Course Change Request

Date Submitted: 02/27/18 3:20 pm

Viewing: **ECEN 420 : Linear Control Systems**

Last edit: 02/28/18 12:55 pm

Changes proposed by: w-lala

Catalog Pages referencing this course:
- AERO - Aerospace Engineering
- Department of Aerospace Engineering
- Department of Electrical & Computer Engineering
- Department of Electrical and Computer Engineering
- ECEN - Electrical & Comp Engr
- ECEN - Electrical & Comp Engr (ECEN)

Faculty Senate Number

Contact(s)

<table>
<thead>
<tr>
<th>Name</th>
<th>E-mail</th>
<th>Phone</th>
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</thead>
<tbody>
<tr>
<td>Windy Lala</td>
<td><a href="mailto:w-lala@tamu.edu">w-lala@tamu.edu</a></td>
<td>979-458-3127</td>
</tr>
</tbody>
</table>

Rationale for Course

**Edit**

The proposed changes are part of a routine curriculum review.

Course prefix: ECEN  
Course number: 420

Department: Electrical & Computer Eng
College/School: College of Engineering
Academic Level: Undergraduate
Undergraduate course level justification (Select One)

Academic Level (alternate): Graduate
Effective term: 2018-2019

Complete Course Title: Linear Control Systems
Abbreviated Course Title: LINEAR CONROL SYSTEMS

Catalog course description:
Application of state variable and frequency domain techniques to modeling, analysis and synthesis of single input, single output linear control systems.

Prerequisites and Restrictions:
Grade of C or better in ECEN 314 and MATH 308; junior or senior classification.

Concurrent Enrollment: No
Should catalog prerequisites / concurrent enrollment be enforced? Yes

Enforced Prerequisites / Concurrent Enrollment

In Workflow
1. ECEN Department Head
2. Curricular Services Review
3. EN Committee Preparer UG
4. EN Committee Chair UG
5. EN College Dean UG
6. UCC Preparer
7. UCC Chair
8. Faculty Senate Preparer
9. Faculty Senate
10. Provost II
11. President
12. Curricular Services
13. Banner

Approval Path
1. 02/27/18 3:37 pm
   Aydin Karsilayan (karsilay): Approved for ECEN Department Head
2. 02/28/18 12:56 pm
   Sandra Williams (sandra-williams): Approved for Curricular Services Review
3. 02/28/18 2:08 pm
   Eileen Hoy (ehoy): Approved for EN Committee Preparer UG
4. 03/02/18 9:33 am
   Prasad Enjeti (enjetti): Approved for EN Committee Chair UG
5. 03/02/18 9:38 am
   Prasad Enjeti (enjetti): Approved for EN College Dean UG
6. 03/05/18 9:06 am
   Sandra Williams (sandra-williams): Approved for UCC Preparer
7. 03/09/18 3:32 pm
   Sandra Williams (sandra-williams): Approved for UCC Chair

https://nextcatalog.tamu.edu/courseleaf/approve/
<table>
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<th>And/Or</th>
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<th>Other: 0</th>
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<td>(per week):</td>
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<th>Repeatable for credit?</th>
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<td>Three-peat?</td>
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<th>Satisfactory/Unsatisfactory</th>
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<table>
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<tr>
<th>Method of instruction</th>
<th>Lecture</th>
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| Will sections of this course be taught as non-traditional? (i.e., parts of term, distance education) | Yes |

**Learning Outcomes**

*Meets traditional face-to-face learning outcomes.*

Describe how learning outcomes are met or provide justification why they are not met.

*Learning outcomes are met in the same manner as the traditional, on-campus sections; the study abroad sections are still face-to-face with a Texas A&M University instructor.*

**Hours**

*Meets traditional face-to-face hours.*

Describe how hours are met or provide justification why they are not met.

*Study Abroad sections are schedule to meet the same lecture requirements as a traditional, face-to-face section.*

Will this course be taught as a distance education course?  

Yes No

I verify that I have reviewed the FAQ for Export Control Basics for Distance Education.

Yes No

Is 100% of this course going to be taught in Texas?  

No

Will classroom space be needed for this course?  

Yes

This will be a required course or an elective course for the following programs:

Required (select program)  

Elective (select program)
Has/will this course be(en) submitted for core curriculum consideration? No
Has/will this course be(en) submitted for Writing or Communication consideration? No
Has/will this course be(en) submitted for ICD consideration? No

Course Syllabus

Syllabus: Upload syllabus
Upload syllabus: ecen420-syllabus.docx
Letters of support or other documentation No
Additional information
Reviewer Comments
Sandra Williams (sandra-williams) (02/22/18 7:42 pm): Rollback: Please attach a traditional syllabus and a non-traditional syllabus [if applicable].
Sandra Williams (sandra-williams) (03/09/18 3:32 pm): UCC approved March 9 via e-vote.
Reported to state? No
Course title and number  Linear Control Systems, ECEN 420
Term (e.g., Fall 200X)  Spring 2018
Meeting times and location  TR 5:30-6:45pm in ETB 1037

Course Description and Prerequisites

Application of state variable and frequency domain techniques to modeling, analysis and synthesis of single input, single output linear control systems.

Prerequisites: Grade of C or better in ECEN 314 and MATH 308; junior or senior classification.

Learning Outcomes or Course Objectives

After completing this course, students will be able to:
- Analyze and design linear control systems
- Determine a linear system’s stability condition
- Apply feedback techniques to stabilize a linear system
- Simulate feedback systems using the control system toolbox of Matlab

Instructor Information

Name  Dr. A Datta
Telephone number  (979) 845-5917
Email address  datta@ece.tamu.edu
Office hours  TR 4:00pm-5:00pm and by appointment
Office location  WEB 212-F

Textbook and/or Resource Material


Grading Policies

3 Exams  25 points each
Homework  15 points
MATLAB Assignments  10 points

Make-ups available for university-excused absences, see http://student-rules.tamu.edu/rule07.

Grading Scale

A = 90-100
B = 80-89
C = 70-79
D = 60-69
F = <60
Course Topics, Calendar of Activities, Major Assignment Dates

Exam #1: February 20th, 2018
Exam #2: March 27th, 2018
Exam #3: April 24th, 2018
Matlab Assignments due: April 24th, 2018

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Required Reading</th>
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<tbody>
<tr>
<td>1-2</td>
<td>Overview of control. Review of Laplace transforms, differential equations, transfer functions, Matrix Algebra</td>
<td>Read: 1.1-1.3, 3.1, Appendix A; Problems: 3.1-3.9, 3.12, 3.14-3.17</td>
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<tr>
<td>3-5</td>
<td>State Space Design</td>
<td>Read: 7.1-7.9; Problems: 7.1-7.58</td>
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<tr>
<td>6-7</td>
<td>Mathematical Models of Dynamic Systems</td>
<td>Read: 2.1-2.4; Problems: 2.1-2.11, 2.13-2.23</td>
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<tr>
<td>8-9</td>
<td>Block diagrams, Signal Flow and Time Response</td>
<td>Read: 3.2-3.6; Problems: 3.22-36, 3.38-52, 3.54-55</td>
</tr>
<tr>
<td>10-11</td>
<td>Feedback Control System Characteristics</td>
<td>Read: 4.1-4.3; Problems: 4.1-4.37</td>
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<tr>
<td>12-14</td>
<td>Frequency Response Methods, Nyquist Criterion, Bode Plots</td>
<td>Read: 6.1-6.4, 6.6, 6.7; Problems: 6.1-6.66</td>
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</table>

Other Pertinent Course Information

ECEN 420 Computer Assignments: The purpose of these assignments is to familiarize you with the capabilities of the Matlab package and in particular the Control System Toolbox. These can be accessed over the Novell network from the ECE computers. The specific assignments will be made once we have covered the relevant topics in the lecture. For each problem your report should contain the problem statement, any preliminary calculations, Matlab script used to solve it, the numerical and graphical output from Matlab and the final answer with comments where appropriate.

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call 979-845-1637. For additional information, visit [http://disability.tamu.edu](http://disability.tamu.edu).

Academic Integrity

For additional information please visit: [http://aggiehonor.tamu.edu](http://aggiehonor.tamu.edu)

"An Aggie does not lie, cheat, or steal, or tolerate those who do."