

## ECG 781 Digital Filters Syllabus

### Spring 2016

**Course** EEG 781 Digital Filters  
 TR 2:30 PM - 3:45 PM  
 SEB 1243

**Prerequisites** EEG 780 Digital Signal Processing or equivalent

**Instructor** Dr. P. Stubberud  
 Office Hours: TR 2:00 PM - 2:30 PM and by E-mail  
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**Texts** Alan V. Oppenheim and Ronald W. Schaffer, Discrete-Time Signal Processing, 3rd edition, Prentice Hall, 2009.  
 Monson H. Hayes, Schaum's Outline of Digital Signal Processing, 2nd edition, McGraw-Hill, 2011.

**Notes** Copies of my class notes will be distributed when possible. Lectures will be available at <http://comsys.ee.unlv.edu/~stubber/>.

**Grades** The course grade will be based on the following:

Computer Assignments	15%
Exam 1	T, March 8 (Tentative) 20%
Exam 2	R, April 28 (Tentative) 20%
Final	R, May 12 3:10 PM (Firm) 45%

#### Computer

**Assignments** Computer assignments will require the use of MATLAB or Octave.

**Exams** The exams will cover material from the lectures, the notes, and the assigned reading.

**Cheating** Any type of cheating is punishable by an F in the course.

#### Course Material

Implementations of Discrete Systems  
 Structures for Digital Systems (O&S 6.0-6.10, Hayes 8.0-8.4)  
 Random Signals and System (O&S A.1-A.4)  
 Quantization (O&S 4.8-4.9, Hayes 8.5)

## Filter Design

Filter Design Techniques (O&S 7.0-7.7, B.1-B.3; Hayes Ch 9)

### Course Outcomes

Upon completion of this course, students will be able to:

1. Determine various implementations of linear discrete systems and represent them with block diagrams.
2. Determine the signal to quantization noise ratio of digital systems implemented with either fixed point or floating point binary arithmetic.
3. Design and implement linear phase FIR filters using windowing techniques.
4. Design and implement IIR digital filters from prototype analog filter designs using the bilinear or impulse invariance transformations.
5. Design and implementation of IIR digital filters without the use of prototype analog filter designs.

### Library Resources

Students may consult <https://www.library.unlv.edu/consultation> with a librarian on research needs. For this class, the subject librarian is Sue Wainscott.

([https://www.library.unlv.edu/contact/librarians\\_by\\_subject](https://www.library.unlv.edu/contact/librarians_by_subject)). UNLV Libraries provides resources to support students' access to information. Discovery, access, and use of information are vital skills for academic work and for successful post-college life. Access library resources and ask questions at <https://www.library.unlv.edu>.

### UNLV Policies

**Academic Misconduct** – Academic integrity is a legitimate concern for every member of the campus community; all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility and professionalism. By choosing to join the UNLV community, students accept the expectations of the Student Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling in UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's function as an educational institution.

An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the *Student Academic Misconduct Policy* (approved December 9, 2005) located at:

[http://www.unlv.edu/sites/default/files/page\\_files/27/UNLVStudentConductCode1212016.pdf](http://www.unlv.edu/sites/default/files/page_files/27/UNLVStudentConductCode1212016.pdf).

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**Disability Resource Center (DRC)** – The UNLV Disability Resource Center (SSC-A 143, <http://drc.unlv.edu/>, 702-895-0866) provides resources for students with disabilities. If you feel that you have a disability, please make an appointment with a Disabilities Specialist at the DRC to discuss what options may be available to you. If you are registered with the UNLV Disability Resource Center, bring your Academic Accommodation Plan from the DRC to the instructor during

office hours so that you may work together to develop strategies for implementing the accommodations to meet both your needs and the requirements of the course. Any information you provide is private and will be treated as such. To maintain the confidentiality of your request, please do not approach the instructor in front of others to discuss your accommodation needs.

**Religious Holidays Policy** – Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor no later than the end of the first two weeks of classes, **January 29, 2016**, of his or her intention to participate in religious holidays which do not fall on state holidays or periods of class recess. For additional information, please visit: <http://catalog.unlv.edu/content.php?catoid=6&navoid=531>.

**Incomplete Grades** - The grade of I – Incomplete – can be granted when a student has satisfactorily completed three-fourths of course work for that semester/session but for reason(s) beyond the student's control, and acceptable to the instructor, cannot complete the last part of the course, and the instructor believes that the student can finish the course without repeating it. The incomplete work must be made up before the end of the following regular semester for undergraduate courses. Graduate students receiving "I" grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the time indicated, a grade of F will be recorded and the GPA will be adjusted accordingly. Students who are fulfilling an Incomplete do not register for the course but make individual arrangements with the instructor who assigned the I grade.

**Tutoring** – The Academic Success Center (ASC) provides tutoring and academic assistance for all UNLV students taking UNLV courses. Students are encouraged to stop by the ASC to learn more about subjects offered, tutoring times and other academic resources. The ASC is located across from the Student Services Complex (SSC). Students may learn more about tutoring services by calling 702-895-3177 or visiting the tutoring web site at: <http://academicsuccess.unlv.edu/tutoring/>.

**Rebelmail** – By policy, faculty and staff should e-mail students' Rebelmail accounts only. Rebelmail is UNLV's official e-mail system for students. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the university. Students' e-mail prefixes are listed on class rosters. The suffix is always @unlv.nevada.edu. **Emailing within WebCampus is acceptable.**

**Final Examinations** – The University requires that final exams given at the end of a course occur at the time and on the day specified in the final exam schedule. See the schedule at: <http://www.unlv.edu/registrar/calendars>.