

The University of Texas at Dallas

EECT 6379 Energy Harvesting, Storage and Powering for Microsystems

Course Information

Lecture Time: 5:30-6:45pm, Tuesdays & Thursdays

Location: ECSS 2.126

Instructor: Ashis Maity (Email: axm168431@utdallas.edu)

Office Hours: 3:30-5:00pm, Wednesdays (location: ECSN4.324) or by appointment

TA: Yingping Chen (Email: yxc152330@utdallas.edu)

Office Hours: 9:00-10:0am, Tuesdays and Thursdays (location: ECSN4.324)

Major Ref: Lecture notes & class reading materials

Minor Ref: R1. ***Fundamentals of Power Electronics***, Second Edition, R.W. Erickson and D. Maksimovic, Kluwer Academic Publishers (2001);
R2. ***Design of Analog Integrated Circuits***, B. Razavi, Wiley (2014);
R3. ***Reconfigurable Switched-Capacitor Power Converters***, D. Ma, R. Bondade, Springer (2013)

Prerequisites: EE 3311 and EE 3310, or equivalent; Cadence/HSPICE tools.

Course Objectives

This course focuses on circuit and system design concepts, principles and techniques of energy harvesting and management with emphasis on the imposed requirements of micro-scale dimensions. The course is designed with two major parts. In the first part, it prepares the students with fundamental knowledge on semiconductor devices, power electronic circuits and control and operation methods. In the second part, the electrical (and mechanical to certain topics) characteristics of various renewable energy sources including solar, kinetic, electromagnetic sources, will be addressed, followed by corresponding harvesting & management circuits and methods with state-of-art examples. The goal is to offer students timely training in one of the fastest growing industry areas – renewable energy and smart grids.

Course Learning Outcomes

- Ability to analyze and design power stage of second order switch mode power converters
- Ability to analyze and design switched-capacitor power converters
- Ability to analyze and design fundamental control methods for switch mode and switched-capacitor power converters
- Ability to analyze and design basic maximum power point tracking circuits for various energy harvesting mechanisms

Evaluation

Exams	67.5%
Quizzes & Professionalism	7.5%
Home/project assignments	25%

Exams:

All exams are in-class exams, which require closed-book, closed-notes and allow one-page, letter-size, single-side formula sheet for each. The tentative schedule of the exams is as follows.

Exam 1 (prerequisite course, 7.5%):	Feb. 2
Exam 2 (20%):	Feb. 28
Exam 3 (20%):	Mar. 28
Exam 4 (20%):	Apr. 27

Quizzes & Professionalism:

There will be several short quizzes to be conducted in class. In general, the questions in a quiz are fundamental and directly related to the class materials that have been recently covered. The purpose of the quizzes is to help the students further understand the class materials with active classroom participation. A quiz is usually conducted in class either before or after a lecture session.

The professionalism portion of your grade will basically depend on your adherence to the university class policies.

Homework/project assignments:

In general, homework/project will be assigned when a major class topic is delivered. You will be given at sufficient time to complete each home, so **no late submission is allowed**. The due date of each assignment will be specified when the assignment is announced.

Code of Academic Integrity

Violations of this code can lead to sanctions and even expulsion from the University. The guiding principle is that submitted work must be the student's own. However, the complete implications of the code are explained on the University's web page at: <https://www.utdallas.edu/conduct/integrity>.

Withdrawals

If you wish to withdraw, correct procedure must be followed. Simply stopping attendance does not drop you from the course. If you do not withdraw according to procedure, your name will appear on the final grade report with a failing grade.

Incompletes

A course grade of "incomplete" (I) can be awarded only in cases of documented hardship, such as a medical or family emergency.

UT Dallas Syllabus Policies and Procedures

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus including Sharing Confidential Information pursuant to Title IX and the link to UT Dallas' Campus Carry webpage.

Please go to <http://go.utdallas.edu/syllabus-policies> for these policies.