

WEST VIRGINIA UNIVERSITY  
COLLEGE OF ENGINEERING AND MINERAL RESOURCES  
LANE DEPARTMENT OF COMPUTER SCIENCE AND ELECTRICAL ENGINEERING

***EE 463: Digital Signal Processing Fundamentals***  
***Spring 2015***  
**3 credit hours**

**Class Info:** Meeting times: T/R 2:00-3:15 PM  
Location: MRB 243

**Instructor:** Daryl Reynolds  
Email: [daryl.reynolds@mail.wvu.edu](mailto:daryl.reynolds@mail.wvu.edu) (I do not check mix email)  
Office: ESB 837  
Office phone: 293-9134

**Office Hours:** T/R 12:30 – 1:30 PM; W 2:00 - 3:00 PM (by request)  
*after class or by appointment*

**Objectives:** This class is concerned with the analysis and processing of signals in the discrete-time domain. Several analytical tools will be developed including the z-transform, DTFT, DFT, and FFT. As most processing operations can be expressed as filtering operations, several filter implementations (FIR and IIR) will be considered along with the methodology to design such filters.

**Prerequisite:** EE 327

**Text:** V.K. Ingle and J.G. Proakis, *Digital Signal Processing Using Matlab*, Third Edition, McGraw Hill, 2012, ISBN 978-1-111-42737-5.

**Outcomes:** At the end of the semester you should be able to:

- Distinguish between a continuous and discrete-time signal in both the time and frequency domains.
- Determine if a discrete-time system is causal, linear, time-invariant, and stable.
- Compute the following signal-analysis operations:
  - Elementary signal operations on discrete-time signals: Addition, shifting, folding, summation, sample product, energy, power, correlation, and convolution.
  - The z-transform of a periodic signal.
  - The discrete-time Fourier transform (DTFT).
  - The discrete Fourier transform (DFT).
  - The fast Fourier transform (FFT)
- Design an FIR or IIR filter to meet required specifications.

**Web-page:** A webpage is maintained for this class within ecampus. This webpage will contain materials handed out in class, including homework assignments/solutions and select lecture notes. Time-critical course announcements will be emailed to your mix account. Note, however, that I do not read mix email.

<b>Assessment:</b>	Homework Assignments	0%	(assigned, but not graded)
	Matlab Projects	20%	(4-6 projects)
	Midterm exams (2)	25%	each
	Final exam	30%	

**Grade**

<b>Boundaries:</b>	A	90%	You are guaranteed at least the letter grade shown here if you obtain the corresponding score. However, at my discretion, the decision boundaries may be adjusted in <i>your</i> favor. '+' and '-' grades will not be reported.
	B	80%	
	C	70%	
	D	60%	

**Homework:** There will be approximately 6 homework assignments given throughout the semester. They will be assigned, but not collected or graded. Solutions will be posted. **Although homework will not be graded, the exercises are critical for preparing you for the three class exams.**

**Matlab**

**Projects:** There will be 4-6 Matlab projects assigned throughout the semester that address practical problems. Each assignment will result in a matlab script (.m file) that will be e-mailed to your instructor, along with .pdf copies of any accompanying figures.

**Exams:** There will be two midterm exams and a final exam. **The final exam is on Thursday, May 7 from 11:00 AM-1:00 PM.** All tests will be closed book, however an equation sheet and a calculator will be allowed.

**Missed Test**

**Policy:** You are expected to attend the quizzes, tests, and final exam at the scheduled times and dates. If you have a legitimate unavoidable conflict, please let me know as soon as possible, but no later than one week before the test (or quiz/exam). If you miss a test, exam, or quiz without first having your absence approved, then your eligibility to make up the exam will be at the discretion of the Associate Dean for Student Affairs.

**Honor Code:** All work submitted for the quizzes, test, and final exam must be your own unaided work. You may confer with your colleagues on interpretation and approach to homework problems, but the final solution must be your own work. Copying homework solutions is strictly prohibited and will be interpreted as a violation of the university's academic honest policy, as listed in the Undergraduate Catalog.

**Re-grading:** If you believe that the instructor or grader made a mistake or was unfair in grading, you may request a re-grade. However, the request must be made in writing and within one week that the assignment or exam was returned. If your homework did not follow the submission guidelines, it will not be re-graded.

**Attendance:** Attendance will not be graded. However, attendance will be taken randomly and exam bonus points awarded at the instructor's consent. In any case, you will be responsible for all material covered in class and posted on the class webpage. It is your responsibility to make sure that you are present for all quizzes and exams, and that all assignments are turned in on time, and that you are aware of all announcements made in class and/or on the course webpage. Please arrive to class on time. If you do arrive late, please come to the front of the classroom to pick up copies of any handouts that may have been distributed.

**Days of Special**

**Concern:** *WVU recognizes the diversity of its students and the needs of those who wish to be absent from class to participate in Days of Special Concern, which are listed in the Schedule of Courses. Students should notify their instructors by the end of the second week of classes or prior to the first Day of Special Concern, whichever is earlier, regarding Day of Special Concern observances that will affect their attendance. Further, students must abide by the attendance policy of their instructors as stated on their syllabi. Faculty will make reasonable accommodation for tests or field trips that a student misses as a result of observing a Day of Special Concern.*