Graduate Council Curriculum Committee
June 10, 2020
2:00p.m., Zoom

Agenda

1. Welcome and call to order

2. General business
    - Minutes from today's meeting will be emailed to the Committee for approval to complete the academic year.

3. Course and Program proposals

4. Adjournment

Members and Administrators of the Graduate Council Curriculum Committee

Patricia Bockelman, Chair, College of Graduate Studies
Terrie Sypolt, Vice Chair, University Libraries
Elsie Olan, College of Community Innovation and Education
Andre Gesquiere, College of Sciences
Sonia Arellano, College of Arts and Humanities
Art Weeks, College of Engineering and Computer Science
Jihe (Jackie) Zhao, College of Medicine
Jascinth Lindo, College of Nursing
Axel Schülzgen, College of Optics and Photonics
Olga Molina, College of Health Professions and Sciences
Alex Rubenstein, College of Business Administration
Wei Wei, Rosen College of Hospitality Management
Shemeca Smith, Graduate Student Association
Laurie von Kalm, College of Sciences, Administrator
Joellen Edwards, College of Nursing, Administrator
Ali Gordon, College of Engineering and Computer Science, Administrator
Jim Moharam, College of Optics and Photonics, Administrator
Lynn Hepner, College of Arts and Humanities, Administrator
Devon Jensen, College of Graduate Studies, Administrator
Glenn Lambie, College of Community Innovation and Education, Administrator
Saleh Naser, College of Medicine, Administrator
Linda Rosa-Lugo, College of Health Professions and Sciences, Administrator
Sevil Sonmez, College of Business Administration, Administrator
Alan Fyall, Rosen College of Hospitality Management, Administrator

Graduate Council Curriculum Committee
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1. College of Business Administration

College of Business Administration certificate additions

1. Cyber Risk Management Graduate Certificate
2. FinTech Graduate Certificate (joint CBA & CECS)
3. Supply Chain Management Graduate Certificate

2. College of Engineering and Computer Science

College of Engineering and Computer Science course revision

1. EAS 5407 Mechatronic Systems
    - Removing lab component due to limited lab space in department.
    - Course number changed from 5407C to 5407.
    - Lab credit hours removed.

College of Engineering and Computer Science certificate and track additions

1. Aerospace Engineering MSAE, Guidance Control and Dynamics Track
2. Mechanical Engineering MSME, Guidance Control and Dynamics Track
3. Data Analytics Graduate Certificate
4. Technologies for Smart Communities Graduate Certificate
    - Name change from: Connectivity, Sensing and Control for Smart Communities

3. College of Optics and Photonics

College of Optics and Photonics certificate additions

1. Applied Photonics Graduate Certificate
2. Optical Imaging Systems Graduate Certificate

4. College of Sciences

College of Sciences certificate additions

1. Data Modeling Graduate Certificate
2. Financial Mathematics Graduate Certificate
3. Research Smarts Graduate Certificate

GCCC Agenda Summer-20

Committee	**Graduate Curriculum Committee**
Notes	
Total Proposals	**12**

College of Business Administration - Graduate Program Addition-New - Cyber Risk Management Graduate Certificate

2020-2021 Graduate New Certificate or Track

General Catalog Information

Read before you begin

TURN ON help text before starting this proposal by clicking in the top right corner of the heading.
FILL IN all fields required marked with an * after importing data. You will not be able to launch the proposal without completing required fields.

LAUNCH proposal by clicking in the top left corner. DO NOT make proposed changes before launching proposal. Changes will only be tracked after proposal is launched.

Select *Program* below.

Program Type* (•) Program ( ) Shared Core

This form is to be used to ADD graduate tracks or certificate programs. If there are multiple tracks being added to a program, one form must be submitted to revise the program and additional forms must be submitted for each of the track additions.

Please refer to the Graduate Council Curriculum Meeting Schedule for submission deadlines.

Proposal Type:* Graduate Program Addition-New

College:* College of Business Administration

Unit / Department / College:* Department of Management

Primary Unit Housing Program:* Department of Management

Type of Action:* ☐ Track ☑ Certificate

Name of new track or certificate:* Cyber Risk Management Graduate Certificate

Proposed Effective Term and Year:* Fall 2020

Delivery:* ☐ Face to Face ☑ UCF Online (all courses online-approved with UCF Online) ☐ Mixed Delivery

If you will be submitting other forms for tracks or course actions, please list them here:

New Equipment Fee?* ○ Yes ◉ No

If yes, also complete the 2020-2021 Graduate Equipment Fee form.

Will the program be a market tuition rate program?* ○ Yes ◉ No

Will the program be a cost recovery program?* ○ Yes ◉ No

For the Informational Description Chart box below, please copy and paste this example chart and add your relevant program information:

College: Link to College website	**Degree: CRT**
Department: Link to department website	**Option: N/A**
Program Websites: Link to program website	

Informational Description Chart:*

College: Business Administration	**Degree:** CRT
Department: Management	
Program Websites:	

Rationale:* The certificate in Cyber Risk Management introduces students from various academic backgrounds to current cybersecurity and privacy matters affecting organizations and emphasizes managerial and risk-based approaches to help organizations effectively prepare for and respond to these concerns.

Prospective Curriculum*

Program Description

The certificate in Cyber Risk Management introduces students from various academic backgrounds to current cybersecurity and privacy matters affecting organizations and emphasizes managerial and risk-based approaches to help organizations effectively prepare for and respond to these concerns.

Curriculum

Total Credit Hours Required: 9 Credit Hours Minimum beyond the Bachelor's Degree

Required Courses: 9 Credit Hours

ISM 6327 Foundations of Cybersecurity and Privacy
ISM 6938 ST: Cyber Risk Assessment
ISM 6938 ST: Cyber Management and Leadership

Application Requirements

Admission is open to those with documentation of a bachelors degree from an accredited institution or participation in a UCF graduate degree program. Students who maintain graduate standing in a UCF graduate degree program during the time required to complete a graduate certificate are eligible for this certificate. An application to the graduate certificate program, a current resume, and official transcripts must be submitted. Applicants must apply online. All requested materials must be submitted by the established deadline.

Those applying who are NOT currently enrolled in a UCF graduate program must have a minimum of 2 years of full-time work experience after completion of the bachelor's degree.

In addition to the Admissions, applicants to this program must provide:

One official transcript (in a sealed envelope) from each college/university

One official transcript (in a sealed envelope) from each college/university attended.

Resume/CV

Application Deadlines

Cyber Risk Management Graduate Certificate	*Fall Priority	Fall	Spring	Summer
Domestic Applicants		Jul 1	Dec 1	
International Applicants				
*Applicants who plan to enroll full time in a degree program and who wish to be considered for university fellowships or assistantships should apply by the Fall Priority date.				

Contact Info

Graduate Program

Kelley Dietrich
cbagrad@bus.ucf.edu

Graduate Admissions

TBA

gradadmissions@ucf.edu

Telephone: 407-823-2766

Millican Hall 230

Online Application

Graduate Admissions

Mailing Address

UCF College of Graduate Studies

Millican Hall 230

PO Box 160112

Orlando, FL 32816-0112

Institution Codes

GRE: 5233

GMAT: RZT-HT-58

TOEFL: 5233

ETS PPI: 5233

Impact on Current Students

Will students be moved from an existing program, track, or certificate into this new track or certificate?* ○ Yes ◉ No

If yes, state the name of the program or track where students are currently enrolled and the current enrollment numbers.

Will students have the option to stay in their existing program, track, or certificate?* ◉ Yes ○ No

Future Students

Indicate likely career or student outcomes upon completion:

Provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc.

Year 1

Headcount:

SCHs:

Year 2

Headcount:

SCHs:

Year 3

Headcount:	SCHs:

Please complete the following section on financial support:

(Specify all forms of support – assistantships, fellowships, and tuition remission.)

Year 1

Number of assistantship students:	Source of funds:
Number of fellowship students (specify fellowship):	
Number of tuition remissions:	Source of funds:

Year 2

Number of assistantship students:	Source of funds:
Number of fellowship students (specify fellowship):	
Number of tuition remissions:	Source of funds:

Year 3

Number of assistantship students:	Source of funds:
Number of fellowship students (specify fellowship):	
Number of tuition remissions:	Source of funds:

Attachments

Please attach the required files by navigating to the Proposal Toolbox and clicking in the top right corner of the form.

Faculty List*	☑ Attached
Support from involved	

Support from involved units that no duplication exists* ☐ Attached ☑ Not Applicable

Library Assessment of Resources* ☑ Attached

Administration Use Only

Program Type Certificate

Degree Type Certificate

Status* ◉ Active-Visible ○ Inactive-Hidden

Catalog Ownership: Department of Management

Certificate in Cyber Risk Management Faculty

· ISM 6327 Foundations of Cybersecurity and Privacy- **Clay Posey, Ph.D. (Management Dept.)**
· ISM 6328 Cyber Risk Assessment - **Clay Posey, Ph.D. (Management Dept.)**
· ISM 6329 Cyber Risk Management and Leadership- **Alex Rubenstein, Ph.D. (Management Dept.)**

Emily Stettner

From: Sevil Sonmez
Sent: Monday, May 18, 2020 2:43 PM
To: Meredith Smart
Subject: Cyber Risk Management Certificate

Meredith, please see Ali Gordon's statement of support below.

Sevil Sönmez, Ph.D.
Associate Dean of Faculty, Research, and Graduate Programs
College of Business Administration
University of Central Florida
12744 Pegasus Drive, 230M
Orlando, FL 32816-1991

Office: 407.823.2220
Fax: 407.823.5741
Sevil.Sonmez@ucf.edu
business.ucf.edu

From: Ali Gordon <Ali.Gordon@ucf.edu>
Sent: Monday, May 18, 2020 10:33 AM
To: Sevil Sonmez <sevil@ucf.edu>
Subject: RE: Certificate

Students who earn this certificate will be able to use all of their credits towards the upcoming CECS MS in Cybersecurity and Privacy. We fully support your program.

Ali

From: Sevil Sonmez <sevil@ucf.edu>
Sent: Monday, May 18, 2020 10:02 AM
To: Ali Gordon <Ali.Gordon@ucf.edu>
Subject: Re: Certificate

Hi Ali, it'll be Cyber Risk Management.

Sevil Sönmez, Ph.D.
Associate Dean of Faculty, Research, and Graduate Programs
College of Business Administration
University of Central Florida
12744 Pegasus Drive, 230M
Orlando, FL 32816-1991

Office: 407.823.2220
Fax: 407.823.5741

Sevil.Sonmez@ucf.edu
business.ucf.edu

From: Ali Gordon <Ali.Gordon@ucf.edu>
Sent: Monday, May 18, 2020 9:43 AM
To: Sevil Sonmez <sevil@ucf.edu>
Subject: Certificate

Sevil,

Will the name of your new graduate certificate be: Cyber Risk Management or Cybersecurity and Privacy or something different?

Thanks,

Ali

University of Central Florida

University Libraries

TO: Emily Stettner, Assistant Director, Graduate Curriculum
FROM: Min Tong, Business Librarian, University Libraries
DATE: May 29, 2020
RE: Library Assessment Waiver for Proposed Online Graduate Certificates

As the Subject Librarian for Business, I was contacted by Ms. Ying Zhang, Interim Associate Director of Collection & Technical Services at the University Libraries, regarding the proposed graduate certificates in **FinTech**, **Cybersecurity and Privacy**, and ***Supply Chain Management***. According to the description of the proposal and the proposed course list, all required courses and electives are currently taught and there is no major change in the curriculum focus. Therefore, there will be minimal impact on the existing support from the library collections and services. Based on the assessment, I waive a full library analysis for the proposal of the three proposed graduate certificates.

In the unfortunate event library budget shortfalls occur, some existing resource subscriptions may be cut or scaled back, which may reduce the support for the subject areas of the proposed graduate certificates. I will keep the program apprised if/when this were to occur.

A full library analysis will be needed if any of the proposed certificates were to change its focus substantively or to be expanded to a track or a program.

Submitted by,
Min Tong, M.L.I.S. M.A.
Business Librarian
University of Central Florida Libraries
min.tong@ucf.edu

College of Business Administration - Graduate Program Addition-New - FinTech Graduate Certificate

2020-2021 Graduate New Certificate or Track

General Catalog Information

Read before you begin

TURN ON help text before starting this proposal by clicking in the top right corner of the heading.
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Select *Program* below.

Program Type* (•) Program ( ) Shared Core

This form is to be used to ADD graduate tracks or certificate programs. If there are multiple tracks being added to a program, one form must be submitted to revise the program and additional forms must be submitted for each of the track additions.

Please refer to the Graduate Council Curriculum Meeting Schedule for submission deadlines.

Proposal Type:* Graduate Program Addition-New

College:* College of Business Administration

Unit / Department / College:* Department of Finance

Primary Unit Housing Program:* FinTech

Type of Action:* [ ] Track [x] Certificate

Name of new track or certificate:* FinTech Graduate Certificate

Proposed Effective Term and Year:* Fall 2020

Delivery:* ☐ Face to Face
☑ UCF Online (all courses online-approved with UCF Online)
☐ Mixed Delivery

If you will be submitting other forms for tracks or course actions, please list them here:

New Equipment Fee?* ○ Yes ◉ No

If yes, also complete the 2020-2021 Graduate Equipment Fee form.

Will the program be a market tuition rate program?* ○ Yes ◉ No

Will the program be a cost recovery program?* ○ Yes ◉ No

For the Informational Description Chart box below, please copy and paste this example chart and add your relevant program information:

College: Link to College website	**Degree: CRT**
Department: Link to department website	**Option: N/A**
Program Websites: Link to program website	

Informational Description Chart:*

College: Business Administration and College of Engineering and Computer Science	Degree: CRT
Department: Finance (College of Business) and Computer Science (College of Engineering and Computer Science)	Option: N/A
Program Websites:	

Rationale:*

FinTech is the use of technology to innovate, improve and facilitate the delivery of traditional financial services. The objective of the FinTech Certificate is to introduce students to the foundations of FinTech and employable technical skills including artificial intelligence, and the development of algorithms.

Prospective Curriculum*

Program Description

FinTech is the use of technology to innovate, improve and facilitate the delivery of traditional financial services. The objective of the FinTech Certificate is to introduce students to the foundations of FinTech and employable technical skills including artificial intelligence and the development of algorithms.

Curriculum

Total Credit Hours Required: 12 Credit Hours Minimum beyond the Bachelor's Degree

Required Courses: 12 Credit Hours

CAP 5336 Advanced Artificial Intelligence
COT 5405 Analysis of Algorithms
FIN 6515 Analysis of Investment Opportunities
FIN 6779 FinTech in Decision Making
[Right] Fall only

[After] or

FIN 6778 Foundations of FinTech
[Right] Spring only

Application Requirements

Admission is open to those with documentation of a bachelors degree from an accredited institution or participation in a UCF graduate degree program. Students who maintain graduate standing in a UCF graduate degree program during the time required to complete a graduate certificate are eligible for this certificate. An application to the graduate certificate program, a current resume, and official transcripts must be submitted. Applicants must apply online. All requested materials must be submitted by the established deadline.

Those applying who are NOT currently enrolled in a UCF graduate program must have a minimum of 2 years of full-time work experience after completion of the bachelor's degree.

In addition to the Admissions, applicants to this program must provide:

One official transcript (in a sealed envelope) from each college/university attended.

Resume/CV

Application Deadlines

Entrepreneurship Graduate Certificate	*Fall Priority	Fall	Spring	Summer
Domestic Applicants		Jul 1	Dec 1	
International Applicants				

*Applicants who plan to enroll full time in a degree program and who wish to be considered for university fellowships or assistantships should apply by the Fall Priority date.

Contact Info

Graduate Program

Kelley Dietrich

cbagrad@bus.ucf.edu

Graduate Admissions

TBA

gradadmissions@ucf.edu

Telephone: 407-823-2766

Millican Hall 230

Online Application

Graduate Admissions

Mailing Address

UCF College of Graduate Studies

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PO Box 160112

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Institution Codes

GRE: 5233

GMAT: RZT-HT-58

TOEFL: 5233

ETS PPI: 5233

Impact on Current Students

Will students be moved from an existing program, track, or certificate into this new track or certificate?* ○ Yes ◉ No

If yes, state the name of the program or track where students are currently enrolled and the current enrollment numbers.

Will students have the option to stay in their existing program, track, or certificate?* ◉ Yes ○ No

Future Students

Indicate likely career or student outcomes upon completion:

Provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc.	

Year 1

Headcount:	**SCHs:**

Year 2

Headcount:	**SCHs:**

Year 3

Headcount:	**SCHs:**

Please complete the following section on financial support:

(Specify all forms of support – assistantships, fellowships, and tuition remission.)

Year 1

Number of assistantship students:	**Source of funds:**
Number of fellowship students (specify fellowship):	
Number of tuition remissions:	**Source of funds:**

Year 2

Number of assistantship students:	**Source of funds:**
Number of fellowship students (specify fellowship):	
Number of tuition remissions:	**Source of funds:**

Year 3

Number of assistantship students:	**Source of funds:**
Number of fellowship students (specify fellowship):	
Number of tuition remissions:	**Source of funds:**

Attachments

Please attach the required files by navigating to the Proposal Toolbox and clicking in the top right corner of the form.

Faculty List*	☑ Attached
Support from involved units that no duplication exists*	☐ Attached ☑ Not Applicable
Library Assessment of Resources*	☑ Attached

Administration Use Only

Program Type	Certificate
Degree Type	Certificate
Status*	◉ Active-Visible ○ Inactive-Hidden
Catalog Ownership:	

Certificate in FinTech Faculty

· FIN 6115 Analysis of Investment Opportunities- **Pradipkumar Ramanlal, Ph.D. (Finance Dept.)**
· FIN 6779 FinTech in Decision Making **Christo Pirinsky, Ph.D. (Finance Dept.)**
· COT 5405 Design and Analysis of Algorithms-**Sharma Thankachan, Ph.D. (Computer Science Dept.)**
· CAP 6536 Advanced Artificial Intelligence -**Sumit Kumar Jha, Ph.D. (Computer Science Dept.)**

Emily Stettner

From: Ajai Singh
Sent: Monday, May 18, 2020 3:18 PM
To: Sevil Sonmez
Cc: Meredith Smart
Subject: RE: FinTech Certificate

Hi Sevil:

Finance has three courses for the Certificate.

FIN 6515 can be offered in both Fall and Spring semesters.
FIN 6779 is offered only in Fall semesters.
FIN 6778 Foundations in FinTech taught by Eshwar Venugopal, is offered in Spring semesters.

Depending on the semester, either FIN 6778 or 6779 will be included in the certificate.

Please do let me know if there are any questions.

All the best,
Ajai

From: Sevil Sonmez <sevil@ucf.edu>
Sent: Monday, May 18, 2020 3:12 PM
To: Gary Leavens <Leavens@ucf.edu>
Cc: Ajai Singh <aks@ucf.edu>; Ali Gordon <Ali.Gordon@ucf.edu>; Meredith Smart <Meredith.Smart@ucf.edu>; Michael Georgiopoulos <michaelg@ucf.edu>
Subject: Re: FinTech Certificate

Thanks so very much Gary!

Sevil Sönmez, Ph.D.
Associate Dean of Faculty, Research, and Graduate Programs
College of Business Administration
University of Central Florida
12744 Pegasus Drive, 230M
Orlando, FL 32816-1991

Office: 407.823.2220
Fax: 407.823.5741
Sevil.Sonmez@ucf.edu
business.ucf.edu

From: Gary Leavens <Leavens@ucf.edu>
Sent: Monday, May 18, 2020 3:06 PM
To: Sevil Sonmez <sevil@ucf.edu>
Cc: Ajai Singh <aks@ucf.edu>; Ali Gordon <Ali.Gordon@ucf.edu>; Meredith Smart <Meredith.Smart@ucf.edu>; Michael

Georgiopoulos <michaelg@ucf.edu>; Ali Gordon <Ali.Gordon@ucf.edu>
Subject: RE: FinTech Certificate

Hi Sevil,

Yes, the department of Computer Science is supporting the FinTech certificate with the following two courses:

- COT 5405 Design and Analysis of Algorithms (existing course, is/will be in W mode)
- CAP 6536 Advanced Artificial Intelligence (existing course, is/will be in W mode)

Regards,

Gary T. Leavens
437D Harris Center
Computer Science, University of Central Florida
4000 Central Florida Blvd., Orlando, FL 32916-2362 USA
http://www.cs.ucf.edu/~leavens phone: +1-407-823-4758
Leavens@ucf.edu

From: Sevil Sonmez <sevil@ucf.edu>
Sent: Monday, May 18, 2020 3:03 PM
To: Gary Leavens <Leavens@ucf.edu>
Cc: Ajai Singh <aks@ucf.edu>; Ali Gordon <Ali.Gordon@ucf.edu>; Meredith Smart <Meredith.Smart@ucf.edu>
Subject: FinTech Certificate

Hi Gary, I hope this note finds you in good health and spirits.

Meredith (cc'd here) has put all the pieces of the FinTech Certificate into Curriculog. We need one last piece -- an email from you saying that you support the FinTech Certificate, to which the Department of Computer Science is contributing the 2 below courses.

Certificate in FinTech (Joint: CBA/CECS—Departments of Finance and Computer Science)

- COT 5405 Design and Analysis of Algorithms (existing course, is/will be in W mode) **Sharma Thankachan, Ph.D. (Computer Science Dept.)**
- CAP 6536 Advanced Artificial Intelligence (existing course, is/will be in W mode) **Sumit Kumar Jha, Ph.D. (Computer Science Dept.)**
- FIN 6115 Analysis of Investment Opportunities (existing course) **Pradipkumar Ramanlal, Ph.D. (Finance Dept.)**
- FIN 6779 FinTech in Decision Making (approved for FinTech MS) **Christo Pirinsky, Ph.D. (Finance Dept.)**

Thanks very much in advance. Take good care,

Sevil

Sevil Sönmez, Ph.D.
Associate Dean of Faculty, Research, and Graduate Programs
College of Business Administration
University of Central Florida
12744 Pegasus Drive, 230M
Orlando, FL 32816-1991

Office: 407.823.2220
Fax: 407.823.5741
Sevil.Sonmez@ucf.edu
business.ucf.edu

University of Central Florida

University Libraries

TO: Emily Stettner, Assistant Director, Graduate Curriculum
FROM: Min Tong, Business Librarian, University Libraries
DATE: May 29, 2020
RE: Library Assessment Waiver for Proposed Online Graduate Certificates

As the Subject Librarian for Business, I was contacted by Ms. Ying Zhang, Interim Associate Director of Collection & Technical Services at the University Libraries, regarding the proposed graduate certificates in **FinTech**, **Cybersecurity and Privacy**, and ***Supply Chain Management***. According to the description of the proposal and the proposed course list, all required courses and electives are currently taught and there is no major change in the curriculum focus. Therefore, there will be minimal impact on the existing support from the library collections and services. Based on the assessment, I waive a full library analysis for the proposal of the three proposed graduate certificates.

In the unfortunate event library budget shortfalls occur, some existing resource subscriptions may be cut or scaled back, which may reduce the support for the subject areas of the proposed graduate certificates. I will keep the program apprised if/when this were to occur.

A full library analysis will be needed if any of the proposed certificates were to change its focus substantively or to be expanded to a track or a program.

Submitted by,
Min Tong, M.L.I.S. M.A.
Business Librarian
University of Central Florida Libraries
min.tong@ucf.edu

College of Business Administration - Graduate Program Addition-New - Supply Chain Management Graduate Certificate

2020-2021 Graduate New Certificate or Track

General Catalog Information

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Program Type* ◉ Program ○ Shared Core

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Proposal Type:* Graduate Program Addition-New

College:* College of Business Administration

Unit / Department / College:* Department of Management

Primary Unit Housing Program:* Department of Management

Type of Action:* ☐ Track ☑ Certificate

Name of new track or certificate:* Supply Chain Management Graduate Certificate

Proposed Effective Term and Year:* Fall 2020

Delivery:* ☐ Face to Face
☑ UCF Online (all courses online-approved with UCF Online)
☐ Mixed Delivery

If you will be submitting other forms for tracks or course actions, please list them here:

New Equipment Fee?* ○ Yes ◉ No

If yes, also complete the 2020-2021 Graduate Equipment Fee form.

Will the program be a market tuition rate program?* ○ Yes ◉ No

Will the program be a cost recovery program?* ○ Yes ◉ No

For the Informational Description Chart box below, please copy and paste this example chart and add your relevant program information:

College: Link to College website	**Degree: CRT**
Department: Link to department website	**Option: N/A**
Program Websites: Link to program website	

Informational Description Chart:*

College: Business Administration	**Degree:** CRT
Department: Management	
Program Websites:	

Rationale:*

This is a nine credit-hour (three course), graduate certificate program comprised of course work in Supply Chain Management, Project Management, and Conflict Resolution/Negotiation. Students will learn to manage the supply chain in different industries, for different products and services, and with a diverse group of customers and colleagues. Topics include appropriate metrics, planning, scheduling, budgeting, business analytics, logistics, procurement, production control, inventory management, risk management, coordination, and quality management. There is a specific focus on methods for resolving conflicts and negotiating with a wide variety of stakeholders, including managers, peers, and clients/customers.

Prospective Curriculum*

Program Description

This is a nine credit-hour (three course), graduate certificate program comprised of course work in Supply Chain Management, Project Management, and Conflict Resolution/Negotiation. Students will learn to manage the supply chain in different industries, for different products and services, and with a diverse group of customers and colleagues. Topics include appropriate metrics, planning, scheduling, budgeting, business analytics, logistics, procurement, production control, inventory management, risk management, coordination, and quality management. There is a specific focus on methods for resolving conflicts and negotiating with a wide variety of stakeholders, including managers, peers, and clients/customers.

Curriculum

Total Credit Hours Required: 9 Credit Hours Minimum beyond the Bachelor's Degree

Required Courses: 9 Credit Hours

MAN 6448 Conflict Resolution and Negotiation
MAN 6581 Project Management
MAR 6466 Strategic Supply Chain and Operations Management

Application Requirements

Admission is open to those with documentation of a bachelors degree from an accredited institution or participation in a UCF graduate degree program. Students who maintain graduate standing in a UCF graduate degree program during the time required to complete a graduate certificate are eligible for this certificate. An application to the graduate certificate program, a current resume, and official transcripts must be submitted. Applicants must apply online. All requested materials must be submitted by the established deadline.

Those applying who are NOT currently enrolled in a UCF graduate program must have a minimum of 2 years of full-time work experience after completion of the bachelor's degree.

In addition to the Admissions, applicants to this program must provide:

One official transcript (in a sealed envelope) from each college/university attended.

Resume/CV

Application Deadlines

Supply Chain Management Graduate Certificate	*Fall Priority	Fall	Spring	Summer
Domestic Applicants		Jul 1	Dec 1	
International Applicants				
*Applicants who plan to enroll full time in a degree program and who wish to be considered for university fellowships or assistantships should apply by the Fall Priority date.				

Contact Info

Graduate Program

Kelley Dietrich
cbagrad@bus.ucf.edu

Graduate Admissions

TBA

gradadmissions@ucf.edu

Telephone: 407-823-2766

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SCHs:

Year 2

Headcount:	
	SCHs:

Year 3

Headcount:	
	SCHs:

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(Specify all forms of support – assistantships, fellowships, and tuition remission.)

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Number of fellowship students (specify fellowship):	
Number of tuition remissions:	**Source of funds:**

Year 2

Number of assistantship students:	**Source of funds:**
Number of fellowship students (specify fellowship):	
Number of tuition remissions:	**Source of funds:**

Year 3

Number of assistantship students:	**Source of funds:**
Number of fellowship students (specify fellowship):	
Number of tuition remissions:	**Source of funds:**

Attachments

Please attach the required files by navigating to the Proposal Toolbox and clicking in the top right corner of the form.

Faculty List*	☑ Attached
Support from involved units that no duplication exists*	☐ Attached ☑ Not Applicable
Library Assessment of Resources*	☑ Attached

Administration Use Only

Program Type	Certificate
Degree Type	Certificate
Status*	◉ Active-Visible ○ Inactive-Hidden
Catalog Ownership:	

Certificate in Supply Chain Management

· MAN 6581 Project Management- **Lynn Becker, Ed.D. (Management Dept.)**
· MAN 6448 Conflict Resolution and Negotiation- **Rebecca Bennett, Ph.D. (Management Dept.)**
· MAR 6466 Strategic Supply Chain and Operations Management -**Muge Yayla-Kullu, Ph.D. (Marketing Dept.)**

Emily Stettner

From: Ronald F Piccolo
Sent: Monday, May 18, 2020 4:31 PM
To: Sevil Sonmez; Pradeep Bhardwaj
Cc: Jim Gilkeson; Meredith Smart
Subject: RE: Supply Chain Management Certificate

Hi,

This email confirms that the Management Department is supportive of the Supply Chain Marketing Certificate. The faculty members listed in your email below: Drs. Becker and Bennett, will represent our Department.

Please let me know if you need additional information.
Ron

From: Sevil Sonmez <sevil@ucf.edu>
Sent: Monday, May 18, 2020 3:11 PM
To: Ronald F Piccolo <Ronald.Piccolo@ucf.edu>; Pradeep Bhardwaj <Pradeep.Bhardwaj@ucf.edu>
Cc: Jim Gilkeson <James.Gilkeson@ucf.edu>; Meredith Smart <Meredith.Smart@ucf.edu>
Subject: Supply Chain Management Certificate

Dear Ron and Pradeep, hope your week has gotten off to a good start. Meredith has put all the pieces of the Supply Chain Management Certificate into Curriculog. We need one last piece -- an email from each of you saying that you support the Certificate, in which Department of Management and Department of Marketing faculty will be teaching the below courses.

Certificate in Supply Chain Management (Joint: Departments of Integrated Business and Marketing)

- MAN 6581 Project Management (existing course in MSM Integrated Business) **Lynn Becker (Department of Management -- MSM-IB Course)**
- MAN 6448 Conflict Resolution and Negotiation (existing course in MSM IB) **Becky Bennett (Department of Management -- MSM-IB Course)**
- MAR 6466 Strategic Supply Chain and Operations Management (existing course in Evening MBA) **Muge Yayla-Kullu, Ph.D. (Marketing Dept.)**

Please be sure to cc all. Thanks in advance,

Sevil

Sevil Sönmez, Ph.D.
Associate Dean of Faculty, Research, and Graduate Programs
College of Business Administration
University of Central Florida
12744 Pegasus Drive, 230M
Orlando, FL 32816-1991

Office: 407.823.2220
Fax: 407.823.5741

Sevil.Sonmez@ucf.edu
business.ucf.edu

University of Central Florida

University Libraries

TO: Emily Stettner, Assistant Director, Graduate Curriculum
FROM: Min Tong, Business Librarian, University Libraries
DATE: May 29, 2020
RE: Library Assessment Waiver for Proposed Online Graduate Certificates

As the Subject Librarian for Business, I was contacted by Ms. Ying Zhang, Interim Associate Director of Collection & Technical Services at the University Libraries, regarding the proposed graduate certificates in **FinTech**, **Cybersecurity and Privacy**, and ***Supply Chain Management***. According to the description of the proposal and the proposed course list, all required courses and electives are currently taught and there is no major change in the curriculum focus. Therefore, there will be minimal impact on the existing support from the library collections and services. Based on the assessment, I waive a full library analysis for the proposal of the three proposed graduate certificates.

In the unfortunate event library budget shortfalls occur, some existing resource subscriptions may be cut or scaled back, which may reduce the support for the subject areas of the proposed graduate certificates. I will keep the program apprised if/when this were to occur.

A full library analysis will be needed if any of the proposed certificates were to change its focus substantively or to be expanded to a track or a program.

Submitted by,
Min Tong, M.L.I.S. M.A.
Business Librarian
University of Central Florida Libraries
min.tong@ucf.edu

College of Engineering and Computer Science - Grad Course Revision - Mechatronic Systems

2020-2021 Graduate Course Revision

General Catalog Information

Read before you begin

1. TURN ON help text before starting this proposal by clicking in the top right corner of the heading.

2. FILL IN all fields required marked with an *. You will not be able to launch the proposal without completing required fields.

3. LAUNCH proposal by clicking in the top left corner. DO NOT make proposed changes before launching proposal. **Changes will only be tracked after the proposal is launched.**

Course revisions must be accompanied by a course syllabus and rationale. Departments must also submit an electronic syllabus to the college curriculum person.

Proposal Type:* Grad Course Revision

College:* College of Engineering and Computer Science

Unit / Department / College:*

Activity Log

Lynn Grabenhorst

+ Department of Mechanical and Aerospace Engineering

Department of Mechanical and Aerospace Engineering

IMPORT COURSE NOW! Please use the Import feature to import the course information from the Catalog by clicking in the top left corner of the form. Do **not** type the course prefix and code.

Prefix:*

Activity Log

Lynn Grabenhorst

+ EAS

EAS

Code:* ~~5407C~~ 5407

Course Title:*	**Mechatronic Systems**
30 Character Abbreviation:*	**Mechatronic Systems**
Full Title:*	Mechatronic Systems
Course Instructor (Must be Approved Graduate Faculty/Scholars):	Dr. Park
Department Chair Phone Number:*	4078235448
Dept Chair Email*	Yoav.Peles@ucf.edu

Complete the remaining required fields and LAUNCH this proposal by clicking in the top left corner! Do not begin revisions until **after** launch. Course revisions before launch will not be tracked.

Course Description:*	**Mechatronics system modeling and development; Sensors, actuators, analog and digital devices, signals and data acquisition, communication protocols, microcontroller and programming logics, mechanical designs and power transmission, control theories and implementation.**
Prerequisite(s):	**EGN3373: Principles of EE or EE3307C: Electronics I** **EML3303C: Mechanical and Aerospace Engineering Measurements** **EGN 3321: Engineering Analysis-Dynamics**
Corequisite(s):	**None.**
Does this proposal include revisions to prerequisites?*	○ Yes ◉ No
Grading Scheme:	ABCDF

Credit Hour Information

As part of UCF's accreditation with SACSCOC, we are required to have a formal model of credit hour designations. The following chart provides a general framework for faculty to use as they make course proposals. The elements will help faculty to better determine the credit hour designation for a course and help the institution with a standard approach in this determination.

Credit Hour Design Options

Credit Hour	1	1	1
(Formal) Instruction Time - Class Hours or Online Module, etc.	1	1	1
Lab/Studio/Field work	0	1	2
Out-of-Class (homework, course readings, group work, online posts, etc)	2	1	0
Total Course Engagement	3	3	3

Any combination of these elements that extend beyond the 3 hours of Total Course Engagement, could be considered a 2 credit hour class. The course should try to maintain a 1:3 ratio.

1 Credit hours = 3 hours of Total Course Engagement

2 Credit hours = 6 hours of Total Course Engagement

3 Credit hours = 9 hours of Total Course Engagement

4 Credit hours = 12 hours of Total Course Engagement

Please note the Out-of-Class hours will not appear in the graduate catalog. This field is for information only.

For further review, please see the SACSCOC definition: http://www.sacscoc.org/pdf/081705/Credit%20Hours.pdf

Credit Hours:* **3**

Instruction Time:* **3**

Lab/Studio/Field Work Hours:* **0**

Out-of-Class Hours:* 0

Total Engagement Hours:* **3**

NOTE: For a repeatable course, indicate in the syllabus what will remain the same and what will change when the course is repeated. Also indicate who approves content before a course is repeated.

Repeat for credit?

Activity Log

Lynn Grabenhorst

+ N

○ Yes ◉ No

If yes, indicate the degree program name and the total times the course may repeated.

If the course you are revising is a split-level class, please note this revision form will only impact the graduate side of the course. The undergraduate component of the course should be revised through the Undergraduate Curriculum Committee. As a reminder, the graduate syllabus should clearly demonstrate more advanced subject matter, expectations, and rigor.

Split-Level Class:*

Activity Log

Lynn Grabenhorst

+ N

○ Yes ◉ No

List undergraduate split-level course:

Term of Offering

When will the course be offered?

Activity Log

Lynn Grabenhorst

+ E

☐ Odd Fall ☑ Even Fall ☐ Odd Spring ☐ Even Spring ☐ Odd Summer
☐ Even Summer ☐ Every Semester ☐ Occasional

Intended Utilization of Course

The course will be used primarily as:

Activity Log

Lynn Grabenhorst

+ E

○ Required Course ◉ Elective Course

Justification for Course Revision

What is the rationale for revising this course?*

The Department is limited on Laboratory space. This course is being revised in light of this limitation

What grad programs/tracks require or recommend this course for graduation?	**None, Elective Course**
If not a major requirement, what will be the source of students?	**Mechanical, Aerospace, and Electrical Engineering Graduate Students**
What is the estimated annual enrollment?	**30 Students**

Possible duplications and conflicts with other departments or colleges should be discussed with appropriate parties. Please detail discussion you have had.

Detail Discussion	**Not applicable.**

Course Syllabus Policy

The University of Central of Florida has established guidelines as it relates to the form and structure of all course syllabi. An effective syllabus provides an overview of the purpose of a course, outlines course requirements, and defines expectations for student performance. Faculty members are responsible for developing course content and selecting pedagogical approaches for their courses. Leveraging this policy to develop them will provide a consistent approach for presenting essential information that supports learning and ensures that UCF is in compliance with the standards set forth by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) and other accrediting bodies.

To this end, each syllabus should include the following required elements:

- **Information from the official Schedule of Classes**
- **Instructor and/or GTA contact information**
- **Explicit, public description of the course**
- **Student learning outcomes**
- **Sequence of course activity**
- **Assessment and grading procedures**
- **Course Materials and Resources**
- **Core policy statements**
  - **Academic integrity statement including definition(s) of and consequences for academic misconduct**
  - **Statement directing students needing accommodations to work with faculty and with Student Accessibility Services to ensure equal access to educational activities**
  - **Statement regarding emergency procedures and campus safety, encouraging students to be aware of their surroundings and familiar with actions to take in various types of emergencies**
  - **Statement regarding accommodations for active duty military students**

Full details of the syllabus policy can be found at: https://policies.ucf.edu/documents/4-403.pdf

Course Syllabus Policy*	☑ I have aligned this syllabus per the UCF syllabus policy.

Attachment List

Please attach any required files by navigating to the Proposal Toolbox and clicking in the top right corner.

Check	☐ I have completed all relevant parts of the form.
Attached	☐ I have attached a course syllabus and rationale.

Administration Use Only

Catalog Ownership:	
Course OID	
Course Type	
Status	○ Active-Visible ○ Inactive-Hidden

PeopleSoft

Academic Organization	
Academic Group	
Career	
Print in Catalog	
Effective Date	
Lab Fee	
CRSE_ID	

EAS 5407 Mechatronics Systems (3, 0)
Fall, 2020

Course Description:

Catalog: Mechatronics system modeling and development; Sensors, actuators, analog and digital devices, signals and data acquisition, communication protocols, microcontroller and programming logics, mechanical designs and power transmission, control theories and implementation

Extended: Mechatronics is an integration of the mechanical and electrical engineering principles within a system, consisting of sensors, electronics, mechanisms, actuators, controls and computers, and is often used in the field of robotics, manufacturing, automation, and assembly. The design and operation of mechatronic systems require engineers to understand a variety of engineering knowledge and skills. This course is designed for graduate students to (1) understand the concept of mechatronics and mechatronics system components, (2) learn design principles to integrate multidisciplinary components as a system to meet functionality requirements of products, (3) gain the fundamental knowledge about mechanisms and control theories, (4) have hands-on skills in developing a basic mechatronic system. A team-based course project is presented to prepare the students to read literature, understand research problems, and identify possible innovations in the field. Topics covered in the course include: mechatronic system models; sensors, transducers, actuators; analog and digital devices; signals and data acquisition; communication protocols; microcontroller and programming logics; mechanical designs and power transmission; control theories and implementation; and circuit design.

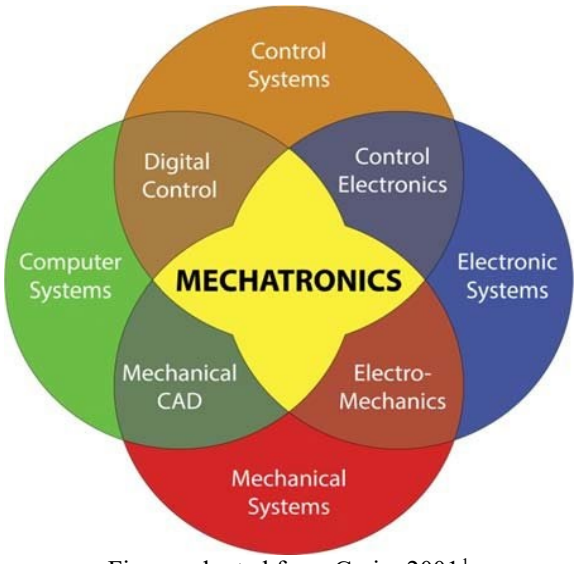

Figure adopted from Craig, 2001[1]

[1] Craig, K. (2001) "Is Anything Really New in Mechatronics Education?" IEEE Robotics & Automation Magazine, Vol. 8, No. 2, pp. 12-19.

Prepared by: J. Park Date: January 29, 2020

Prerequisites: This course is for advanced undergraduates and graduate students. Analytical skills and lab familiarity with basic analog and digital electronics are desired. Graduate Standing or "C" or better in

- EGN3373 (Principles of EE) or EE3307C (Electronics I) or equivalent undergraduate electronics course
- EML3303C (Mechanical and Aerospace Engineering Measurements) or equivalent undergraduate measurement course
- EGN 3321 (Engineering Analysis – Dynamics) or equivalent undergraduate dynamic course

or Consent by Instructor

Co-requisites: NONE

Course Materials and Resources:

- Required: None
- Optional:
  - David Alciatore (2018) *Introduction to Mechatronics and Measurement Systems 5th edition,* McGraw-Hill Education
  - Musa Jouaneh (2012), *Fundamentals of Mechatronics, SI Edition*, Cengage Learning
  - Sabri Cetinkunt (2015), *Mechatronics with Experiments (Coursesmart) 2nd Edition*, Wiley

  * Supplementary material will be supplied for lectures

Instructor and GTA Contact Information:

Instructor: Dr. Joon-Hyuk Park, Mechanical and Aerospace Engineering

- Email: Please use web-course email
- Office Location: R1-377
- Phone: 407-823-1227
- Office Hours: 3-6 pm Tue/Wed or by appointment

Class/Lab Time and Location:

- Two 75-minute lectures per week
- Time: MoWe 7:30-8:45 pm
- Location: ENG2 0103

Course Objectives:

A student who successfully fulfills the course requirements will have gained knowledge and skills:

a. To learn the fundamentals of microcontrollers, analog and digital electronics, sensors, actuators, and their applications to modern mechatronics systems
b. To understand basic electronics laws and how to apply them in circuit designs
c. To design a mechatronic system with integrated actuators, sensors, control logics, and mechanical system elements
d. To develop kinematic, dynamic and control models for the mechatronic system
e. To identify and select appropriate mechatronic components to meet product requirements

f. To program microcontrollers and use modern software tools to model, analyze, and optimize the mechatronic system
g. To demonstrate documentation and presentation skills as an individual and as a group

Relationship of the course to ABET program outcomes[2]

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. An ability to communicate effectively with a range of audiences
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
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
8. An ability to use the technique, skills, and modern engineering tools necessary for engineering

EAS 5407C								
	Mechanical Engineering Student Learning Outcomes							
Course Objectives	1	2	3	4	5	6	7	8
a	x	x					x	
b	x							
c	x	x			x	x		x
d						x		x
e		x			x			
f						x		x
g			x		x			

[2] UCF Mechanical Engineering Student Outcomes – Accreditation Standards: http://mae.ucf.edu/accreditation/

Sequence of Course Activity (*Subject to Change):

Week	Date	Topic	In-class activity	HW /Exam
1	08/24	**Mechatronics system overview** • Mechatronic system design process • Systems: embedded system, open- and closed-loop system, system elements • Applications	Team formula -tion	
2	08/31	**Sensors and transducers** • Performance terminology: range, error, resolution, sensitivity, hysteresis, drift, etc. • Displacement, position and proximity • Velocity and motion • Force, pressure, flow, temperature, light		HW#1
3	09/07	**Analog and digital devices** • Operational amplifier • Analog to digital converter • Digital to analog converter • Transistors • Diodes and photodiodes • Multiplexers • triacs, opto-isolators, and phototransistors		
4	09/14	**Signals and data acquisition** • Digital and analog signals • Signal conditioning/filtering • Pulse width modulation	Quiz#1	
5	09/21	**Communication systems** • Digital communication • Centralized, hierarchical, and distributed control • Networks and protocols • Serial communication interfaces • Parallel communication interfaces • Wireless communication interfaces		HW#2
6	09/28	**Microcontroller** • Overview of different types of microcontrollers • Choice of a microcontroller for a specific application • Microprocessor systems • Programming basics: C, assembly and machine language		
7	10/05	**Digital logic** • Digital arithmetic (binary and hexadecimal) • Floating-point representation and cost • Logic gates • Sequential logic	Mid-term	
8	10/12	**Mechanical designs and power transmission** • Types of motion, kinematic chains		HW#3

Prepared by: J. Park Date: January 29, 2020

		• Mechanism design and synthesis • Power transmission (cams, gears, ratchet/pawl, belt/chain drives, bearings, cable-driven)		
9	10/19	**Actuators** • Electrical actuation systems (mechanical switches, solenoids, current motors, stepper motors, servomotors) • Motors, encoders, drivers • Pneumatic and hydraulic actuation systems • Actuator selection process		
10	10/26	**System models** • Mathematical models • Building blocks for different types of systems • Dynamic responses and system transfer functions	Quiz#2	
11	11/02	**Basic control theory** • Control process • PID controller • Digital control system • Position and force control • Impedance and admittance control • Adaptive control		HW#4
12	11/09	**Basic circuit review and circuit design** • Current and voltage sources • Resistance, capacitance, inductance • Constitutive laws • Kirchoffs current and voltage laws • Circuit design examples and practice	Quiz#3	
13	11/16	**Application development project I** • System modeling and simulation (Simulink) • System model demonstrations (team presentation)	Team presentation	
14	11/23 11/25 no class	**Application development project II** • System components and mechanism design demonstrations (team presentation)	Team presentation	
15	11/30	**Application development project III** • Final presentation: controller design and simulation result (team presentation)	Team presentation	Final report
16	12/07	**Practical tips and review**		

Assessment and Grading Procedures:
The letter grade will be assigned according to the following scale: A-F (+/-)

A 90-100
B 80-89
C 70-79
D 60-69

Prepared by: J. Park Date: January 29, 2020

F less than 60

The course grade will be determined numerically as follows:

Homework	20% (5% each x 4 HWs)
Quiz (3 equally weighted tests)	15%
Midterm exam	35%
Team project (report and presentation)	30%

Homework: Students will be given a week for each homework. Homework will consist of solving problems that correspond to the materials covered in the previous week(s). Homeworks are due at the start of the next class. All assignments (homework, team project report and presentation slides) submitted electronically via WebCourse. Submission will be accepted for credit up to one class period after the due date for 50% credit. There will be no acceptance after one week.

Team project: The objective of the team project is to help the students to gain hands-on experience by using learned materials in designing – not building – a mechatronic system for real-world applications. Each project team will have 2 to 3 students. They are expected to work together to accomplish the assigned tasks. Formal project proposals (a template will be provided) should be submitted and approved by the instructor by week 7. The final project should include a presentation with a system demonstration (system model, design and simulation) and a technical report.

Make-up Exam and Assignment Policy:
Students who represent the university in an authorized event or activity (for example, student-athletes) and who are unable to meet a course deadline due to a conflict with that event must provide the instructor with documentation in advance to arrange a make-up. No penalty will be applied. For more information, see the UCF policy at: <http://policies.ucf.edu/documents/4-401.1MakeupAssignmentsForAuthorizedUniversityEventsOrCocurricularActivities.pdf)
Students must notify their instructor in advance if they intend to miss class for a religious observance. For more information, see the UCF policy at: <http://regulations.ucf.edu/chapter5/documents/5.020ReligiousObservancesFINALOct17.pdf>.
No partial credits for late submission

Course Policy Statement:
Academic Integrity:
Students should familiarize themselves with UCF's Rules of Conduct. According to Section 1, "Academic Misconduct," students are prohibited from engaging in

1. Unauthorized assistance: Using or attempting to use unauthorized materials, information or study aids in any academic exercise unless specifically authorized by the instructor of record. The unauthorized possession of examination or course-related material also constitutes cheating.
2. Communication to another through written, visual, electronic, or oral means: The presentation of material which has not been studied or learned, but rather was obtained

through someone else's efforts and used as part of an examination, course assignment, or project.

3. Commercial Use of Academic Material: Selling of course material to another person, student, and/or uploading course material to a third-party vendor without authorization or without the express written permission of the university and the instructor. Course materials include but are not limited to class notes, Instructor's PowerPoints, course syllabi, tests, quizzes, labs, instruction sheets, homework, study guides, handouts, etc.
4. Falsifying or misrepresenting the student's own academic work.
5. Plagiarism: Using or appropriating another's work without any indication of the source, thereby attempting to convey the impression that such work is the student's own.
6. Multiple Submissions: Submitting the same academic work for credit more than once without the express written permission of the instructor.
7. Helping another violate academic behavior standards.

For more information about Academic Integrity, students may consult The Center for Academic Integrity http://www.academicintegrity.org/icai/assets/FVProject.pdf.
For more information about plagiarism and misuse of sources, see "Defining and Avoiding Plagiarism: The WPA Statement on Best Practices."

Students should also familiarize themselves with the procedures for academic misconduct in UCF's student handbook, *The Golden Rule* http://goldenrule.sdes.ucf.edu/docs/goldenrule.pdf. UCF faculty members have a responsibility for students' education and the value of a UCF degree, and so seek to prevent unethical behavior and when necessary respond to academic misconduct. Penalties can include a failing grade in an assignment or in the course, suspension or expulsion from the university, and/or a "Z Designation" on a student's official transcript indicating academic dishonesty, where the final grade for this course will be preceded by the letter Z. For more information about the Z Designation, see http://goldenrule.sdes.ucf.edu/zgrade.

Course Accessibility Statement:
The University of Central Florida is committed to providing access and inclusion for all persons with disabilities. Students with disabilities who need disability-related access in this course should contact the professor as soon as possible. Students should also connect with Student Accessibility Services (SAS) <http://sas.sdes.ucf.edu/> (Ferrell Commons 185, sas@ucf.edu, phone 407-823-2371). Through Student Accessibility Services, a Course Accessibility Letter may be created and sent to professors, which informs faculty of potential access and accommodations that might be reasonable. Determining reasonable access and accommodations requires consideration of the course design, course learning objectives and the individual academic and course barriers experienced by the student.

Campus Safety Statement:

- Emergencies on campus are rare, but if one should arise during class, everyone needs to work together. Students should be aware of their surroundings and familiar with some basic safety and security concepts.
- In case of an emergency, dial 911 for assistance.

- Every UCF classroom contains an emergency procedure guide posted on a wall near the door. Students should make a note of the guide's physical location and review the online version at <http://emergency.ucf.edu/emergency_guide.html>.
- Students should know the evacuation routes from each of their classrooms and have a plan for finding safety in case of an emergency.
- If there is a medical emergency during class, students may need to access a first-aid kit or AED (Automated External Defibrillator). To learn where those are located, see <http://www.ehs.ucf.edu/workplacesafety.html> (click on link from menu on left).
- To stay informed about emergency situations, students can sign up to receive UCF text alerts by going to <ucf.edu> and logging in. Click on "Student Self Service" located on the left side of the screen in the toolbar, scroll down to the blue "Personal Information" heading on the Student Center screen, click on "UCF Alert", fill out the information, including e-mail address, cell phone number, and cell phone provider, click "Apply" to save the changes, and then click "OK."
- Students with special needs related to emergency situations should speak with their instructors outside of class.
- To learn about how to manage an active-shooter situation on campus or elsewhere, consider viewing this video (<https://youtu.be/NIKYajEx4pk>).

Campus Safety Statement for Student in Online-Only Courses:

- To stay informed about emergency situations, students can sign up to receive UCF text alerts by going to <ucf.edu> and logging in. Click on "Student Self Service" located on the left side of the screen in the toolbar, scroll down to the blue "Personal Information" heading on the Student Center screen, click on "UCF Alert", fill out the information, including e-mail address, cell phone number, and cell phone provider, click "Apply" to save the changes, and then click "OK."
- Students with special needs related to emergency situations should speak with their instructors outside of class.

Deployed Active Duty Military Students:

Students who are deployed active duty military and/or National Guard personnel and require accommodation should contact their instructors as soon as possible after the semester begins and/or after they receive notification of deployment to make related arrangements.

College of Engineering and Computer Science - Graduate Program Addition-New - Aerospace Engineering MSAE, Guidance Control and Dynamics Track ▶

2020-2021 Graduate New Certificate or Track

General Catalog Information

Read before you begin

TURN ON help text before starting this proposal by clicking in the top right corner of the heading.
FILL IN all fields required marked with an * after importing data. You will not be able to launch the proposal without completing required fields.

LAUNCH proposal by clicking in the top left corner. DO NOT make proposed changes before launching proposal. Changes will only be tracked after proposal is launched.

Select *Program* below.

Program Type* ◉ Program ○ Shared Core

This form is to be used to ADD graduate tracks or certificate programs. If there are multiple tracks being added to a program, one form must be submitted to revise the program and additional forms must be submitted for each of the track additions.

Please refer to the Graduate Council Curriculum Meeting Schedule for submission deadlines.

Proposal Type:* Graduate Program Addition-New

College:* College of Engineering and Computer Science

Unit / Department / College:* Department of Mechanical and Aerospace Engineering

Primary Unit Housing Program:* MSAE

Type of Action:* ☑ Track ☐ Certificate

Name of new track or certificate:* Aerospace Engineering MSAE, Guidance Control and Dynamics Track ▶

Proposed Effective Term and Year:* Fall 2020

Delivery:* ☑ Face to Face
☑ UCF Online (all courses online-approved with UCF Online)
☑ Mixed Delivery

If you will be submitting other forms for tracks or course actions, please list them here:

New Equipment Fee?* ○ Yes ◉ No

If yes, also complete the 2020-2021 Graduate Equipment Fee form.

Will the program be a market tuition rate program?* ○ Yes ◉ No

Will the program be a cost recovery program?* ○ Yes ◉ No

For the Informational Description Chart box below, please copy and paste this example chart and add your relevant program information:

College: Link to College website	**Degree: CRT**
Department: Link to department website	**Option: N/A**
Program Websites: Link to program website	

Informational Description Chart:*

College: Engineering and Computer Science	**Degree:** MSAE
Department: Mechanical and Aerospace Engineering	**Option:** Thesis, Nonthesis
Program Websites: http://www.mae.ucf.edu/	

Rationale:*

This new track will target employees of Lockheed Martin and other space-related industries around Central Florida who want to pursue graduate studies. The curriculum is developed with strong emphasis in courses related to guidance control and dynamics.

Prospective Curriculum*

Track Description

The Master of Science in Guidance, Control and Dynamics (MSAE) is designed to prepare students for careers as engineers in the aerospace industry. The curriculum is developed with strong emphasis in courses related to guidance control and dynamics with applications in aerospace engineering.

Curriculum

The MSAE is awarded upon completion of a minimum of 30 credit hours, including 9 credit hours of required courses, 15 credit hours of elective courses selected from an approved list of courses, and an additional 6 credit hours in either a thesis or nonthesis option.

Total Credit Hours Required: 30 Credit Hours Minimum beyond the Bachelor's Degree

All students must identify an adviser and file an official degree program of study prior to the completion of 9 credit hours of study. The program of study must be approved by the department and therefore students should consult with the MMAE Graduate Director for assistance in filling out their program of study.

A student with an undergraduate degree outside of the selected departmental discipline may also be required to satisfy an articulation program. Substitutions to the program of study must meet with the approval of the adviser and the department.

Prerequisites (or equivalent)

MAP 2302 - Differential Equations

EML 3034C - Modeling Methods in Mechanical and Aerospace Engineering

EAS 4134 - High-Speed Aerodynamics

EAS 4105 - Flight Mechanics **or**

EAS 4400 - Spacecraft Attitude Dynamics

EAS 4200 - Flight Structures **or**

EAS 4210 Space Structural Dynamics

Required Courses—9 Credit Hours

EML 5271 Intermediate Dynamics
EEL 5630 Digital Control Systems

Select one of the following courses:

EEL 5173 Linear Systems Theory
EML 5311 System Control

Elective Courses—15 Credit Hours

All students, both thesis and nonthesis, must complete at least 12 credit hours of electives. The following list are suggested electives to be taken in the program of study.

EAS 6403C Attitude Determination and Control
EAS 6415 Guidance, Navigation and Control
EEL 6616 Adaptive Control
EEL 6621 Nonlinear Control Systems
EML 5713 Intermediate Fluid Mechanics
EML 6223 Advanced Vibrational Systems
EML 5237 Intermediate Mechanics of Materials
EEL 5432 Satellite Remote Sensing
EEE 5542 Random Processes I
EEL 5881 Software Engineering I
EAS 6507 Topics of Astrodynamics
EAS 5407C Mechatronic Systems
EAS 6405 Advanced Flight Dynamics
EAS 6414 Estimation of Dynamical Systems in Aerospace Engineering
EAS 6722 Multidisciplinary Optimization Under Uncertainty
EEL 5625 Applied Control Systems
EEL 5669 Introduction to Robotics and Autonomous Vehicles
EEL 5690 Introduction to Medical Robotics and Tele-Operation
EEL 5820 Image Processing
EEL 6026 Optimization of Engineering Systems
EEL 6616 Adaptive Control

EEL 6616 Adaptive Control

EEL 6619 Nonlinear Robust Control and Applications

EEL 6621 Nonlinear Control Systems

EEL 6662 Advanced Robotics

EEL 6667 Planning and Control for Mobile Robotic Systems

EEL 6671 Modern and Optimal Control Systems

EEL 6674 Optimal Estimation for Control

EEL 6675 Stochastic Control

EEL 6683 Cooperative Control of Networked Autonomous Systems

EEL 6812 Introduction to Neural Networks

EEL 6823 Image Processing II

EEL 6875 Autonomous Agents

EEL 6876 Current Topics in Artificial Intelligence

EEL 6878 Modeling and Artificial Intelligence

EML 6223 Advanced Vibrational Systems

EML 6226 Analytical Dynamics

EML 6227 Nonlinear Vibration

EML 6808 Analysis and Control of Robot Manipulators

Thesis Option—6 Credit Hours

The thesis option requires 30 credit hours, at least half of which must be at the 6000 level and will include 6 credit hours of thesis credit. A student pursuing the thesis program may not register for thesis credit hours until an advisory committee has been appointed and the committee has reviewed the program of study and the proposed thesis topic.

Students must register for the course a minimum of two times during their graduate career in the master's program (thesis option). The students must also complete the course with a satisfactory (S) grade in both attempts. If the student does not complete the course with a satisfactory grade, the student will be asked to repeat the course to meet program requirements.

EAS 6971 Thesis **6 Credit Hours**

Additionally, students pursuing the thesis option must enroll in the following course:

EML 5090 Mechanical and Aerospace Seminar

Nonthesis Option—6 Credit Hours

The nonthesis option is primarily designed to meet the needs of part-time students and requires 30 credit hours of course work, at least one-half of which must be at the 6000 level. Students pursuing the nonthesis option are required to take one additional elective and take either EML 6085 - Research Methods in Mechanical and Aerospace Engineering (or XXX 6918 Directed Research, with approval)* as part of their 30-credit-hour course requirement.

***For students who are not on campus and upon prior approval from the graduate coordinator, XXX 6918 Directed Research (3 credit hours) may be substituted as the student's independent learning experience. If the substitution of XXX 6918 is approved, a letter must be provided by the member of the faculty supervising the directed research certifying independent learning.**

EML 6085 and XXX 6918 fulfill the independent learning requirement and either course is required for nonthesis students.

[Before] Elective **3 Credit Hours**

EML 6085 Research Methods in Mechanical and Aerospace Engineering

Equipment Fee

Students in the Aerospace Engineering MSAE program pay a $90 equipment fee each semester that they are enrolled.

Independent Learning

The independent learning requirement is met by successful completion of a master's thesis for the thesis option. The nonthesis option independent learning experience is provided by the required course, EML 6085 - Research Methods in Mechanical and Aerospace Engineering (3 credit hours). For students who are not on campus and upon prior approval from the graduate coordinator, XXX 6918 Directed Research (3 credit hours) may be substituted as the student's independent learning experience. If the substitution of XXX 6918 is approved, a letter must be provided by the member of the faculty supervising the directed research certifying independent learning.

Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate

Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

One official transcript (in a sealed envelope) from each college/university attended.

Bachelor's degree in Aerospace Engineering or closely related discipline.

Résumé.

Statement of educational, research, and professional career objectives.

Applicants applying to this program who have attended a college/university outside the United States must provide a course-by-course credential evaluation with GPA calculation. Credential evaluations are accepted from World Education Services (WES) or Josef Silny and Associates, Inc. only.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

Additional courses may be required to correct deficiencies. Students should contact the MMAE graduate program director for further information.

Application Deadlines

Guidance Control and Dynamics	*Fall Priority	Fall	Spring	Summer
Applicants	Jan 15	Jul 1	Dec 1	
International Applicants	Jan 15	Jan 15	Jul 1	
*Applicants who plan to enroll full time in a degree program and who wish to be considered for university fellowships or assistantships should apply by the Fall Priority date.				

Financials

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see the College of Graduate Studies Funding website, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see UCF Graduate Fellowships, which includes descriptions of university fellowships and what you should do to be considered for a fellowship.

Contact Info

Graduate Program

Jihua Gou PhD

Professor

jihua.gou@ucf.edu

Telephone: 407-823-2155

ENGR1 - 307

Graduate Admissions

Ashley Rivera Mercado

gradadmissions@ucf.edu

Telephone: 407-823-2766

Millican Hall 230

Online Application

Graduate Admissions

Mailing Address

UCF College of Graduate Studies

Millican Hall 230

PO Box 160112

Orlando, FL 32816-0112

Institution Codes

GRE: 5233

GMAT: RZT-HT-58

TOEFL: 5233

ETS PPI: 5233

Graduate Fellowships

Grad Fellowships

Telephone: 407-823-0127

gradfellowship@ucf.edu

https://graduate.ucf.edu/funding/

Graduate Financial Aid

UCF Student Financial Assistance

Millican Hall 120

Telephone: 407-823-2827

Appointment Line: 407-823-5285

Fax: 407-823-5241

finaid@ucf.edu

http://finaid.ucf.edu

Impact on Current Students

Will students be moved from an existing program, track, or certificate into this new track or certificate?* (•) Yes ( ) No

If yes, state the name of the program or track where students are currently enrolled and the current enrollment numbers.

MSME: 132 enrolled
MSAE: 90 enrolled

Will students have the option to stay in their existing program, track, or certificate?* (•) Yes ( ) No

Future Students

Indicate likely career or student outcomes upon completion:

Students graduating from this new track are likely work in the field of guidance control and dynamics in arospace and defense industries.

Provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc.

This new track will target employess of Lockheed Martin and other space and defense industries around Central Florida.

There is no licensure or certification that depends upon this new track.

Year 1

Headcount: 5

SCHs: 30

Year 2

Headcount: 10

SCHs: 60

Year 3

Headcount: 20

SCHs: 120

Please complete the following section on financial support:

(Specify all forms of support – assistantships, fellowships, and tuition remission.)

Year 1

Number of assistantship students: 0

Source of funds:

Number of fellowship students (specify fellowship): 0

Number of tuition remissions: 0

Source of funds:

Year 2

Number of assistantship students: 0

Source of funds:

Number of fellowship students (specify fellowship): 0

Number of tuition remissions: 0

Source of funds:

Year 3

Number of assistantship students: 0

Source of funds:

Number of fellowship students (specify fellowship): 0

Number of tuition remissions: 0

Source of funds:

Attachments

Please attach the required files by navigating to the Proposal Toolbox and clicking in the top right corner of the form.

Faculty List*	☑ Attached
Support from involved units that no duplication exists*	☐ Attached ☑ Not Applicable
Library Assessment of Resources*	☑ Attached

Administration Use Only

Program Type	Master
Degree Type	Master of Science in Aerospace Engineering
Status*	◉ Active-Visible ○ Inactive-Hidden
Catalog Ownership:	Department of Mechanical and Aerospace Engineering

MAE Faculty

Kareem Ahmed	Yuanli Bai	Samik Bhattacharya	Suryanarayana Challapalli	Quanfang Chen
Hyoung Jin "Joe" Cho	Hwan Choi	Louis Chow	Tuhin Das	Andrew Dickerson
Tarek Elgohary	Quishi Fu	Ranajay Gosh	Ali Gordon	Jihua "Jan" Gou
Helen Huang	Olusegun Ilegbusi	Jayanta Kapat	Alain Kassab	Jeffrey L. Kauffman
Michael Kinzel	Ranganathan Kumar	Kawai Kwok	Hansen A. Mansy	Sagnik Mazumdar
Marino Nader	Nina Orlovskaya	Ahmet Ozbay	Sudeshna Pal	Joon-Hyuk Park
Yoav Peles	Luigi Perotti	Seetha Raghavan	Wen Shen	Sang-Eun "Sam" Song
Mark Steiner	Robert L. Steward Jr.	Kurt Stresau	Tian Tian	Subith Vasu
Felipe Viana	Dazhong Wu	Yunjun Xu	Denizhan Yavas	

ECE Faculty

Reza Abdolvand	Reza Abdolvand	Zakhia Abichar	Georgios Anagnostopoulos	Mohammad Assefzadeh
George Atia	Amro J. Awad	Ulas Bagci	Issa Batarseh	Aman Behal
Ladislau Boloni	Yehuda Braiman	Alexander N. Cartwright	ChungYong Chan	Mainak Chatterjee
Kenle Chen	Ronald F. DeMara	Aleksandar Dimitrovski	Ronald Driggers	Shady Elashhab
Chinwendu Enyioha	Rickard Ewetz	Azza Fahim	Yaser P. Fallah	Deliang Fan
Hassan Foroosh	Michael Georgiopoulos	Xun Gong	Zhishan Guo	Mark Heinrich
James Hickman	Charles E. Hughes	Maria Jacob	Sumit Jha	Yier Jin
Saiful Khondaker	Brian Kim	Guifang Li	Qifeng Li	Patrick LiKamWa
Mingjie Lin	Arkadiy Lyakh	Abhijit Mahalanobis	Donald C. Malocha	Wasfy B. Mikhael
Raj Mittra	Aziz Mohaisen	Alan Paris	Ronald Phillips	Eytan Pollak
Junjian Qi	Zhihua Qu	Nazanin Rahnavard	Gregory Rawlins	Martin C. Richardson

Samuel M. Richie	Tania Roy	Winston V. Schoenfeld	Mubarak Shah	Marwan Simaan
Sundar Sinnappan	M.J. Soileau	Yan Solihin	Sang-Eun Song	Suboh Suboh
Gita Sukthankar	Wei Sun	Kalpathy B. Sundaram	W. Linwood Jones	Yeonwoong Jung
Vikram J. Kapoor	Sharma Thankachan	Damla Turgut	Nicolaos Tzannes	Azadeh Vosoughi
Parveen Wahid	Jun Wang	Arthur Weeks	Lei Wei	Pawel Wocjan
Annie Wu	Fan Yao	Jiann S. Yuan	Murat Yuksel	Qun Zhou
Cliff Zou				

MEMO

To: Dr. Kalpathy Sundaram, Electrical & Computer Engineering
Dr. Zhihua Qu, Chair, Department of Electrical and Computer Engineering
Dr. Jihua Gou, Mechanical and Aerospace Engineering
Dr. Michael Georgiopoulos, Dean, College of Engineering & Computer Science
Ms. Ying Zhang, Interim Associate Director, Collections & Technical Services
Mr. Frank Allen, Interim Director of Libraries
Dr. Winston Schoenfeld, Senior Associate Dean, College of Graduate Studies

From: Buenaventura (Ven) Basco, Associate Librarian, Research and Information Services

Subject: Library Evaluation of the Joint Proposal to add MSEE Track in Guidance Control and Dynamics in Electrical & Computer Engineering (ECE) and Mechanical & Aerospace Engineering (MAE) Departments

Date: April 10, 2020

This memorandum is submitted for review and approval. As requested by Dr. Kalpathy Sundaram, Department of Electrical & Computer Engineering, an analysis was conducted to evaluate the University of Central Florida (UCF) Libraries' resources to support the joint proposal from Electrical & Computer Engineering (ECE) and Mechanical & Aerospace Engineering (MAE) Departments to add MSEE Track in Guidance Control and Dynamics.

Analysis

This analysis provides resource comparisons with peer institutions to evaluate current holdings for databases, journals, and books. To complete the analysis, the expertise and assistance of Ying Zhang and Sara Duff was solicited, which significantly added to the overall evaluation.

In consultation with Dr. Kalpathy Sundaram for the proposed MSEE Track in Guidance Control and Dynamics, the institutions listed below were selected for comparison. It should be noted that no institution offers the same track.

- North Carolina State University (NCSU)
- Temple University
- University of Florida (UF)

Summary and Projected Costs for New Library Resources:

Each of these institutions offers a master's degree program in Electrical Engineering and Computer Engineering. An area of specialization in Intelligent Systems and Control is currently offered by Temple University. Additionally, NCSU and UF also offer a Master of Science Degree in Aerospace Engineering. In comparing the library collections at the selected aspiring programs, UCF Libraries need to add recently published monographs to fill the gaps in the collection. The total cost for library materials for the first year to begin the program is **$1,000**. For costs in subsequent years, see the chart below. After the five-year period, costs will continue so money will need to be added to the Library budget to cover those expenses.

In the unfortunate event library budget shortfalls occur, some existing resource subscriptions may be cut or scaled back.

Projected costs needed to acquire library materials to support the new MSEE Track in Guidance Control and Dynamics

	2020	**2021**	**2022**	**2023**	**2024**
Books (print and online)	$1,000	1,050	1,102	1,157	1,215
Total	$1,000	1,050	1,102	1,157	1,215

Cost: $____ plus 5% inflation for each year thereafter

Databases

Database Name	**UCF**	**UF**	**NCSU**	**Temple**
Mechanical and Transportation Engineering Abstract (ProQuest)	x	x	x	
Compendex (Engineering Index)	x	x	x	x
IEEE Xplore	x	x	x	x
INSPEC	x	x	x	x
Advanced Technologies & Aerospace Collection (ProQuest)	x	x	x	
Science Direct	x	x	x	x
SCOPUS			x	x
Web of Science	x	x	x	x
NASA Technical Reports Server (NTRS) FREE	x	x	x	x
Applied Science & Technology Source	x	x		
Journal Citation Index (JCR)	x	x	x	x
NTIS (Free public access to a very small portion of the database)	x	x	x	
ProQuest Dissertations and Thesis Full-Text	x	x	x	x
SPIE Digital Library	x		x	

Databases: The UCF Libraries journal list compares favorably with the chosen institutions. **We have the databases needed to support MS Track in Guidance Control and Dynamics.**

Key Journals

Top 25 Electronic Journals in Aerospace Engineering - as determined by Thomson Reuters Journal Impact Factor 2018 Rankings	**UCF**	**UF**	**NCSU**	**Temple**
Progress in Aerospace Sciences	x	x	x	
Journal of Astronomical Telescopes Instruments and Systems	x		x	

Aerospace Science and Technology	x	x	x	x
IEEE Transactions on Aerospace and Electronic Systems	x	x	x	x
ACTA Astronautica	x	x	x	
Chinese Journal of Aeronautics (Open Access)	x	x		x
Journal of Guidance, Control, and Dynamics	x	x	x	2001-2015
Microgravity Science and Technology	x	x	x	x
AIAA Journal	x	x	x	1986 - 2015
Journal of Propulsion and Power	x	x	x	1990 - 2015
Journal of the Astronautical Sciences			1958 - 2014	
International Journal of Satellite Communications and Networking	x	x	x	x
Navigation- Journal of the Institute of Navigation	x	x	x	x
Journal of Aerospace Engineering	x	x	x	x
International Journal of Aerospace Engineering	x	x	x	x
Proceedings of the Institution of Mechanical Engineers Part G – Journal of Aerospace Engineering	x	x	x	x
International Journal of Micro Air Vehicles	x	x	x	x
Journal of Spacecraft and Rockets	x	x	x	
Aeronautical Journal	x	x	x less 1-year delay	
Journal of Aircraft	x	x	x	
Aircraft Engineering and Aerospace Technology	x	x less 1-year delay	x less 1-year delay	x less 1-year delay
International Journal of Aeroacoustics	x	x	x	x
International Journal of Turbo & Jet Engines	x	x	x	x
Transactions of the Japan Society for Aeronautical and Space Sciences. Full text available at: J-STAGE Free		x	x	x

Journals: By comparing the title by title list, UCF Libraries journal list compares favorably well with the chosen institutions. New journals will not be requested at this time.

Books – Combined Print and E-Books *(by the Subject headings, keywords provided or LC ranges)*

Subject Heading	**UCF**	**UF**	**NCSU**	**Temple**
Astrodynamics	101	139	114	31
Astronautics	2670	2418	1864	941
Control Theory	1222	1451	1465	995
Dynamics	3044	2333	1574	760
Flight Control	339	594	421	80
Guidance Systems	99	133	84	0
Intelligent control systems	409	288	585	312
Linear Systems	241	308	218	153
Nonlinear control theory	179	175	212	176
Space Vehicles – Control Systems	163	257	273	34
Space Vehicles – Guidance Systems	91	122	44	10

Books: The analysis of the book collection shows that UCF Libraries compare favorably well in most of the areas with the other institutions when compared. However, we are below in three areas – control theory, flight control, and space vehicles – control systems when compared to University of Florida and North Carolina State University. We will need to add some books in order to support the new MS track and to add new publications in the next 5 years. The library will need **$1,000** initially to purchase books/e-books in the three areas mentioned to catch up and additional **$1,000** each year for the remaining four years.

APPENDIX

Signature of the Library Director.

Signature of Equal Opportunity Officer	**Date**
Frank R. Allen	April 13, 2020
Signature of Library Director	**Date**

This appendix was created to facilitate the collection of signatures in support of the proposal. Signatures in this section illustrate that the Library Director has reviewed sections above.

College of Engineering and Computer Science - Graduate Program Addition-New - Mechanical Engineering MSME, Guidance Control and Dynamics Track ►

2020-2021 Graduate New Certificate or Track

General Catalog Information

Read before you begin

TURN ON help text before starting this proposal by clicking in the top right corner of the heading.
FILL IN all fields required marked with an * after importing data. You will not be able to launch the proposal without completing required fields.

LAUNCH proposal by clicking in the top left corner. DO NOT make proposed changes before launching proposal. Changes will only be tracked after proposal is launched.

Select *Program* below.

Program Type* (•) Program
( ) Shared Core

This form is to be used to ADD graduate tracks or certificate programs. If there are multiple tracks being added to a program, one form must be submitted to revise the program and additional forms must be submitted for each of the track additions.

Please refer to the Graduate Council Curriculum Meeting Schedule for submission deadlines.

Proposal Type:* Graduate Program Addition-New

College:* College of Engineering and Computer Science

Unit / Department / College:* Department of Mechanical and Aerospace Engineering

Primary Unit Housing Program:* MSME

Type of Action:* [x] Track
[ ] Certificate

Name of new track or certificate:* Mechanical Engineering MSME, Guidance Control and Dynamics Track ►

Proposed Effective Term and Year:* Fall 2020

Delivery:* ☑ Face to Face
☑ UCF Online (all courses online-approved with UCF Online)
☑ Mixed Delivery

If you will be submitting other forms for tracks or course actions, please list them here:

New Equipment Fee?* ○ Yes ◉ No

If yes, also complete the 2020-2021 Graduate Equipment Fee form.

Will the program be a market tuition rate program?* ○ Yes ◉ No

Will the program be a cost recovery program?* ○ Yes ◉ No

For the Informational Description Chart box below, please copy and paste this example chart and add your relevant program information:

College: Link to College website	**Degree: CRT**
Department: Link to department website	**Option: N/A**
Program Websites: Link to program website	

Informational Description Chart:*

College: Engineering and Computer Science	**Degree:** MSAE
Department: Mechanical and Aerospace Engineering	**Option:** Thesis, Nonthesis
Program Websites: http://www.mae.ucf.edu/	

Rationale:*

This new track will target employees of Lockheed Martin and other space-related industries around Central Florida who want to pursue graduate studies. The curriculum is developed with strong emphasis in courses related to guidance control and dynamics.

Prospective Curriculum*

Track Description

The Master of Science in Guidance, Control and Dynamics (MSME) is designed to prepare students for careers as engineers in the aerospace industry. The curriculum is developed with strong emphasis in courses related to guidance control and dynamics with applications in aerospace engineering.

Curriculum

The MSME is awarded upon completion of a minimum of 30 credit hours, including 9 credit hours of required courses, 15 credit hours of elective courses selected from an approved list of courses, and an additional 6 credit hours in either a thesis or nonthesis option.

Total Credit Hours Required: 30 Credit Hours Minimum beyond the Bachelor's Degree

All students must identify an adviser and file an official degree program of study prior to the completion of 9 credit hours of study. The program of study must be approved by the department and therefore students should consult with the MSME Graduate Director for assistance in filling out their program of study.

A student with an undergraduate degree outside of the selected departmental discipline may also be required to satisfy an articulation program. Substitutions to the program of study must meet with the approval of the adviser and the department.

Prerequisites (or equivalent)

MAP 2302 - Differential Equations

EML 3034C - Modeling Methods in Mechanical and Aerospace Engineering

EAS 4134 - High-Speed Aerodynamics

EAS 4105 - Flight Mechanics or

EAS 4400 - Spacecraft Attitude Dynamics

EAS 4200 - Flight Structures **or**

EAS 4210 Space Structural Dynamics

Required Courses—9 Credit Hours

EML 5271 Intermediate Dynamics
EEL 5630 Digital Control Systems

Select one of the following courses:

EEL 5173 Linear Systems Theory
EML 5311 System Control

Elective Courses—12 Credit Hours

All students, both thesis and nonthesis, must complete at least 12 credit hours of electives. The following list are suggested electives to be taken in the program of study.

EAS 6403C Attitude Determination and Control
EAS 6415 Guidance, Navigation and Control
EEL 6616 Adaptive Control
EEL 6621 Nonlinear Control Systems
EML 5152 Intermediate Heat Transfer
EML 5713 Intermediate Fluid Mechanics
EML 6211 Continuum Mechanics
EML 6223 Advanced Vibrational Systems
EML 5237 Intermediate Mechanics of Materials
EML 6155 Convection Heat Transfer
EML 6157 Radiation Heat Transfer
EAS 6808 Space Environment and Payload Instrumentation
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EEE 5542 Random Processes I
EEL 5881 Software Engineering I

Thesis Option—6 Credit Hours

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The thesis option requires 30 credit hours, at least half of which must be at the 6000 level and will include 6 credit hours of thesis credit. A student pursuing the thesis program may not register for thesis credit hours until an advisory committee has been appointed and the committee has reviewed the program of study and the proposed thesis topic.

Students must register for the course a minimum of two times during their graduate career in the master's program (thesis option). The students must also complete the course with a satisfactory (S) grade in both attempts. If the student does not complete the course with a satisfactory grade, the student will be asked to repeat the course to meet program requirements.

EAS 6971 Thesis 6 Credit Hours

Additionally, students pursuing the thesis option must enroll in the following course:

EML 5090 Mechanical and Aerospace Seminar

Nonthesis Option—6 Credit Hours

The nonthesis option is primarily designed to meet the needs of part-time students and requires 30 credit hours of course work, at least one-half of which must be at the 6000 level. Students pursuing the nonthesis option are required to take one additional elective and take either EML 6085 - Research Methods in Mechanical and Aerospace Engineering (or XXX 6918 Directed Research, with approval)* as part of their 30-credit-hour course requirement.

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EML 6085 and XXX 6918 fulfill the independent learning requirement and either course is required for nonthesis students.

[Before] Elective **3 Credit Hours**

EML 6085 Research Methods in Mechanical and Aerospace Engineering

Equipment Fee

Students in the Mechanical Engineering MSME program pay a $90 equipment fee each semester that they are enrolled.

Independent Learning

The independent learning requirement is met by successful completion of a master's thesis for the thesis option. The nonthesis option independent learning experience is provided by the required course, EML 6085 - Research Methods in Mechanical and Aerospace Engineering (3 credit hours). For students who are not on campus and upon prior approval from the graduate coordinator, XXX 6918 Directed Research (3 credit hours) may be substituted as the student's independent learning experience. If the substitution of XXX 6918 is approved, a letter must be provided by the member of the faculty supervising the directed research certifying independent learning.

Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

One official transcript (in a sealed envelope) from each college/university attended.

Bachelor's degree in Mechanical Engineering or closely related discipline.

Résumé.

Statement of educational, research, and professional career objectives.

Applicants applying to this program who have attended a college/university outside the United States must provide a course-by-course credential evaluation with GPA calculation. Credential evaluations are accepted from World Education Services (WES) or Josef Silny and Associates, Inc. only.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

Additional courses may be required to correct deficiencies. Students should contact the MMAE graduate program director for further information.

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Guidance Control and Dynamics	*Fall Priority	Fall	Spring	Summer
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*Applicants who plan to enroll full time in a degree program and who wish to be considered for university fellowships or assistantships should apply by the Fall Priority date.				

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Contact Info

Graduate Program

Jihua Gou PhD

Professor

jihua.gou@ucf.edu

Telephone: 407-823-2155

ENGR1 - 307

Graduate Admissions

Ashley Rivera Mercado

gradadmissions@ucf.edu

Telephone: 407-823-2766

Millican Hall 230

Online Application

Graduate Admissions

Mailing Address

UCF College of Graduate Studies

Millican Hall 230

PO Box 160112

Orlando, FL 32816-0112

Institution Codes

GRE: 5233

GMAT: RZT-HT-58

TOEFL: 5233

ETS PPI: 5233

Graduate Fellowships

Grad Fellowships

Telephone: 407-823-0127

gradfellowship@ucf.edu

https://graduate.ucf.edu/funding/

Graduate Financial Aid

UCF Student Financial Assistance

Millican Hall 120

Telephone: 407-823-2827

Appointment Line: 407-823-5285

Fax: 407-823-5241

finaid@ucf.edu

http://finaid.ucf.edu

Impact on Current Students

Will students be moved from an existing program, track, or certificate into this new track or certificate?* (•) Yes ( ) No

If yes, state the name of the program or track where students are currently enrolled and the current enrollment numbers.

SME: 132 enrolled
MSAE: 90 enrolled

Will students have the option to stay in their existing program, track, or certificate?* (•) Yes ( ) No

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Provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc.	This new track will target employess of Lockheed Martin and other space and defense industries around Central Florida. There is no licensure or certification that depends upon this new track.

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Headcount: 20

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Number of assistantship students: 0

Source of funds:

Number of fellowship students (specify fellowship): 0

Number of tuition remissions: 0

Source of funds:

Year 3

Number of assistantship students:	0	**Source of funds:**	
Number of fellowship students (specify fellowship):	0		
Number of tuition remissions:	0	**Source of funds:**	

Attachments

Please attach the required files by navigating to the Proposal Toolbox and clicking in the top right corner of the form.

Faculty List*	☑ Attached	
Support from involved units that no duplication exists*	☐ Attached	☑ Not Applicable
Library Assessment of Resources*	☑ Attached	

Administration Use Only

Program Type	Master
Degree Type	Master of Science in Aerospace Engineering
Status*	◉ Active-Visible ○ Inactive-Hidden
Catalog Ownership:	Department of Mechanical and Aerospace Engineering

MEMO

To: Dr. Kalpathy Sundaram, Electrical & Computer Engineering
Dr. Zhihua Qu, Chair, Department of Electrical and Computer Engineering
Dr. Jihua Gou, Mechanical and Aerospace Engineering
Dr. Michael Georgiopoulos, Dean, College of Engineering & Computer Science
Ms. Ying Zhang, Interim Associate Director, Collections & Technical Services
Mr. Frank Allen, Interim Director of Libraries
Dr. Winston Schoenfeld, Senior Associate Dean, College of Graduate Studies

From: Buenaventura (Ven) Basco, Associate Librarian, Research and Information Services

Subject: Library Evaluation of the Joint Proposal to add MSEE Track in Guidance Control and Dynamics in Electrical & Computer Engineering (ECE) and Mechanical & Aerospace Engineering (MAE) Departments

Date: April 10, 2020

This memorandum is submitted for review and approval. As requested by Dr. Kalpathy Sundaram, Department of Electrical & Computer Engineering, an analysis was conducted to evaluate the University of Central Florida (UCF) Libraries' resources to support the joint proposal from Electrical & Computer Engineering (ECE) and Mechanical & Aerospace Engineering (MAE) Departments to add MSEE Track in Guidance Control and Dynamics.

Analysis

This analysis provides resource comparisons with peer institutions to evaluate current holdings for databases, journals, and books. To complete the analysis, the expertise and assistance of Ying Zhang and Sara Duff was solicited, which significantly added to the overall evaluation.

In consultation with Dr. Kalpathy Sundaram for the proposed MSEE Track in Guidance Control and Dynamics, the institutions listed below were selected for comparison. It should be noted that no institution offers the same track.

- North Carolina State University (NCSU)
- Temple University
- University of Florida (UF)

Summary and Projected Costs for New Library Resources:

Each of these institutions offers a master's degree program in Electrical Engineering and Computer Engineering. An area of specialization in Intelligent Systems and Control is currently offered by Temple University. Additionally, NCSU and UF also offer a Master of Science Degree in Aerospace Engineering. In comparing the library collections at the selected aspiring programs, UCF Libraries need to add recently published monographs to fill the gaps in the collection. The total cost for library materials for the first year to begin the program is **$1,000**. For costs in subsequent years, see the chart below. After the five-year period, costs will continue so money will need to be added to the Library budget to cover those expenses.

In the unfortunate event library budget shortfalls occur, some existing resource subscriptions may be cut or scaled back.

Projected costs needed to acquire library materials to support the new MSEE Track in Guidance Control and Dynamics

	2020	**2021**	**2022**	**2023**	**2024**
Books (print and online)	$1,000	1,050	1,102	1,157	1,215
Total	$1,000	1,050	1,102	1,157	1,215

Cost: $____ plus 5% inflation for each year thereafter

Databases

Database Name	**UCF**	**UF**	**NCSU**	**Temple**
Mechanical and Transportation Engineering Abstract (ProQuest)	x	x	x	
Compendex (Engineering Index)	x	x	x	x
IEEE Xplore	x	x	x	x
INSPEC	x	x	x	x
Advanced Technologies & Aerospace Collection (ProQuest)	x	x	x	
Science Direct	x	x	x	x
SCOPUS			x	x
Web of Science	x	x	x	x
NASA Technical Reports Server (NTRS) FREE	x	x	x	x
Applied Science & Technology Source	x	x		
Journal Citation Index (JCR)	x	x	x	x
NTIS (Free public access to a very small portion of the database)	x	x	x	
ProQuest Dissertations and Thesis Full-Text	x	x	x	x
SPIE Digital Library	x		x	

Databases: The UCF Libraries journal list compares favorably with the chosen institutions. **We have the databases needed to support MS Track in Guidance Control and Dynamics.**

Key Journals

Top 25 Electronic Journals in Aerospace Engineering - as determined by Thomson Reuters Journal Impact Factor 2018 Rankings	**UCF**	**UF**	**NCSU**	**Temple**
Progress in Aerospace Sciences	x	x	x	
Journal of Astronomical Telescopes Instruments and Systems	x		x	

Aerospace Science and Technology	x	x	x	x
IEEE Transactions on Aerospace and Electronic Systems	x	x	x	x
ACTA Astronautica	x	x	x	
Chinese Journal of Aeronautics (Open Access)	x	x		x
Journal of Guidance, Control, and Dynamics	x	x	x	2001-2015
Microgravity Science and Technology	x	x	x	x
AIAA Journal	x	x	x	1986 - 2015
Journal of Propulsion and Power	x	x	x	1990 - 2015
Journal of the Astronautical Sciences			1958 - 2014	
International Journal of Satellite Communications and Networking	x	x	x	x
Navigation- Journal of the Institute of Navigation	x	x	x	x
Journal of Aerospace Engineering	x	x	x	x
International Journal of Aerospace Engineering	x	x	x	x
Proceedings of the Institution of Mechanical Engineers Part G – Journal of Aerospace Engineering	x	x	x	x
International Journal of Micro Air Vehicles	x	x	x	x
Journal of Spacecraft and Rockets	x	x	x	
Aeronautical Journal	x	x	x less 1-year delay	
Journal of Aircraft	x	x	x	
Aircraft Engineering and Aerospace Technology	x	x less 1-year delay	x less 1-year delay	x less 1-year delay
International Journal of Aeroacoustics	x	x	x	x
International Journal of Turbo & Jet Engines	x	x	x	x
Transactions of the Japan Society for Aeronautical and Space Sciences. Full text available at: J-STAGE Free		x	x	x

Journals: By comparing the title by title list, UCF Libraries journal list compares favorably well with the chosen institutions. New journals will not be requested at this time.

Books – Combined Print and E-Books *(by the Subject headings, keywords provided or LC ranges)*

Subject Heading	**UCF**	**UF**	**NCSU**	**Temple**
Astrodynamics	101	139	114	31
Astronautics	2670	2418	1864	941
Control Theory	1222	1451	1465	995
Dynamics	3044	2333	1574	760
Flight Control	339	594	421	80
Guidance Systems	99	133	84	0
Intelligent control systems	409	288	585	312
Linear Systems	241	308	218	153
Nonlinear control theory	179	175	212	176
Space Vehicles – Control Systems	163	257	273	34
Space Vehicles – Guidance Systems	91	122	44	10

Books: The analysis of the book collection shows that UCF Libraries compare favorably well in most of the areas with the other institutions when compared. However, we are below in three areas – control theory, flight control, and space vehicles – control systems when compared to University of Florida and North Carolina State University. We will need to add some books in order to support the new MS track and to add new publications in the next 5 years. The library will need **$1,000** initially to purchase books/e-books in the three areas mentioned to catch up and additional **$1,000** each year for the remaining four years.

APPENDIX

Signature of the Library Director.

Signature of Equal Opportunity Officer	**Date**
Frank R. Allen	April 13, 2020
Signature of Library Director	**Date**

This appendix was created to facilitate the collection of signatures in support of the proposal. Signatures in this section illustrate that the Library Director has reviewed sections above.

College of Engineering and Computer Science - Graduate Program Addition-New - Data Analytics Graduate Certificate

2020-2021 Graduate New Certificate or Track

General Catalog Information

Read before you begin

TURN ON help text before starting this proposal by clicking in the top right corner of the heading.
FILL IN all fields required marked with an * after importing data. You will not be able to launch the proposal without completing required fields.
LAUNCH proposal by clicking in the top left corner. DO NOT make proposed changes before launching proposal. Changes will only be tracked after proposal is launched.

Select *Program* below.

Program Type* (•) Program ( ) Shared Core

This form is to be used to ADD graduate tracks or certificate programs. If there are multiple tracks being added to a program, one form must be submitted to revise the program and additional forms must be submitted for each of the track additions.

Please refer to the Graduate Council Curriculum Meeting Schedule for submission deadlines.

Proposal Type:* Graduate Program Addition-New

College:* College of Engineering and Computer Science

Unit / Department / College:* Department of Computer Science

Primary Unit Housing Program:* Master of Science in Data Analytics

Type of Action:* [ ] Track [x] Certificate

Name of new track or certificate:* Data Analytics Graduate Certificate

Proposed Effective Term and Year:* Fall 2020

Delivery:*
- [ ] Face to Face
- [ ] UCF Online (all courses online-approved with UCF Online)
- [x] Mixed Delivery

If you will be submitting other forms for tracks or course actions, please list them here:

New Equipment Fee?* ○ Yes ◉ No

If yes, also complete the 2020-2021 Graduate Equipment Fee form.

Will the program be a market tuition rate program?* ○ Yes ◉ No

Will the program be a cost recovery program?* ◉ Yes ○ No

For the Informational Description Chart box below, please copy and paste this example chart and add your relevant program information:

College: Link to College website	**Degree: CRT**
Department: Link to department website	**Option: N/A**
Program Websites: Link to program website	

Informational Description Chart:*

College: Engineering and Computer Science	**Degree:** CRT
Department: Computer Science	**Option:** N/A
Program Websites: http://www.ce.ucf.edu/credit/data/	

Rationale:* Data Analytics is a newly important discipline in the economy that seeks to infer insights from large amounts of data (“big data”) by using various computer science techniques and statistical algorithms. Data Analytics is concerned with both computational techniques for managing data and resources efficiently and statistical techniques that measure the validity of such insights. There is a current and growing need for employees with advanced technical skills in these areas, prompted by the increasing ability of organizations to collect data. This graduate certificate program intends to train people to develop algorithms and computerized systems to facilitate the discovery of information from big data. This will be part of the interdisciplinary Master of Science program in Data Analytics (MSDA), offered jointly by the Colleges of Engineering and Computer Science and the College of Science at UCF. The graduate certificate program will emphasize the technical aspects of big data analytics, including machine learning, algorithm design, data acquisition, management, mining, and analysis. This certificate program will entail 15 credit hours of the MSDA program. By completion of the graduate certificate, students will be able to:

1. Deploy cutting edge tools to analyze large structured and unstructured data sets.
2. Implement algorithms for data mining and analysis
3. Perform data acquisition and management for large and dynamic databases.
4. Understand and communicate advanced knowledge derived from data.

Add complete catalog copy here! Must include description, curriculum, contact information, application requirements, and application deadlines. After you add/import courses, click on the View Curriculum Schema button below to add the catalog copy. Please note: this information is what will flow directly to the graduate catalog. Any attached documents to this proposal will not be used for catalog purposes.

Tip: You can Import a similar track or certificate to use as a templete instead of starting from scratch. Use the Import button at the top left corner of the form. **For instructions on adding the catalog copy please view the Graduate Program New: Importing a Template Program training video at: https://graduatecouncil.ucf.edu/curriculum-committee/.**

Follow these steps to propose courses to the new track or certificate curriculum:

Step 1

There are two options for adding courses: "Add Course" and "Import Course." For courses already in the catalog, click on "Import Course" and find the courses needed. For new classes going through a Curriculog Approval Process click on "Add Course"-- a box will open asking you for the Prefix, Course Number and Course Title.

Step 2

Click on "View Curriculum Schema." Click on the area/header of the program where you would like to add courses. When you click on "Add Courses" it will bring up the list of courses available from Step 1. Select

Prospective Curriculum*

Program Description

The Graduate Certificate in Data Analytics, which is part of the Master of Science in Data Analytics program, aims to provide students with the new ability to develop algorithms and computer programs for discovery of information from large amounts of data. This includes the architecture of programs, as well as technical details of algorithm development. Students are expected to be able to write and maintain novel computer programs that make efficient use of cutting-edge computer technology.

Students in this certificate option will receive a broad background in the areas of parallel database programming, machine learning, data mining, and network science while specializing in particular areas of data analytics practice. Students successfully completing this certificate program will have exhibited an advanced ability to lead in the discovery of actionable knowledge from "big data."

Curriculum

The Graduate Certificate in Data Analytics requires 15 credit hours. Students must receive a grade of "B" or higher in all courses.

Total Credit Hours Required: 15 Credit Hours Minimum beyond the Bachelor's Degree

Prerequisites

An undergraduate degree in computer science, statistics, computer engineering or information technology is desirable but not required. Applicants without a strong undergraduate background in computer science or statistics must demonstrate an understanding of the material covered in the following upper division undergraduate courses:

COP 3330 Object-Oriented Programming
COP 3503C Computer Science II
COP 4710 Database Systems
STA 2023 Statistical Methods I
Programming experience or STA 4164 Statistical Methods III

Required Courses: 15 Credit Hours

All students are required to take the following courses, for a total of 15 credit hours.

CAP 5610 Machine Learning
CNT 5805 Network Science
COP 5711 Parallel and Distributed Database Systems
STA 5206 Statistical Analysis
STA 5703 Data Mining Methodology I

Application Requirements

For information on general UCF graduate certificate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

In addition to the general UCF graduate application requirement, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- Resume/CV
- Letters of recommendation (encouraged but not required)

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

An undergraduate degree in Computer Science, Statistics, Information Technology, or Computer Engineering is desirable but not required. Applicants without a strong undergraduate background in Computer Science and Statistics must demonstrate an understanding of the material covered in upper-division undergraduate courses listed under the Articulation Section of the Curriculum Information. Applicants may choose to demonstrate their knowledge of these courses by taking these courses as non-degree seeking and scoring "B" or better in all of them.

Application Deadlines

Data Analytics	*Fall Priority	Fall	Spring	Summer
Domestic Applicants	Jan 15	Jul 1		
International Applicants	Jan 15	Jan 15		
*Applicants who plan to enroll full time in a degree program and who wish to				

be considered for university fellowships or assistantships should apply by the Fall Priority date.

Financials

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see the College of Graduate Studies Funding website, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see UCF Graduate Fellowships, which includes descriptions of university fellowships and what you should do to be considered for a fellowship.

Contact Info

Graduate Program

Ivan Garibay PhD

igaribay@ucf.edu

Telephone: 407-882-1163

ENG2

Graduate Admissions

Ashley Rivera Mercado

gradadmissions@ucf.edu

Telephone: 407-823-2766

Millican Hall 230

Online Application

Graduate Admissions

Mailing Address

UCF College of Graduate Studies

Millican Hall 230

PO Box 160112

Orlando, FL 32816-0112

Institution Codes

GRE: 5233

GMAT: RZT-HT-58

TOEFL: 5233

ETS PPI: 5233

Graduate Fellowships

Grad Fellowships

Telephone: 407-823-0127

gradfellowship@ucf.edu

https://graduate.ucf.edu/funding/

Graduate Financial Aid

UCF Student Financial Assistance

Millican Hall 120

Telephone: 407-823-2827

Appointment Line: 407-823-5285

Fax: 407-823-5241

finaid@ucf.edu

http://finaid.ucf.edu

Impact on Current Students

Impact on Current Students

Will students be moved from an existing program, track, or certificate into this new track or certificate?* ○ Yes ◉ No

If yes, state the name of the program or track where students are currently enrolled and the current enrollment numbers.

Will students have the option to stay in their existing program, track, or certificate?* ◉ Yes ○ No

Future Students

Indicate likely career or student outcomes upon completion:

There is a current and growing need for employees with advanced technical skills in these areas, prompted by the increasing ability of organizations to collect data. This graduate certificate program intends to train people to develop algorithms and computerized systems to facilitate the discovery of information from big data. According to the November 2019 EAB study, based on analysis of comparable programs and quantitative data analytics, a data analytics graduate certificate can offer a favorable regional impact. According to the analysis, employer demand for data analytics grew 3.07 percent on average, monthly since October 2016, outpacing average monthly growth of employer demand across all occupations. Certificate completers will be able to use state-of-the-art software to perform data mining and analysis on large structured and unstructured data sets and transform such data into actionable knowledge. Completers will also be able to deliver insights derived from data in an advanced and unambiguous manner. While these are highly sought-after skills in industry, these same techniques are extremely important in academia as well. Certificate completers will have the skills required for advanced research and could apply the same techniques and coursework towards more advanced graduates degrees (PhD and MS).

Provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc.

Enrolled students will typically hold undergraduate degrees in science, engineering or mathematics and have professional work experience in diverse industries. The majority of the students will work fulltime and seek to build data analytics skills for their current roles. Currently, there are no certifications or licensure that depends on this education.

Year 1

Headcount: 15

SCHs: 225

Year 2

Headcount: 20

SCHs: 300

Year 3

Headcount: 25

SCHs: 375

Please complete the following section on financial support:

(Specify all forms of support – assistantships, fellowships, and tuition remission.)

Year 1

Number of assistantship students: 0

Source of funds: 3516-5133

Number of fellowship students (specify fellowship): 0

Number of tuition remissions: 0

Source of funds:

Year 2

Number of assistantship students: 0

Source of funds: 3516-5133

Number of fellowship students (specify fellowship): 0

Number of tuition remissions: 0

Source of funds: 3516-5133

Year 3

Number of assistantship students: 0

Source of funds: 3516-5133

Number of fellowship students (specify fellowship): 0

Number of tuition remissions: 0

Source of funds: 3516-5133

Attachments

Please attach the required files by navigating to the Proposal Toolbox and clicking in the top right corner of the form.

Faculty List* ☑ Attached

Support from involved units that no duplication exists* ☐ Attached ☑ Not Applicable

Library Assessment of Resources* ☑ Attached

Administration Use Only

Program Type Master

Degree Type Master of Science

Status* ◉ Active-Visible ○ Inactive-Hidden

Catalog Ownership: Department of Computer Science

Graduate Certificate in Data Analytics
Assessment of Library Resources

When reviewing library support for the M.S. Data Analytics, Graduate Certificate Program in the College of Engineering and Computer Sciences, Departments of Computer Science and the College of Science, Department of Statistics, we selected the following institutions for comparison:

- Florida State University (FSU)
- Louisiana State University (LSU)

Both institutions currently offer similar graduate programs. The following information will show that UCF does have the necessary and appropriate library resources and collections to provide initial support for the graduate certificate program.

Databases: UCF Libraries' database list is strong compared to the other institutions with the advantage of having Business Source Premier, Web of Science, and IEEE. The databases in computer sciences also offer solid resources for students in the program that include journal articles, conference proceedings, review papers, and technical reports.

Institutional Comparison--Databases	**UCF**	**LSU**	**FSU**	
Science Direct	X	X	X	
ACM Digital Library	X	X	X	
INSPEC	X	X	X	
IEEE Explore	X	X	X	
Computer Database	X	X	X	
Applied Science & Technology	X	X	X	
Current Index to Statistics	X	X	X	
Business Source Premier	X			LSU/FSU have Business Source Complete, not Premier
Web of Science	X	X		
Computer & Information Systems Abstracts	X		X	

Journals: The University of Central Florida Libraries' journal listing compares favorably with the other institutions and there are some open access titles (i.e. Big Data & Society from Sage and Journal of Big Data from Springer). Since data analytics covers a broad territory in computer science and statistics, many of the publications in data analytics/big data are already occurring in established journals in those fields to which UCF already has access.

Books: Because the Graduate Certificate in Data Analytics and the MS in Data Analytics draws from a variety of subject sources in which we already well established, UCF compares quite favorable with its peers. The numbers of titles within the areas such as "big data" and "data mining" are small but that is in part due to the fact that titles are finally beginning to emerge devoted solely to the subject area alone. Since these topics are also quite relevant to students not only in data analytics but to students in other existing programs, more titles should be purchased from monies that already exist for those areas. UCF also has access to Springer E-Books as well as IEEE/Wiley E-Books.

Institutional Comparison--Books	UCF	LSU	FSU
Linear Models	937	155	908
Statistical Methods	252	1205	559
Probability Theory	273	165	227
Multivariate Analysis	695	265	238
Big Data	15	8	19
Data Mining	67	93	102
Data Warehousing	174	38	28
Information Visualization	67	17	34
Database Design	326	281	71
Data Structures	284	120	159
Data analytics	66	6	50
Prediction theory	73	36	44

Costs: The UCF Libraries has a collection strength that is ample to support the M.S. in Data Analytics program thus there will be equally sufficient levels of support for the Graduate Certificate in Data Analytics. Monies from the MSDA program have already been allotted to enhance the UCF collection in Statistical Methods [this cost was already built into the MSDA program budget]. There are also new areas including Big Data and Data Mining in which materials were needed. Publication in these areas is has increased and the library will need future funding to keep current with these and other new areas of research. The new funding will enable the library to purchase new books to support the program.

Graduate Certificate in Data Analytics Faculty List

Course	Faculty Member
CNT 5805 Network Science	Dr. Edwin Nassiff
STA 5206 Statistical Analysis	Dr. Nizam Uddin
CAP 5610 Machine Learning	Dr. Yanji Fu
STA 5703 Data Mining Methodology I	Dr. Chung-Ching Wang
COP 5711 Parallel and Distrib. Database	Dr. Kien Hua

College of Engineering and Computer Science - Technologies for Smart Communities Graduate Certificate

2020-2021 Graduate New Certificate or Track

General Catalog Information

Read before you begin

TURN ON help text before starting this proposal by clicking in the top right corner of the heading.
FILL IN all fields required marked with an * after importing data. You will not be able to launch the proposal without completing required fields.

LAUNCH proposal by clicking in the top left corner. DO NOT make proposed changes before launching proposal. Changes will only be tracked after proposal is launched.

Select *Program* below.

Program Type* (•) Program ( ) Shared Core

This form is to be used to ADD graduate tracks or certificate programs. If there are multiple tracks being added to a program, one form must be submitted to revise the program and additional forms must be submitted for each of the track additions.

Please refer to the Graduate Council Curriculum Meeting Schedule for submission deadlines.

Proposal Type:* Graduate Program Addition-New

College:* College of Engineering and Computer Science

Unit / Department / College:* Department of Electrical and Computer Engineering

Primary Unit Housing Program:* Electrical and Computer Engineering

Type of Action:* [ ] Track [x] Certificate

Name of new track or certificate:* Technologies for Smart Communities Graduate Certificate

Proposed Effective Term and Year:* Fall 2020

Delivery:* ☐ Face to Face
☐ UCF Online (all courses online-approved with UCF Online)
☑ Mixed Delivery

If you will be submitting other forms for tracks or course actions, please list them here:

New Equipment Fee?* ○ Yes ◉ No

If yes, also complete the 2020-2021 Graduate Equipment Fee form.

Will the program be a market tuition rate program?* ○ Yes ◉ No

Will the program be a cost recovery program?* ○ Yes ◉ No

For the Informational Description Chart box below, please copy and paste this example chart and add your relevant program information:

College: Link to College website	**Degree: CRT**
Department: Link to department website	**Option: N/A**
Program Websites: Link to program website	

Informational Description Chart:*

College: Engineering and Computer Science	Degree: CRT
Department: Electrical and Computer Engineering	Option: N/A
Program Websites: http://www.ece.ucf.edu	

Rationale:* This program aims at offering an interdisciplinary curriculum focusing on the needs of engineers and professionals who will deal with the technological aspects of the emerging smart and connected communities.

The recent rapid advancement of sensing, communication, computing and AI technologies has inspired the concept of smart communities, in which technology plays a key role and defines interaction of the people and cyber-physical systems. While individual fields of engineering and science cover the basics of the technologies that are used in smart communities, a collective understanding of how technology-infused smart communities operate, in particular from the technology perspective, is not offered in any of our current graduate programs.

In fact, the technical aspects of design and integration of smart community technologies has spawned several new research directions that are becoming established interdisciplinary fields. These include research areas targeted by national programs such as the smart and connected communities and cyber-physical systems. This certificate program aims at preparing the graduate students to undertake advanced engineering or research efforts in these interdisciplinary areas.

The courses that are selected for the certificate are chosen such that the students will receive a broad exposure to all of the technologies that are utilized in smart communities, in addition to in-depth training on specific aspects of these technical fields through recommended electives. This curriculum is different from what is currently offered in other programs at UCF, in that it is inherently interdisciplinary and focuses on newly established fields such as cyber-physical systems, IoT, and smart grid, rather than the core traditional disciplines. A systems oriented view is one of the main traits of this program. It is expected that some of the courses offered through this certificate program are taught in collaboration with faculty from multiple departments.

Add complete catalog copy here! Must include description, curriculum, contact information, application requirements, and application deadlines. After you add/import courses, click on the View Curriculum Schema button below to add the catalog copy. Please note: this information is what will flow directly to the graduate catalog. Any attached documents to this proposal will not be used for catalog purposes.

Tip: You can Import a similar track or certificate to use as a templete instead of starting from scratch. Use the Import button at the top left corner of the form. **For instructions on adding the catalog copy please view the Graduate Program New: Importing a Template Program training video at: https://graduatecouncil.ucf.edu/curriculum-committee/.**

Follow these steps to propose courses to the new track or certificate curriculum:

Step 1

There are two options for adding courses: "Add Course" and "Import Course." For courses already in the catalog, click on "Import Course" and find the courses needed. For new classes going through a Curriculog Approval Process click on "Add Course"-- a box will open asking you for the Prefix, Course Number and Course Title.

Step 2

Click on "View Curriculum Schema." Click on the area/header of the program where you would like to add courses. When you click on "Add Courses" it will bring up the list of courses available from Step 1. Select the courses you wish to add. For removing courses click on the and proceed.

Prospective Curriculum*

Program Description

The Graduate Certificate in Technologies for Smart Communities provides students with an interdisciplinary curriculum focused on technologies that enable smart and connected communities of the future. The program prepares students for design and operation challenges of emerging smart and connected communities, in particular from technology perspective.

This graduate certificate is beneficial to individuals (professionals, engineers and computer scientists) who have an interest in deployment and operation of smart and connected communities, in particular the challenges that pertain to communications, sensing, and control technologies.

UCF Partnerships

The Technologies for Smart Communities certificate partners with several UCF master's programs. If students complete the certificate and are accepted into a partnering program, all certificate coursework can be used toward that master's degree. Here is a list of our partnering UCF master's programs:

Electrical Engineering MSEE

Computer Engineering MSCpE

Curriculum

The Graduate Certificate in Technologies for Smart Communities requires a total of 18 credit hours (6 courses). 12 credit hours are from four required courses given below. The remaining six credit hours can be selected from the list of elective courses. Electives outside of the provided list require approval from the ECE graduate coordinator.
Total Credit Hours Required: 18 Credit Hours Minimum beyond the Bachelor's Degree

Required Courses—12 Credit Hours

Students will complete four required courses:

EEE 5781 Cyber-Physical Technologies for Smart Communities
EEL 6718 Attacks and Defenses in Secure Cyber-Physical Systems
EEL 5291 Distributed Control and Optimization for Smart Grid
EEL 6257 Data Analytics in Power Systems

Elective Courses—6 Credit Hours

Students will complete their choice of two electives:

EEL 5297 Introduction to Smart Grid
PAD 5887 Energy Policy
EEL 5268 Communications and Networking for Smart Grid
EEL 6683 Cooperative Control of Networked Autonomous Systems
EEL 5669 Introduction to Robotics and Autonomous Vehicles
EEE 6712 Modeling and Analysis of Networked Cyber-Physical Systems
EEL 6590 Advanced Topics in Communications
EEL 6788 Advanced Topics in Computer Networks

Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

One official transcript (in a sealed envelope) from each college/university attended
Résumé or Curriculum Vitae

Application Deadlines

Technologies for Smart Communities Graduate Certificate	*Fall Priority	Fall	Spring	Summer
Domestic Applicants		Jul 1	Dec 1	Apr 1
International Applicants				

*Applicants who plan to enroll full time in a degree program and who wish to be considered for university fellowships or assistantships should apply by the Fall Priority date.

Contact Info

Graduate Program

Kalpathy Sundaram PhD

Professor

eecpe-grad@eecs.ucf.edu

Telephone: 407-823-5326

Telephone: 407-823-3020

HEC 439B

Graduate Admissions

Anthony Tufano

gradadmissions@ucf.edu

Telephone: 407-823-2766

Millican Hall 230

Online Application

Graduate Admissions

Mailing Address

UCF College of Graduate Studies

Millican Hall 230

PO Box 160112

Orlando, FL 32816-0112

Institution Codes

GRE: 5233

GMAT: RZT-HT-58

TOEFL: 5233

ETS PPI: 5233

Impact on Current Students

Will students be moved from an existing program, track, or certificate into this new track or certificate?* ○ Yes ◉ No

If yes, state the name of the program or track where students are currently enrolled and the current enrollment numbers.

Will students have the option to stay in their existing program, track, or certificate?* ◉ Yes ○ No

track) or certificate:

Future Students

Indicate likely career or student outcomes upon completion:	Technical management, engineering, or engineering management positions related to the design and operation of smart infrastructure, buildings, cities, and smart communities in general.

Provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc.	Students who are in existing engineering MSc programs as well as those specifically interested in the proposed certificate program, e.g., current engineers in industry. Currently there are many professionals and engineers in industry and government/public institutions (with various backgrounds) who are becoming exposed to technologies that enable smart and connected communities. This certificate program aims to provide them with the complementary education that will help them successfully deal with such technologies.

Year 1

Headcount: 20-40	**SCHs:**

Year 2

Headcount:	**SCHs:**

Year 3

Headcount:	**SCHs:**

Please complete the following section on financial support:

(Specify all forms of support – assistantships, fellowships, and tuition remission.)

Year 1

Number of assistantship students:	**Source of funds:**
Number of fellowship students (specify fellowship):	
Number of tuition remissions:	**Source of funds:**

Year 2

Number of	

assistantship students:	**Source of funds:**
Number of fellowship students (specify fellowship):	
Number of tuition remissions:	**Source of funds:**

Year 3

Number of assistantship students:	**Source of funds:**
Number of fellowship students (specify fellowship):	
Number of tuition remissions:	**Source of funds:**

Attachments

Please attach the required files by navigating to the Proposal Toolbox and clicking in the top right corner of the form.

Faculty List*	☑ Attached
Support from involved units that no duplication exists*	☐ Attached ☑ Not Applicable
Library Assessment of Resources*	☑ Attached

Administration Use Only

Program Type	
Degree Type	
Status*	◉ Active-Visible ○ Inactive-Hidden
Catalog Ownership:	

Certificate: Connectivity, Sensing and Control for Smart Communities

The recent rapid advancement of sensing, communication, computing and AI technologies has inspired the concept of smart communities, in which technology plays a key role and defines interaction of people and cyber-physical systems. While individual fields of engineering and science cover the basics of the technologies that are used in smart communities, a collective understanding of how technology-infused smart communities operate, in particular from the technology perspective, is not offered in any of our current graduate programs.

In fact, the technical aspects of design and integration of smart community technologies has spawned several new research directions that are becoming established interdisciplinary fields. These include research areas targeted by national programs such as the smart and connected communities and cyber-physical systems. This certificate program aims at preparing the graduate students to undertake advanced engineering or research efforts in these interdisciplinary areas.

The courses that are selected for the certificate are chosen such that the students will receive a broad exposure to all of the technologies that are utilized in smart communities, in addition to in-depth training on specific aspects of these technical fields through recommended electives. This curriculum is different from what is currently offered in other programs at UCF, in that it is inherently interdisciplinary and focuses on newly established fields such as cyber-physical systems, IoT, and smart grid, rather than the core traditional disciplines. A systems oriented view is one of the main traits of this program. It is expected that some of the courses offered through this certificate program are taught jointly by faculty from multiple departments.

X:mandatory, E: elective

Course number	Course title and description	
EEL5061	**Cyber-Physical Technologies for Smart Communities** (Technologies for Smart Community) Introducing technologies that enable smart and connected communities, including sensing, computing, communication and new device technologies related to smart grid, smart infrastructure, and intelligent transportation, as well as IoT and sensor networks (Yaser/Walter/Aleks/ + a CEE faculty)	**X**
EEE6297	**Attacks and Defenses in Secure Cyber-Physical Systems** **Security issues in CPS**, (Junjian)	**X**
EEL5291	**Distributed Control and Optimization** (Qu)	**X**
EEL 6257	**Data Analytics in Power Systems** (Qun)	**X**
EEL5294	**Introduction to Smart Grid** Renewable Energy Integration/Microgrid, covering issues in integration of renewable sources, technologies and microgird (Wei)	E
EEL6683	**Cooperative Control of Networked Autonomous Systems** (Qu)	E
PAD5XXX permanent number pending	**Energy Policy** This course will address the interaction of policy, economics, politics, and institutions on energy related issues. (Kelly)	E
EEE6712	**Modeling and Analysis of Cyber Physical Systems** Communication/sensing for ITS, smart grid, telemedicine, and health system, sensor networks, modeling of CPS, hybrid systems intro. (Yaser)	E
EEL 5268	**Communication and Networking for the Smart Grid** (Vosoughi)	E
EEL 6590	**Advanced Topics in Communications**	E
EEL 6788	**Advanced Topics in Computer Networks**	E
EEL 6xxx permanent number pending	**Stochastic Control and Dynamic Programming** (chinwendu)	E
EEL 5669	**Introduction to Robotics and Autonomous Vehicles**	E

College of Graduate Studies

Graduate Program Recommendation Form - ADDITIONS ONLY

This form is to be used to ADD degree programs, tracks, or certificate programs. If there are tracks being added to the program, one form may be used for both the program and the track(s).

Please refer to the Graduate Council Curriculum Meeting Schedule for submission deadlines.

Checklist of items to be attached with completed form:

☐ Complete and current Graduate Catalog copy (www.graduatecatalog.ucf.edu), including description, curriculum, contact information, application requirements, and application deadlines.

☐ A list of faculty who will participate in the program, track or certificate and their credentials.

☐ If applicable, a written agreement from all involved units that they are in support of, will provide courses to, or will participate in the program, track, or certificate.

☐ Course Action Request forms, as needed.

☐ Library assessment of resources.

College/Unit(s) Submitting Proposal: College of Engineering and Computer Science (CECS) / Dept. of ECE

Proposed Effective Term/Year: Fall 2019

Unit(s) Housing Program: Department of Electrical and Computer Engineering

Name of program, track and/or certificate: Connectivity, Sensing and Control for Smart Communities Certificate

Please check all that apply. This action affects a: ☐ Program ☐ Track ☒ Certificate

DELIVERY: Program will be delivered: ☐ Face to Face ☐ UCF Online ☒ Mixed Delivery

Will the program be a **market tuition rate** program? ☐ Yes ☒ No

Will the program be a **cost recovery** program? ☐ Yes ☒ No

Brief description of program and rationale for the addition: **Do not add complete catalog copy here.**

The recent rapid advancement of sensing, communication, computing and AI technologies has inspired the concept of smart communities, in which technology plays a key role and defines interaction of the people and cyber-physical systems. While individual fields of engineering and science cover the basics of the technologies that are used in smart communities, a collective understanding of how technology-infused smart communities operate, in particular from the technology perspective, is not offered in any of our current graduate programs.

In fact, the technical aspects of design and integration of smart community technologies has spawned several new research directions that are becoming established interdisciplinary fields. These include research areas targeted by national programs such as the smart and connected communities and cyber-physical systems. This certificate program aims at preparing the graduate students to undertake advanced engineering or research efforts in these interdisciplinary areas.

The courses that are selected for the certificate are chosen such that the students will receive a broad exposure to all of the technologies that are utilized in smart communities, in addition to in-depth training on specific aspects of these technical fields through recommended electives. This curriculum is different from what is currently offered in other programs at UCF, in that it is inherently interdisciplinary and focuses on newly established fields such as cyber-physical systems, IoT, and smart grid, rather than the core traditional disciplines. A systems oriented view is one of the main traits of this program. It is expected that some of the courses offered through this certificate program are taught jointly by faculty from multiple departments.

Impact on Current Students

Will students be moved from an existing program, track, or certificate into this new program, track, or certificate? ☒ Yes ☐ No

If yes, state the name of the program or track where students are currently enrolled and attach a list of students if possible:

Students in traditional engineering MSc programs, including EE and CpE MSc.

Will students have the option to stay in their existing program, track, or certificate? ☒ Yes ☐ No

If yes, how will current students be impacted by the addition of a program, track or certificate?

The certificate is complementary to existing engineering MSc programs

Future Students

Provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc. Also, complete the following table.

Students who are in existing engineering MSc programs as well as those specifically interested in the proposed certificate program, e.g., current engineers in industry.

	Year 1	Year 2	Year 3
Headcount			
SCHs			

Indicate likely career or student outcomes upon completion: (What will students do? What will their job titles be?)

Engineering, research or middle management positions.
Students completing this certificate will be able to undertake positions, either in engineering or management, that require broad knowledge of the technologies used in smart cities and smart communities.

Please complete the following table on financial support:
(Specify all forms of support – assistantships, fellowships, and tuition remission.)

	Number of assistantship students	Source of funds	Number of fellowship students (specify fellowship)	Number of tuition remissions	Source of funds
Year 1					
Year 2					
Year 3					

Signatures

Recommend Approval *(all approval levels must be signed)*

Graduate Faculty Program Coordinator:

Print: _____ **Signature:** _____ **Date:** _____

Department Chair / Director

Print: _____ **Signature:** _____ **Date:** _____

College Academic Standards

Print: _____ **Signature:** _____ **Date:** _____

College Dean

Print: _____ **Signature:** _____ **Date:** _____

Graduate Council

Print: _____ **Signature:** _____ **Date:** _____

Vice President for Research and Dean of the College of Graduate Studies:

Print: _____ **Signature:** _____ **Date:** _____

Approval

Provost and Executive Vice President:

Print: _____ **Signature:** _____ **Date:** _____

Distribution: After approval is received from the Provost, distribution will be to:

Department(s); College; Registrar; Associate Registrar; Institutional Knowledge Management; Academic Services; College of Graduate Studies

University of Central Florida
College of Engineering and Computer Science
Department of Electrical and Computer Engineering

EEL 5061:

"Cyber-Physical Technologies for Smart Communities"

Fall 20xx – 3 Credit Hours

Instructor

Dr. Yaser Fallah
HEC 355,
407-823-4182
Yaser.Fallah@ucf.edu

Prerequisites

Graduate standing in CECS. Instructor permission or one of the following: Signals and Systems, Communication networks, Power Systems.
Familiarity with Python or MATLAB (for course project).

Textbook

- The course is based on lecture notes and survey papers.

Course Description

Study of new technological advances in areas such as sensing, computing, device and communications that enable smart and connected communities - The above technologies and their use in smart grid, smart infrastructure and intelligent transportation systems will be described and analyzed. An overview of system building approaches using the new technologies will be offered. The role of IoT, sensor networks, autonomous vehicles, renewable energy sources and cooperative control will be discussed.

Learning Outcomes

- Understand the new technologies and their role in enabling smart communities concept.
- Learn system building approaches from a cyber physical systems perspective
- Learn how technology impacts these complex systems and what tools may be needed for system design and modeling.
- Apply their knowledge of components and technologies to sample systems simulated in software tools

Grading

Seminars	40%
Quizzes	30%
Term Project Report	30%

Semester Grade

$92 \leq A \leq 100$
$80 \leq B < 90$ A- >90, B+ >85
$70 \leq C < 80$ B- >77
$60 \leq D < 70$
$F < 60$

Tentative Lecture Topics

The course focuses on the emerging technologies that enable the concept of smart and connected communities (SCC) and its many components such as smart grid, smart infrastructure and intelligent transportation systems. The emphasis of this course is on sensing, computing, communication and device technologies. Specific technologies such as IoT, sensor networks, and autonomous vehicles will be discussed in detail, with more emphasis on the sensing and communication aspects. The objective of the course is to educate students on new technologies that enable SCCs through the design of complex cyber-physical systems. The course will be offered in two segments. In the first part of the course, details of cyber technologies (sensing, networking and computing) and their evolution and future trajectory will be discussed. Specific devices and protocols will be examined. In the second part of the course, system building and analysis of SCCs that are built using these technologies will be taught. The aim is to educate students on both the technical advances in sensing, communication and device technologies, as well as on the basic systems science that allows embedding technology in smart systems. Example applications and systems designed and modeled in software tools will be presented and offered as course projects and learning modules.

1. Introduction (Week 1-2)
    a. Smart and Connected Communities
    b. Energy, Transportation, and Infrastructure, how they interact
    c. Cyber technology advances
2. Device Technologies (Week 3-4)
    a. New devices enabling new architectures in smart infrastructure, smart grid, renewable energy, solid state components
    b. New transportation modes and components, autonomous and electric vehicles
    c. Building technologies
3. Sensing Technologies (Week 5-8)
    a. Sensor Types (simple to complex sensors), Cameras, radar, lidar
    b. Internet of Things
    c. Global Positioning Systems
    d. Sensors for Autonomous Vehicles
    e. Situational Awareness, Cooperative Perception, Systems perspective
4. Communications Technologies (Week 9-14)
    a. Wired and Wireless Communication for Smart Grid, EMCS
    b. Wireless Communication in intelligent transportation systems
    c. V2V, V2I and V2X communications for Connected and Autonomous Vehicles (5G, LTE)
    d. Sensor Networks (protocols, device and network types), network management
    e. Communications as a component of the system vs networked systems
5. Computing Technologies (Week 14-16)
    a. Embedded computing, microcontrollers and CPUs
    b. Middleware architectures and new industrial tools
    c. Cloud computing for smart systems
    d. Software architectures, networked systems
    e. System level design and analysis

Course format:
Lectures every week, plus seminars presentations by students. Software based simulation and training will be utilized from week 8 to 16.

Class Policy

- ✓ General: Attendance at lecture is expected. If you miss a class, you are responsible for all assignments and material covered. You are required to participate in all class discussions. You will be required to answer questions or discuss your solutions in class. You must maintain good class notes and should review all past materials covered before attending a class.

- ✓ Homework Assignments: There will be 2-3 Homework assignments during the semester. Typically problems will be assigned in class. These exercises are to help you determine your level of mastery of knowledge presented in class.

- ✓ Term Paper: The term paper will be a report on a project that each student is expected to complete during the semester. The grading will be based on the thoroughness of the work in several areas: search of research topics, understanding the technical papers, and exploring new solutions.

- ✓ Seminars: Students are expected to present three 20-30 minute seminars in class. The aim is to evaluate their level of mastery of the research methods thought in class. Evaluation will not be based on presentation skills. The first seminar is expected to be on a general topic and include literature survey. The second and third seminars will focus on the term project, covering design methodologies, and evaluation and testing.

- ✓ Help in Learning: If you attended the lectures and did not understand any material, see the instructor promptly – before the next lecture. If you did not attend the class, first obtain the notes from your classmates, review the material, and then promptly see your instructor.

- ✓ Plagiarism: Plagiarism will be severely penalized according to UCF rules and may result in an F grade for the course or receive no credit for the specific test or project. Students are expected to exhibit the same level of professionalism and integrity that will distinguish them in their future careers. Both the person who reproduced in whole or in any part from the work of others and the person who allowed the work to be copied will be penalized. Consequences and procedures for dealing with cases of academic dishonesty are outlined in the UCF Student Code of Rights and Responsibilities.

- ✓ Inclusivity: The University of Central Florida community is committed to creating and fostering a positive learning and working environment based on open communication, mutual respect, and inclusion. If you are a person with a disability and anticipate needing any type of accommodation in order to participate in this class, please advise me and make appropriate arrangements with the Office of Disability Services.

Note:

EEL 6257 Data Analytics in Power Systems

1. Course Information

- Credit hours: 3
- Time: T, Th 1:30 PM – 2:45 PM
- Instructor: Dr. Qun Zhou
- Email: qun.zhou@ucf.edu
- Office hours: T, Th 2:45 PM – 4: 15 PM

2. Course Description

2.1. Course Prerequisites

- Students should have knowledge on power system operations and planning.
- Students should also demonstrate proficient programming skills in either Matlab, Python, or R.

2.2. Course Description

Power systems is one of the largest manmade complex physical systems. With the proliferation of sensors, an unprecedented amount of data is collected in power systems across the globe. This course introduces typical data analytical methods, including statistical modeling and machine learning algorithms, for power system operations and planning. The applications of data analytical methods include energy forecasting, state estimation, load disaggregation, fault location, topology identification, cyber security, and health monitoring. The course is designed to equip students with basic knowledge of data analytical methods and skills of applying these methods to improve power systems.

2.3. Course Objectives

The course are designed for students to achieve the following:

1) Become familiar with state-of-the-art data analytical methods
2) Understand power system problems that can be solved using these methods
3) Develop the ability to implement data analytical methods to solve real-world power system problems
4) Develop skills to communicate effectively through writing and presentation
5) Develop skills for in-depth power system research

2.4. Required Texts

None.

2.5. Supplemental texts and helpful resources

[1] A. J. Wood and B. F. Wollenberg, *Power generation, operation, and control*. John Wiley & Sons, 2012.
[2] G. Casella and R. L. Berger, *Statistical inference*. Duxbury Pacific Grove, CA, 2002.
[3] Udacity. *Udacity Data Sience and Machine Learning Courses* [Online]. Available: https://www.udacity.com
[4] Harvard. (2015). *Harvard Course on Data Science* [Online]. Available: http://cs109.org

2.6. Course Expectations

Students are expected to spend time and efforts after class to self-learn state-of-the-art data analytical methods and toolkits. Students with little power background needs to put effort in studying power system basics. Students are expected to produce research results of high quality and at the best can be published in conferences and journals.

3. Topics

1) Overview of data science process
2) Review of typical statistical and machine learning methods
3) Energy forecasting
4) State estimation and bad data detection
5) Cyber security
6) Topology identification and fault location
7) Load disaggregation
8) Asset management and health monitoring (optional, if time permits)
9) Other topics (optional, if time permits)

4. Course Evaluation

4.1. Homework/Competition

Homework is organized as competitions. For each power system topics, the performance metrics are clear in terms of estimation or prediction accuracy. Therefore, I will assign homework as a competition and rank student performance among the whole class. The test results will only be revealed when all students submitted their prediction results. The

homework grade will be assigned based on performance, i.e., students who ranked No.1 will receive full marks (100 out 100), students who ranked No.2 will receive 2-point deduction (98 out of 100), and so on and so forth. The point deduction mechanism can be modified depending on the size of the class. In addition, you need to strictly follow the reporting format (follow IEEE double-column paper format) and vividly visualize your results (in numbers, tables, and figures). Additional points will be deducted if not reporting properly. Competition results will be discussed in class.

4.2. Project

This is a research-based graduate class. In the beginning of the class, each student gets to pick his/her own topic, and students are expected to conduct in-depth research on that topic throughout the semester, including literature review, algorithm design, implementation and case studies. Students are required to submit a midterm and a final written report.

4.3. Presentations

Students are required to give two 30-min presentations in the class, a topic presentation and a project presentation. The topic presentation serves as a summary of the literature review. It should cover background on the selected topics and a review of one selected method or algorithm that you think innovative and creative. The project presentation will be held at the end of the course, and it should cover details of your research journey (literature review, your methodology, implementation and case studies).

4.3.1 Topic Presentation

The topic presentation serves as a summary of the literature review. It should cover background on the selected topics and a review of state-of-the-art methods or algorithms that you think innovative and creative. Each presentation is expected to be 20 - 30 min.

Your topic presentation is expected to be a comprehensive literature review. It should cover the following:

- **Introduction:** What problem you are trying to solve?
- **State of the Art:** How are the other researching tackling the problem? Carefully read at least 10 to 15 research papers, and summarize them into categories with different features, pros and cons, etc.
- **Detailed review:** pick one or two papers that really attract your attention, discuss the methodology and results in detail.
- **Propose your own:** try to propose your own idea for the course project. This could be brief, and you are expected to give more details in your midterm project report.
- **References:** include all references in your slides.

5. Course Grading

5.1. Percent of Final Grade

- Homework/Competition: 25%
- Topic Presentation: 15%
- Project Presentation: 15%
- Midterm Project Report: 20%
- Final Project Report: 25%

5.2. Grading Scale

- A: 90-100
- A-: 87-90
- B+: 83-87
- B: 80-83
- B-: 77-80
- C+: 73-77
- C: 70-73
- D: 60-70
- F: 0-60

6. Policies

- Late homework will not be accepted.
- Competition and project report submission should follow IEEE journal format.
- Plagiarism is not allowed and will be heavily penalized based on UCF student policies.

EEL 6297: Attacks and Defenses in Secure Cyber-Physical Systems

Department of Electrical and Computer Engineering

College of Engineering and Computer Science, University of Central Florida

COURSE SYLLABUS

Instructor:	Dr. Junjian Qi	Term:	
Office:	R1 150E	Class Meeting Days:	
Phone:	(407) 823-1305	Class Meeting Hours:	
E-Mail:	Junjian.Qi@ucf.edu	Class Location:	
Website:	http://www.ece.ucf.edu/~jqi/	Lab Location:	N/A
Office Hours:			

I. University Course Catalog Description

Topics to include basics of cyber-physical systems (CPSs), security challenges and issues for CPSs, and defense approaches to enhance their security.

II. Course Overview

This is an advanced course to security of cyber-physical systems, designed to provide students with the knowledge of security challenges and issues for CPSs and defense approaches to enhance their security. Course content includes basics of cyber-physical systems, network security, key management in CPSs, lightweight crypto and security, security vulnerabilities and challenges in IoT, detecting data integrity attacks in smart grid, cyber attacks against smart grid wide-area control, cybersecurity of smart buildings, and cybersecurity for distributed energy resources and smart inverters.

III. Learning Outcomes

By the end of this course, **graduate** students will be able to:

- Describe basic concepts of the CPSs,
- Acquire knowledge of security issues and challenges of CPSs,
- Acquire knowledge of attacks and defenses in CPSs,
- Develop skills to communicate effectively through writing and presentation,
- Develop the ability to apply knowledge of cyber-physical systems,
- Describe in a report, and build a math model based method to enhance the security of CPSs.

IV. Course Prerequisites

Course Prerequisites: EEL4294 Introduction to Smart Grid or equivalent or consent of instructor.

V. Course Credits

3 credit hours

VI. Required Texts and Materials

[1] H. Song, G. A. Fink, and S. Jeschke, *Security and Privacy in Cyber-Physical Systems: Foundations, Principles, and Applications*, Wiley-IEEE Press, 2017.

VII. Supplementary (Optional) Texts and Materials

[2] Al-Sakib Khan Pathan, *Securing Cyber-Physical Systems*, CRC Press, 2015.

[3] Rajeev Alur, *Principles of Cyber-Physical Systems*, MIT press, 2015.

VIII. Topics

- Basics on cyber-physical systems (CPSs)
- Security issues in CPSs
- Approaches to secure CPSs
- Network security
- National security concerns from CPSs
- Legal considerations of CPSs and the Internet of Things (IoT)
- Key management in CPSs
- Lightweight crypto and security
- Security issues, vulnerabilities, and challenges in IoT
- Cyber-physical vulnerabilities of wireless sensor networks in smart cities
- Detecting data integrity attacks in smart grid
- Cyber attacks against smart grid wide-area control
- Cybersecurity of smart buildings
- Cybersecurity for distributed energy resources and smart inverters

IX. Course Evaluation

Project

At the beginning of the class, each student picks his/her own topic, and students are expected to conduct in-depth research on that topic throughout the semester, including literature review, algorithm design, implementation and case studies. Students are required to submit a midterm and a final written report.

Presentations

Students are required to give one topic presentation and one project presentation in the class. Each presentation will last for 20 minutes. The topic presentation serves as a summary of the literature review. It should cover background on the selected topics and a review of one selected method or algorithm that you think innovative and creative. The project presentation will be held at the end of the course, and it should cover details of your research journey (literature review, your methodology, implementation and case studies).

Percent of Final Grade

- Homework: 25%
- Topic Presentation: 15%
- Project Presentation: 15%
- Midterm Project Report: 20%
- Final Project Report: 25%

Grading Scale

- A: 90-100
- A-: 87-90
- B+: 83-87
- B: 80-83
- B-: 77-80
- C+: 73-77
- C: 70-73
- D: 60-70
- F: 0-60

X. Course Policies

Financial Aid Requirement: All instructors/faculty are required to document students' academic activity at the beginning of each course. In order to document that you began this course, please complete the following academic activity by the end of the first week of classes or as soon as possible after adding the course. Failure to do so may result in a delay in the disbursement of your financial aid.

Late homework will not be accepted.

Report format: Competition and project report submission should follow IEEE journal format.

Plagiarism: It is not allowed and will be heavily penalized based on UCF student policies.

Email: It is the student's responsibility to check email often. When emailing instructor, in the email subject line, type: EEL6XXX + additional, yet concise, useful/revealing information. Provide sufficient detail in the text message.

Attendance: You are highly encouraged to participate in discussion during the class. Although there is no attendance check, you are expected to show up every class. It is imperative that you come to class and take notes.

Disability Access: The University of Central Florida is committed to providing reasonable accommodations for all persons with disabilities. This syllabus is available in alternate formats upon request. Students who need accommodations must be registered with Student Disability Services, Ferrell Commons Room 185, phone (407) 823-2371, TTY/TDD only phone (407) 823-2116, before requesting accommodations from the professor.

Professionalism Policy: Per university policy and classroom etiquette; mobile phones, iPods, *etc*. must be silenced during all classroom and lab lectures. Those not heeding this rule will be asked to leave the classroom/lab immediately so as to not disrupt the learning environment. Please arrive on time for all class meetings. Students who habitually disturb the class by talking, arriving late, *etc*., and have been warned may suffer a reduction in their final class grade.

UNIVERSITY OF CENTRAL FLORIDA

SCHOOL OF PUBLIC ADMINISTRATION

PAD5XXX – Energy Policy

Professor: Dr. Kelly A. Stevens	**Semester:** TBD **Time:** TBD **Room:** TBD
Office: Orlando Campus Research 1 150F **Hours:** TBD	**Phone:** (407) 823-2243 **Fax:** (407) 823-2604
E-mail: Kelly.Stevens@ucf.edu	

Course Text(s):

The following is/are the required texts/readings for the course:

- Required Texts –
  1.) Fox-Penner, Peter. (2010). *Smart Power: Climate Change, the Smart Grid, and the Future of Electric Utilities.* Island Press: Washington.
  2.) Levi, Michael (2013). *The Power Surge: Energy, Opportunity, and the Battle for America's Future.* Oxford University Press: Oxford.
- Additional Required Readings – Will be posted to Webcourses.

Course Description

This course will address the history and future of energy technology trajectories, and the interaction of policy, economics, politics, and institutions on these developments. Particular emphasis will be on clean energy and policies in the US, but this course will also review transportation, environmental, and resource policies along with international agreements and fossil-based sources of energy. Much of this class will be discussion driven based on readings from the texts, journal articles, and government institutions such as the Energy Information Administration and the Department of Energy.

Course Objectives

At the completion of this course, students will be able to:

• **Discuss** the history and complex nature of energy policy and deregulation in the U.S.
• **Identify** different policy mechanisms and their role in influencing energy technology trajectories.
• **Describe** public policy formulation in the energy sector and how that process affects today's energy landscape.
• **Analyze** current events and trends in energy policy from an economic, technical, and political viewpoint and how these perspectives interact.

Public Administration Core Competencies

This course is designed to respond in part to the national Association of Schools of Public Affairs Administration (NASPAA) common curriculum components:

1. *Ability to lead and manage in public governance*
2. *Ability to participate and contribute to the policy process*
3. *Ability to analyze, synthesize, think critically, solve problems and make decisions*
4. *Ability to articulate and apply a public service perspective*
5. *Ability to communicate and interact productively with a diverse and changing workforce and citizenry*

Course Requirements

Grading in this course will be assessed based on the following requirements, with the percent towards the final grade indicated. Absent an emergency situation, written assignments will not be accepted after the due date.

1.) Financial Aid Attendance Requirement (1%): All faculty members are required to document students' academic activity at the beginning of each course. Completing your introduction assignment will meet this requirement and document that you began this course. This assignment must be completed by XXXXX. Failure to do so will cause a delay in the disbursement of your financial aid.

2.) Attendance and Participation (9%): Students are expected to attend class and actively participate. Each student can expect to be called upon randomly to discuss the assigned readings and to encourage their colleagues to participate in discussions of these readings, covering relevant points, and providing an analysis of the information covered. If you miss a class, it is your full responsibility to obtain missed notes and handouts from another student in the course.

3.) Policy Brief (15%): The policy brief should be four pages (double spaced), providing a brief overview of a provided issue and the pertinent concerns for each of the involved parties. Following that, the majority of the paper should analyze the issue using course materials.

4.) Group Policy Brief (student's choice) (25%): The requirements for the second policy brief are similar to the first, however for this assignment groups will choose the topic for the second policy brief. Additionally, each group will produce a poster to present to the class on their topic.

5.) Reading Reflections (20%): There will be **two** reading reflections of three pages (double spaced) each based off of one week's assigned readings. Weeks will be assigned to students during the first day of class.

6.) Research Paper (30%): The final research paper will be on a topic of the student's choice within energy policy. The final paper should be 10-15 pages (double spaced) and cite material from outside the course. This paper will analyze the topic from an economic, technical, and political standpoint.

Grades

100	93	=	**A**	4.0
92	90	=	**A-**	3.75
89	87	=	**B+**	3.25
86	83	=	**B**	3.0
82	80	=	**B-**	2.75
79	77	=	**C+**	2.25
76	73	=	**C**	2.0
72	70	=	**C-**	1.75
69	67	=	**D+**	1.25
66	63	=	**D**	1.0
62	60	=	**D-**	0.75
59	0	=	**F**	0.00

Academic Honesty

Many incidents of plagiarism result from students' lack of understanding about what constitutes plagiarism. However, you are expected to familiarize yourself with UCF's policy on plagiarism. All work you submit must be your own scholarly and creative efforts. UCF's Golden Rule defines plagiarism as follows: "whereby another's work is used or appropriated without any indication of the source, thereby attempting to convey the impression that such work is the student's own." Students will be held to the terms of academic honesty as dictated by UCF. Plagiarism, copying, and all other types of cheating will not be tolerated. All abuses will be reported to the University. Students found guilty of academic dishonesty may receive an "F" in the course, be asked to leave the University, or suffer other consequences. Students should refer to the Golden Rule http://goldenrule.sdes.ucf.edu/ for further clarification of this issue. Turnitin.com is an online system, which determines if work has been copied from another source. Turnitin is integrated to Webcourses at UCF.

Accessibility Statement

The University of Central Florida is committed to providing reasonable accommodations for all persons with disabilities. This syllabus is available in alternate formats upon request. Students with disabilities who need accommodations in this course must contact the professor at the beginning of the semester to discuss needed accommodations. No accommodations will be provided until the student has met with the professor to request accommodations. Students who need accommodations must be registered with Student Accessibility Services, Ferrell Commons, 7F, Room 185, phone (407) 823-2371, TTY/TDD only phone (407) 823-2116, before requesting accommodations from the professor.

Writing/APA Style Assistance

Successful undergraduate work requires *reasonable proficiency in writing skills* (grammar, spelling, syntax, use of paragraphs and punctuation), as well as *proper documentation* of sources and citation of references (APA recent edition). Poor writing and use of APA will result in a lower grade on assignment. There are many references available for students on

the School of Public Administration's website at: https://www.cohpa.ucf.edu/publicadmin/student-resources/.

Classroom Decorum and Respect

Learning and the exchange of ideas are an integral part of our face to face classes. When we come together, my expectation is that everyone will be treated with mutual respect and civility, thereby creating an optimum learning environment. Every student is to be respected, regardless of their culture, values, or beliefs. During class sessions, differences of opinion are welcome if presented in a mutually respectful manner. Students should feel free to express their opinions and to refer to relevant personal situations without fear of disapproval or disrespect; however, the classroom is not the place where students should indulge in personal venting or support seeking. While I do encourage the exchange of ideas in class, I would ask that you please refrain from side conversations as they distract from the class.

Cell Phones, iPads and Computers

Please silence or turn off your cell phones and iPads during class, and please refrain from texting, checking your mail, checking social media, or surfing the Internet on your phone or iPad during class. This distracts from your participation. I will give you several breaks during class to do such things. If you must answer your phone, check your voicemail, or return a phone call, please quietly go out in the hall and return to class when you are finished. I do not need to know why you are leaving. I do not mind if you audiotape class meetings, but please let me know in advance.

Laptops and iPads are a convenient tool for students to take class notes, but please don't allow it to become a distraction. I ask that you only use it to take notes and not use it to check your e-mail, Facebook, or randomly surf the Internet. If I feel that students are abusing this policy, I may ask you to put your laptop away or ban laptops going forward.

Religious Observances or Military-Related Responsibilities

If you experience a scheduling conflict or need accommodation for religious observance or military-related responsibilities, please speak with the instructor.

Notice of Copyright

This course may contain copyright protected materials such as audio or video clips, images, text materials, etc. These items are being used with regard to the Fair Use doctrine in order to enhance the learning environment. Please do not copy, duplicate, download or distribute these items. The use of these materials is strictly reserved for this classroom environment and your use only. All copyright materials are credited to the copyright holder.

UCF Creed

Integrity, scholarship, community, creativity, and excellence are the core values that guide our conduct, performance, and decisions.

Integrity	I will practice and defend academic and personal honesty.
Scholarship	I will cherish and honor learning as a fundamental purpose of my membership in the UCF community.
Community	I will promote an open and supportive campus environment by respecting the rights and contributions of every individual.
Creativity	I will use my talents to enrich the human experience.
Excellence	I will strive toward the highest standards of performance in any endeavor I undertake.

UCF School of Public Administration Values

The UCF School of Public Administration is dedicated to advancing public service values and civic leadership in all programmatic areas. For our faculty, staff, and students, public service values are demonstrated by adhering to ethical principles of behavior and by acting in a professional manner

Ethical Principles

We advocate the following ethical principles of conduct as the foundation of public service:

- **Integrity** – to serve in a honest, transparent manner while honoring promises;
- **Benevolence** – to promote the public good, avoid doing harm, and respect the worth of each individual;
- **Fairness –** to act in way that is just and equitable to all, while avoiding undue burden on the most vulnerable in our society; and
- **Social Justice** – to identify and address the unfair burdens experienced by groups of individuals through intentional and unintentional policies, laws, and societal projects and practices.

Professional Principles

We advocate the following professional principles to advance public service as a profession:

- **Commitment** – to pursue a passion for the public interest with accountability and transparency;
- **Competence** – to utilize the most current knowledge, skills, and abilities to serve the public interest with efficiency and objectivity;
- **Scholarship** – to cherish and honor learning that enriches the human experience;
- **Stewardship** – to accept responsibility for decisions and actions regarding the protection of public resources;
- **Diversity and Inclusiveness –** to respect and value all perspectives and experiences, creating an environment that is open to all; and
- **Leadership –** to inspire others to advance the public interest while actively promoting democratic participation and collaboration**.**

Course Schedule

Include all meeting class times, reading assignments from the text (*italicized*), assignment due dates, and exams. Readings should be done in preparation for class on the day they are listed.

Week/Date	Topics Covered & Readings	Assignment Due
Week 1: DATE	Syllabus, Introduction, Reflection Readings and Groups Assignments *Syllabus*	Financial Aid Requirement Assignment
Week 2: DATE	Brief history of energy policy *Reading*	
Week 3: DATE	Energy primer *Reading*	
Week 4: DATE	Energy markets, supply & demand, deregulation/restructuring *Reading*	
Week 5: DATE	Policies and strategies affecting energy use *Reading*	
Week 6: DATE	Technology-based policies *Reading*	1st policy brief
Week 7: DATE	Emissions-based policies *Reading*	
Week 8: DATE	Transportation policies *Reading*	
Week 9: DATE	Group Project Poster Presentations	Group policy brief
Week 10: DATE	Sustainability policies *Reading*	
Week 11: DATE	Resilient energy systems *Reading*	
Week 12: DATE	Climate policies & politics *Reading*	

Week/Date	Topics Covered & Readings	Assignment Due
Week 13: DATE	States, cities, and local areas in energy policy; role of private companies and investments *Reading*	
Week 14: DATE	International comparisons and agreements; developing countries *Reading*	
Week 15: DATE	Future trends and projections *Reading*	
Research Paper Due: DATE		

Disclaimer Statement:

Please note this is a tentative syllabus, and the instructor reserves the right to make any changes that may be necessary to meet the objectives of the course.

Last updated: 10/4/2018

Memo

To: Dr. Yaser Pourmohammadi Fallah, Department of Electrical & Computer Engineering
Dr. Zhihua Qu, Department Chair, Electrical & Computer Engineering
Dr. Michael Georgiopoulos, Dean, College of Engineering & Computer Science
Mr. Barry Baker, Director of Libraries
Ms. Selma Jaskowski, Assoc. Director, Technology Services & Resource Management
Ms. Ying Zhang, Dept. Head, Acquisitions & Collections
Dr. Liz Klonoff, Dean, College of Graduate Studies
Dr. John Weishampel, Senior Associate Dean, College of Graduate Studies

From: Buenaventura (Ven) Basco, Associate Librarian, Research and Information Services

Subject: Library Assessment for the proposed Connectivity, Sensing and Control for Smart Communities Graduate Certificate in the Department of Electrical and Computer Engineering.

Date: March 27, 2019

This memorandum is submitted for review and approval. As requested by Dr. Yaser Pourmohammadi Fallah of the Department of Electrical and Computer Engineering, an analysis was conducted to evaluate the University of Central Florida (UCF) Libraries' resources to support the new Graduate Certificate, Connectivity, Sensing and Control for Smart Communities in the Department of Electrical & Computer Engineering in the College of Engineering and Computer Science.

Analysis

This analysis provides resource comparisons with peer institutions to evaluate current holdings for databases, journals, and books. To complete the analysis, the expertise and assistance of Ying Zhang and Sara Duff was solicited, which significantly added to the overall evaluation.

In consultation with Dr. Fallah for the proposed Connectivity, Sensing and Control for Smart Communities Graduate Certificate, the following institutions were selected for comparison:

- Arizona State University - Sensor, Signal & Information Processing Certificate
- Georgia Tech – Graduate Certificate in Urban Analytics
- Stanford University – Internet of Things Graduate Certificate
- University of Florida – Microsystem Technology Certificate

Summary and Projected Costs for New Library Resources:

Each of these institutions offers almost similar program to the proposed Connectivity, Sensing and Control for Smart Communities Graduate Certificate but none that is exactly the same. In comparing the library collections with the selected schools, UCF Libraries has sufficient resources to start the proposed certificate.

Should the program expand in scope or decide to offer a track in the future, essential resources as well as databases and books, may become critical, and therefore additional funds will be requested at that point. In the unfortunate event library budget shortfalls occur, some existing resource subscriptions may be cut or scaled back.

Databases

Database Name	UCF	UF	Arizona State	Stanford	Georgia Tech
IEEE Xplore	X	X	X	X	X
Compendex (Ei Village)	X	X	X	X	X
Web of Science	X	X	X	X	X
Science Direct	X	X	X	X	X
Inspec	X	X	X	X	X
ABI Inform	X	X	X	X	X
Business Source Premier	X	X	NO	X	X
Urban Studies Abstracts	X	NO	NO	X	NO
Avery Index to Architectural Periodicals	X	X	X	X	X
ACM Digital Library	X	X	X	X	X

Databases: The UCF Libraries compares favorably well with the chosen institutions. We have the databases needed to support proposed Connectivity, Sensing and Control for Smart Communities Graduate Certificate. However, in the event of any new key database becomes critical for the program in the future, additional recurring funding will need to be provided to the Libraries to add these resources.

Key Journals

Key Journals in Connectivity, Sensing and Control for Smart Communities	UCF	UF	Arizona State	Stanford	Georgia Tech
IET Wireless Sensor Systems	X	X	X	X	X
International Journal of Distributed Sensor Networks	X	X	X	X	X
IEEE Transactions on Mobile Computing	X	X	X	X	X
IEEE Transactions on Automatic Control	X	X	X	X	X
IEEE Transactions on Control of Network Systems	X	X	X	X	X
International Journal of Communication Systems	X	X	X	X	X
IEEE Control Systems Magazine	X	X	X	X	X
IEEE Transactions on Control Systems Technology	X	X	X	X	X
IET Control Theory and Applications	X	X	X	X	X
Energy and Buildings	X	X	X	X	X
Sustainable Cities and Society	X	X	X	X	X
IEEE Transactions on Smart Grid		X	X	X	X
Environmental Innovation and Societal Transitions	X	X	X	X	X
Landscape and Urban Planning	X	X	X	X	X
Computers, Environment and Urban Systems	X	X	X	X	X

ACM Transactions on Intelligent Systems and Technology (TIST)	X	X	X	X	X

Journals: By comparing the title by title list, UCF Libraries journal list compares favorably with the chosen institutions. However, in the event of program expansion or any new key journal becomes critical for the program in the future, additional recurring funding will need to be provided to the Libraries to add these resources.

Books – Combined Print and E-Books *(by the Subject headings, keywords provided or LC ranges)*

Subject Heading	**UCF**	**UF**	**Arizona State**	**Stanford**	**Georgia Tech**
Smart Cities	6	2	17	16	5
Sustainable Development	4514	4717	6004	7495	3365
Cooperating Object (Computer Systems)	11	17	53	73	26
Embedded Computer Systems	533	550	678	897	597
Embedded Internet Devices	29	40	54	58	36
Cyber Intelligence (Computer security)	84	76	72	118	54
Power Electronics, Electrical Machines and Networks	379	22	82	58	281
Automatic Control	3630	1964	1598	1886	1615
Big Data/Analytics	133	4	21	14	42
Systems and Data Security	1591	150	1357	235	1496
TOTAL	**10937**	**7452**	**9945**	**10850**	**7517**

Books: **Due to the interdisciplinary recent nature of the proposed program, the analysis of the book collection has used broad subject terms related to the program. In these broad subject areas, UCF Libraries compares favorably with all schools when compared. However, as new publications become available, additional funds need to be dedicated to the purchase of books and eBooks for this proposed certificate program.**

APPENDIX B

Please include the signature of the Equal Opportunity Officer and the Library Director.

Signature of Equal Opportunity Officer	**Date**
	March 27, 2019
Signature of Library Director	**Date**

This appendix was created to facilitate the collection of signatures in support of the proposal. Signatures in this section illustrate that the Equal Opportunity Officer has reviewed section II.E of the proposal and the Library Director has reviewed sections X.A and X.B.

College of Optics and Photonics - Graduate Program Addition-New - Applied Photonics Graduate Certificate

2020-2021 Graduate New Certificate or Track

General Catalog Information

Read before you begin

TURN ON help text before starting this proposal by clicking in the top right corner of the heading.
FILL IN all fields required marked with an * after importing data. You will not be able to launch the proposal without completing required fields.

LAUNCH proposal by clicking in the top left corner. DO NOT make proposed changes before launching proposal. Changes will only be tracked after proposal is launched.

Select *Program* below.

Program Type* ◉ Program ○ Shared Core

This form is to be used to ADD graduate tracks or certificate programs. If there are multiple tracks being added to a program, one form must be submitted to revise the program and additional forms must be submitted for each of the track additions.

Please refer to the Graduate Council Curriculum Meeting Schedule for submission deadlines.

Proposal Type:* Graduate Program Addition-New

College:* College of Optics and Photonics

Unit / Department / College:* College of Optics and Photonics

Primary Unit Housing Program:* College of Optics and Photonics

Type of Action:* ☐ Track ☑ Certificate

Name of new track or certificate:* Applied Photonics Graduate Certificate

Proposed Effective Term and Year:* Fall 2020-21

Delivery:* ☐ Face to Face
☑ UCF Online (all courses online-approved with UCF Online)
☐ Mixed Delivery

If you will be submitting other forms for tracks or course actions, please list them here: No

New Equipment Fee?* ○ Yes ◉ No

If yes, also complete the 2020-2021 Graduate Equipment Fee form.

Will the program be a market tuition rate program?* ○ Yes ◉ No

Will the program be a cost recovery program?* ○ Yes ◉ No

For the Informational Description Chart box below, please copy and paste this example chart and add your relevant program information:

College: Link to College website	**Degree: CRT**
Department: Link to department website	**Option: N/A**
Program Websites: Link to program website	

Informational Description Chart:*

College: https://www.creol.ucf.edu/	Degree: CRT
Department: https://www.creol.ucf.edu/academics/	Option: N/A
Program Websites: https://www.creol.ucf.edu/academics/graduate/	

Rationale:* The Applied Photonics Graduate Certificate is designed to provide working professionals with knowledge and training in optical imaging systems to enhance their career opportunities and meet their current responsibilities. The target participants are scientists and engineers in the aerospace, defense, photonic systems, and fiber optics communication industries, and in related government research laboratories.

Prospective Curriculum*

Program Description

The Applied Photonics Graduate Certificate is designed to provide working professionals with knowledge and training in optical imaging systems to enhance their career opportunities and meet their current responsibilities.

The certificate program compliments their technical backgrounds in science and engineering with the basic principles and applications of photonics engineering in fiber communication systems, lasers, medicine, and aerospace and defense photonics.

Please note: **Project Engineering Graduate Certificate may be completed fully online**, although not all elective options or program prerequisites may be offered online. Newly admitted students choosing to complete this program exclusively via UCF online classes may enroll with a reduction in campus-based fees.

International students (F or J visa) are required to enroll in a full-time course load of 9 credit hours during the fall and spring semesters. Only 3 of the 9 credit hours may be taken in a completely online format. For a detailed listing of enrollment requirements for international students, please visit **http://global.ucf.edu/**. If you have questions, please consult UCF Global at 407-823-2337.

UCF is not authorized to provide online courses or instruction to students in some states. Refer to **State Restrictions** for current information.

This program has potential ties to professional licensure or certification in the field. For more information on how this program may prepare you in that regard, please

visit **https://apq.ucf.edu/licensure-programs/**.

Curriculum

For the Applied Photonics certificate, students complete two required courses and two elective courses, for a total of 12 credit hours.

Total Credit Hours Required: 12 Credit Hours Minimum beyond the Bachelor's Degree

Required Courses: 6 Credit Hours

.

OSE 5414 Fundamentals of Optoelectronic Devices
OSE 6111 Optical Wave Propagation

Elective Courses: 6 Credit Hours

Choose two of the following five courses.

OSE 5525 Laser Engineering
OSE 6143 Fiber Optics Communication System
OSE 6421 Integrated Photonics
OSE 6474 Fundamentals Optical Fiber Communications
OSE 6536 Semiconductor Lasers

Application Requirements

Admission is open to those with a bachelor's degree in industrial engineering or a closely related discipline from an accredited institution. An application to the graduate certificate program and official transcripts must be submitted. Applicants must **apply online**. All requested materials must be submitted by the established deadline.

In addition, applicants to this certificate must provide:

Applicants applying to this program who have attended a college/university outside the United States must provide a course-by-course credential evaluation with GPA calculation. Credential evaluations are accepted from **World Education Services (WES)** or **Josef Silny and Associates, Inc** only.

Applications are accepted for the fall and spring terms only.

Application Deadlines

Applied Photonics Graduate Certificate	*Fall Priority	Fall	Spring	Summer
Domestic Applicants		Jul 1	Dec 1	
International Applicants				

*Applicants who plan to enroll full time in a degree program and who wish to be considered for university fellowships or assistantships should apply by the Fall Priority date.

Contact Info

Graduate Program

M. G. “Jim” Moharam, PhD

Professor and Interim Associate Dean

moharam@creol.ucf.edu

CREOL, Room 208

Graduate Admissions

Ashley Rivera Mercado

gradadmissions@ucf.edu

Telephone: 407-823-2766

Millican Hall 230

Online Application

Graduate Admissions

Mailing Address

UCF College of Graduate Studies

Millican Hall 230

PO Box 160112

Orlando, FL 32816-0112

Institution Codes

GRE: 5233

GMAT: RZT-HT-58

TOEFL: 5233

ETS PPI: 5233

Impact on Current Students

Will students be moved from an existing program, track, or certificate into this new track or certificate?* ○ Yes ◉ No

If yes, state the name of the program or track where students are currently enrolled and the current enrollment numbers.	No current certificate program exists.
Will students have the option to stay in their existing program, track, or certificate?*	○ Yes ◉ No

Future Students

Indicate likely career or student outcomes upon completion:	**Working scientists and engineers from industry and government labs.** **Improve career opportunities** **Meet employment responsibilities** **No licensure**
Provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc.	

Year 1

Headcount: 6

SCHs: 36

Year 2

Headcount: 12

SCHs: 72

Year 3

Headcount: 12

SCHs: 72

Please complete the following section on financial support:

(Specify all forms of support – assistantships, fellowships, and tuition remission.)

Year 1

Number of assistantship students:	none	**Source of funds:**	
Number of fellowship students (specify fellowship):			
Number of tuition remissions:		**Source of funds:**	

Year 2

Number of assistantship students:	none	**Source of funds:**	
Number of fellowship students (specify fellowship):			
Number of tuition remissions:		**Source of funds:**	

Year 3

Number of assistantship students:	none	**Source of funds:**	
Number of fellowship students (specify fellowship):			
Number of tuition remissions:		**Source of funds:**	

Attachments

Please attach the required files by navigating to the Proposal Toolbox and clicking in the top right corner of the form.

Faculty List*	☑ Attached
Support from involved units that no duplication exists*	☐ Attached ☑ Not Applicable
Library Assessment of Resources*	☑ Attached

Administration Use Only

Program Type	Certificate

Certificate

Degree Type Certificate

Status* (•) Active-Visible ( ) Inactive-Hidden

Catalog Ownership: College of Optics and Photonics

Graduate Faculty Status Approved:

Dr. Ayman Abouraddy	Professor of Optics & Photonics	CREOL A116	407-823-6809	raddy@creol.ucf.edu
Dr. Rodrigo Amezcua Correa	Assistant Professor of Optics & Photonics	CREOL A118	407-823-6853	r.amezcua@creol.ucf.edu
Dr. Luca Argenti	Assistant Professor of Physics, Optics & Photonics	PSB 304	407-259-9917	luca.argenti@ucf.edu
Dr. Miguel A. Bandres	Assistant Professor of Optics & Photonics	CREOL A222		bandres@creol.ucf.edu
Dr. Zenghu Chang	University Trustee Chair, Pegasus and Distinguished Professor of Physics, Optics & Photonics	PS464	407-823-4442	Zenghu.Chang@ucf.edu
Dr. Demetrios Christodoulides	Pegasus Professor of Optics & Photonics/Cobb Family Endowed Chair	CREOL 210	407-882-0074	demetri@creol.ucf.edu
Dr. Peter J. Delfyett	University Trustee Chair & Pegasus Professor of Optics & Photonics, ECE & Physics; Director, Townes Laser Institute	CREOL A231	407-823-6812	delfyett@creol.ucf.edu
Dr. Ivan Divliansky	Research Assistant Professor of Optics and Photonics	CREOL A121	407-823-6827	ibd1@creol.ucf.edu
Dr. Aristide Dogariu	Pegasus Professor of Optics & Photonics/FPCE	CREOL A111	407-823-6839	adogariu@creol.ucf.edu
Dr. Ronald Driggers	Professor of Optics & Photonics	CREOL A315	407-823-0323	Ron.Driggers@creol.ucf.ed
Dr. Sasan Fathpour	Associate Professor of Optics & Photonics	CREOL A216	407-823-6961	fathpour@creol.ucf.edu
Dr. Romain Gaume	Assistant Professor of Optics & Photonics	CREOL 172	407-823-5683	gaume@creol.ucf.edu
Dr. Leonid B. Glebov	Research Professor of Optics & Photonics	CREOL 285	407-823-6983	lbglebov@creol.ucf.edu
Dr. David J. Hagan	Interim Dean for Academic Programs & Pegasus Professor of Optics & Photonics, Physics	CREOL 209	407-823-6817	hagan@creol.ucf.edu
Dr. Kyu Young Han	Assistant Professor of Optics & Photonics	CREOL A334	407-823-6922	kyhan@creol.ucf.edu
Dr. Aravinda Kar	Professor of Optics & Photonics, MMAE, ECE and Physics	CREOL 284	407-823-6921	akar@creol.ucf.edu
Dr. Pieter G. Kik	Associate Professor of Optics & Photonics	CREOL A220	407-823-4622	kik@creol.ucf.edu
Dr. Stephen Kuebler	Associate Professor of Chemistry, Optics & Photonics	Phys Sciences 347	407-823-3720	Stephen.Kuebler@ucf.edu
Dr. Guifang Li	Professor of Optics & Photonics, Physics, ECE	CREOL A239	407-823-6811	li@creol.ucf.edu
Dr. Patrick L. LiKamWa	Professor of Optics & Photonics, ECE	CREOL A211	407-823-6816	patrick@creol.ucf.edu
Dr. M. G. "Jim" Moharam	Interim Associate Dean, and Professor of Optics & Photonics	CREOL A234	407-823-6833	moharam@creol.ucf.edu
Dr. Shuo "Sean" Pang	Assistant Professor of Optics & Photonics	CREOL A237	407-823-6869	pang@creol.ucf.edu
Dr. C. Kyle Renshaw	Assistant Professor of Optics & Photonics	CREOL A209	407-823-2807	krenshaw@creol.ucf.edu
Dr. Kathleen A. Richardson	Professor of Optics & Photonics	CREOL A110	407-823-6815	kcr@creol.ucf.edu
Dr. Martin C. Richardson	Pegasus Professor and University Trustee Chair, Northrop Grumman Prof of X-ray Photonics; Prof of Optics & Photonics	CREOL 126	407-823-6819	mcr@creol.ucf.edu
Dr. Bahaa E. A. Saleh	Professor of Optics & Photonics	CREOL	407-882-3326	besaleh@creol.ucf.edu
Dr. Winston V. Schoenfeld	Associate Dean, College of Graduate Studies, Professor of Optics & Photonics & Director, Florida Solar Energy Center (FSEC)	CREOL A215	(407) 823-6634	winston@creol.ucf.edu
Dr. Axel Schülzgen	Professor of Optics & Photonics	CREOL A115	407-823-1746	axel@creol.ucf.edu
Dr. M.J. Soileau	University Distinguished Professor of Optics & Photonics, ECE & Physics	CREOL A219	407-823-5539	MJ@ucf.edu
Dr. Konstantin L. Vodopyanov	21st Century Scholar Chair & Professor of Optics & Photonics, and Physics	CREOL A113	407-823-6818	vodopyanov@creol.ucf.ed
Dr. Shin-Tson Wu	Pegasus Professor of Optics & Photonics	CREOL 280	407-823-4763	swu@creol.ucf.edu
Dr. Xiaoming Yu	Assistant Professor of Optics & Photonics	CREOL A337	(407) 823-6872	yux@creol.ucf.edu

UNIVERSITY OF CENTRAL FLORIDA

University Libraries
P.O. Box 162666
Orlando, Florida 32816-2666

To: Dr. David Hagan, Interim Dean, CREOL
Ms. Alma Montelongo, Graduate Admissions Coordinator, CREOL
Dr. Devon Jensen, Associate Dean, College of Graduate Studies
Ms. Emily Stettner, Assistant Director, Graduate Curriculum, College of Graduate Studies
Mrs. Ying Zhang, Interim Associate Director for Collections & Technical Services
Ms. Sara Duff, Acquisitions Librarian
Mr. Frank Allen, Interim Director of Libraries

From: Sandy Avila, Science Librarian

Subject: Library evaluation of the proposal to add an Applied Optics Graduate Certificate, in CREOL- the College of Optics & Photonics

Date: June 9, 2020

As the Subject Librarian for CREOL- the College of Optics & Photonics, I have reviewed the proposed graduate certificate in Applied Optics. According to the description of the proposal and the proposed course list for this graduate certificate, all courses required and elective are currently taught and there is no major change in the curriculum focus. Therefore, there will be minimal impact on the existing support from the library collections and services. Based on the assessment, I waive a full library analysis of the proposal for the Applied Optics Graduate Certificate.

In the unfortunate event library budget shortfalls occur, some existing resource subscriptions may be cut or scaled back, which may reduce the support for CREOL. I will keep the program apprised if/when this were to occur. A full library analysis will be needed if these certificates were to change its focus substantively or to be expanded to a track or a program.

College of Optics and Photonics - Graduate Program Addition-New - Optical Imaging Systems Graduate Certificate

2020-2021 Graduate New Certificate or Track

General Catalog Information

Read before you begin

TURN ON help text before starting this proposal by clicking in the top right corner of the heading.
FILL IN all fields required marked with an * after importing data. You will not be able to launch the proposal without completing required fields.

LAUNCH proposal by clicking in the top left corner. DO NOT make proposed changes before launching proposal. Changes will only be tracked after proposal is launched.

Select *Program* below.

Program Type* ◉ Program ○ Shared Core

This form is to be used to ADD graduate tracks or certificate programs. If there are multiple tracks being added to a program, one form must be submitted to revise the program and additional forms must be submitted for each of the track additions.

Please refer to the Graduate Council Curriculum Meeting Schedule for submission deadlines.

Proposal Type:* Graduate Program Addition-New

College:* College of Optics and Photonics

Unit / Department / College:* College of Optics and Photonics

Primary Unit Housing Program:* College of Optics and Photonics

Type of Action:* ☐ Track ☑ Certificate

Name of new track or certificate:* Optical Imaging Systems Graduate Certificate

Proposed Effective Term and Year:* Fall 2020-21

Delivery:* ☐ Face to Face
☑ UCF Online (all courses online-approved with UCF Online)
☐ Mixed Delivery

If you will be submitting other forms for tracks or course actions, please list them here: no

New Equipment Fee?* ○ Yes ◉ No

If yes, also complete the 2020-2021 Graduate Equipment Fee form.

Will the program be a market tuition rate program?* ○ Yes ◉ No

Will the program be a cost recovery program?* ○ Yes ◉ No

For the Informational Description Chart box below, please copy and paste this example chart and add your relevant program information:

College: Link to College website	**Degree: CRT**
Department: Link to department website	**Option: N/A**
Program Websites: Link to program website	

Informational Description Chart:*

College: https://www.creol.ucf.edu/	Degree: CRT
Department: https://www.creol.ucf.edu/	Option: N/A
Program Websites: https://www.creol.ucf.edu/academics/graduate/	

Rationale:* The Optical Imaging Systems Graduate Certificate is designed to provide working professionals with knowledge and training in optical imaging systems to enhance their career opportunities and meet their current responsibilities. The target participants are scientists and engineers in the aerospace, defense, photonic systems, and fiber optics communication industries, and in related government research laboratories.

Prospective Curriculum*

Program Description

The Optical Imaging Systems Graduate Certificate is designed to provide working professionals with knowledge and training in optical imaging systems to enhance their career opportunities and meet their current responsibilities.

The certificate program compliments their technical backgrounds in science and engineering with the basic principles and applications of optical engineering in imaging, electro-optic systems, radiometry, and optical system design.

Please note: **Project Engineering Graduate Certificate may be completed fully online**, although not all elective options or program prerequisites may be offered online. Newly admitted students choosing to complete this program exclusively via UCF online classes may enroll with a reduction in campus-based fees.

International students (F or J visa) are required to enroll in a full-time course load of 9 credit hours during the fall and spring semesters. Only 3 of the 9 credit hours may be taken in a completely online format. For a detailed listing of enrollment requirements for international students, please visit **http://global.ucf.edu/**. If you have questions, please consult UCF Global at 407-823-2337.

UCF is not authorized to provide online courses or instruction to students in some states. Refer to **State Restrictions** for current information.

This program has potential ties to professional licensure or certification in the field. For more information on how this program may prepare you in that regard, please visit **https://apq.ucf.edu/licensure-programs/**.

Curriculum

For the Optical Imaging System certificate, students complete two required courses and two elective course, for a total of 12 credit hours.

Total Credit Hours Required: 12 Credit Hours Minimum beyond the Bachelor's Degree

Required Courses: 6 Credit Hours

OSE 5115 Interference and Diffraction
OSE 6211 Imaging and Optical Systems

Elective Courses: 6 Credit Hours

Choose two of the following four courses.

OSE 5203 Geometrical Optics

OSE 5525 Laser Engineering
OSE 6242 Infrared Systems
OSE 6265 Optical Systems Design

Application Requirements

Admission is open to those with a bachelor's degree in industrial engineering or a closely related discipline from an accredited institution. An application to the graduate certificate program and official transcripts must be submitted. Applicants must apply online. All requested materials must be submitted by the established deadline.

In addition, applicants to this certificate must provide:

Applicants applying to this program who have attended a college/university outside the United States must provide a course-by-course credential evaluation with GPA calculation. Credential evaluations are accepted from World Education Services (WES) or Josef Silny and Associates, Inc only.

Applications are accepted for the fall and spring terms only.

Application Deadlines

Optical Imaging Systems Graduate Certificate	
Domestic Applicants	
International Applicants	
***Applicants who plan to enroll full time in a degree program and who wish to be considered for university fellowships or assistantships should apply by the Fall Priority date.**	

Contact Info

Graduate Program

M. G, "Jim" Moharam, PhD

Professor and Interim Associate Dean

moharam@creolucf.edu

CREOL 208

Graduate Admissions

Ashley Rivera Mercado

gradadmissions@ucf.edu

Telephone: 407-823-2766

Millican Hall 230

Online Application

Graduate Admissions

Mailing Address

UCF College of Graduate Studies

Millican Hall 230

PO Box 160112

Orlando, FL 32816-0112

Institution Codes

GRE: 5233

GMAT: RZT-HT-58

TOEFL: 5233

ETS PPI: 5233

Impact on Current Students

Will students be moved from an existing program, track, or certificate into this new track or certificate?*	○ Yes ◉ No
If yes, state the name of the program or track where students are currently enrolled and the current enrollment numbers.	None. No current certificate program.
Will students have the option to stay in their existing program, track, or certificate?*	○ Yes ◉ No

Future Students

Indicate likely career or student outcomes	Senior Scientist/Engineer

upon completion:	

Provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc.	-Working scientists and engineers from industry and government labs. -Improve career opportunities -Meet employment responsibilities -No licensure

Year 1

Headcount:	6	**SCHs:**	36

Year 2

Headcount:	12	**SCHs:**	72

Year 3

Headcount:	12	**SCHs:**	72

Please complete the following section on financial support:

(Specify all forms of support – assistantships, fellowships, and tuition remission.)

Year 1

Number of assistantship students:	none	**Source of funds:**	
Number of fellowship students (specify fellowship):			
Number of tuition remissions:		**Source of funds:**	

Year 2

Number of assistantship students:	none	**Source of funds:**	
Number of fellowship students (specify fellowship):			
Number of tuition remissions:		**Source of funds:**	

Year 3

Number of assistantship students:	none	**Source of funds:**	
Number of fellowship students (specify fellowship):			
Number of tuition remissions:		**Source of funds:**	

Attachments

Please attach the required files by navigating to the Proposal Toolbox and clicking in the top right corner of the form.

Faculty List*	☑ Attached
Support from involved units that no duplication exists*	☐ Attached ☑ Not Applicable
Library Assessment of Resources*	☑ Attached

Administration Use Only

Program Type	Certificate
Degree Type	Certificate
Status*	◉ Active-Visible ○ Inactive-Hidden
Catalog Ownership:	College of Optics and Photonics

Graduate Faculty Status Approved:

Dr. Ayman Abouraddy	Professor of Optics & Photonics	CREOL A116	407-823-6809	raddy@creol.ucf.edu
Dr. Rodrigo Amezcua Correa	Assistant Professor of Optics & Photonics	CREOL A118	407-823-6853	r.amezcua@creol.ucf.edu
Dr. Luca Argenti	Assistant Professor of Physics, Optics & Photonics	PSB 304	407-259-9917	luca.argenti@ucf.edu
Dr. Miguel A. Bandres	Assistant Professor of Optics & Photonics	CREOL A222		bandres@creol.ucf.edu
Dr. Zenghu Chang	University Trustee Chair, Pegasus and Distinguished Professor of Physics, Optics & Photonics	PS464	407-823-4442	Zenghu.Chang@ucf.edu
Dr. Demetrios Christodoulides	Pegasus Professor of Optics & Photonics/Cobb Family Endowed Chair	CREOL 210	407-882-0074	demetri@creol.ucf.edu
Dr. Peter J. Delfyett	University Trustee Chair & Pegasus Professor of Optics & Photonics, ECE & Physics; Director, Townes Laser Institute	CREOL A231	407-823-6812	delfyett@creol.ucf.edu
Dr. Ivan Divliansky	Research Assistant Professor of Optics and Photonics	CREOL A121	407-823-6827	ibd1@creol.ucf.edu
Dr. Aristide Dogariu	Pegasus Professor of Optics & Photonics/FPCE	CREOL A111	407-823-6839	adogariu@creol.ucf.edu
Dr. Ronald Driggers	Professor of Optics & Photonics	CREOL A315	407-823-0323	Ron.Driggers@creol.ucf.edu
Dr. Sasan Fathpour	Associate Professor of Optics & Photonics	CREOL A216	407-823-6961	fathpour@creol.ucf.edu
Dr. Romain Gaume	Assistant Professor of Optics & Photonics	CREOL 172	407-823-5683	gaume@creol.ucf.edu
Dr. Leonid B. Glebov	Research Professor of Optics & Photonics	CREOL 285	407-823-6983	lbglebov@creol.ucf.edu
Dr. David J. Hagan	Interim Dean for Academic Programs & Pegasus Professor of Optics & Photonics, Physics	CREOL 209	407-823-6817	hagan@creol.ucf.edu
Dr. Kyu Young Han	Assistant Professor of Optics & Photonics	CREOL A334	407-823-6922	kyhan@creol.ucf.edu
Dr. Aravinda Kar	Professor of Optics & Photonics, MMAE, ECE and Physics	CREOL 284	407-823-6921	akar@creol.ucf.edu
Dr. Pieter G. Kik	Associate Professor of Optics & Photonics	CREOL A220	407-823-4622	kik@creol.ucf.edu
Dr. Stephen Kuebler	Associate Professor of Chemistry, Optics & Photonics	Phys Sciences 347	407-823-3720	Stephen.Kuebler@ucf.edu
Dr. Guifang Li	Professor of Optics & Photonics, Physics, ECE	CREOL A239	407-823-6811	li@creol.ucf.edu
Dr. Patrick L. LiKamWa	Professor of Optics & Photonics, ECE	CREOL A211	407-823-6816	patrick@creol.ucf.edu
Dr. M. G. "Jim" Moharam	Interim Associate Dean, and Professor of Optics & Photonics	CREOL A234	407-823-6833	moharam@creol.ucf.edu
Dr. Shuo "Sean" Pang	Assistant Professor of Optics & Photonics	CREOL A237	407-823-6869	pang@creol.ucf.edu
Dr. C. Kyle Renshaw	Assistant Professor of Optics & Photonics	CREOL A209	407-823-2807	krenshaw@creol.ucf.edu
Dr. Kathleen A. Richardson	Professor of Optics & Photonics	CREOL A110	407-823-6815	kcr@creol.ucf.edu
Dr. Martin C. Richardson	Pegasus Professor and University Trustee Chair, Northrop Grumman Prof of X-ray Photonics; Prof of Optics & Photonics	CREOL 126	407-823-6819	mcr@creol.ucf.edu
Dr. Bahaa E. A. Saleh	Professor of Optics & Photonics	CREOL	407-882-3326	besaleh@creol.ucf.edu
Dr. Winston V. Schoenfeld	Associate Dean, College of Graduate Studies, Professor of Optics & Photonics & Director, Florida Solar Energy Center (FSEC)	CREOL A215	(407) 823-6634	winston@creol.ucf.edu
Dr. Axel Schülzgen	Professor of Optics & Photonics	CREOL A115	407-823-1746	axel@creol.ucf.edu
Dr. M.J. Soileau	University Distinguished Professor of Optics & Photonics, ECE & Physics	CREOL A219	407-823-5539	MJ@ucf.edu
Dr. Konstantin L. Vodopyanov	21st Century Scholar Chair & Professor of Optics & Photonics, and Physics	CREOL A113	407-823-6818	vodopyanov@creol.ucf.edu
Dr. Shin-Tson Wu	Pegasus Professor of Optics & Photonics	CREOL 280	407-823-4763	swu@creol.ucf.edu
Dr. Xiaoming Yu	Assistant Professor of Optics & Photonics	CREOL A337	(407) 823-6872	yux@creol.ucf.edu

UNIVERSITY OF CENTRAL FLORIDA

University Libraries
P.O. Box 162666
Orlando, Florida 32816-2666

To: Dr. David Hagan, Interim Dean, CREOL
Ms. Alma Montelongo, Graduate Admissions Coordinator, CREOL
Dr. Devon Jensen, Associate Dean, College of Graduate Studies
Ms. Emily Stettner, Assistant Director, Graduate Curriculum, College of Graduate Studies
Mrs. Ying Zhang, Interim Associate Director for Collections & Technical Services
Ms. Sara Duff, Acquisitions Librarian
Mr. Frank Allen, Interim Director of Libraries

From: Sandy Avila, Science Librarian

Subject: Library evaluation of the proposal to add an Optical Imaging Systems Graduate Certificate, in CREOL- the College of Optics & Photonics

Date: June 9, 2020

As the Subject Librarian for CREOL- the College of Optics & Photonics, I have reviewed the proposed graduate certificate in Optical Imaging Systems. According to the description of the proposal and the proposed course list for this graduate certificate, all courses required and elective are currently taught and there is no major change in the curriculum focus. Therefore, there will be minimal impact on the existing support from the library collections and services. Based on the assessment, I waive a full library analysis of the proposal for the Optical Imaging Systems Graduate Certificate.

In the unfortunate event library budget shortfalls occur, some existing resource subscriptions may be cut or scaled back, which may reduce the support for CREOL. I will keep the program apprised if/when this were to occur. A full library analysis will be needed if these certificates were to change its focus substantively or to be expanded to a track or a program.

College of Sciences - Graduate Program Addition-New - Data Modeling Graduate Certificate ►

2020-2021 Graduate New Certificate or Track

General Catalog Information

Read before you begin

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Select *Program* below.

Program Type* (•) Program ( ) Shared Core

This form is to be used to ADD graduate tracks or certificate programs. If there are multiple tracks being added to a program, one form must be submitted to revise the program and additional forms must be submitted for each of the track additions.

Please refer to the Graduate Council Curriculum Meeting Schedule for submission deadlines.

Proposal Type:* Graduate Program Addition-New

College:* College of Sciences

Unit / Department / College:* Department of Mathematics

Primary Unit Housing Program:* Mathematics Graduate Program

Type of Action:* [ ] Track [x] Certificate

Name of new track or certificate:* Data Modeling Graduate Certificate ►

Proposed Effective Term and Year:* Fall 2020

Delivery:* ☐ Face to Face
☑ UCF Online (all courses online-approved with UCF Online)
☐ Mixed Delivery

If you will be submitting other forms for tracks or course actions, please list them here:

New Equipment Fee?* ○ Yes ◉ No

If yes, also complete the 2020-2021 Graduate Equipment Fee form.

Will the program be a market tuition rate program?* ○ Yes ◉ No

Will the program be a cost recovery program?* ○ Yes ◉ No

For the Informational Description Chart box below, please copy and paste this example chart and add your relevant program information:

College: Link to College website	**Degree: CRT**
Department: Link to department website	**Option: N/A**
Program Websites: Link to program website	

Informational Description Chart:*

College: Sciences	**Degree:** CRT
Department: Mathematics	
Program Websites: http://sciences.ucf.edu/math/graduate	

Rationale:*

The Mathematics Department has a sucessful graduate math certificate program to prepare students to teach college mathematics. The department intends to expand the certificate program by adding two more: this graduate certificate is on mathematical data modeling. One rationale is the high demand from the data science industry, and the other one is the expertise of faculty hired in last few years. The purpose of the certificate program is for students to gain working knowledge on math modeling and t master practical techniques for careers in data analyst, data archtict, and data engineering.

Prospective Curriculum*

Program Description

The Mathematical Science Graduate Certificate on Data Modeling is designed for students to gain knowledge of mathematical modeling and analytics techniques for data extraction, and to prepare their career on data analyst and data architect.

All required courses will be offered to accommodate distance learning by posting recorded lectures (Modality V) or Web-based instruction (Modality W), and offering scheduled online problem sessions and office hours. However, the elective option or program prerequisites may not be offered online. Newly admitted students choosing to complete this program exclusively via UCF online classes may enroll with a reduction in campus-based fees.

International students (F or J visa) are required to enroll in a full-time course load of 9 credit hours during the fall and spring semesters. Only 3 of the 9 credit hours may be taken in a completely online format. For a detailed listing of enrollment requirements for international students, please visit http://global.ucf.edu/. If you have questions, please consult UCF Global at 407-823-2337.

UCF is not authorized to provide online courses or instruction to students in some states. Refer to State Restrictions for current information.

Curriculum

The mathematical science graduate certificate on data modeling requires taking 4 graduate courses (12 credit hours) with letter grade B- or higher, including 9 credit hours of required courses and 3 credit hours of elective courses.

Total Credit Hours Required: 12 Credit Hours Minimum beyond the Bachelor's Degree

Required Courses: 9 Credit Hours

Students choose three of the following five core courses.

MAP 6195 Mathematical Foundations for Massive Data Modeling and Analysis
MAT 5712 Scientific Computing
MAP 5117 Mathematical Modeling
MAP 6168 Mathematical Modeling II

MAP 5336 Ordinary Differential Equations and Applications

Elective Courses: 3 Credit Hours

Students should take one additional core, or one graduate-level course on mathematical data modeling offered across the campus with the prior approval of the program director.

Application Requirements

Admission is open to those with a bachelor's degree from an accredited institution. An application to the graduate certificate program and official transcripts must be submitted. No GRE is required. Applicants must apply online. All requested materials must be submitted by the established deadline.

Application Deadlines

Data Modeling Graduate Certificate	*Fall Priority	Fall	Spring	Summer
Domestic Applicants		Jul 1	Dec 1	Apr 1
International Applicants				
*Applicants who plan to enroll full time in a degree program and who wish to be considered for university fellowships or assistantships should apply by the Fall Priority date.				

Contact Info

Graduate Program

Qiyu Sun

Professor

qiyu.sun@ucf.edu

Telephone: 407-823-4839

PO Box 161364

Graduate Admissions

Anthony Tufano

mathematical data modeling offered across the campus with the prior approval of the program director.

Application Requirements

Admission is open to those with a bachelor's degree from a regionally accredited institution. An application to the graduate certificate program and official transcripts must be submitted. No GRE is required. Applicants must apply online. All requested materials must be submitted by the established deadline.

Application Deadlines

Data Modeling Graduate Certificate	*Fall Priority	Fall	Spring	Summer
Domestic Applicants		Jul 1	Dec 1	Apr 1
International Applicants				

*Applicants who plan to enroll full time in a degree program and who wish to be considered for university fellowships or assistantships should apply by the Fall Priority date.

Contact Info

Graduate Program

Qiyu Sun

Professor

qiyu.sun@ucf.edu

Telephone: 407-823-4839

PO Box 161364

Graduate Admissions

Anthony Tufano

gradadmissions@ucf.edu

Telephone: 407-823-2766

Millican Hall 230

Online Application

Graduate Admissions

Mailing Address

UCF College of Graduate Studies

Millican Hall 230

PO Box 160112

Orlando, FL 32816-0112

Institution Codes

GRE: 5233

GMAT: RZT-HT-58

TOEFL: 5233

ETS PPI: 5233

Impact on Current Students

Will students be moved from an existing program, track, or certificate into this new track or certificate?*

○ Yes ◉ No

If yes, state the name of the program or track where students are currently enrolled

and the current enrollment numbers.	

Will students have the option to stay in their existing program, track, or certificate?*	(•) Yes ( ) No

Future Students

Indicate likely career or student outcomes upon completion:	Data analyst and data architect in industry and government.
Provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc.	This certificate is designed to attract students with undergraduate degrees in STEM with a strong mathematics preparation (e.g., major/minor in mathematics) who intend to have careers in mathematical modeling and data industry. No national and state license or certification depend upon this education.

Year 1

Headcount: 5-10	**SCHs:** 30-60

Year 2

Headcount: 5-10	**SCHs:** 30-60

Year 3

Headcount: 5-10	**SCHs:** 30-60

Please complete the following section on financial support:

(Specify all forms of support – assistantships, fellowships, and tuition remission.)

Year 1

Number of assistantship students: 0	**Source of funds:**
Number of fellowship students (specify fellowship): 0	
Number of tuition remissions: 0	**Source of funds:**

Year 2

Number of assistantship students:	0	**Source of funds:**	
Number of fellowship students (specify fellowship):	0		
Number of tuition remissions:	0	**Source of funds:**	

Year 3

Number of assistantship students:	0	**Source of funds:**	
Number of fellowship students (specify fellowship):	0		
Number of tuition remissions:	0	**Source of funds:**	

Attachments

Please attach the required files by navigating to the Proposal Toolbox and clicking in the top right corner of the form.

Faculty List*	☑ Attached
Support from involved units that no duplication exists*	☐ Attached ☑ Not Applicable
Library Assessment of Resources*	☑ Attached

Administration Use Only

Program Type	Certificate
Degree Type	Certificate
Status*	◉ Active-Visible ○ Inactive-Hidden
Catalog Ownership:	Department of Mathematics

Faculty List on related to the new track: Mathematical Science Graduate Certificate on Data Modeling

1. Alexander Katsevich, Professor
2. Xin Li, Professor
3. Marianna Pensky, Professor
4. Qiyu Sun, Professor
5. Brian Moore, Associate Professor
6. Zhisheng Shui, Associate Professor
7. Teng Zhang, Associate Professor
8. Calos Borges, Assistant Professor
9. Gerrit Welpher, Assistant Professor

Memo

To: Dr. Xin Li, Department Chair, Mathematics Department
Dr. Qiyu Sun, Graduate Coordinator, Mathematics Department
Dr. Devon Jensen, Associate Dean, College of Graduate Studies
Ms. Emily Stettner, Assistant Director, Graduate Curriculum, College of Graduate Studies
Mrs. Ying Zhang, Interim Associate Director for Collection & Technical Services
Ms. Sara Duff, Acquisitions Librarian
Mr. Frank Allen, Interim Director of Libraries

From: Sandy Avila, Science Librarian

Subject: Library evaluation of the proposal to add a Mathematical Science Graduate Certificate in Data Modeling, in the Department of Mathematics in the College of Sciences

Date: May 12, 2020

As the Subject Librarian for the Mathematics Department, I was contacted by Dr. Qiyu Sun, the Mathematics Department Graduate Coordinator regarding the proposed graduate certificate in Mathematical Sciences in Data Modeling. According to the description of the proposal and the proposed course list for both graduate certificates, all courses required and elective are currently taught and there is no major change in the curriculum focus. Therefore, there will be minimal impact on the existing support from the library collections and services. Based on the assessment, I waive a full library analysis of the proposal for the Mathematical Sciences Graduate Certificate in Data Modeling.

In the unfortunate event library budget shortfalls occur, some existing resource subscriptions may be cut or scaled back, which may reduce the support for Mathematics. I will keep the program apprised if/when this were to occur. A full library analysis will be needed if these certificates were to change its focus substantively or to be expanded to a track or a program.

College of Sciences - Graduate Program Addition-New - Financial Mathematics Graduate Certificate ►

2020-2021 Graduate New Certificate or Track

General Catalog Information

Read before you begin

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LAUNCH proposal by clicking in the top left corner. DO NOT make proposed changes before launching proposal. Changes will only be tracked after proposal is launched.

Select *Program* below.

Program Type* ◉ Program ○ Shared Core

This form is to be used to ADD graduate tracks or certificate programs. If there are multiple tracks being added to a program, one form must be submitted to revise the program and additional forms must be submitted for each of the track additions.

Please refer to the Graduate Council Curriculum Meeting Schedule for submission deadlines.

Proposal Type:* Graduate Program Addition-New

College:* College of Sciences

Unit / Department / College:* Department of Mathematics

Primary Unit Housing Program:* Math graduate program

Type of Action:* ☐ Track ☑ Certificate

Name of new track or certificate:* Financial Mathematics Graduate Certificate ►

Proposed Effective Term and Year:* Fall 2020

Delivery:* ☐ Face to Face
☑ UCF Online (all courses online-approved with UCF Online)
☐ Mixed Delivery

If you will be submitting other forms for tracks or course actions, please list them here:

New Equipment Fee?* ○ Yes ◉ No

If yes, also complete the 2020-2021 Graduate Equipment Fee form.

Will the program be a market tuition rate program?* ○ Yes ◉ No

Will the program be a cost recovery program?* ○ Yes ◉ No

For the Informational Description Chart box below, please copy and paste this example chart and add your relevant program information:

College: Link to College website	**Degree: CRT**
Department: Link to department website	**Option: N/A**
Program Websites: Link to program website	

Informational Description Chart:*

College: Sciences	**Degree:** CRT
Department: Mathematics	
Program Websites: http://sciences.ucf.edu/math/graduate	

Rationale:*

The Mathematics Department has a sucessful math certificate program to prepare students to teach at college level in mathematics. The department intends to expand the certificate program by adding two more: this is one of the two and it is a graduate certificate in financial mathematics. One rationale includes: (i) the high demand from the financial industry, (ii) the existing expertise of faculty, and (iii) the existing courses in our the program as we just added financial mathematics track to our master/PhD program. This certificate mainly targets for those students who may or may not have had financial industry experience but who need to learn updated working knowledge and skills in financial mathematics. The purpose of the certificate program is to prepare students to enter a career in financial industry and financial data analysis.

Prospective Curriculum*

Program Description

The Mathematical Science Graduate Certificate on Financial Mathematics is designed for students to gain knowledge of mathematical finance and to pursue careers in financial services industry and regulatory agency.

All required courses will be offered to accommodate distance learning by posting recorded lectures (Modality V) or Web-based instruction (Modality W), and offering scheduled online problem sessions and office hours. However, the elective option or program prerequisites may not be offered online. Newly admitted students choosing to complete this program exclusively via UCF online classes may enroll with a reduction in campus-based fees.

International students (F or J visa) are required to enroll in a full-time course load of 9 credit hours during the fall and spring semesters. Only 3 of the 9 credit hours may be taken in a completely online format. For a detailed listing of enrollment requirements for international students, please visit http://global.ucf.edu/. If you have questions, please consult UCF Global at 407-823-2337.

UCF is not authorized to provide online courses or instruction to students in some states. Refer to State Restrictions for current information.

Curriculum

The mathematical science graduate certificate on financial mathematics requires taking 4 graduate courses (12 credit hours), including 9 credit hours of required courses and 3 credit hours of elective courses.

Total Credit Hours Required: 12 Credit Hours Minimum beyond the Bachelor's Degree

Required Courses: 9 Credit Hours

Students choose three of the following five core courses.

MAP 5641 Financial Mathematics I

MAP 6646 Risk Management for Financial Mathematics

MAP 5612 Computational Methods for Financial Mathematics I

MAP 5606 Differential Equations for Financial Mathematics

MAP 6195 Mathematical Foundations for Massive Data Modeling and Analysis

Elective Courses: 3 Credit Hours

Students should take one additional core course, or one of the following four courses offered by the department of mathematics or one graduate-level course related to mathematical finance offered across the campus with the prior approval of the program director.

MAP 6642 Financial Mathematics II

MAP 6616 Computational Methods for Financial Mathematics II

MAP 5931 Proseminar for Financial Mathematics

MAP 6207 Optimization Theory

Application Requirements

Admission is open to those with a bachelor's degree from an accredited institution. An application to the graduate certificate program and official transcripts must be submitted, No GRE is required. Applicants must apply online. All requested materials must be submitted by the established deadline.

Application Deadlines

Financial Mathematics Graduate Certificate	*Fall Priority	Fall	Spring	Summer
Domestic Applicants		Jul 1	Dec 1	Apr 1
International Applicants				

*Applicants who plan to enroll full time in a degree program and who wish to be considered for university fellowships or assistantships should apply by the Fall Priority date.

Contact Info

Graduate Program

Qiyu Sun

Professor

qiyu.sun@ucf.edu

qiyu.sun@ucf.edu

Telephone: 407-823-4839

PO Box 161364

Graduate Admissions

Anthony Tufano

gradadmissions@ucf.edu

Telephone: 407-823-2766

Millican Hall 230

Online Application

Graduate Admissions

Mailing Address

UCF College of Graduate Studies

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PO Box 160112

Orlando, FL 32816-0112

Institution Codes

GRE: 5233

GMAT: RZT-HT-58

TOEFL: 5233

ETS PPI: 5233

Impact on Current Students

Will students be moved from an existing program, track, or certificate into this new track or certificate?* ○ Yes ◉ No

If yes, state the name of the program or track where students are currently enrolled and the current enrollment numbers.

Will students have the option to stay in their existing program, track, or certificate?*	(•) Yes ( ) No

Future Students

Indicate likely career or student outcomes upon completion:	Graduates may work in financial institutions, such as banks, credit card issuers, insurance companies, and as investment bankers and financial planners.
Provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc.	This certificate mainly targets for those students with interests in financial industry who want to learn updated skills in financial mathematics for a possible career in finance. There is no licensure nor certification depending on this program but it will prepare students for the professional examinations/certifications.

Year 1

Headcount: 5-10	**SCHs:** 30-60

Year 2

Headcount: 5-10	**SCHs:** 30-60

Year 3

Headcount: 5-10	**SCHs:** 30-60

Please complete the following section on financial support:

(Specify all forms of support – assistantships, fellowships, and tuition remission.)

Year 1

Number of assistantship students: 0	**Source of funds:**
Number of fellowship students (specify fellowship): 0	
Number of tuition remissions: 0	**Source of funds:**

Year 2

Year 2

Number of assistantship students:	0	**Source of funds:**	
Number of fellowship students (specify fellowship):	0		
Number of tuition remissions:	0	**Source of funds:**	

Year 3

Number of assistantship students:	0	**Source of funds:**	
Number of fellowship students (specify fellowship):	0		
Number of tuition remissions:	0	**Source of funds:**	

Attachments

Please attach the required files by navigating to the Proposal Toolbox and clicking in the top right corner of the form.

Faculty List*	☑ Attached
Support from involved units that no duplication exists*	☐ Attached ☑ Not Applicable
Library Assessment of Resources*	☑ Attached

Administration Use Only

Program Type	Certificate
Degree Type	Certificate
Status*	◉ Active-Visible ○ Inactive-Hidden
Catalog Ownership:	Department of Mathematics

Faculty List on related to the new track: Mathematical Science Graduate Certificate on Financial Mathematics

1. Jiongmin Yong, Professor
2. Yuanwei Qi, Professor
3. Zhisheng Shui, Associate Professor
4. Janson Swanson, Associate Professor
5. Teng Zhang, Associate Professor
6. Christian Keller, Assistant Professor

Memo

To: Dr. Xin Li, Department Chair, Mathematics Department
Dr. Qiyu Sun, Graduate Coordinator, Mathematics Department
Dr. Devon Jensen, Associate Dean, College of Graduate Studies
Ms. Emily Stettner, Assistant Director, Graduate Curriculum, College of Graduate Studies
Mrs. Ying Zhang, Interim Associate Director for Collection & Technical Services
Ms. Sara Duff, Acquisitions Librarian
Mr. Frank Allen, Interim Director of Libraries

From: Sandy Avila, Science Librarian

Subject: Library evaluation of the proposal to add a Mathematical Science Graduate Certificate in Financial Mathematics, in the Department of Mathematics in the College of Sciences

Date: May 12, 2020

As the Subject Librarian for the Mathematics Department, I was contacted by Dr. Qiyu Sun, the Mathematics Department Graduate Coordinator regarding the proposed graduate certificate in Mathematical Sciences in Financial Mathematics. According to the description of the proposal and the proposed course list for both graduate certificates, all courses required and elective are currently taught and there is no major change in the curriculum focus. Therefore, there will be minimal impact on the existing support from the library collections and services. Based on the assessment, I waive a full library analysis of the proposal for the Mathematical Sciences Graduate Certificate in Financial Mathematics.

In the unfortunate event library budget shortfalls occur, some existing resource subscriptions may be cut or scaled back, which may reduce the support for Mathematics. I will keep the program apprised if/when this were to occur. A full library analysis will be needed if these certificates were to change its focus substantively or to be expanded to a track or a program.

College of Sciences - Graduate Program Addition-New - Research Smarts Graduate Certificate

2020-2021 Graduate New Certificate or Track

General Catalog Information

Read before you begin

TURN ON help text before starting this proposal by clicking in the top right corner of the heading.
FILL IN all fields required marked with an * after importing data. You will not be able to launch the proposal without completing required fields.

LAUNCH proposal by clicking in the top left corner. DO NOT make proposed changes before launching proposal. Changes will only be tracked after proposal is launched.

Select *Program* below.

Program Type* ◉ Program ○ Shared Core

This form is to be used to ADD graduate tracks or certificate programs. If there are multiple tracks being added to a program, one form must be submitted to revise the program and additional forms must be submitted for each of the track additions.

Please refer to the Graduate Council Curriculum Meeting Schedule for submission deadlines.

Proposal Type:* Graduate Program Addition-New

College:* College of Sciences

Unit / Department / College:* Department of Sociology

Primary Unit Housing Program:* Applied Sociology MA; Sociology Ph.D.

Type of Action:* ☐ Track ☑ Certificate

Name of new track or certificate:* Research Smarts Graduate Certificate

Proposed Effective Term and Year:* Fall 2020

Delivery:* ☑ Face to Face
☑ UCF Online (all courses online-approved with UCF Online)
☑ Mixed Delivery

If you will be submitting other forms for tracks or course actions, please list them here:

New Equipment Fee?* ○ Yes ◉ No

If yes, also complete the 2020-2021 Graduate Equipment Fee form.

Will the program be a market tuition rate program?* ○ Yes ◉ No

Will the program be a cost recovery program?* ○ Yes ◉ No

For the Informational Description Chart box below, please copy and paste this example chart and add your relevant program information:

College: Link to College website	**Degree: CRT**
Department: Link to department website	**Option: N/A**
Program Websites: Link to program website	

Informational Description Chart:*

College: https://sciences.ucf.edu/	Degree: Certificate
Department:https://sciences.ucf.edu/sociology/	Option: N/A
Program Websites: https://sciences.ucf.edu/sociology/graduate/	

Rationale:* The world today is a bastion of information. We constantly receive information from everywhere, and this can be overwhelming. We need to be able to determine facts from fake news, propaganda, misunderstandings, and outright untrue assertions. Understanding research methods and data analysis strategies is important because it allows us to be critical consumers of the information that comes our way. Also, knowing about how knowledge is created influences what we know by offering us a systematic way to assess and gain knowledge.

Prospective Curriculum*

Program Description

The Graduate Certificate in Research Smarts provides students with the essential skills and critical thinking needed by today's consumers of news and information.

Increasing one's Research Smarts will provide students with the practical skills and critical thinking necessary to produce and to consume findings, facts, and information with the assurance that it was arrived at systematically. These skills are not only useful in daily life, as we wade through the mass of news and information that comes our way, but also in private business, nonprofit organizations, government agencies, and other employment opportunities. Students seeking employment, those with jobs currently, or those working toward advancement can benefit from a critical examination of how knowledge is gained and which sources of information can be trusted. This is because nearly all employers value employees who are confident in their understanding and use of scientific research skills.

Students earning the Graduate Certificate in Research Smarts will acquire the following skills:

- **Be able to define knowledge, social science research, and research methods.**
- **Summarize why understanding research methods is important.**
- **Evaluate and describe each of the major steps taken to conduct research as well as the importance of each step.**
- **Develop research questions and compare the different types of research questions.**
- **Understand why ethics are an important consideration during research.**
- **Understand a variety of ways to analyze data.**
- **Understand the relationship between research methods and data analysis.**
- **Be able to design a sound research project from developing the research question to collecting the data, to selecting the best analysis strategy to making strategic conclusions.**
- **Use the above skills to critically assess news and information as well as evaluate the claims and assertions of others.**

Please note: The Research Smarts Graduate Certificate may be completed remotely during the academic year 2020-2021. After that, not all elective options or program prerequisites may be offered remotely or online. Newly admitted students choosing to complete this program exclusively via UCF online classes may enroll with a reduction in campus-based fees.

International students (F or J visa) are required to enroll in a full-time course load of 9 credit hours during the fall and spring semesters. Only 3 of the 9 credit hours may be taken in a completely online format. For a detailed listing of enrollment requirements for international students, please visit http://global.ucf.edu/. If you have questions, please consult UCF Global at 407-823-2337.

UCF is not authorized to provide online courses or instruction to students in some states. Refer to State Restrictions for current information.

Curriculum

Curriculum

The Research Smarts Graduate Certificate consists of three required courses.

Total Credit Hours Required: 9 Credit Hours Minimum beyond the Bachelor's Degree

Required Courses: 9 Credit Hours

Students may select 9 hours (3 courses) from the following list:

SYA 6305 Social Research
SYA 6315 Qualitative Research Methods
SYA 6356 Geographic Information Systems in Society
SYA 6425 Design and Conduct of Social Surveys
SYA 6452 GIS Applications
SYA 6455 Research Analysis
SYA 6458 Advanced Topics in Geographic Information Systems in Society
SYA 6657 Program Design and Evaluation
SYA 7309 Advanced Sociological Research Methods
SYA 7407 Advanced Data Analysis
SYA 7457 Topics in Data Analysis
SYA 7658 Social Policy and Research Analysis

Application Requirements

Admission is open to those with a bachelor's degree from an accredited institution and at least one statistics course or math course of Algebra II or higher. An application to the graduate certificate program and official transcripts must be submitted. Applicants must apply online. All requested materials must be submitted by the established deadline.

Application Deadlines

Research Smarts Graduate Certificate	*Fall Priority	Fall	Spring	Summer
Domestic Applicants		Jul 1		
International Applicants				
*Applicants who plan to enroll full time in a degree program and who wish to be considered for university fellowships or assistantships should apply by the Fall Priority date.				

Contact Info

Graduate Program

Timothy L. Hawthorne, PhD

Associate Professor

Department of Sociology

Timothy.Hawthorne@ucf.edu

Telephone: 407-823-3744

HPH, RM 403

Ms. Bridgett Burk

Graduate Admissions Coordinator

Department of Sociology

HPH, RM 403

407.823.3744

Graduate Admissions

Christina Dabrowski

gradadmissions@ucf.edu

Telephone: 407-823-2766

Millican Hall 230

Online Application

Graduate Admissions

Mailing Address

UCF College of Graduate Studies

Millican Hall 230

PO Box 160112

Orlando, FL 32816-0112

Institution Codes

GRE: 5233

GMAT: RZT-HT-58

TOEFL : 5233

ETS PPI: 5233

Impact on Current Students

Will students be moved from an existing program, track, or certificate into this new track or certificate?* ○ Yes ◉ No

If yes, state the name of the program or track where students are currently enrolled and the current enrollment numbers.

Will students have the option to stay in their existing program, track, or certificate?* ◉ Yes ○ No

Future Students

Indicate likely career or student outcomes upon completion: Students will have skills in research methods, data analysis strategies, critical thinking, evaluation and assessment. These skills are always relevant and valuable in the job market.

Provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc.

Students who are enrolled in graduate degree programs and are interested in gaining extra expertise in research methods and data analysis.

Individuals who are looking to change their job focus or be promoted at work can use these new skills to increase their value at their place of work.

Individuals who are seeking employment opportunities can acquire these new skills in order to make their applications more compelling to prospective employers.

Year 1

Headcount: 5

SCHs: 45

Year 2

Headcount: 7

SCHs: 63

Year 3

Headcount: 9	**SCHs:** 81

Please complete the following section on financial support:

(Specify all forms of support – assistantships, fellowships, and tuition remission.)

Year 1

Number of assistantship students: 0	**Source of funds:**
Number of fellowship students (specify fellowship):	
Number of tuition remissions:	**Source of funds:**

Year 2

Number of assistantship students: 0	**Source of funds:**
Number of fellowship students (specify fellowship):	
Number of tuition remissions:	**Source of funds:**

Year 3

Number of assistantship students: 0	**Source of funds:**
Number of fellowship students (specify fellowship):	
Number of tuition remissions:	**Source of funds:**

Attachments

Please attach the required files by navigating to the Proposal Toolbox and clicking in the top right corner of the form.

Faculty List* Attached

Support from involved units that no duplication exists*	☐ Attached ☑ Not Applicable
Library Assessment of Resources*	☑ Attached

Administration Use Only

Program Type	Certificate
Degree Type	Certificate
Status*	◉ Active-Visible ○ Inactive-Hidden
Catalog Ownership:	Department of Sociology

/

Sociology Faculty who are qualified to teach in the Research Smarts Graduate Certificate

Alison Cares, Associate Professor

Amanda Koontz, Associate Professor

Amy Donley, Associate Professor

Amy Reckdenwald, Associate Professor

Bhoomi Thakore, Assistant Professor

Elizabeth Mustaine, Professor

Elzbieta Sikorska, Associate Professor

Fernando Rivera, Professor

Jay Corzine, Professor

J. Scott Carter, Associate Professor

Jacqueline Woerner, Assistant Professor

Jason Ford, Professor

Jonathan Cox, Assistant Professor

Liz Grauerholz, Professor

Melanie Hinojosa, Associate Professor

Michael Armato, Lecturer

Ramon Hinojosa, Associate Professor

Shannon Carter, Associate Professor

Timothy Hawthorne, Associate Professor

Yingru Li, Associate Professor

UNIVERSITY OF CENTRAL FLORIDA

University Libraries
P.O. Box 162666
Orlando, Florida 32816-2666

May 28, 2020

Dr. Jay Corzine
Graduate Director
Department of Sociology
University of Central Florida

Dear Dr. Corzine,

As the Subject Librarian for Sociology, I recently learned about the proposed graduate certificate in Research Smarts. According to the description of the proposal and the proposed course list, all required and elective courses are currently taught and there is no major change in the curriculum focus. Therefore, there will be minimal impact on the existing support from the library collections and services. Based on this assessment, I waive a full library analysis for this proposal of a Graduate Certificate in Research Smarts.

In the unfortunate event library budget shortfalls occur, some existing online subscriptions may be cut or scaled back, which may reduce the support for this certificate. I will keep the program apprised if/when this were to occur.

Please contact me with any concerns I can address.

Sincerely,

Rebecca M Murphey

Rebecca M Murphey

Reference & PTRC Librarian

University of Central Florida

Cc: Dr. Devon Jensen, Associate Dean, Graduate Admissions and Recruiting
Dr. Elizabeth Mustaine, Chair, Department of Sociology
Emily Stettner, Assistant Director, Graduate Curriculum
Terrie Sypolt, Associate Librarian and member, Graduate Curriculum Committee
Ying Zhang, Interim Associate Director, Collections & Technical Services