

Cover Sheet: Request 11343

EEL4185 State Variable Methods in Linear Systems

Info

Process	Course New Ugrad/Pro
Status	Pending
Submitter	Chillingworth,Shannon M schill@ece.ufl.edu
Created	12/8/2016 10:20:08 AM
Updated	2/10/2017 3:18:09 PM
Description of request	New course approval.

Actions

Step	Status	Group	User	Comment	Updated
Department	Approved	ENG - Electrical and Computer Engineering 011905000	Fox, Robert M		12/8/2016
No document changes					
College	Approved	ENG - College of Engineering	Caple, Elizabeth		1/20/2017
No document changes					
University Curriculum Committee	Comment	PV - University Curriculum Committee (UCC)	Case, Brandon	Added to the February agenda.	1/24/2017
No document changes					
University Curriculum Committee	Pending	PV - University Curriculum Committee (UCC)			1/24/2017
No document changes					
Statewide Course Numbering System					
No document changes					
Office of the Registrar					
No document changes					
Student Academic Support System					
No document changes					
Catalog					
No document changes					
College Notified					
No document changes					

Course|New for request 11343

Info

Request: EEL4185 State Variable Methods in Linear Systems

Description of request: New course approval.

Submitter: Chillingworth, Shannon M schill@ece.ufl.edu

Created: 2/10/2017 3:21:16 PM

Form version: 4

Responses

Recommended PrefixEEL

Course Level 4

Number 185

Category of Instruction Advanced

Lab Code None

Course Title State Variable Methods in Linear Systems

Transcript Title STATE VAR METHODS

Degree Type Baccalaureate

Delivery Method(s) On-Campus

Co-Listing Yes

Co-Listing Explanation This course is co-listed with the graduate class EEL 5182. The homework portion of the graduate section will involve additional work and more advanced concepts with respect to the undergraduate section. The exams will also involve more advanced concepts with respect to the undergraduate section.

Effective Term Fall

Effective Year 2017

Rotating Topic? No

Repeatable Credit? No

Amount of Credit 3

S/U Only? No

Contact Type Regularly Scheduled

Weekly Contact Hours 3

Course Description Linear algebra and state variable methods for design and analysis of discrete and continuous linear systems.

Prerequisites EEL 4657C

Co-requisites None

Rationale and Placement in Curriculum Course will expose students to advanced topics linear control systems.

Course Objectives To teach engineering students the use of state variable methods in the design and analysis of linear control systems.

These objectives will be accomplished through instruction in the following topics

- Realization theory and implementation (5 weeks).
- Controllability of linear systems.
- State feedback and stabilization of linear systems
- Linear observers.
- Observability of linear systems.
- Combining observers and controllers.
- Stabilizability and detectability of linear systems.

Course Textbook(s) and/or Other Assigned Reading Title: Linear Systems

Author: T. Kailath

1980, First Edition, Prentice-Hall, Inc.

ISBN number: 0135369614

Software: N/A

Weekly Schedule of Topics Course Schedule

Week 1:	Introduction
Week 2:	Background (Homework 1)
Week 3:	Realization of Linear Systems (Homework 2)
Week 4:	Observability (Homework 3)
Week 5:	Reachability (Homework 4)
Week 6:	Constructibility (Homework 5)
Week 7:	Controllability (Homework 6)
Week 8:	Discrete-time systems (Exam 1)
Week 9:	Linear State Feedback (Homework 7)
Week 10-11:	Asymptotic Observers (Homework 8)
Week 12-13:	The Observer-Controller Configuration (Homework 9)
Week 14:	The Observer-Controller Configuration: Examples (Homework 10)
Week 15:	Review

Links and Policies Attendance Policy, Class Expectations, and Make-Up Policy

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Excused absences are consistent with university policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) and require appropriate documentation from the University's student counseling office.

Students must possess portable computers and bring them to class upon announcement.

Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

University Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Software Use

All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Campus Resources:

Health and Wellness

U Matter, We Care:

If you or a friend is in distress, please contact umatter@ufl.edu or 352-392-1575 so that a team member can reach out to the student.

Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS)
Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. <https://lss.at.ufl.edu/help.shtml>.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. <https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. <https://writing.ufl.edu/writing-studio/>.

Student Complaints Campus:

https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaint-process>.

Grading Scheme Evaluation of Grades:

Assignment

Percentage of Final Grade
Homework Sets (10) 10%
Midterm Exam

35%

Final Exam

55%
TOTAL

100%

Grading Policy:

NOTE: This grading scale is only an example and should not dictate the scale or weights chosen for a course

Percent	Grade	Grade Points
93 - 100	A	4.00
90 - 92	A-	3.67
87 - 89	B+	3.33
83 - 86	B	3.00
80 - 82	B-	2.67
77 - 79	C+	2.33
73 - 76	C	2.00
70 - 72	C-	1.67
67 - 69	D+	1.33
63 - 66	D	1.00
60 - 62	D-	0.67
0 - 59	E	0.00

A "C-" will not be a qualifying grade for critical tracking courses. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). Note: A "C-" average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement.

Note: This course is co-listed with the graduate class EEL 5182. The homework portion of the graduate section will involve additional work and more advanced concepts with respect to the undergraduate section. The exams will also involve more advanced concepts with respect to the undergraduate section.

More information on UF grading policy may be found at:
<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Instructor(s) Dr. Jacob Hammer

Title of Course: State Variable Methods in Linear Systems

EEL 4XXX Section # XXXX

Class Periods: MWF, period 8, and 3:00-3:50PM

Location: TBD

Academic Term: Fall 2017

Instructor

- Name: Jacob Hammer
- Email Address: hammer@mst.ufl.edu
- Office Phone Number: 352-392-4934
- Office Hours: MWF 3:50-4:40PM in NEB 563

Teaching Assistants

Please contact through the Canvas website

N/A

Course Description

Linear algebra and state variable methods for design and analysis of discrete and continuous linear systems.

Course Pre-Requisites / Co-Requisites

EEL 4657C

Course Objectives

To teach engineering students the use of state variable methods in the design and analysis of linear control systems.

These objectives will be accomplished through instruction in the following topics

- Realization theory and implementation (5 weeks).
- Controllability of linear systems.
- State feedback and stabilization of linear systems
- Linear observers.
- Observability of linear systems.
- Combining observers and controllers.
- Stabilizability and detectability of linear systems.

Materials and Supply Fees

N/A

Professional Component (ABET)

This course consists of 1.5 credits of Engineering Design and 1.5 credits of Engineering Science

Relation to Program Outcomes (ABET)

a - an ability to apply knowledge of mathematics, science, and engineering

c - an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

d - an ability to function on multi-disciplinary teams

e - an ability to identify, formulate, and solve engineering problems

i - a recognition of the need for, and an ability to engage in life-long learning

j - a knowledge of contemporary issues

k - an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

EE Program Criteria

EE2 - knowledge of mathematics, basic and engineering sciences necessary to analyze and design complex systems

EE3 - knowledge of advanced mathematics including linear algebra, complex variables and discrete mathematics

Required Textbooks and Software

- Title: Linear Systems
- Author: T. Kailath
- 1980, First Edition, Prentice-Hall, Inc.
- ISBN number: 0135369614
- Software: N/A

Recommended Materials

- Title: N/A
- Author:
- Publication date, edition, and publisher:
- ISBN number:

Course Schedule

Week 1:	Introduction
Week 2:	Background (Homework 1)
Week 3:	Realization of Linear Systems (Homework 2)
Week 4:	Observability (Homework 3)
Week 5:	Reachability (Homework 4)
Week 6:	Constructibility (Homework 5)
Week 7:	Controllability (Homework 6)
Week 8:	Discrete-time systems (Exam 1)
Week 9:	Linear State Feedback (Homework 7)
Week 10-11:	Asymptotic Observers (Homework 8)
Week 12-13:	The Observer-Controller Configuration (Homework 9)
Week 14:	The Observer-Controller Configuration: Examples (Homework 10)
Week 15:	Review

Attendance Policy, Class Expectations, and Make-Up Policy

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies. Excused absences are consistent with university policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>) and require appropriate documentation from the University's student counseling office.

Students must possess portable computers and bring them to class upon announcement.

Evaluation of Grades:

Assignment	Percentage of Final Grade
Homework Sets (10)	10%
Midterm Exam	35%
Final Exam	55%
TOTAL	100%

Homework Due Dates:

Each homework assignment is due one week after it was assigned; if there is no class on the due date, then the homework will be due the first class thereafter.

Exam Dates:

Midterm Exam: Wednesday, March 15, in class.

Final Exam: Thursday, April 27, 7:30-9:30AM

Grading Policy:

NOTE: This grading scale is only an example and should not dictate the scale or weights chosen for a course

Percent	Grade	Grade Points
93 - 100	A	4.00
90 - 92	A-	3.67
87 - 89	B+	3.33
83 - 86	B	3.00
80 - 82	B-	2.67
77 - 79	C+	2.33
73 - 76	C	2.00
70 - 72	C-	1.67
67 - 69	D+	1.33
63 - 66	D	1.00
60 - 62	D-	0.67
0 - 59	E	0.00

A “C-” will not be a qualifying grade for critical tracking courses. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). Note: A “C-” average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement.

Note: This course is co-listed with the graduate class EEL 5182. The homework portion of the graduate section will involve additional work and more advanced concepts with respect to the undergraduate section. The exams will also involve more advanced concepts with respect to the undergraduate section.

More information on UF grading policy may be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at <https://evaluations.ufl.edu/evals>. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at <https://evaluations.ufl.edu/results/>.

University Honesty Policy

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Software Use

All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Campus Resources:

Health and Wellness

U Matter, We Care:

If you or a friend is in distress, please contact umatter@ufl.edu or 352-392-1575 so that a team member can reach out to the student.

Counseling and Wellness Center: <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

Academic Resources

E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu.
<https://lss.at.ufl.edu/help.shtml>.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring.
<https://teachingcenter.ufl.edu/>.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers.
<http://writing.ufl.edu/writing-studio/>.

Student Complaints Campus: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

On-Line Students Complaints: <http://www.distance.ufl.edu/student-complaint-process>.

This course is co-listed with the graduate class EEL 5182. The homework portion of the graduate section will involve additional work and more advanced concepts with respect to the undergraduate section. The exams will also involve more advanced concepts with respect to the undergraduate section.