app, such as CS CamScanner.

In Fall 2022, all Exams will be scanned after the test session by the student into Gradescope. There will be a period of time given after the exam to allow you enough time to scan and place it there. **Keep your exam until the exam is graded just in case.** They will be graded and sent back to you electronically through Gradescope. A rubric of deductions on every problem that is consistent for every student will be available to you. Also, there is a chance to electronically submit a request for regrade (normally within two weeks after your grade is posted) if you have any valid concerns about grading.

HOMEWORK:

Homework assignments are due as indicated on the homework problems, and generally due in a week once posted. See course homepage for more details. After the homework solution is posted, you should check your homework solutions to make sure you have done the homework correctly; this helps us to learn the course materials.

LABORATORY ASSIGNMENTS:

In Fall 2022, we planned to have all in-person labs, hence we will have two major in-person lab projects.

Project #1: design, build and test a simple CATV channel blocker using the knowledge of transmission lines. We split the project in two sessions. During the first session, i.e., Pre-Project 1, you will investigate the performance of some sample open-circuit stubs as blockers. You do not need to build anything at this point, but some simple analysis is necessary. In the second session, you will design, build and test the channel blocker. Students can work in groups of two to four for this project.

Project #2: design, build and test Beakman's DC motors by applying knowledge learned from Fields & Waves I and its prerequisites.

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In case of hybrid/online modality, those who are online will have the following option:

Project #1a: an open-ended simulation project with a team of 2 students. Each team submits a Statement of Work (SoW) to propose a simulation project relevant to the course for approval before starting the simulation and analysis. Each team will submit a report and a video clip. The detailed rubric will be announced.

Project #2a: Same as the in-person project2, but remote students will be able to complete the project in at home. Parts kits will be shipped to the remote students residing in the U.S. Those who are residing abroad should acquire your parts or team with an in-person student to complete the project through virtual collaboration.

#### EXAMS:

There will be three (3) MidTerm exams (Quizzes) and a Final exam. In Fall 2022, all exams will be given in classroom. Tentative exam schedule is posted on the Course Homepage.

In case an exam is given in the WebEx Teams space, the document will be posted before start time. You can write answers on any loose-leaf paper or print out the exam and start the solution of each problem on a separate page.

*Follow the honor code or you will be subject to the consequences of an academic dishonesty violation!* You must sign the front page of exams to indicate that you will not communicate with other students and not access online resources. Submission will be done by you through Gradescope. You'll get an extra time to upload.

# Course Logistics Section

## PRACTICE:

You should do as many exercises as possible including those in the textbook or in class problems or back exams. Please feel free to seek help if you have any difficulties understanding the way the problems are solved.

## PARTNERS:

You will need to work with a partner(s) on the projects. A team of two is encouraged and no more than 4 students in a team are allowed. You will turn in one homework per person and one project report per team. Please print YOUR NAME and ASSIGNMENT clearly on all papers so we can grade and return them to you efficiently.

I strongly encourage community learning spaces to meet in small or large groups to discuss homework, discuss concepts and practice together. Please be sure to write your own individual processes and submit your own homework. Copying homework is a violation of academic integrity. The ECSE Study Hall WebEx Teams space is a great place to meet students in the department. Please feel free to join this community and form your own within the Fields and Waves Teams space.

## CLEAN-UP:

Please be sure to follow RPI protocols for you and other's safety and health. We want to keep the studio and classroom clean because they are also used by other courses. Rather than setting down a list of clean-up rules, we simply ask you to leave your work area in the condition you would like to find it when you come to class!

## EXCUSES:

For absence from a lecture or lab activity, give the TA and instructor a copy of your excuse signed by the dean of students. Planned trips and other functions under your control do NOT qualify for an excused absence.

## CONFLICTS:

In the case of an exam conflict, please notify the course instructor as early as possible.

*Any portion of the syllabus related to the pandemic are subject to change. It is a unique time that requires flexibility, patience, and communication. Communication is vital. All changes will be presented to the entire class through designated channels (e.g., email, Piazza, WebEx Teams, in lecture).*

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# Appendix A: *Academic Integrity Policy*

See next page.

You should sign and submit this document to Gradescope before submitting your first assignments for grading.

## Academic Integrity Policy for ECSE-2100, Fall 2022

Intellectual integrity and credibility are the foundation of all academic work. A violation of Academic Integrity policy is, by definition, considered a flagrant offense to the educational process. It is taken seriously by students, faculty, and Rensselaer and will be addressed in an effective manner. If found responsible for committing academic dishonesty, a student may be subject to one or both types of penalties: an academic (grade) penalty administered by the professor and/or disciplinary action through the Rensselaer judicial process described in the student handbook. Three relevant academic integrity violations to emphasize include:

**Collaboration:** Collaboration is defined as deliberately facilitating an act of academic dishonesty in any way or form; for example, allowing another student to observe an exam paper or allowing another student to "recycle" one's old term paper or using one another's work in a paper or lab report without citing it as another's work.

**Copying:** Copying is defined as obtaining information pertaining to a graded exercise by deliberately observing the paper of another student; for example, noting which alternative a neighboring student has circled on a multiple-choice exam.

**Plagiarism:** Plagiarism is defined as representing the work or words of another as one's own through the omission of acknowledgment or reference. Examples include using sentences verbatim from a published source in a term paper without appropriate referencing, or presenting as one's own the detailed argument of a published source, or presenting as one's own electronically or digitally enhanced graphic representations from any form of media.

The Rensselaer Handbook of Student Rights and Responsibilities defines the full list of forms of Academic Dishonesty, and you should make yourself familiar with these. In this class, all assignments that are turned in for a grade must represent the student's own work. In cases where help was received, or teamwork was allowed, a notation on the assignment should indicate your collaboration.

**Specific examples:** Some assignments, like exams, have a clearly marked place on the front page that requires a signature confirming academic integrity. If you forget to sign the document before submitting it, a TA or instructor will contact you directly to ask you to sign before grading your assignment. *We require that you take exams without speaking to other students or anyone other than the instructor and TAs via any communication channel.* We expect you to use the formula sheets provided by the instructor. You cannot interact with Chegg.com or any other online/internet assignment sharing system for any graded assignment. Interaction with such a system results in an automatic failure for the entire course. A result of the violation using online resources to assist in graded assignments will result in a formal report. As a warning, there are ways that we can easily detect your use of these online resources that compromise academic integrity.

Submission of any assignment that is in violation of the policies described above will result in a penalty of zero grade to an individual homework or project assignment, or a grade of F in the class if the assignment is a midterm quiz or final exam, and may be subject to further disciplinary action. If you have any question concerning this policy before submitting an assignment, please ask for clarification. Your assignments will not be graded without a copy of this form on file.

Your name (please print clearly): \_\_\_\_\_

Your signature: \_\_\_\_\_ Date: \_\_\_\_\_

## Appendix B: *Digital Tools Acknowledgement*

See next page.

You should sign and submit this document to Gradescope before submitting your first assignments for grading.

## Digital Tools Acknowledgement for ECSE-2100, Fall 2022

As described in the syllabus, ECSE 2100 uses several external services to manage course content and grading, including Piazza, Gradescope, and Webex Teams. These online tools provide services designed to assist schools, teachers and other educational partners to improve student learning outcomes. In some circumstances, these online tools may receive personally identifiable information about students (“Student Data”) from the instructor in the course providing this service. For example, an instructor will provide a class roster, email addresses of all students in the class, as well as coursework data that may be linked to a particular student. All listed online resource companies used by the instructor consider Student Data to be strictly confidential and have physical, administrative and technical security protections in place to protect such data. They do not use personally identifiable Student Data for any purpose other than to provide the services to the instructor, and they do not share personally identifiable Student Data with any third party except as authorized or required by the instructor. The online tools above may collect, analyze, and share anonymized or aggregated data or data derived from Student Data for certain purposes, but only if the disclosure of such data could not reasonably identify a specific individual or specific School. Collection and use of Student Data provided by the instructor is governed by Terms of Service for each platform and by the provisions of the Family Educational Rights and Privacy Act (FERPA). Student Data is provided and controlled by the instructor. If you have questions about reviewing, modifying, or deleting your personal information, please contact Rama Hamarneh [hamarr@rpi.edu](mailto:hamarr@rpi.edu) and cc [luj@rpi.edu](mailto:luj@rpi.edu).

All live sessions will be recorded, including your questions and comments and possibly your video if your camera is on. These video recordings may be shared to other students outside this class for educational purpose. If you don’t want to be part of the recordings, please be sure to turn off your camera and microphone.

By signing this acknowledgement, you agree to the usage of the digital tools mentioned above for distributing, collecting, and grading your homeworks, exams, and chats in ECSE-2100 this semester and for other purposes mentioned above. Your assignments will not be graded without a copy of this form on file; please see the instructor if you have any concerns about how a specific tool will be used.

Your name (please print clearly): \_\_\_\_\_

Your signature: \_\_\_\_\_ Date: \_\_\_\_\_