Course Description Fundamentals of network synthesis, filter approximations and frequency transformations. Active filter synthesis using bilinear and biquad circuits. Topics in computer-aided design.

Prerequisites Grade of C or better in ECE 310.

ABET Student Outcomes The following are the ABET Student Outcomes (1, 6, 7) for this course. Outcomes 1 and 6 are emphasized while outcome 7 is reinforced.

(1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

(6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

(7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Topics The following is a list of topics to be covered: transfer functions, frequency response, filter types and specifications; frequency scaling, impedance scaling; bilinear transfer functions and passive/active realizations; cascade synthesis, biquadratic active filter types; classical approximations to the ideal lowpass filter response: (Butterworth, Chebyshev); frequency transformation from lowpass to highpass/bandpass/bandstop; passive filters; operational-transconductance amplifier (OTA) based filters.

References The relevant chapters of the textbook by VanValkenburg will be available on Blackboard


LTspice LTspice from Analog Devices (formerly Linear Technology) will be used for simulations. This software is absolutely free and works very well for everything we will do in this course. Both Windows and native Mac versions are now available. For more information, please take a look at the course webpage.

Matlab Matlab can be quite useful is some of the computations and its use is encouraged. It is available on all university computers.

Course webpage and Blackboard I will announce in class when something is posted on the course webpage and/or Blackboard; however, I will not be sending out mass emails all of the time so it is your responsibility to check these frequently.

Attendance Attendance will be recorded at every lecture. Not all material and examples covered in class will be available in the text. If you miss any lecture, arrange with a classmate to get a copy of the lecture notes.

Homework Homework will be assigned and collected. Late homework will not be accepted. Homework assignments must use the cover sheet given on the course webpage – no exceptions. Homework without cover sheets will not be accepted. All homework must be done on 8.5×11 inch copy paper.

Pop-quizzes Pop-quizzes will be given in class to test the knowledge of homework and lecture material. There will be no make-ups for pop-quizzes.
**Exams**  Exams will be based on homework and material covered in lectures. There will be two exams during the lecture period (12-12:50pm) on Fridays in week 6 (Friday, February 21), week 12 (Friday, April 10), and a final exam during the finals' week (Tuesday, May 5, 8-10am). No make-up exams or alternate arrangements will be allowed unless for reasons beyond a student’s control (supporting documents required).

**Grade Determination**  Your grade for the course will be determined by your attendance and your performance in the homework, pop-quizzes, and exams. Here are the relative weights for each component:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Attendance</td>
<td>5%</td>
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<tr>
<td>Homework</td>
<td>10%</td>
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<tr>
<td>Pop-quizzes</td>
<td>10%</td>
</tr>
<tr>
<td>Two in-class Exams (25% each)</td>
<td>50%</td>
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<tr>
<td>Final Exam</td>
<td>25%</td>
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**Grading Scale:**  
(A = 90–100%, B = 80–89%, C = 70–79%, D = 60–69%, F = 0–59%)

**Academic Integrity**  As an academic community, UIC is committed to providing an environment in which research, learning, and scholarship can flourish and in which all endeavors are guided by academic and professional integrity. All members of the campus community - students, staff, faculty, and administrators - share the responsibility of insuring that these standards are upheld so that such an environment exists. Instances of academic misconduct by students will be handled pursuant to the Student Disciplinary Policy  

Academic Dishonesty will not be tolerated! Dishonest actions by students including plagiarism will result in appropriate disciplinary action. Intentional use or attempt to use unauthorized assistance, materials, information, or people in any examination, quiz, or assignment will lead to a failing grade in the course. College of Engineering and University guidelines will be followed. Academic dishonesty will be dealt with according to the policies set forth in the UIC Student Disciplinary Policy booklet mentioned above.

Here are some examples of academically dishonest actions:

- **Cheating:** Either intentionally using or attempting to use unauthorized materials, information, people, or study aids in any academic exercise, or extending to or receiving any kind of unauthorized assistance on any examination or assignment to, or, from another person.
- **Fabrication:** Knowing or unauthorized falsification, reproduction, lack of attribution, or invention of any information or citation in an academic exercise.
- **Facilitating Academic Dishonesty/Plagiarism:** Intentionally or knowingly representing the words or ideas of another as one’s own in any academic exercise.
- **Bribes, Favors, Threats:** Bribing or attempting to bribe, promising favors to or making threats against, any person, with the intention of affecting a record of a grade, grade, or evaluation of academic performance. Any conspiracy with another person who then takes or attempts to act on behalf or at the direction of the student.
- **Examination by Proxy:** Taking or attempting to take an exam for someone else other than the student is a violation by both the student enrolled in the course and the proxy or substitute.
- **Grade Tampering:** Any unauthorized attempt to change, actual change of, or alteration of grades or any tampering with grades.
- **Non-Original Works:** Submission or attempt to submit any written work authored, in whole or part, by some-one other than the student.

For more information please visit the UIC Office of the Dean of Students website “Academic Integrity”:  
http://dos.uic.edu/community-standards/academic-integrity
Classroom Policies  Any action that distracts or disrupts others is not permitted during lecture. This includes eating, talking/texting on a mobile phone, using headphones, surfing the web, wearing inappropriate dress, reading a newspaper, etc. Offenders will be asked to leave the classroom. Please respect your instructor and especially your classmates (who are paying to take the course and rightfully expect a quality learning environment) at all times. If you arrive late to lecture, enter quietly and sit in the back.

Disability Policy UIC is committed to full inclusion and participation of people with disabilities in all aspects of university life. Students who face or anticipate disability-related barriers while at UIC should connect with the Disability Resource Center (DRC) at drc.uic.edu, drc@uic.edu, or at (312) 413-2183 to create a plan for reasonable accommodations. In order to receive accommodations, students must disclose disability to the DRC, complete an interactive registration process with the DRC, and provide their course instructor with a Letter of Accommodation (LOA). Course instructors in receipt of an LOA will work with the student and the DRC to implement approved accommodations.

Religious Holidays The faculty of the University of Illinois at Chicago shall make every effort to avoid scheduling examinations or requiring that student projects be turned in or completed on religious holidays. Students who wish to observe their religious holidays shall notify the faculty member by the tenth day of the semester of the date when they will be absent unless the religious holiday is observed on or before the tenth day of the semester. In such cases, the students shall notify the faculty member at least five days in advance of the date when he/she will be absent. The faculty member shall make every reasonable effort to honor the request, not penalize the student for missing the class, and if an examination or project is due during the absence, give the student an exam or assignment equivalent to the one completed by those students in attendance. If the student feels aggrieved, he/she may request remedy through the campus grievance procedure.

Harassment If you have experienced sexual assault, domestic/dating violence, stalking, or harassment, there is help available on campus. The Campus Advocacy Network (CAN) provides free and confidential services to UIC students, faculty, and staff who have experienced or are experiencing interpersonal violence. If you would like to speak with an advocate, please contact CAN at can-appointment@uic.edu, call (312) 413-8206, or stop by the CAN office at 1101 W. Taylor St. To learn more, visit CAN's website at can.uic.edu/.

Grievance UIC is committed to the most fundamental principles of academic freedom, equality of opportunity, and human dignity involving students and employees. All UIC Students have the right to appeal adverse academic decisions or actions through a formal University of Illinois at Chicago (UIC) Academic Grievance process that is fair, takes a reasonable amount of time, and provides the Student with requisite levels of due process. More information at https://policies.uic.edu/educational-policy/student-academic-grievance-policy/