ASU EEE598: Principles of Signal and Power Integrity

Course Information

Course Description: The subject of signal and power integrity involves understanding and mitigation of the various impediments to faithful distribution of signals and power throughout an electrical system using interconnects. Most commonly, the subject addresses microelectronics systems comprising a number of silicon (or other semiconductor) integrated circuits residing within a package and mounted on one or more printed circuit boards. Issues of signal integrity have been important throughout the history of electronics, but recent trends have illuminated the need to develop the subject as a rigorous endeavor. Understanding the fundamental principles of signal integrity and knowing how to apply these principles to specific applications is now of tantamount importance in the successful development of both radio frequency and high-speed digital circuits. This course is intended to expose students to the fundamental principles involved in ensuring signal and power integrity in modern electronics systems. Issues of signal integrity have been important throughout the history of electronics, but recent trends have illuminated the need to develop the subject as a rigorous endeavor. Understanding the fundamental principles of signal integrity and knowing how to apply these principles to specific applications is now of tantamount importance in the successful development of both radio frequency and high-speed digital circuits. Indeed, a convergence point is being reached where many of the techniques and tools developed for the design of microwave frequency circuits are now being applied to solve signal integrity issues in digital circuits, while simultaneously the formal techniques of signal integrity are now being applied to gain insight into previously intractable problems with microwave circuits.

Credits: 3

Recommended Prerequisites: EEE 445 or equivalent; background in microwave circuit design

Course Learning Outcomes

At the completion of this course, students will be able to:

1. Understand the fundamental principles of signal integrity and apply these principles to specific applications.
2. Design power delivery networks for high-speed digital circuits that meet required specifications.

Textbooks

Signal and Power Integrity – Simplified, third edition, by Eric Bogatin. ISBN-13: 978-0-13-451341-6.

Course Access

Your ASU courses can be accessed by both my.asu.edu and asu.instructure.com; bookmark both in the event that one site is down.

Student Success

To be successful:

- check the course daily
- read announcements
- attend lectures
- communicate regularly with your peers and instructor using Ed Discussion
- create a study and/or assignment schedule to stay on track
- complete assessments by the due dates specified
- seek help sooner rather than later
- access ASU Online Student Resources

Grading

We will use the plus/minus grading system (B+, etc.). Standard grade scale will be used. If grades are too low, I will curve up but never down.

Quizzes 30%

Projects 40%

Final Exam 30%

Your grade will be determined based on the following (standard ASU) grading schema:

Grade	**Percentage**
A+	100% - 97%
A	<97-94%
A-	<94-90%

B+	<90-87%
B	<87-84%
B-	<84-80%
C+	<80-77%
C	<77-70%
D	<70-60%
E	<60%

Note that numerical grades are not rounded to the nearest percent.

Submitting Assessments

All assessments MUST be submitted to the designated area of Canvas.

Assignment due dates follow Arizona time. Note: Arizona is in the mountain time zone and does not observe daylight savings time.

Grading Procedure

Grades reflect your performance on assignments and adherence to deadlines. Grades on assignments will be available in the Canvas Gradebook.

Late or Missed Assessments

Notify the instructor **BEFORE** an assessment is due if an urgent situation arises and you will be unable to submit the assessment on time. In the event of an emergency that prevents you from completing the assessment, contact the instructor as soon as possible to request an accommodation for late submission.

Follow the appropriate University policies to request an accommodation for religious practices or to accommodate a missed assessment due to University-sanctioned activities.

A zero is given for a missed quiz or final exam unless there is a documented explanation.

Communicating With the Instructor

We will be using EdDiscussion this semester. All questions regarding the course material must be posted on EdDiscussion. If you send the instructor an email concerning the course material, you will be instructed to post the question on EdDiscussion. On the other hand, questions concerning your class performance, to request an accommodation, or regarding other personal matters should be sent by email to the instructor. All students are expected to regularly check the class discussion and to also answer and comment on any questions or posts they find of interest.

Email

ASU email is an official means of communication among students, faculty, and staff. Students are expected to read and act upon email in a timely fashion. Students bear the responsibility of missed messages and should check their ASU-assigned email regularly.

ASU Policies

Classroom Behavior

Students should refrain from the use of personal electronic devices during class to avoid causing distractions. The use of recording devices is not permitted during class. Any violent or threatening conduct by an ASU student in this class will be reported to the ASU Police Department and the Office of the Dean of Students.

Academic Integrity

Students in this class must adhere to ASU's academic integrity policy, which can be found at https://provost.asu.edu/academic-integrity/policy). Students are responsible for reviewing this policy and understanding each of the areas in which academic dishonesty can occur. In addition, all engineering students are expected to adhere to both the ASU Academic Integrity Honor Code and the Fulton Schools of Engineering Honor Code. All academic integrity violations will be reported to the Fulton Schools of Engineering Academic Integrity Office (AIO). The AIO maintains record of all violations and has access to academic integrity violations committed in all other ASU college/schools.

Copyright

Course content, including lectures, are copyrighted materials and students may not share outside the class, upload to online websites not approved by the instructor, sell, or distribute course content or notes taken during the conduct of the course (see ACD 304–06, "Commercial Note Taking Services" and ABOR Policy 5-308 F.14 for more information).

You must refrain from uploading to any course shell, discussion board, or website used by the course instructor or other course forum, material that is not the student's original work, unless the students first comply with all applicable copyright laws; faculty members reserve the right to delete materials on the grounds of suspected copyright infringement.

Policy against threatening behavior, per the Student Services Manual, SSM 104–02

Students, faculty, staff, and other individuals do not have an unqualified right of access to university grounds, property, or services. Interfering with the peaceful conduct of university-related business or activities or remaining on campus grounds after a request to leave may be considered a crime. All incidents and allegations of violent or threatening conduct by an ASU student (whether on- or off-campus) must be reported to the ASU Police Department (ASU PD) and the Office of the Dean of Students.

Disability Accommodations.

Suitable accommodations will be made for students having disabilities. Students needing accommodations must register with the ASU disabilities resource Center and provide documentation of that registration to the instructor. Students should communicate the need for an accommodation in sufficient time for it to be properly arranged.

Harassment and Sexual Discrimination

Arizona State University is committed to providing an environment free of discrimination, harassment, or retaliation for the entire university community, including all students, faculty members, staff employees, and guests. ASU expressly prohibits discrimination, harassment, and retaliation by employees, students, contractors, or agents of the university based on any protected status: race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, gender identity, and genetic information.

Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at https://sexualviolenceprevention.asu.edu/faqs.

Mandated sexual harassment reporter: As an employee of the University, I am considered a mandated reporter and therefore obligated to report any information regarding alleged acts of sexual discrimination that I am informed of or have a reasonable basis to believe occurred.

ASU Counseling Services, https://eoss.asu.edu/counseling, is available if you wish to discuss any concerns confidentially and privately.

Other

Syllabus changes: Any information in this syllabus (other than grading and absence policies) may be subject to change with reasonable advance notice.

In the event the instructor fails to indicate a time obligation, the time obligation will be 15 minutes for class sessions lasting 90 minutes or less, and 30 minutes for class sessions lasting more than 90 minutes. Students may be directed to wait longer by someone from the academic unit if they know the instructor will arrive shortly.