EE 325 – SIGNALS AND SYSTEMS I

Credits and Contact Hours: 3 credits. (Two 75-minute lectures per week.)

Instructors: Massimiliano Laddomada, Ph.D.

- Other supplemental materials: as provided by the instructor.

Course Description:

- Catalog Description: This is one of the fundamental courses of Electrical Engineering, providing theoretical concepts and mathematical tools used for the design and analysis of continuous-time linear systems as well as analog signals. Topics covered in this course include linear convolution, impulse response, Fourier series, Fourier transforms and Laplace transform.
- Prerequisite: ENGR2305 Electric Circuits I and MATH2413 (Calculus I); or Instructor permission.
- Corequisite: none.
- Required, Elective: Required.

Course Learning Objectives: By the completion of this course, the student will be able to:

1. Analyze linear time-invariant systems by employing linear convolution between signals.
2. Calculate the Laplace transform of analog signals.
3. Calculate the Fourier Series of periodic signals.
4. Calculate the Fourier Transform of analog signals.
5. Identify contemporary issues in signal processing.

Topics Covered:

Classification of signals and systems 2 week
Linear and time-invariant systems; Linear convolution and impulse response 2 weeks
Laplace transforms, properties, inverse Laplace transform, transfer function 2 weeks
Fourier series representation of continuous time signals, properties and applications 2 weeks
Fourier transforms 3 weeks
Fourier transform properties and applications 2 weeks
Tests and Presentation 3 weeks

**Evaluation Methods:**
Homework will be provided but not evaluated as part of the student’s grade.

- Exam I 25%
- Research Presentation and Report 25%
- Exam II 25%
- Exam III 25%

**Grading Scale:** A (100-90), B (89-80), C (79-70), D (69-60), F (59-0)

**Student Participation.** Participation Policy: Students are expected to attend the lectures

**Disability Accommodations:** Students with disabilities may request reasonable accommodations through the A&M-Texarkana Disability Services Office by calling 903-223-3062.

**Academic Integrity:** Academic honesty is expected of students enrolled in this course. Cheating on examinations, unauthorized collaboration, falsification of research data, plagiarism, and undocumented use of materials from any source constitute academic dishonesty and may be grounds for a grade of ‘F’ in the course and/or disciplinary actions. For additional information, see the university catalog.

**A&M-Texarkana Email Address:** Upon application to Texas A&M University-Texarkana an individual will be assigned an A&M-Texarkana email account. This email account will be used to deliver official university correspondence. Each individual is responsible for information sent and received via the university email account and is expected to check the official A&M-Texarkana email account on a frequent and consistent basis. Faculty and students are required to utilize the university email account when communicating about coursework.

**Drop Policy:** To drop this course after the census date (see semester calendar), a student must complete the Drop/Withdrawal Request Form, located on the University website http://tamut.edu/Registrar/droppingwithdrawing-from-classes.html) or obtained in the Registrar’s Office. The student must submit the signed and completed form to the instructor of each course indicated on the form to be dropped for his/her signature. The signature is not an “approval” to drop, but rather confirmation that the student has discussed the drop/withdrawal with the faculty member. The form must be submitted to the Registrar’s office for processing in person, email
Registrar@tamut.edu, mail (7101 University Ave., Texarkana, TX 75503) or fax (903-223-3140). Drop/withdraw forms missing any of the required information will not be accepted by the Registrar’s Office for processing. It is the student’s responsibility to ensure that the form is completed properly before submission. If a student stops participating in class (attending and submitting assignments) but does not complete and submit the drop/withdrawal form, a final grade based on work completed as outlined in the syllabus will be assigned.

**Student Technical Assistance:**
- Solutions to common problems and FAQ’s for your web-enhanced and online courses are found at this link: [http://www.tamut.edu/webcourses/index.php?pageid=37](http://www.tamut.edu/webcourses/index.php?pageid=37)
- If you cannot find your resolution there, you can send in a support request detailing your specific problem here: [http://www.tamut.edu/webcourses/gethelp2.php](http://www.tamut.edu/webcourses/gethelp2.php)
- Blackboard Helpdesk contacts:
  - Office hours are: Monday - Friday, 8:00a to 5:00p
    - Julia Allen (main contact) 903-223-3154 julia.allen@tamut.edu
    - Frank Miller (alternate) 903-223-3156 frank.miller@tamut.edu
    - Nikki Thomson (alternate) 903-223-3083 nikki.thomson@tamut.edu
Course Relationship to ABET Student Outcomes
This course addresses the following Accreditation Board for Engineering and Technology (ABET) outcomes including the ability to:

- 3a) an ability to apply knowledge of mathematics, science, and engineering
- 3e) an ability to identify, formulate, and solve engineering problems
- 3i) a recognition of the need for, and an ability to engage in life-long learning
- 3j) a knowledge of contemporary issues

<table>
<thead>
<tr>
<th>Mapping between Course learning objective and ABET student outcomes</th>
<th>ABET 3a</th>
<th>ABET 3e</th>
<th>ABET 3i</th>
<th>ABET 3j</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Analyze linear time-invariant systems by employing linear convolution between signals</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2) Calculate the Laplace transform of an analog signal</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Calculate the Fourier Series of a periodic signal</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4) Calculate the Fourier Transform of an analog signal</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) Identify contemporary issues in signal processing</td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

1 (or I)=objective addresses outcome slightly, 2 (or D)=moderately, 3 (or M)=substantively