Graduate Curriculum Committee
March 17, 2014
12:00, MH 243 (Room Change)

AGENDA

1) Welcome and call to order

2) Approval of minutes from the last meeting

3) Addition of a HIA graduate certificate – COHPA
4) Revisions to the Public Affairs PhD – Public Admin. MPA dual degree track revisions – COHPA

5) Addition of a Business Analytics track to the MS Management program – CBA
6) Inactivation of the 1Year Full-Time track to the MBA – CBA

7) Revisions to the PSM Modeling & Simulation program – CGS
8) Revisions to the MS Modeling & Simulation program – CGS
9) Revisions to the PhD Modeling & Simulation program - CGS
10) Revisions to the Modeling & Simulation graduate certificate - CGS

11) Courses and special topics

12) Adjournment

Members of the Graduate Council Curriculum Committee:
Tosha Dupras, COS (Chair)
Deborah Breiter, RCHM
Donna Malvey, COHPA
Charles Kelliher, CBA
Patrick Murphy, CAH
Art Weeks, CECS
Joyce Nutta, CEHP
Terrie Sypolt, LIB
Julee Waldrop, CON
Boris Zeldovich, COP
Antonis Zervos, COM
Lucretia Cooney, GSA
Max Poole, CGS Liaison

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

Program Recommendation Form

This form is to be used to revise, add, suspend, or delete degree programs, tracks, or certificate programs. If there are changes to a program and the changes will affect the program tracks also, one form may be used for this type of change.

PLEASE NOTE: The deadline for new tracks or certificates is **February 1 of each year**. Any proposal for new tracks or certificates received after this date will not be included in the next year's catalog. Revisions to existing programs, tracks, or certificates are **due by March 15**. Any proposals for revisions received after that date will not be included in the next year's catalog. Please include catalog copy (description, curriculum, contact information, application requirements, and application deadlines). For revisions – attach the catalog copy **showing changes (use Track Changes in Word)**.

College/Unit(s) Submitting Proposal: College of Health & Public Affairs

Proposed Effective Term/Year: Fall 2015

Unit(s) Housing Program: Department of Health Management & Informatics

Name of program, track and/or certificate: Health Information Administration Graduate Certificate

Brief description of program (this description will show up in the graduate catalog copy)**:** *Do not add complete catalog copy here.*

The Health Information Administration Graduate Certificate is a 20 credit certificate that provides students enrolled in the Masters in Healthcare Informatics program with the requisite knowledge to pursue the Registered Health Information Administrator (RHIA) credential offered through the American Health Information Management Association (AHIMA). This certificate is intended to meet the needs of students in the MS in Healthcare Informatics program who are interested in pursing a career in Health Information Administration.

DELIVERY - Will program be delivered: ☐ Face to face ☑ Completely online ☐ Mixed delivery

Admissions deadlines: (Please specify if you have a different deadline for the track than for the program?)

Application requirements: (Please specify if you have different application requirements for the track than for the program? Will you admit directly to the track?)

Anatomy & physiology I and II (4 credit hours each), medical terminology (3 credit hours)

Program Director(s) and contact information: (name, email, phone, campus address, program website address)

Alice Noblin, PhD, RHIA, CCS; Alice.Noblin@ucf.edu, HPA 2, 210

Please check one: this action affects a: ☐ Program ☐ Track ☑ Certificate

Please check one: this action is a(n):

☑ Addition. Please proceed to Part A.

☐ Revision. If a revision applies to multiple tracks, please list them here and then proceed to Part A:

☐ Inactivation

☐ Temporary Suspension of Admissions. Give Length of Suspension:

Temporary suspension of admissions: The program will be removed from the online application. A notation will be entered in the graduate catalog indicating the length of the suspension of admissions. Currently enrolled students will not experience any issues with continued enrollment.

Inactivation: Admissions will be suspended for new students and the program will be removed from the online application. Students active in the program are eligible to complete the program under the appropriate criteria and an appropriate teach-out plan is required. The program will be removed from the catalog as of the approved term.

If you checked inactivation or you are temporarily suspending admissions, please go to Part B and complete it.

Signature Page

RECOMMENDATIONS

☑ Yes ☐ No **Department Chair:** _____ **Date:** 3/10/2014

☑ Yes ☐ No **College Curriculum Committee Chair:** _____ **Date:** 3/11/2014

☐ Yes ☐ No **College Dean:** _____ **Date:** _____

☐ Yes ☐ No **Chair or GSC:** _____ **Date:** _____

☐ Yes ☐ No **Dean, College of Graduate Studies:** _____ **Date:** _____

APPROVAL

Provost and Executive Vice President: _____ **Date:** _____

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

Department(s); College; Registrar; Associate Registrar; Institutional Research; Academic Services; Faculty Senate; University Analysis and Planning Support; College of Graduate Studies

Part A – For additions or revisions of programs, tracks or certificates

Brief statement of rationale: (Please indicate the rationale, how it affects the unit and faculty teaching in and students enrolled in the program, track or certificate.)

According to the Bureau of Labor Statistics, the demand for the health information management workforce is set to grow faster than average and the changes in health care financing will exacerbate the need for trained RHIA professionals. Currently, there is no similar graduate certificate in the State of Florida. The certificate will depend on existing faculty. Students may apply to the HIA Certificate if they are in the MS-HCI and have met the certificate pre-requisites.

For Revisions:

Brief listing of Program Changes: (Please indicate the changes in bullet format. If there are changes to the credit hours of the program, required courses or other requirements, please state those changes. **Remember to attach the catalog copy showing changes, using Track Changes in Word.**)

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 provide a list of students if possible:

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

Name Change

Are you changing the name of an existing program, track, or certificate? ☐ **Yes** ☑ **No**

If yes, provide the new name of the program, track, or certificate:

Provide the name of the current program, track, or certificate:

When is the name change effective? Please note: A name change will apply to the record of all students who are currently enrolled, readmitted or newly admitted into this program as of the effective date of this change.

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

If you are requesting a CIP Code change for an existing program, track, or certificate, please provide:

old CIP:

new CIP:

If a name change is your only revision, stop here. Otherwise, complete the rest of Part A.

Part A - Continued

Specify the faculty who will participate in the program, track or certificate and their credentials to do so: (List faculty and a brief paragraph of their credentials.)

Alice Noblin, PhD, RHIA is an assistant professor in the Department of Health Management and Informatics and program director for the BS in Health Informatics and Information Management. She has over 10 years of teaching experience in RHIA programs and worked as an RHIA for 25 years prior to coming to academia.

Thomas Falen, RHIA, LHRM, is an Instructor in the Department of Health Management and Informatics teaching in the Health Informatics and Information Management program since 1996. Prior to joining academia, he worked in coding and as a medical record consultant for over 15 years. Mr. Falen completed his doctoral work in March, 2014, and his degree has been granted.

Kendall Cortelyou-Ward, PhD is an assistant professor in the Department of Health Management and Informatics and the program director for the MS in Health Care Informatics program. She has done extensive research in the area of health care informatics and currently has 18 peer reviewed publications in the area. Her area of focus in the program is health care informatics, finance and management.

Rick Biehl, PhD is a part time faculty member in the Department of Health Management and Informatics, where his teaching focuses on data architecture and modeling. He has over 20 years of experience in data warehousing and informatics consulting. His company, Data Oriented Quality Solutions, works with hospitals to assist them with their big data needs.

Lawrence West, PhD is an associate professor in the Department of Health Management and Informatics, teaching primarily in the areas of database, system analysis and design, and biostatistics. Dr. West's expertise lies in these areas and this will be his area of focus for the RHIA Certificate.

Impact of changes on students: Will current students be impacted by the addition or revision of a program, track or certificate? If so, how?

Students currently enrolled in the PSM-MSHCI program will be provided the opportunity to enroll in additional classes to earn the HIA graduate certificate in conjunction with their MSHCI degree.

If applicable, provide a written agreement (email is fine) from all involved units that they are in support of, will provide courses to, or will participate in the program, track, or certificate. Please attach the correspondence and also list the units here.

If an addition, 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.

The anticipated student body is the subset of students in the MS-HCI program who are interested in obtaining the RHIA credential.

	Year 1	Year 2	Year 3
Headcount	7	10	10
SCHs	140	200	200

If an addition, indicate likely career or student outcomes upon completion: (What will students do? What will their job titles be?)

Students graduating with their Health Information Administration Graduate Certificate will be eligible to sit for the RHIA credentialing exam. Job opportunities exist in multiple settings including, hospitals, physician practices, mental health, long term care, managed care, software vendors, and government agencies.

Part A - Continued

If an addition or there are substantial REVISIONS to existing tracks or certificates, please complete the following table on financial support: (Specify all forms of support – assistantships, fellowships, and tuition remission.)

	No. assistantship students	Source of funds	No. fellowship students (specify fellowship)	No. tuition remissions	Source of funds
Year 1	0	N/A	0	0	N/A
Year 2	0	N/A	0	0	N/A
Year 3	0	N/A	0	0	N/A

Checklist of items to be provided:

☑ **Electronic graduate catalog copy for additions; track changes included if there are revisions. (required)**

☑ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**

☐ **If an addition, list of 1-3 students and 1-3 faculty for profiles in the graduate catalog (provide email address so Graduate Studies can contact them to write profiles and take photos). You may provide draft copy of profiles if you wish.**

☐ **If an addition, what disciplines does this program, track or certificate belong to? What other UCF graduate programs, tracks, or certificates are related to it? This information will be used to provide additional links for prospective students to search in the online graduate catalog.**

Part B – For inactivations or suspensions of programs, tracks, or certificates

Are students currently enrolled in the program? ☐ **Yes** ☐ **No**

If yes, number of current students:

Please specify the intended time period of inactivation or suspension:

If program, track, or certificate is being inactivated or suspended, then attach a "teach out" plan for all current students specifying how they can finish the program or where students will be placed if moving to another program. The "teach out" plan should specify when courses will be offered to enable students to finish. Specify whether students will remain in the existing program to finish, and if so, when the completion date will be, whether students will be moved to another program, etc. Please provide a list of students where applicable.

Sample teach out plan: Enter the terms and courses that will be taught for each term throughout the last semester. **Please delete course prefixes and numbers in this section if no teach out plan is required.**

Fall 2012	Spring 2013	Summer 2013	Fall 2013	Spring 2014
EDF 7041	EDF 7041	EDF 7041	EDF 7041	EDF 7041
EDF 6442	EDF 6442	EDF 6442	EDF 6442	
EDF 7848	EDF 7848	EDF 7848		
EDF 6543	EDF 6543			
EDA 7503				

Checklist of items to be provided:

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **E-mails showing consultation with other units. (if applicable)**

	Cohort 1 Fall 12 HCI Admits	Cohort 2 Fall 13 HCI Admits	Cohort 3 Fall 14 HCI Admits	Cohort 4 Fall 15 HCI Admits
Fall 12	HIM 5118			
	HIM 6119			
Spg 13	HIM 6122			
	HIM 6124			
Sum 13	HIM 6217			
	HIM 6935			
Fall 13	HIM 6123	HIM 5118		
	HIM 6464	HIM 6119		
Spg 14	HIM 6125	HIM 6122		
	HIM 6947	HIM 6124		
Sum 14		HIM 6217		
		HIM 6935		
Fall 14	**HIM 6293**	HIM 6123	HIM 5118	
	HSA 6759	HIM 6464	HIM 6119	
Spg 15	**HSA 6189**	**HSA 6189**	HIM 6122	
	HSA 6752	**HSA 6752**	HIM 6124	
Sum 15	**HSA 6175**	**HSA 6175**	HIM 6935	
			HIM 6217	
Fall 15		**HIM 6293**	HIM 6123	HIM 5118
		HSA 6759	HIM 6464	HIM 6119
Spg 16		HIM 6125	**HSA 6189**	HIM 6122
		HIM 6947	**HSA 6752**	HIM 6124
Sum 16			**HSA 6175**	**HSA 6175**
Fall 16			**HIM 6293**	**HIM 6293**
			HSA 6759	**HSA 6759**
Spg 17			HIM 6125	**HIM 6189**
			HIM 6947	**HSA 6752**
Sum 17				HIM 6217
				HIM 6935
Fall 17				HIM 6123
				HIM 6464
Spg 18				HIM 6125
				HIM 6947

PROGRAM DESCRIPTION

The Department of Health Management and Informatics offers a Registered Health Information Administrator (RHIA) Graduate Certificate program that requires 20 hours of coursework in addition to the MS in Healthcare Informatics coursework. Admission is only open to those in the UCF MS in Healthcare Informatics program. This program is designed to meet the growing demand for highly trained health care information management professionals.

The RHIA Graduate Certification can be obtained by students already enrolled in the MS – Health Care Informatics program at UCF and have completed the following pre-requisites: medical terminology and anatomy and physiology 1 and 2.

The RHIA Graduate Certificate is offered online in a distance-learning cohort format to offer access and convenience to working professionals. Applications and admissions are accepted once per year for fall term only, beginning no earlier than the second year of the HCI program (i.e., fall of second year).

The successful completion of the HCI degree and the RHIA Graduate Certificate does qualify graduates to sit for the RHIA examination.

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 www.intl.ucf.edu. If you have any questions, please consult the International Services Center at 407-823-2337.

CURRICULUM

The RHIA Graduate Certificate will be awarded upon completion of 20 credits of prescribed graduate study in addition to the MS in Healthcare Informatics program. Courses are offered all online as a cohort program with all students completing two courses per semester. All students must take the courses in the prescribed sequence. Visit the program website listed above to see the program cohort schedule.

Total Credit Hours Required:
20 Credit Hours Minimum in addition to the UCF MS in Healthcare Informatics (38 Credit Hours), Total 58 Credit Hours

Prerequisites

The following prerequisites are required for consideration of admission to the certificate program:

- Medical Terminology
- Anatomy & Physiology I and II

Required Courses—20 Credit Hours

- HIM 6293 Health Care Coding & Diagnosis (ICD-10) 4
- HSA 6189 Health Care Procedural Coding & Reimbursement 4
- HSA 6752 Health Care Analytics 4
- HSA 6759 Outcomes Management 4
- HSA 6175 Advanced Trends in Health Care Finance & Management 4

Cost Per Credit Hour

For the cost per credit is $833 per credit.

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 admission requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- Goal statement indicating how the RHIA Graduate Certificate will enhance career goals or why the applicant wants to pursue this certification (at least 1 page, doubled-spaced, 12 pt).
- Résumé (no longer than two pages).
- 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 and TOEFL scores. Credential evaluations are accepted fromWorld Education Services (WES) or Josef Silny and Associates, Inc. only.
- A computer-based score of 220 (or 80 internet-based score) on the Test of English as a Foreign language (TOEFL) if an applicant is from a country where English is not the official language, or if an applicant's degree is not from an accredited U.S. institution, or if an applicant did not earn a degree in a country where English is the only official language or a university where English is the only official language of instruction. Although we prefer the TOEFL, we will accept IELTS scores of 6.5.

Admission to the program is competitive, based on evaluation of the applicant's abilities, past academic performance, work experience, and the match of the program with career goals. The RHIA Graduate Certificate program accepts the most qualified Masters in HCI students. Not all students who apply may be accepted, even if minimum requirements are met. Furthermore, personal phone interviews may be used as part of the evaluation process.

Please note: Due to restrictive state regulations, UCF is not permitted to provide online courses or instruction to students in the following states. If you reside in one of these states, you may not be permitted to enroll in or be admitted to a UCF online program. Please contact your state's higher

education regulation authorities or the UCF Graduate Program (see contact information above) for more details.

- Alabama
- Arkansas
- Maryland
- Minnesota

Application Deadlines

RHIA Graduate Certificate	Fall Priority	Fall	Spring	Summer
Domestic Applicants	Jan 15	Jul 15	-	-
International Applicants	Jan 15	Jan 15	-	-
International Transfer Applicants	Jan 15	Mar 1	-	-

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.

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COLLEGE OF GRADUATE STUDIES

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College/Unit(s) Submitting Proposal: College of Health and Public Affairs

Proposed Effective Term/Year: Fall 2014

Unit(s) Housing Program: Public Affairs Doctoral Program and School of Public Administration

Name of program, track and/or certificate: Public Affairs PhD - Master of Public Administration Dual Degree Track

Brief description of program (this description will show up in the graduate catalog copy)**: Do not add complete catalog copy here.**

The Public Affairs PhD - Public Administration MPA Dual Degree Track provides academically talented students an opportunity to earn the Doctor of Philosophy in Public Affairs and the Master of Public Administration degrees concurrently. Students successfully completing the PhD/MPA Dual Degree program will have the skills and analytical techniques for careers in academia or in the public and nonprofit sectors. After successful completion of the PhD/MPA Dual Degree program, students will receive two diplomas, one for the Public Administration MPA degree and one for the Public Affairs PhD degree.

DELIVERY - Will program be delivered: ☐ **Face to face** ☐ **Completely online** ☑ **Mixed delivery**

Admissions deadlines: (Please specify if you have a different deadline for the track than for the program?)

Application requirements: (Please specify if you have different application requirements for the track than for the program? Will you admit directly to the track?)

Program Director(s) and contact information: (name, email, phone, campus address, program website address)

Lynette Feder

lynette.feder@ucf.edu

407-823-3650; HPA I, Room 220 http://www2.cohpa.ucf.edu/publicaffairs/

Please check one: this action affects a: ☐ Program ☑ Track ☐ Certificate

Please check one: this action is a(n):

☐ Addition. Please proceed to Part A.

☑ Revision. If a revision applies to multiple tracks, please list them here and then proceed to Part A:

☐ Inactivation

☐ Temporary Suspension of Admissions. Give Length of Suspension:

Temporary suspension of admissions: The program will be removed from the online application. A notation will be entered in the graduate catalog indicating the length of the suspension of admissions. Currently enrolled students will not experience any issues with continued enrollment.

Inactivation: Admissions will be suspended for new students and the program will be removed from the online application. Students active in the program are eligible to complete the program under the appropriate criteria and an appropriate teach-out plan is required. The program will be removed from the catalog as of the approved term.

If you checked inactivation or you are temporarily suspending admissions, please go to Part B and complete it.

Signature Page

Recommend Approval (all approval levels must be signed)

Department Chair (Print) _____ **(Signature)** _____ **Date** _____

College Academic Standards (Print) _____ **(Signature)** _____ **Date** _____

College Dean (Print) _____ **(Signature)** _____ **Date** _____

Graduate Council (Print) _____ **(Signature)** _____ **Date** _____

Graduate Dean (Print) _____ **(Signature)** _____ **Date** _____

Approval

Provost and Executive Vice President: _____ **Date** _____

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

Department(s); College; Registrar; Associate Registrar; Institutional Research; Academic Services; Faculty Senate; University Analysis and Planning Support; College of Graduate Studies

Part A – For additions or revisions of programs, tracks or certificates

Brief statement of rationale: (Please indicate the rationale, how it affects the unit and faculty teaching in and students enrolled in the program, track or certificate.)

Two years ago the College of Health and Public Affairs decided to revise the doctoral program in Public Affairs (PAF) to be more in line with the community-based mission of the College and offer an interdisciplinary educational experience. The College put together a committee with at least one representative from each of the five tracks and four disciplines. The curriculum was revised using a competency-based approach. In the end, an interdisciplinary and methodologically rigorous program was developed that will provide graduates with the ability to have a significant and positive impact on our communities. We believe that this will provide students with a more enriched educational experience leaving them better able to have positive impact on the many social ills that affect our society.

Revisions to the main five tracks were approved in October. The Dual Degree track was omitted by accident and must now be approved to officially reflect the new PAF curriculum.

For Revisions:

Brief listing of Program Changes: (Please indicate the changes in bullet format. If there are changes to the credit hours of the program, required courses or other requirements, please state those changes. **Remember to attach the catalog copy showing changes, using Track Changes in Word.**)

-Total credit hours increased from 57 to 60
-Required courses restructured and increase from 42 credit hours to 45 credit hours
-Interdisciplinary Practicum course added as part of required courses

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 provide a list of students if possible:

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

Name Change

Are you changing the name of an existing program, track, or certificate? ☐ **Yes** ☑ **No**

If yes, provide the new name of the program, track, or certificate:

Provide the name of the current program, track, or certificate:

When is the name change effective? Please note: A name change will apply to the record of all students who are currently enrolled, readmitted or newly admitted into this program as of the effective date of this change.

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

If you are requesting a CIP Code change for an existing program, track, or certificate, please provide:

old CIP:

new CIP:

If a name change is your only revision, stop here. Otherwise, complete the rest of Part A.

Part A - Continued

Specify the faculty who will participate in the program, track or certificate and their credentials to do so: (List faculty and a brief paragraph of their credentials.)

See attached.

Impact of changes on students: Will current students be impacted by the addition or revision of a program, track or certificate? If so, how?

There are currently no active students in the MPA/PAF Dual Degree track.

If applicable, provide a written agreement (email is fine) from all involved units that they are in support of, will provide courses to, or will participate in the program, track, or certificate. Please attach the correspondence and also list the units here.

See attached.

If an addition, 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.

Not applicable as we already have a doctoral program in Public Affairs and we are only revising it to make it more consistent with the College's Mission Statement

	Year 1	Year 2	Year 3
Headcount	25	50	75
SCHs	198	396	585

If an addition, indicate likely career or student outcomes upon completion: (What will students do? What will their job titles be?)

Not applicable as we already have a doctoral program in Public Affairs and we are only revising it to make it more consistent with the College's Mission Statement

Part A - Continued

If an addition or there are substantial REVISIONS to existing tracks or certificates, please complete the following table on financial support: (Specify all forms of support – assistantships, fellowships, and tuition remission.)

	No. assistantship students	Source of funds	No. fellowship students (specify fellowship)	No. tuition remissions	Source of funds
Year 1					
Year 2					
Year 3					

Checklist of items to be provided:

☑ **Electronic graduate catalog copy for additions; track changes included if there are revisions. (required)**

☑ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☑ **Emails showing consultation with other units. (if applicable)**

☐ **If an addition, list of 1-3 students and 1-3 faculty for profiles in the graduate catalog (provide email address so Graduate Studies can contact them to write profiles and take photos). You may provide draft copy of profiles if you wish.**

☐ **If an addition, what disciplines does this program, track or certificate belong to? What other UCF graduate programs, tracks, or certificates are related to it? This information will be used to provide additional links for prospective students to search in the online graduate catalog.**

Part B – For inactivations or suspensions of programs, tracks, or certificates

Are students currently enrolled in the program? ☐ **Yes** ☐ **No**

If yes, number of current students:

Please specify the intended time period of inactivation or suspension:

If program, track, or certificate is being inactivated or suspended, then attach a "teach out" plan for all current students specifying how they can finish the program or where students will be placed if moving to another program. The "teach out" plan should specify when courses will be offered to enable students to finish. Specify whether students will remain in the existing program to finish, and if so, when the completion date will be, whether students will be moved to another program, etc. Please provide a list of students where applicable.

Sample teach out plan: Enter the terms and courses that will be taught for each term throughout the last semester. **Please delete course prefixes and numbers in this section if no teach out plan is required.**

Fall 2012	Spring 2013	Summer 2013	Fall 2013	Spring 2014

Checklist of items to be provided:

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **E-mails showing consultation with other units. (if applicable)**

CURRICULUM

Total Credit Hours Required:

8~~1~~4 Credit Hours Minimum beyond the Bachelor's Degree

The Public Administration MPA Dual Degree track in the Public Affairs PhD program consists of 8~~1~~4 credit hours, including 6~~0~~3 credit hours of required courses, 6 credit hours of electives approved by the student's faculty adviser or program director, and 15 credit hours of dissertation. For required courses, students first complete seven core courses plus the capstone course for the MPA program (24 credit hours), and then take ~~five~~ four Public Affairs substantive ~~interdisciplinary~~ core courses and ~~four~~ six research methods courses for the PhD program (~~27~~30 credit hours), plus three courses (9 credit hours) from the Public Administration track in the PhD program.

Required Courses—6~~0~~3 Credit Hours

Required Courses for MPA—24 Credit Hours

In addition to the following required courses, the MPA degree will include 6 credit hours of advanced research methods and quantitative methods in Public Affairs and 12 credit hours of electives that are incorporated into the prescribed PhD curriculum.

- PAD 6035 Public Administration in the Policy Process (3 credit hours)
- PAD 6037 Public Organization Management (3 credit hours)
- PAD 6053 Public Administrators in the Governance Process (3 credit hours)
- PAD 6207 Public Financial Management (3 credit hours)
- PAD 6227 Public Budgeting (3 credit hours)
- PAD 6335 Strategic Planning and Management (3 credit hours)
- PAD 6417 Human Resource Management (3 credit hours)
- PAD 6062 Advanced Concepts and Applications in Public Administration (3 credit hours)

Required Courses for PhD—3~~6~~9 Credit Hours

- ~~PAF 7000 Foundations in Public Affairs (3 credit hours)~~
- ~~PAF 7110 Ethics and Social Justice in Public Affairs (3 credit hours)~~
- ~~PAD 7026 Advanced Seminar in Public Administration (3 credit hours)~~
- ~~PAF 7230 Strategic Change and Management in Public Affairs (3 credit hours)~~
- ~~PAF 7300 Policy Analysis in Public Affairs (3 credit hours)~~
- ~~PAD 7057 Advanced Public Management (3 credit hours)~~
- ~~PAF 7315 Public Policy: Microeconomic Applications (3 credit hours)~~
- ~~PAF 7802 Advanced Research Methods in Public Affairs I (3 credit hours)~~
- ~~PAF 7806 Advanced Research Methods in Public Affairs II (3 credit hours)~~
- ~~PAF 7804 Advanced Quantitative Methods in Public Affairs I (3 credit hours)~~
- ~~PAF 7805 Advanced Quantitative Methods in Public Affairs II (3 credit hours)~~

- ~~PAD 7827 Collaborative Public Management (3 credit hours)~~

Public Affairs Substantive Core – 9 Credit Hours

- PAF 7000 Foundations in Public Affairs (3 credit hours)
- PAF 7230 Strategic Change and Management for Public Affairs (3 credit hours)
- PAF 7XXX Social Inquiry and Public Policy (3 credit hours)

Methodological and Statistical Core —18 Credit Hours

- PAF 7802 Advanced Research Methods in Public Affairs I (3 credit hours)
- PAF 7804 Advanced Quantitative Methods in Public Affairs I (3 credit hours)
- PAF 7805 Advanced Quantitative Methods in Public Affairs II (3 credit hours)
- PAF 7820 Qualitative Methods for Public Affairs (3 credit hours)
- PAF 7XXX Policy and Program Evaluation for Public Affairs (3 credit hours)

Advanced Methodology (Students Pick One)

- PAF 7XXX Advanced Statistics for Public Affairs III: Continued Survey of Statistical Methods – OR
- PAF 7XXX Structural Equation Modeling (3 credit hours) – OR
- Pre-approved methodological or statistical course (3 credit hours)

Practicum—3 Credit Hours

PAF 7XXX Practicum in Community-Based Research (3 credit hours)

Track Specialization—9 Credit Hours

Students should take the following three courses:

- PAD 7026 Advanced Seminar in Public Administration (3 credit hours)
- PAD 7057 Advanced Public Management (3 credit hours)
- PAD 7827 Collaborative Public Management (3 credit hours)

Elective Courses—6 Credit Hours

The two required elective courses (3 credit hours each) offered within the dual degree provide an emphasis on public and nonprofit management; however, other emphases may be developed in consultation with the adviser. With prior approval from the Program Director, up to 6 credit hours of elective course work may be taken from outside the department. Students must show that elective courses taken outside of the department directly support an academic or professional career in public administration.

Choose two additional courses from the following:

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- PAD 7317 Program Design and Management (3 credit hours)
- PAD 7707 Advanced Research in Public Administration (3 credit hours)
- See advisor for appropriate methodological elective (3 credit hours)
- Directed independent study (3 credit hours)

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

Program Recommendation Form

This form is to be used to revise, add, suspend, or delete degree programs, tracks, or certificate programs. If there are changes to a program and the changes will affect the program tracks also, one form may be used for both the program and the track.

PLEASE NOTE: The deadline for new tracks or certificates is **February 1 of each year.** Any proposal for new tracks or certificates received after this date will not be included in the next year's catalog. Revisions to existing programs, tracks, or certificates are **due by March 15.** Any proposals for revisions received after that date will not be included in the next year's catalog. Please include catalog copy (description, curriculum, contact information, application requirements, and application deadlines). **For revisions – attach the catalog copy showing changes (use Track Changes in Word).**

College/Unit(s) Submitting Proposal: College of Business

Proposed Effective Term/Year: Fall 2014

Unit(s) Housing Program: Department of Management

Name of program, track and/or certificate: MSM Track in Business Analytics

Brief description of program (this description will show up in the graduate catalog copy)**:** **Do not add complete catalog copy here.**

The purpose of the proposed Business Analytics track between the College of Business (CBA) and the College of Sciences (COS) is to provide employees, with the content and specialized skills necessary to use data collected within their companies to make better and more informed decisions, through the use of data analytic techniques.

DELIVERY - Will program be delivered: ☑ Face to face ☐ Completely online ☐ Mixed delivery

Admissions deadlines: (Please specify if you have a different deadline for the track than for the program?)

Since the MSM is a Market Rate degree, the admission deadlines will correspond with that program.

Application requirements: (Please specify if you have different application requirements for the track than for the program? Will you admit directly to the track?)

The same admission requirements will apply to all tracks.

Program Director(s) and contact information: (name, email, phone, campus address, program website address)

Dr. Stephen Goodman, stephen.goodman@bus.ucf.edu BA1 304

http://www.graduatecatalog.ucf.edu/programs/program.aspx?id=1080&program=Management MS

Please check one: this action affects a: ☐ Program ☑ Track ☐ Certificate

Please check one: this action is a(n):

☑ Addition. Please proceed to Part A.

☐ Revision. If a revision applies to multiple tracks, please list them here and then proceed to Part A:

☐ Inactivation

☐ Temporary Suspension of Admissions. Give Length of Suspension:

Temporary suspension of admissions: The program will be removed from the online application. A notation will be entered in the graduate catalog indicating the length of the suspension of admissions. Currently enrolled students will not experience any issues with continued enrollment.

Inactivation: Admissions will be suspended for new students and the program will be removed from the online application. Students active in the program are eligible to complete the program under the appropriate criteria and an appropriate teach-out plan is required. The program will be removed from the catalog as of the approved term.

If you checked inactivation or you are temporarily suspending admissions, please go to Part B and complete it.

Signature Page

Recommend Approval (all approval levels must be signed)

Department Chair (Print) STEPHEN GOODMAN (Signature) [signature] Date 2/6/2014

College Academic Standards (Print) JIM GILKESON (Signature) [signature] Date 2/10/2014

College Dean (Print) Taylor Ellis (Signature) [signature] Date 2/10/2014

Graduate Council (Print) _____ (Signature) _____ Date _____

Graduate Dean (Print) _____ (Signature) _____ Date _____

Approval

Provost and Executive Vice President: _____ Date _____

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

Department(s); College; Registrar; Associate Registrar; Institutional Research; Academic Services; Faculty Senate; University Analysis and Planning Support; College of Graduate Studies

Part A – For additions or revisions of programs, tracks or certificates

Brief statement of rationale: (Please indicate the rationale, how it affects the unit and faculty teaching in and students enrolled in the program, track or certificate.)

Candidates in this proposed track will represent companies that are interested in using data to make more informed decisions. In particular, it is the desire of this joint program between CBA and COS to prepare business leaders to know how and when to use data to enhance their decision process. Given the increased attention on this topic a number of new master's degree programs are being developed in the USA, making this a viable and desired program. It should also be known that current candidates within both the Colleges of Business and Science have expressed interest in applying to this joint Master's program.

For Revisions:

Brief listing of Program Changes: (Please indicate the changes in bullet format. If there are changes to the credit hours of the program, required courses or other requirements, please state those changes. **Remember to attach the catalog copy showing changes, using Track Changes in Word.)**

Develop new course in Business Intelligence
Change course title for MAR 6646
Change credit hours in MAN 6915 to Variable
Create a new track consisting of 15 credit hours

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 provide a list of students if possible:

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

Name Change

Are you changing the name of an existing program, track, or certificate? ☐ Yes ☑ No

If yes, provide the new name of the program, track, or certificate:

Provide the name of the current program, track, or certificate:

When is the name change effective? Please note: A name change will apply to the record of all students who are currently enrolled, readmitted or newly admitted into this program as of the effective date of this change.

Fall 2014

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

If you are requesting a CIP Code change for an existing program, track, or certificate, please provide:

old CIP:

new CIP:

If a name change is your only revision, stop here. Otherwise, complete the rest of Part A.

Part A - Continued

Specify the faculty who will participate in the program, track or certificate and their credentials to do so: (List faculty and a brief paragraph of their credentials.)

See attached Documents.

Impact of changes on students: Will current students be impacted by the addition or revision of a program, track or certificate? If so, how?

None

If applicable, provide a written agreement (email is fine) from all involved units that they are in support of, will provide courses to, or will participate in the program, track, or certificate. Please attach the correspondence and also list the units here.

See attached documents

If an addition, 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.

	Year 1	Year 2	Year 3
Headcount	24	24	24
SCHs	720	720	720

If an addition, indicate likely career or student outcomes upon completion: (What will students do? What will their job titles be?)

Advancement within current position.

Part A - Continued

If an addition or there are substantial REVISIONS to existing tracks or certificates, please complete the following table on financial support: (Specify all forms of support – assistantships, fellowships, and tuition remission.)

	No. assistantship students	Source of funds	No. fellowship students (specify fellowship)	No. tuition remissions	Source of funds
Year 1	0		0	0	
Year 2	0		0	0	
Year 3	0		0	0	

Checklist of items to be provided:

☑ **Electronic graduate catalog copy for additions; track changes included if there are revisions. (required)**

☑ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☑ **Emails showing consultation with other units. (if applicable)**

☑ **If an addition, list of 1-3 students and 1-3 faculty for profiles in the graduate catalog (provide email address so Graduate Studies can contact them to write profiles and take photos). You may provide draft copy of profiles if you wish.**

☑ **If an addition, what disciplines does this program, track or certificate belong to? What other UCF graduate programs, tracks, or certificates are related to it? This information will be used to provide additional links for prospective students to search in the online graduate catalog.**

Part B – For inactivations or suspensions of programs, tracks, or certificates

Are students currently enrolled in the program? ☐ **Yes** ☐ **No**

If yes, number of current students:

_____

Please specify the intended time period of inactivation or suspension:

_____

If program, track, or certificate is being inactivated or suspended, then attach a "teach out" plan for all current students specifying how they can finish the program or where students will be placed if moving to another program. The "teach out" plan should specify when courses will be offered to enable students to finish. Specify whether students will remain in the existing program to finish, and if so, when the completion date will be, whether students will be moved to another program, etc. Please provide a list of students where applicable.

Sample teach out plan: Enter the terms and courses that will be taught for each term throughout the last semester. **Please delete course prefixes and numbers in this section if no teach out plan is required.**

Fall 2012	Spring 2013	Summer 2013	Fall 2013	Spring 2014
EDF 7041	EDF 7041	EDF 7041	EDF 7041	EDF 7041
EDF 6442	EDF 6442	EDF 6442	EDF 6442	
EDF 7848	EDF 7848	EDF 7848		
EDF 6543	EDF 6543			
EDA 7503				

Checklist of items to be provided:

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **E-mails showing consultation with other units. (if applicable)**

Memorandum of Understanding

and

Proposal for a

Master of Science in Business Analytics

A Joint program between the

College of Business Administration

and the College of Sciences

February 10, 2014

Revisions or additions to tracks and certificate programs

Adding tracks or certificate programs or making changes to existing tracks or graduate certificate programs requires Graduate Council approval. The unit desiring this prepares a document that outlines the rationale for the track or graduate certificate or for the changes that are desired and obtains approval from the departments and colleges involved. Once the colleges (or schools in some cases) approve of the rationale, it is forwarded to the Graduate Council for review. The Graduate Council encourages certificate programs to consider online course delivery when developing their proposals. Target audiences may be increased with this mode of delivery.

The document to add tracks or certificate programs requires the following information:

Purpose of the track

- The purpose of the track or certificate program. If online, please provide a rationale for its being online.

The purpose of the proposed Business Analytics track between the College of Business (CBA) and the College of Sciences (COS) is to provide employees, with the content and specialized skills necessary to use data collected within their companies to make better and more informed decisions, through the use of data analytic techniques.

Career Outcomes

- The likely career or student outcomes for someone who completes the track or program.

The primary career path for candidates in this proposed track encompasses companies that are interested in using data to make more informed decisions. In particular, it is the desire of this joint program between CBA and COS to prepare business leaders to know how and when to use data to enhance their decision process.

Identified Target Audience

- The identified target audience for the track or program and the demonstrated need for the track or program by this audience.

The identified target audience for this Masters of Science track in Business Analytics is for employees of Central Florida Business, that are seeking a better way to make the critical decisions they face daily. The students' expected background is a baccalaureate degree in either Business or Statistics.

An initial enrollment projection of 24 Master's candidates per cohort is the estimated annual target for this track. Given the increased attention on this topic a number of new master's degree programs are being developed in the USA, making this a viable number of participants for this program. It should also be known that current candidates within both the Colleges of Business and Science have expressed interest in applying to this joint Master's program.

After the initial offering of the Business Analytics track, it is the intention of both parties to pursue a separate Master's Degree in Business Analytics, to be run jointly by faculty in both the College of Business and the College of Science. It is the intention of both Colleges to create a new joint certificate in Business Analytics, which would most likely include classes from the

existing Data Mining certificate. Students would be advised concerning University Policy concerning double counting of classes in certificates. Specifically, students would be able to obtain only one certificate.

Curriculum

- The curriculum, identifying the hours of the track or program, the required and elective courses, and other requirements.

The proposed curriculum is a 30-credit hour program that requires a Baccalaureate degree in Business or Statistics for admission.

The 30-credit hour program is comprised of **15** credits of MSM core courses (15 credits from College of Business), and **15** credits in the Business Analytics track (12 credit hours from Statistics and 3 credit hours from business), (see Appendix A).

Graduate Faculty

- The faculty who will participate in this track or program. Please consult with faculty from each department who will provide courses to the curriculum.

The graduate faculty representatives from the College of Business are as follows:

Richard Hofler, Professor

Carol Saunders, Professor

Ronald Michaels, Professor

The graduate faculty representatives from the College of Sciences are as follows (Appendix B):

Morgan Wang, Professor

Mark Johnson, Professor

David Nickerson, Professor

Administration of Program

- A description of who will administer the program and the implementation start date.

The overall administration of the MS in Business Analytics is accomplished through the Program Committee. The Program Committee meets regularly to discuss issues related to the program and to make recommendations regarding the operation of the program. The Program Committee will have at least one faculty member from each of the Colleges of Science and Business.

Administrative issues are handled by the committee in conjunction with the Director of the Executive Development Center. Faculty associated with the track originate major curriculum changes such as new Courses. Recommendations for changes are then sent from the Program. Committee to the Colleges of Sciences, and Business for approval before being sent to the Graduate Standards and Curriculum Committee for action and then to the University Graduate Committee for approval. The EDC Director and faculty make recommendations for admission to the Program Committee for consideration and approval.

Unit Agreement

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

Faculty teaching in this Market Rate program may either teach "in load" or "out of load." If the teaching is out of load, the faculty member will be compensated by the Executive Development Center (EDC), through "out of load" guidelines established by the Collective Bargaining Agreement. If the teaching is "in load", for this specific Market Rate program, the EDC will reimburse the faculty member's department or college through a direct fund transfer an amount equal to the cost of instruction (0.125 academic year FTE, including salary plus benefits).

Any profits remaining after all reasonable costs have been subtracted from the revenues will be split between the two Colleges, based on the percentage of the 3 credit hour classes taught by faculty in each College. In the event that a class is team taught by faculty from both Colleges, then the credit hours for that class will be split. (i.e. a six credit hour class that is team taught will be split 3 credit hours to each College.)

Course Action Requests

- All appropriate course action requests that will be necessary to implement the change.

Three CARs will be needed and are completed in PDF format. These are:

Revise MAR 6646, to change the course title to "Marketing Analytics for Strategic Decision Making" for 3 credit hours.

Create a new course titled GEB 6YYY Business Intelligence for 3 credit hours.

Change MAN 6915 Field projects from 3 credit hours to variable credit hours. This will allow the class to be taught in the HR track for 3 credit hours and in the Business Analytics track for 6 credit hours.

See Appendix B, for CARs (PDF will be added for University approval).

Appendix A

Catalog Copy for Business Analytics

Management MS

Introduction

Together, the Graduate Student Handbook and your graduate program handbook should serve as your main guide throughout your graduate career. The Graduate Student Handbook includes university information, policies, requirements and guidance for all graduate students. Your program handbook describes the details about graduate study and requirements in your specific program. While both of these handbooks are wonderful resources, know that you are always welcome to talk with faculty and staff in your program and in the Graduate College.

Academic Integrity

The central activities and missions of a university rest upon the fundamental assumption that all members of the university community conduct themselves in accordance with a strict adherence to academic and scholarly integrity. As a graduate student and member of the university community, you are expected to display the highest standards of academic and personal integrity.

Here are some resources to help you better understand your responsibilities:

- Academic Honesty
- Academic Integrity Training - Open to all graduate students at no cost

Degree Requirements

The Master of Science in Management program provides an alternative to the MBA degree for students who desire specialized study and the development of a high level of professional proficiency in a functional area of business. The tracks in the Management program prepare students to work in organizations in such areas as human resources, strategic planning, organizational effectiveness, and business analysis. The program of study consists of 30 credit hours of study as outlined below.

Curriculum

Masters of Science in Management

Core Courses—15 Credit Hours from the 7 courses listed below

- MAN 6325. Applied Research Tools (3 credit hours)
- MAN 6305 Human Resources Management (3 credit hours)
- MAN 6915 Applied Field Projects (3 credits for HR track, and 6 credits for BA track)
- MAN 6245 Organizational Behavior (3 credit hours)
- GEB 6YYY Business Intelligence (3 credit hours)
- QMB 6755 Models for Business Decision Making (3 credit hours)
- MAN 6311 Advanced Topics in Human Resources Management (3 credit hours)

Track Curriculum: Human Resources/Change Management

Required Courses—15 Credit Hours – Students would take 5 of the 7

- MAN 6385 Strategic Human Resources Management (3 credit hours)
- MAN6721 Applied Strategy and Business Policy (3 credit hours)
- MAN 6285 Change Management (3 credit hours)
- MAN 6448 Conflict Resolution and Negotiation (3 credit hours)
- MAN 6066 Ethical Leadership (3 credit hours)
- BUL 6444 Employment/Business Law (3 credit hours)
- GEB 6518 Strategic Innovation (3 credit hours)

Track Curriculum: Business Analytics

Required Courses—15 Credit Hours

- STA 5104 Advanced Computer Processing of Statistical Data (3 credit hours)
- STA 6714 Data Preparation (3 credit hours)
- STA 5703 Data Mining Methodology I (3 credit hours)
- STA 6704 Data Mining Methodology II (3 credit hours)
- MAR 6646 Marketing Analytics for Strategic Decision Making (3 credit hours)

Timeline for Completion

The PMSM is a 16-month cohort program that meets two evenings a week, allowing the busy professional to work full-time while earning this degree. Classes are held at UCF's Downtown Orlando Campus.

Graduate Research

UCF has three fundamental responsibilities with regard to graduate student research. They are to

(1) support an academic environment that stimulates the spirit of inquiry, (2) develop the intellectual property stemming from research, and (3) disseminate the intellectual property to the general public. Students are responsible for being informed of rules, regulations and policies pertaining to research. Below are some general policies and resources.

Research Policies and Ethics Information: UCF's Office of Research & Commercialization ensures the UCF community complies with local, state and federal regulations that relate to research. For polices including required Institutional Review Board (IRB) approval when conducting research involving human subjects (e.g. surveys), animal research, conflict of interest and general responsible conduct of research, please see their website: www.research.ucf.edu/ > Compliance.

UCF's Patent and Invention Policy: In most cases, UCF owns the intellectual property developed using university resources. The graduate student as inventor will according to this policy share in the proceeds of the invention. Please see the current UCF Graduate Catalog for details: www.graduatecatalog.ucf.edu/ > Policies > General Graduate Policies.

Financial Support

Students with qualifying assistantships or university-wide fellowships will receive financial packages that include an assistantship or fellowship stipend, tuition remission, and health insurance. Qualifying fellowships are accompanied by tuition waivers. Qualifying assistantships include single appointments of at least .50 FTE (20 hrs/week) or two appointments of at least .25 FTE (10 hrs/week). Tuition remission is in the form of either tuition waivers or tuition payments that cover in-state (resident) tuition. Non-resident students with financial packages are not charged out-of-state tuition or the non-resident financial aid fee.
For additional information about funding for graduate school, please visit the Funding for Graduate School section of the College of Graduate Studies Students website.

If you are interested in applying for loans or externally funded need-based awards, visit the Office of Student Financial Assistance website at and complete the Free Application for Federal Student Aid (FAFSA), which is available January 1 each year.

Graduate Student Associations

Business-related student organizations (or associations) provide a voice for business students in the College of Business Administration. For a listing of student organizations for business students visit the Student Organizations webpage on the College of Business Administration website.

Professional Development

Executive Development Center

The Executive Development Center offers programs that range from broad-based professional development to topic-specific workshops. Distinguished UCF faculty and leading practitioners teach these certificate and non-degree programs that train participants in the areas of branding, finance, leadership, and strategy. For additional information, Please visit the Executive Development Center's webpage.

Faculty Center for Teaching and Learning

The Faculty Center for Teaching and Learning (FCTL) promotes excellence in all levels of teaching at the University of Central Florida. To that end, they offer several programs for the professional development of Graduate Teaching Assistants at UCF.

GTA Training (mandatory for employment as a GTA)

This training provides information and resources for students who will be instructors in a two-day workshop. The seminars cover a variety of topics, including course development, learning theories, lecturing, and academic freedom. Those interested in additional training can also attend an optional training session that normally follows the mandatory training.

Preparing Tomorrow's Faculty Program

This certificate program (12-weeks) consists of group and individualized instruction by Faculty Center staff and experienced UCF professors. Textbooks and materials are provided.

For more information Events > GTA Programs section of the Faculty Center for Teaching and Learning website or call 407/823-3544.

Graduate Research Forum

The Research Forum will feature poster displays representing UCF's diverse colleges and disciplines. The Research Forum is an opportunity for students to showcase their research and creative projects and to receive valuable feedback from faculty judges. Awards for best poster presentation in each category will be given and all participants will receive recognition.

The College of Graduate Studies and the Graduate Student Association invite all UCF students, community, and employers to attend the Graduate Research Forum. For more information, visit the Graduate Research Forum webpage or contact researchweek@ucf.edu.

Graduate Excellence Awards

Each year, the College of Graduate Studies offers graduate students who strive for academic and professional excellence the opportunity to be recognized for their work. Please visit the College of Graduate Studies, Graduate Awards webpage for a listing of awards and application requirements.

Other

Students should take opportunities to present a poster or a topic of research at a conference. To obtain financial support to present at a conference (other than through your program) or to engage in comparable creative activity at a professional meeting, visit the Graduate Travel Support section at www.students.graduate.ucf.edu/travel_support/.

For information about the Council of Southern Graduate Schools (CSGS) thesis and dissertation awards, see their website: www.csgs.org/> Awards.

For **grant-proposal writing** resources: http://uwc.ucf.edu/gradwriting.php.

Job Search

Office for Career Connections

The Office for Career Connections provides career management, internship and job placement services for MBA and graduate business students. It serves employers with their MBA and graduate business internship and full-time hiring needs. For more information visit the Career Connections webpage.

University of Central Florida

Department of Statistics

MEMORANDUM

TO: Teresa Dorman, Associate Dean, COS

FROM: David M. Nickerson, Chair, Department of Statistics

DATE: February 12, 2014

RE: Approval of Masters of Business Analytics

The graduate program committee in the Department of Statistics has reviewed the proposed Masters of Business Analytics. They have approved the curriculum and, in particular, the use of statistics courses listed therein. We will support the program by providing faculty to teach the statistics courses and by serving on the program committee.

Orlando, Florida 32816-2370 • (407) 823-5528 • David.Nickerson@ucf.edu

Taylor Ellis

From: Teresa Dorman
Sent: Thursday, February 20, 2014 5:15 PM
To: Taylor Ellis; Paul Jarley; Richard Hofler; Ronald Michaels; Carol Saunders
Cc: Michael Johnson; David Nickerson
Subject: RE: Business Analytics
Attachments: Business Analytics Proposal_ProgRecForm.pdf

Taylor et al:

I write to let you know that the College of Sciences graduate curriculum committee reviewed and approved the attached proposal for the addition of a Business Analytics track in the Marketing MS program. Within the PDF you will find the final proposal and the letter of support from the Statistics Department.

Please accept this email as a signature confirming college curriculum approval.

As Dr. Nickerson will be involved in the ultimate new degree program's development, who will he be working with as the pre-proposal and full proposal are developed, and as the Market Rate approval process is pursued? (FYI: the next deadline to the provost for CAVP review/approval is 3/7/14).

Thank you,
Teresa

Dr. Teresa Dorman
Associate Dean for Academic & Student Affairs College of Sciences

-----Original Message-----
From: Teresa Dorman
Sent: Monday, February 10, 2014 10:53 AM
To: Taylor Ellis; Paul Jarley; Michael Johnson; David Nickerson; Richard Hofler; Ronald Michaels; Carol Saunders
Subject: RE: Business Analytics

Taylor (et al):

Statistics will be able to provide the memo of support after his department faculty have had an opportunity to review the curriculum. This memo, along with the documents I've received from Taylor already, will go to our college's curriculum for review and then this and CBA's approval of the program will go to the university committee.

When I receive the support memo from Statistics, I will share it with you and give you a timeline for when COS will complete it's curriculum review.

Teresa

-----Original Message-----
From: Taylor Ellis
Sent: Wednesday, February 05, 2014 10:31 AM
To: Teresa Dorman; Paul Jarley; Michael Johnson; David Nickerson; Richard Hofler; Ronald Michaels; Carol Saunders

Subject: Business Analytics

Just another update. The proposal will go before the College of Business MPRC, Monday Feb. 10th at 10:20.

Taylor

Appendix B

CARs for Proposed new classes and credit hour changes are attach in PDF format.

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

Program Recommendation Form

This form is to be used to revise, add, suspend, or delete degree programs, tracks, or certificate programs. If there are changes to a program and the changes will affect the program tracks also, one form may be used for both the program and the track.

PLEASE NOTE: The deadline for new tracks or certificates is **February 1 of each year**. Any proposal for new tracks or certificates received after this date will not be included in the next year's catalog. Revisions to existing programs, tracks, or certificates are **due by March 15**. Any proposals for revisions received after that date will not be included in the next year's catalog. Please include catalog copy (description, curriculum, contact information, application requirements, and application deadlines). **For revisions – attach the catalog copy showing changes (use Track Changes in Word).**

College/Unit(s) Submitting Proposal: College of Health and Public Affairs

Proposed Effective Term/Year: Fall 2014

Unit(s) Housing Program: Public Affairs Doctoral Program and School of Public Administration

Name of program, track and/or certificate: Public Affairs PhD - Master of Public Administration Dual Degree Track

Brief description of program (this description will show up in the graduate catalog copy)**: Do not add complete catalog copy here.**

The Public Affairs PhD - Public Administration MPA Dual Degree Track provides academically talented students an opportunity to earn the Doctor of Philosophy in Public Affairs and the Master of Public Administration degrees concurrently. Students successfully completing the PhD/MPA Dual Degree program will have the skills and analytical techniques for careers in academia or in the public and nonprofit sectors. After successful completion of the PhD/MPA Dual Degree program, students will receive two diplomas, one for the Public Administration MPA degree and one for the Public Affairs PhD degree.

DELIVERY - Will program be delivered: ☐ **Face to face** ☐ **Completely online** ☐ **Mixed delivery**

Admissions deadlines: (Please specify if you have a different deadline for the track than for the program?)

Application requirements: (Please specify if you have different application requirements for the track than for the program? Will you admit directly to the track?)

Program Director(s) and contact information: (name, email, phone, campus address, program website address)

Lynette Feder

lynette.feder@ucf.edu

407-823-3650; HPA I, Room 220 http://www2.cohpa.ucf.edu/publicaffairs/

Please check one: this action affects a: ☐ Program ☐ Track ☐ Certificate

Please check one: this action is a(n):

☐ Addition. Please proceed to Part A.

☐ Revision. If a revision applies to multiple tracks, please list them here and then proceed to Part A:

☐ Inactivation

☐ Temporary Suspension of Admissions. Give Length of Suspension:

Temporary suspension of admissions: The program will be removed from the online application. A notation will be entered in the graduate catalog indicating the length of the suspension of admissions. Currently enrolled students will not experience any issues with continued enrollment.

Inactivation: Admissions will be suspended for new students and the program will be removed from the online application. Students active in the program are eligible to complete the program under the appropriate criteria and an appropriate teach-out plan is required. The program will be removed from the catalog as of the approved term.

If you checked inactivation or you are temporarily suspending admissions, please go to Part B and complete it.

Signature Page

Recommend Approval (all approval levels must be signed)

Department Chair	(Print)	[illegible]	(Signature)	[signature]	Date 2/11/14
College Academic Standards	(Print)	[illegible]	(Signature)	[signature]	Date 2/11/14
College Dean	(Print)	Taylor Ellis	(Signature)	[signature]	Date 2/12/2014
Graduate Council	(Print)		(Signature)		Date
Graduate Dean	(Print)		(Signature)		Date

Approval

Provost and Executive Vice President: _____ Date _____

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

Department(s); College; Registrar; Associate Registrar; Institutional Research; Academic Services; Faculty Senate; University Analysis and Planning Support; College of Graduate Studies

Part A – For additions or revisions of programs, tracks or certificates

Brief statement of rationale: (Please indicate the rationale, how it affects the unit and faculty teaching in and students enrolled in the program, track or certificate.)

Two years ago the College of Health and Public Affairs decided to revise the doctoral program in Public Affairs (PAF) to be more in line with the community-based mission of the College and offer an interdisciplinary educational experience. The College put together a committee with at least one representative from each of the five tracks and four disciplines. The curriculum was revised using a competency-based approach. In the end, an interdisciplinary and methodologically rigorous program was developed that will provide graduates with the ability to have a significant and positive impact on our communities. We believe that this will provide students with a more enriched educational experience leaving them better able to have positive impact on the many social ills that affect our society.

Revisions to the main five tracks were approved in October. The Dual Degree track was omitted by accident and must now be approved to officially reflect the new PAF curriculum.

For Revisions:

Brief listing of Program Changes: (Please indicate the changes in bullet format. If there are changes to the credit hours of the program, required courses or other requirements, please state those changes. **Remember to attach the catalog copy showing changes, using Track Changes in Word.**)

-Total credit hours increased from 57 to 60
-Required courses restructured and increase from 42 credit hours to 45 credit hours
-Interdisciplinary Practicum course added as part of required courses

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 provide a list of students if possible:

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

Name Change

Are you changing the name of an existing program, track, or certificate? ☐ **Yes** ☐ **No**

If yes, provide the new name of the program, track, or certificate:

Provide the name of the current program, track, or certificate:

When is the name change effective? Please note: A name change will apply to the record of all students who are currently enrolled, readmitted or newly admitted into this program as of the effective date of this change.

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

If you are requesting a CIP Code change for an existing program, track, or certificate, please provide:

old CIP:

new CIP:

If a name change is your only revision, stop here. Otherwise, complete the rest of Part A.

Part A - Continued

Specify the faculty who will participate in the program, track or certificate and their credentials to do so: (List faculty and a brief paragraph of their credentials.)

See attached.

Impact of changes on students: Will current students be impacted by the addition or revision of a program, track or certificate? If so, how?

There are currently no active students in the MPA/PAF Dual Degree track.

If applicable, provide a written agreement (email is fine) from all involved units that they are in support of, will provide courses to, or will participate in the program, track, or certificate. Please attach the correspondence and also list the units here.

See attached.

If an addition, 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.

Not applicable as we already have a doctoral program in Public Affairs and we are only revising it to make it more consistent with the College's Mission Statement

	Year 1	Year 2	Year 3
Headcount	25	50	75
SCHs	198	396	585

If an addition, indicate likely career or student outcomes upon completion: (What will students do? What will their job titles be?)

Not applicable as we already have a doctoral program in Public Affairs and we are only revising it to make it more consistent with the College's Mission Statement

Part A - Continued

If an addition or there are substantial REVISIONS to existing tracks or certificates, please complete the following table on financial support: (Specify all forms of support – assistantships, fellowships, and tuition remission.)

	No. assistantship students	Source of funds	No. fellowship students (specify fellowship)	No. tuition remissions	Source of funds
Year 1					
Year 2					
Year 3					

Checklist of items to be provided:

☑ **Electronic graduate catalog copy for additions; track changes included if there are revisions. (required)**

☑ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☑ **Emails showing consultation with other units. (if applicable)**

☐ **If an addition, list of 1-3 students and 1-3 faculty for profiles in the graduate catalog (provide email address so Graduate Studies can contact them to write profiles and take photos). You may provide draft copy of profiles if you wish.**

☐ **If an addition, what disciplines does this program, track or certificate belong to? What other UCF graduate programs, tracks, or certificates are related to it? This information will be used to provide additional links for prospective students to search in the online graduate catalog.**

Part B – For inactivations or suspensions of programs, tracks, or certificates

Are students currently enrolled in the program? ☐ **Yes** ☐ **No**

If yes, number of current students:

Please specify the intended time period of inactivation or suspension:

If program, track, or certificate is being inactivated or suspended, then attach a "teach out" plan for all current students specifying how they can finish the program or where students will be placed if moving to another program. The "teach out" plan should specify when courses will be offered to enable students to finish. Specify whether students will remain in the existing program to finish, and if so, when the completion date will be, whether students will be moved to another program, etc. Please provide a list of students where applicable.

Sample teach out plan: Enter the terms and courses that will be taught for each term throughout the last semester. **Please delete course prefixes and numbers in this section if no teach out plan is required.**

Fall 2012	Spring 2013	Summer 2013	Fall 2013	Spring 2014

Checklist of items to be provided:

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **E-mails showing consultation with other units. (if applicable)**

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

Program Recommendation Form

This form is to be used to revise, add, suspend, or delete degree programs, tracks, or certificate programs. If there are changes to a program and the changes will affect the program tracks also, one form may be used for both the program and the track.

PLEASE NOTE: The deadline for new tracks or certificates is **February 1 of each year**. Any proposal for new tracks or certificates received after this date will not be included in the next year's catalog. Revisions to existing programs, tracks, or certificates are **due by March 15**. Any proposals for revisions received after that date will not be included in the next year's catalog. Please include catalog copy (description, curriculum, contact information, application requirements, and application deadlines). **For revisions – attach the catalog copy showing changes (use Track Changes in Word).**

College/Unit(s) Submitting Proposal: College of Health and Public Affairs

Proposed Effective Term/Year: Fall 2014

Unit(s) Housing Program: Public Affairs Doctoral Program and School of Public Administration

Name of program, track and/or certificate: Public Affairs PhD - Master of Public Administration Dual Degree Track

Brief description of program (this description will show up in the graduate catalog copy)**: Do not add complete catalog copy here.**

The Public Affairs PhD - Public Administration MPA Dual Degree Track provides academically talented students an opportunity to earn the Doctor of Philosophy in Public Affairs and the Master of Public Administration degrees concurrently. Students successfully completing the PhD/MPA Dual Degree program will have the skills and analytical techniques for careers in academia or in the public and nonprofit sectors. After successful completion of the PhD/MPA Dual Degree program, students will receive two diplomas, one for the Public Administration MPA degree and one for the Public Affairs PhD degree.

DELIVERY - Will program be delivered: ☐ **Face to face** ☐ **Completely online** ☐ **Mixed delivery**

Admissions deadlines: (Please specify if you have a different deadline for the track than for the program?)

Application requirements: (Please specify if you have different application requirements for the track than for the program? Will you admit directly to the track?)

Program Director(s) and contact information: (name, email, phone, campus address, program website address)

Lynette Feder

lynette.feder@ucf.edu

407-823-3650; HPA I, Room 220 http://www2.cohpa.ucf.edu/publicaffairs/

Please check one: this action affects a: ☐ Program ☐ Track ☐ Certificate

Please check one: this action is a(n):

☐ Addition. Please proceed to Part A.

☐ Revision. If a revision applies to multiple tracks, please list them here and then proceed to Part A:

☐ Inactivation

☐ Temporary Suspension of Admissions. Give Length of Suspension:

Temporary suspension of admissions: The program will be removed from the online application. A notation will be entered in the graduate catalog indicating the length of the suspension of admissions. Currently enrolled students will not experience any issues with continued enrollment.

Inactivation: Admissions will be suspended for new students and the program will be removed from the online application. Students active in the program are eligible to complete the program under the appropriate criteria and an appropriate teach-out plan is required. The program will be removed from the catalog as of the approved term.

If you checked inactivation or you are temporarily suspending admissions, please go to Part B and complete it.

Signature Page

Recommend Approval (all approval levels must be signed)

Department Chair (Print) _____ **(Signature)** _____ **Date** _____

College Academic Standards (Print) _____ **(Signature)** _____ **Date** _____

College Dean (Print) _____ **(Signature)** _____ **Date** _____

Graduate Council (Print) _____ **(Signature)** _____ **Date** _____

Graduate Dean (Print) _____ **(Signature)** _____ **Date** _____

Approval

Provost and Executive Vice President: _____ **Date** _____

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

Department(s); College; Registrar; Associate Registrar; Institutional Research; Academic Services; Faculty Senate; University Analysis and Planning Support; College of Graduate Studies

Part A – For additions or revisions of programs, tracks or certificates

Brief statement of rationale: (Please indicate the rationale, how it affects the unit and faculty teaching in and students enrolled in the program, track or certificate.)

Two years ago the College of Health and Public Affairs decided to revise the doctoral program in Public Affairs (PAF) to be more in line with the community-based mission of the College and offer an interdisciplinary educational experience. The College put together a committee with at least one representative from each of the five tracks and four disciplines. The curriculum was revised using a competency-based approach. In the end, an interdisciplinary and methodologically rigorous program was developed that will provide graduates with the ability to have a significant and positive impact on our communities. We believe that this will provide students with a more enriched educational experience leaving them better able to have positive impact on the many social ills that affect our society.

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Part A - Continued

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See attached.

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☐ **If an addition, list of 1-3 students and 1-3 faculty for profiles in the graduate catalog (provide email address so Graduate Studies can contact them to write profiles and take photos). You may provide draft copy of profiles if you wish.**

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☐ **E-mails showing consultation with other units. (if applicable)**

Documentation from College of Business Administration

Sabrina Kalish

From: Robert Porter
Sent: Wednesday, February 12, 2014 9:13 AM
To: Sabrina Kalish; Judy Ryder
Cc: Max Poole
Subject: RE: Professional Science Master/Professional Courses

Sabrina,

I do recall our conversation about the course changes. I reviewed your program revisions, and I support the changes you have made.

Dr. Bob Porter
Executive Director
Executive Development Center/MBA Programs UCF College of Business rporter@bus.ucf.edu

407-235-3904

_____
From: Sabrina Kalish
Sent: Tuesday, February 11, 2014 4:06 PM
To: Judy Ryder
Cc: Robert Porter; Max Poole
Subject: RE: Professional Science Master/Professional Courses

Hi Judy,

Thank you but when we last talked about these courses, I think we concluded that they were not a good fit for our PSM program because they have prerequisites attached to them. At the time, you, Bob, and Robin suggested that the management (MAN) and entrepreneurship (GEB) courses would be better options for M&S PSM students to fulfill their business coursework requirement. Many of these courses would not be a change from the elective choices we were previously collaborating over.

I wrote Bob last week to show him our PSM program revision that we are ready to submit for Graduate Council review and to request his written confirmation representing CBA. (Proposal draft is reattached for your reference.) It's been a long year of trying to map out our new PSM curriculum. I hope we are still able to count on collaborating with the MAN and GEB courses we previously discussed.

Thank you,
Sabrina

Sabrina Kalish, M.A.
Coordinator, Modeling & Simulation Graduate Program University of Central Florida
Phone: (407) 882-1407
Mailcode: 0544
www.ist.ucf.edu/grad

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Documentation from Psychology Department

Sabrina Kalish

From: Barbara Fritzsche
Sent: Wednesday, February 26, 2014 2:00 PM
To: Sabrina Kalish
Subject: Re: Curriculum collaboration with Modeling & Simulation PSM program

Dear Sabrina,

We would be happy to allow MS PSM students into the 3 courses listed.

Sincerely,
Barbara

On Feb 11, 2014, at 4:13 PM, "Sabrina Kalish" <Sabrina.Kalish@ucf.edu> wrote:

> Barbara:
>
> Thank you again for meeting with me by phone this week to discuss opportunities for collaboration towards our Modeling and Simulation PSM curriculum revision. We were pleased to review the courses which you recommended for our program and agree that they are a great fit.
>
> We are ready to submit our curriculum edits for Graduate Council review, but need to include documentation from contributing units. Could you please review the information below and reply with your agreement to the inclusion of these courses from your academic unit?
>
> We are proposing to use these Industrial-Organizational Psychology courses as options towards the requirement for business/management/entrepreneurship:
> - INP 6058 Job Analysis and Performance Appraisal (3 credit hours)
> - INP 6317 Work Motivation and Job Attitudes (3 credit hours)
> - INP 6605 Training and Team Performance (3 credit hours)
>
> The full proposal is attached for your reference as well.
>
> Many thanks for your continued partnership,
> Sabrina

Sabrina Kalish, M.A.
Coordinator, Modeling & Simulation Graduate Program
University of Central Florida
Phone: (407) 882-1407
Mailcode: 0544
www.ist.ucf.edu/grad

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Join our networks! <image003.png> <image004.png>
Search “UCF Modeling & Simulation Graduate Program” on Facebook and Linked In

Current Graduate Catalog Description

Modeling and Simulation MS

Professional Science Master's Track

TRACK DESCRIPTION

The Professional Science Master's (PSM) track in the Modeling and Simulation (M&S) Master of Science (MS) program is a two-year course of study designed for working professionals who wish to expand their knowledge and skills in the growing field of modeling and simulation and who will pursue the degree as part-time students. The track's goal is to fill an important niche for training early- to mid-level technical professionals working in the field of modeling and simulation, and to meet strong workforce demands from the Central Florida region, the state of Florida and the nation.

The PSM track in the M&S MS program is a cohort track that consists of a two-year 36-credit hour program of study that covers Fall, Spring and Summer consecutive academic terms. Admissions to the track occur only in the Fall semester of each year, and students are expected to finish the degree in two years.

The program of study includes a balanced course offering not only of technical courses in the science of modeling and simulation but it also includes advanced courses in business management and entrepreneurship. This sequence of courses should provide students with valuable workplace skills through academic and professional training in order to prepare graduates for career paths in the corporate world.

Courses are taught by an interdisciplinary faculty from the UCF Department of Industrial Engineering and Management Systems, the UCF Institute for Simulation and Training, and the UCF College of Business Administration. The curriculum of courses is delivered via a mixture of full online and mixed-mode courses that can be taken remotely and as face-to-face evening courses.

Read More

CURRICULUM

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

The curriculum of the Professional Science Master's track in the M&S MS program has been designed in part using valuable input from leaders in various industrial and governmental sectors of the modeling and simulation communities. Students may choose to take courses from either of two specialty areas. Upon taking the foundation core of courses, students may then choose either the courses from the General Business Management specialty area or the courses from the Entrepreneurship specialty area, depending upon their career aspirations.

The PSM track in the M&S MS program requires the completion of 36 credit hours beyond the bachelor's degree. At least 18 credit hours of courses must be at the 6000 level. The program is set up so that students generally take 21 credit hours (7 courses) of technical courses and 15 credit hours (5 courses) of business courses. The capstone requirement for this PSM track is fulfilled by students completing a 3-credit-hour graduate internship.

Required Courses—36 Credit Hours

Foundation Core—18 Credit Hours

- IDS 6146 Modeling and Simulation Systems (3 credit hours)
- IDS 6147 Perspectives on Modeling and Simulation (3 credit hours)
- ESI 5531 Discrete Systems Simulation (3 credit hours)
- EIN 5140 Project Engineering (3 credit hours)
- ACG 6065 Accounting Foundations (3 credit hours)
- FIN 6404 Foundations of Finance (3 credit hours)

Specialty Area—18 Credit Hours

Specialty Area I: General Business Management

- IDS 6148 Human Systems Integration for Modeling and Simulation (3 credit hours)
- MAN 6245 Organizational Behavior and Development (3 credit hours)
- ESI 6532 Object-Oriented Simulation (3 credit hours)
- ECO 6418 Economic Concepts with Math Applications (3 credit hours)
- MAR 6466 Strategic Supply Chain Management (3 credit hours)
- IDS 6946 Graduate Internship (3 credit hours)

Specialty Area II: Entrepreneurship

- IDS 6148 Human Systems Integration for Modeling and Simulation (3 credit hours)
- GEB 5516 Technological Entrepreneurship (3 credit hours)
- ESI 6532 Object-Oriented Simulation (3 credit hours)
- GEB 6518 Strategic Innovation (3 credit hours)
- GEB 6116 Business Plan Formation (or Elective Course) (3 credit hours)
- IDS 6946 Graduate Internship (3 credit hours)

Students who successfully complete the three GEB courses are eligible to receive the 9-credit-hour Graduate Certificate in Technology Ventures. These three courses focus on the successful development of the knowledge and skills needed to commercialize science and technology research. Those students interested in business opportunities enabled by scientific and technological innovations will find the coursework involving intellectual property issues, innovation commercialization processes, technology business strategies and business plan formation invaluable to their success.

Students desiring to obtain the Graduate Certificate in Technology Ventures MUST apply for the certificate program prior to enrolling in the third GEB course in order to be awarded the graduate certificate.

Elective Courses

- EIN 5108 The Environment of Technical Organizations (3 credit hours)
- EIN 5255C Interactive Simulation (3 credit hours)
- EIN 5317 Training System Design (3 credit hours)
- EIN 5356 Cost Engineering (3 credit hours)
- EIN 6258 Human Computer Interaction (3 credit hours)
- EIN 6528 Simulation Based Life Cycle Engineering (3 credit hours)
- ESI 5219 Engineering Statistics (3 credit hours)
- ESI 5227 Total Quality Improvement (3 credit hours)
- ESI 6224 Quality Management (3 credit hours)
- ESI 6551C Systems Engineering (3 credit hours)

Equipment Fee

Students in the Modeling and Simulation MS program pay a $27 equipment fee each semester that they are enrolled. Part-time students pay $13.50 per semester.

APPLICATION REQUIREMENTS

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

Entering students are expected to have an appropriate technical background in engineering, computer science or other simulation-related disciplines, through academic preparation and/or work experience. Students should have completed the introductory undergraduate calculus course, and have proficiency in both statistics and a higher order programming language such as C++. The Graduate Record Examination (GRE) is not required.

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
- Goal Statement
    - The goal statement should discuss all relevant professional background and any previous research and/or teaching experience. The statement should explain the motivation behind the pursuit of a Professional Science Master’s degree in Modeling and Simulation.

Future career goals after the completion of the applicant's master study should be discussed.
    - The goal statement should between 500 and 1,000 words.
- One letter of recommendation
    - The letter of recommendation should be from a faculty member, administrator or employer. The letter, which must be current to the application, should address the educational and career goals of applicant. The letter writer should also know the applicant well enough to discuss the applicant's capacity to perform, excel and succeed in a graduate program.
- Interview with Program Director and/or Associate Program Director
- 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.

Readmission

Applicants who are reapplying for admission need not resubmit transcripts if the transcripts are previously on file with UCF. However, the following application requirements do need to be current for the new application for readmission:

- Résumé/Curriculum Vitae
- Goal Statement
- Letters of Recommendation

Application Deadlines

Professional Science Master's	Fall Priority	Fall	Spring	Summer
Domestic Applicants	-	Jul 15	-	-
International Applicants	-	Jan 15	-	-
International Transfer Applicants	-	Mar 1	-	-

Proposed Curriculum - Showing marked up revisions

Modeling and Simulation MS

Professional Science Master's Track

TRACK DESCRIPTION

The Professional Science Master's (PSM) track in the Modeling and Simulation (M&S) Master of Science (MS) program is a ~~two-year~~ course of study designed for working professionals and full-time students who wish to expand their knowledge and skills in the growing field of modeling and simulation. This degree can be pursued either full-time or ~~and who will pursue the degree as~~ part-time ~~students~~. The track's goal is to fill an important niche for training early- to mid-level technical professionals with interest in ~~working in~~ the field of modeling and simulation, and to meet strong workforce demands from the Central Florida region, the state of Florida and the nation.

~~The PSM track in the M&S MS program is a cohort track that consists of a two-year 36-credit hour program of study that covers Fall, Spring and Summer consecutive academic terms. Admissions to the track occur only in the Fall semester of each year, and students are expected to finish the degree in two years.~~

The program of study includes a balanced course offering not only of technical courses in the science of modeling and simulation but it also includes advanced courses in business management and entrepreneurship. Elective offerings incorporate courses that are highly relatable to industries where modeling and simulation can be applied. This ~~sequence of courses~~ curriculum and the required internship should provide students with valuable workplace skills through academic and professional training in order to prepare graduates for career paths in the corporate world.

Courses are taught by an interdisciplinary faculty from ~~the UCF Department of Industrial Engineering and Management Systems,~~ the UCF Institute for Simulation and Training, and ~~the UCF College of Business Administration~~nearly every academic college at UCF. The curriculum of courses is delivered via a mixture of ~~full~~ face-to-face, fully online, and mixed-mode ~~courses~~instruction ~~that can be taken remotely and as face-to-face evening courses~~.

Read More

CURRICULUM

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

The curriculum of the Professional Science Master's track in the M&S MS program has been designed in part using valuable input from leaders in various industrial and governmental sectors of the modeling and simulation communities. Students are required to complete courses in M&S technical sciences, and

business management and/or entrepreneurship~~may choose to take courses from either of two specialty areas~~. ~~Upon taking the foundation core of courses, s~~Students may then consider elective courses in highly relatable industries ~~choose either the courses from the General Business Management specialty area or the courses from the Entrepreneurship specialty area,~~ depending upon their career aspirations and graduate program advising.

The PSM track in the M&S MS program requires the completion of 36 credit hours beyond the bachelor's degree. At least 18 credit hours of courses must be at the 6000 level. ~~The program is set up so that students generally take 21 credit hours (7 courses) of technical courses and 15 credit hours (5 courses) of business courses.~~ The capstone requirement for this PSM track is fulfilled by students completing a 3-credit-hour graduate internship.

Required Courses—~~36~~ 24 Credit Hours

~~Foundation Core~~Required Technical Courses —12~~18~~ Credit Hours

- IDS 6147 Perspectives on Modeling and Simulation (3 credit hours)
- IDS 6146 Modeling and Simulation Systems (3 credit hours)
- ~~IDS 6147 Perspectives on Modeling and Simulation (3 credit hours)~~
- ESI 5531 Discrete Systems Simulation (3 credit hours)
- EIN 5140 Project Engineering (3 credit hours)
- ~~ACG 6065 Accounting Foundations (3 credit hours)~~
- ~~FIN 6404 Foundations of Finance (3 credit hours)~~

~~Specialty Area~~Required Business Management/Entrepreneurial Courses — 12~~18~~ Credit Hours

Students may choose any combination of courses between General Business/Management and Entrepreneurship to fulfill this requirement. Other courses not on the list may be considered for approval by the Graduate Program Director. All such requests must be made in advance of enrolling in the course.

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~~Specialty Area I:~~ General Business/~~-~~Management

- ~~IDS 6148 Human Systems Integration for Modeling and Simulation (3 credit hours)~~
- EIN 5108 The Environment of Technical Organizations (3 credit hours)
- EIN 5356 Cost Engineering (3 credit hours)
- INP 6058 Job Analysis and Performance Appraisal (3 credit hours)
- INP 6317 Work Motivation and Job Attitudes (3 credit hours)
- INP 6605 Training and Team Performance (3 credit hours)
- MAN 6245 Organizational Behavior and Development (3 credit hours)
- ~~ESI 6532 Object-Oriented Simulation (3 credit hours)~~
- ~~ECO 6418 Economic Concepts with Math Applications (3 credit hours)~~

- MAN 6305 Human Resources Management (3 credit hours)
- MAN 6448 Conflict Resolution and Negotiation (3 credit hours)
- MAR 6466 Strategic Supply Chain Management (3 credit hours)
- ~~IDS 6946 Graduate Internship (3 credit hours)~~

~~Specialty Area II:~~ Entrepreneurship

- ~~IDS 6148 Human Systems Integration for Modeling and Simulation (3 credit hours)~~
- GEB 5516 Technological Entrepreneurship (3 credit hours)*
- ~~ESI 6532 Object-Oriented Simulation (3 credit hours)~~
- GEB 6115 Entrepreneurship (3 credit hours)
- GEB 6116 Business Plan Formation ~~(or Elective Course)~~ (3 credit hours)*
- GEB 6518 Strategic Innovation (3 credit hours)*
- ~~GEB 6116 Business Plan Formation (or Elective Course) (3 credit hours)~~
- ~~IDS 6946 Graduate Internship (3 credit hours)~~

Students who successfully complete the three GEB courses designated with an asterisk mark (*) are eligible to receive the 9-credit-hour Graduate Certificate in Technology Ventures. These three courses focus on the successful development of the knowledge and skills needed to commercialize science and technology research. Those students interested in business opportunities enabled by scientific and technological innovations will find the coursework involving intellectual property issues, innovation commercialization processes, technology business strategies and business plan formation invaluable to their success.

Students desiring to obtain the Graduate Certificate in Technology Ventures MUST apply for the certificate program prior to enrolling in the third GEB course in order to be awarded the graduate certificate.

Elective Courses - 9 Credit Hours

Students should carefully select electives with the guidance of a faculty advisor. Elective choices should be made with the intent to strengthen a professional interest and/or area of focus in order to meet the individual student's educational and professional goals and objectives.

Listed below are suggested courses in various areas of focus or specialization. These course groupings are mere guides, are not exhaustive, and are only meant to assist with advising and course selection in order to meet the individual student's educational goals and objectives. They are not intended to restrict elective choices among focus areas as we strongly encourage M&S PSM students to maintain an interdisciplinary approach to their graduate studies.

If a student identifies another UCF course which may be of value to his/her M&S interests, but is not already identified in a list below, he/she may request approval from the Graduate Program Director for the

course to be used as an elective in the Graduate Plan of Study. All such requests must be made in advance of enrolling in the course.

Formatted: None

- ~~EIN 5108 The Environment of Technical Organizations (3 credit hours)~~
- ~~EIN 5255C Interactive Simulation (3 credit hours)~~
- ~~EIN 5317 Training System Design (3 credit hours)~~
- ~~EIN 5356 Cost Engineering (3 credit hours)~~
- ~~EIN 6258 Human Computer Interaction (3 credit hours)~~
- ~~EIN 6528 Simulation Based Life Cycle Engineering (3 credit hours)~~
- ~~ESI 5219 Engineering Statistics (3 credit hours)~~
- ~~ESI 5227 Total Quality Improvement (3 credit hours)~~
- ~~ESI 6224 Quality Management (3 credit hours)~~
- ~~ESI 6551C Systems Engineering (3 credit hours)~~

Government/ Defense Contracting

- EIN 6258 Simulation Based Life Cycle Engineering (3 credit hours)
- PAD 5850 Grant and Contract Management (3 credit hours)
- ESI 6551C Systems Engineering (3 credit hours)

Instructional Design for Entertainment and Education

- DIG 5137 Information Architecture (3 credit hours)
- DIG 6836 Design and Development for Texts and Technology (3 credit hours)
- DIG 6647 Science and Technology of Dynamic Media (3 credit hours)
- EME 6614 Instructional Game Design for Training and Education (3 credit hours)
- ENC 6426 Visual Texts and Technology (3 credit hours)

Health Services Systems

- HSA 6119 Health Care Organization and Management I (3 credit hours) - offered Spring
- PHC 6000. Epidemiology (3 credit hours) - offered Summer
- HSC 6636 Issues and Trends in the Health Professions (3 credit hours) – offered every semester

Non-Profit/Public Policy

- PAD 6142 Nonprofit Organizations
- PAD 5041 Ethics and Values in Public Administration (3 credit hours)
- PAD 5850 Grant and Contract Management (3 credit hours)

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Internship —3 Credit Hours

- IDS 6946 Graduate Internship (3 credit hours)

Equipment Fee

Students in the Modeling and Simulation MS program pay a $27 equipment fee each semester that they are enrolled. Part-time students pay $13.50 per semester.

APPLICATION REQUIREMENTS

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

Entering students are expected to have an appropriate technical background in engineering, computer science or other simulation-related disciplines, through academic preparation and/or work experience. Students should have completed the introductory undergraduate calculus course, and have proficiency in both statistics and a higher order programming language such as C++. The Graduate Record Examination (GRE) is not required.

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
- Goal Statement
    - The goal statement should discuss all relevant professional background and any previous research and/or teaching experience. The statement should explain the motivation behind the pursuit of a Professional Science Master's degree in Modeling and Simulation. Future career goals after the completion of the applicant's master study should be discussed.
    - The goal statement should between 500 and 1,000 words.
- ~~One~~ Two letters of recommendation
    - -The letters of recommendation should be from a faculty member, administrator or employer. The letter, which must be current to the application, should address the educational and career goals of applicant. The letter writer should also know the applicant well enough to discuss the applicant's capacity to perform, excel and succeed in a graduate program.
- ~~Interview with Program Director and/or Associate Program Director~~
- 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.

Readmission

Applicants who are reapplying for admission need not resubmit transcripts if the transcripts are previously on file with UCF. However, the following application requirements do need to be current for the new application for readmission:

- Résumé/Curriculum Vitae
- Goal Statement
- Letters of Recommendation

Application Deadlines

Professional Science Master's	Fall Priority	Fall	Spring	Summer
Domestic Applicants	-	Jul 15	-Dec 1	-
International Applicants	-	Jan 15	Jul 1-	-
International Transfer Applicants	-	Mar 1	Sep 1-	-

Proposed Curriculum - Showing clean, final revisions without markings.

Modeling and Simulation MS

Professional Science Master's Track

TRACK DESCRIPTION

The Professional Science Master's (PSM) track in the Modeling and Simulation (M&S) Master of Science (MS) program is a course of study designed for working professionals and full-time students who wish to expand their knowledge and skills in the growing field of modeling and simulation. This degree can be pursued either full-time or part-time. The track's goal is to fill an important niche for training early- to mid-level technical professionals with interest in the field of modeling and simulation, and to meet strong workforce demands from the Central Florida region, the state of Florida and the nation.

The program of study includes a balanced course offering not only of technical courses in the science of modeling and simulation but it also includes advanced courses in business management and entrepreneurship. Elective offerings incorporate courses that are highly relatable to industries where modeling and simulation can be applied. This curriculum and the required internship should provide students with valuable workplace skills through academic and professional training in order to prepare graduates for career paths in the corporate world.

Courses are taught by an interdisciplinary faculty from the UCF Institute for Simulation and Training, and nearly every academic college at UCF. The curriculum of courses is delivered via a mixture of face-to-face, fully online, and mixed-mode instruction.

Read More

CURRICULUM

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

The curriculum of the Professional Science Master's track in the M&S MS program has been designed in part using valuable input from leaders in various industrial and governmental sectors of the modeling and simulation communities. Students are required to complete courses in M&S technical sciences, and business management and/or entrepreneurship. Students may then consider elective courses in highly relatable industries depending upon their career aspirations and graduate program advising.

The PSM track in the M&S MS program requires the completion of 36 credit hours beyond the bachelor's degree. At least 18 credit hours of courses must be at the 6000 level. The capstone requirement for this PSM track is fulfilled by students completing a 3-credit-hour graduate internship.

Required Courses—24 Credit Hours

Required Technical Courses —12 Credit Hours

- IDS 6147 Perspectives on Modeling and Simulation (3 credit hours)
- IDS 6146 Modeling and Simulation Systems (3 credit hours)
- ESI 5531 Discrete Systems Simulation (3 credit hours)
- EIN 5140 Project Engineering (3 credit hours)

Required Business Management/Entrepreneurial Courses —12 Credit Hours

Students may choose any combination of courses between General Business/Management and Entrepreneurship to fulfill this requirement. Other courses not on the list may be considered for approval by the Graduate Program Director. All such requests must be made in advance of enrolling in the course.

General Business/Management

- EIN 5108 The Environment of Technical Organizations (3 credit hours)
- EIN 5356 Cost Engineering (3 credit hours)
- INP 6058 Job Analysis and Performance Appraisal (3 credit hours)
- INP 6317 Work Motivation and Job Attitudes (3 credit hours)
- INP 6605 Training and Team Performance (3 credit hours)
- MAN 6245 Organizational Behavior and Development (3 credit hours)
- MAN 6305 Human Resources Management (3 credit hours)
- MAN 6448 Conflict Resolution and Negotiation (3 credit hours)
- MAR 6466 Strategic Supply Chain Management (3 credit hours)

Entrepreneurship

- GEB 5516 Technological Entrepreneurship (3 credit hours)*
- GEB 6115 Entrepreneurship (3 credit hours)
- GEB 6116 Business Plan Formation (3 credit hours)*
- GEB 6518 Strategic Innovation (3 credit hours)*

Students who successfully complete the three GEB courses designated with an asterisk mark (*) are eligible to receive the 9-credit-hour Graduate Certificate in Technology Ventures. These three courses focus on the successful development of the knowledge and skills needed to commercialize science and technology research. Those students interested in business opportunities enabled by scientific and technological innovations will find the coursework involving intellectual property issues, innovation commercialization processes, technology business strategies and business plan formation invaluable to their success.

Students desiring to obtain the Graduate Certificate in Technology Ventures MUST apply for the certificate program prior to enrolling in the third GEB course in order to be awarded the graduate certificate.

Elective Courses - 9 Credit Hours

Students should carefully select electives with the guidance of a faculty advisor. Elective choices should be made with the intent to strengthen a professional interest and/or area of focus in order to meet the individual student's educational and professional goals and objectives.

Listed below are suggested courses in various areas of focus or specialization. These course groupings are mere guides, are not exhaustive, and are only meant to assist with advising and course selection in order to meet the individual student's educational goals and objectives. They are not intended to restrict elective choices among focus areas as we strongly encourage M&S PSM students to maintain an interdisciplinary approach to their graduate studies.

If a student identifies another UCF course which may be of value to his/her M&S interests, but is not already identified in a list below, he/she may request approval from the Graduate Program Director for the course to be used as an elective in the Graduate Plan of Study. All such requests must be made in advance of enrolling in the course.

Government/ Defense Contracting

- EIN 6258 Simulation Based Life Cycle Engineering (3 credit hours)
- PAD 5850 Grant and Contract Management (3 credit hours)
- ESI 6551C Systems Engineering (3 credit hours)

Instructional Design for Entertainment and Education

- DIG 5137 Information Architecture (3 credit hours)
- DIG 6836 Design and Development for Texts and Technology (3 credit hours)
- DIG 6647 Science and Technology of Dynamic Media (3 credit hours)
- EME 6614 Instructional Game Design for Training and Education (3 credit hours)
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- PAD 5850 Grant and Contract Management (3 credit hours)

Internship —3 Credit Hours

- IDS 6946 Graduate Internship (3 credit hours)

Equipment Fee

Students in the Modeling and Simulation MS program pay a $27 equipment fee each semester that they are enrolled. Part-time students pay $13.50 per semester.

APPLICATION REQUIREMENTS

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

Entering students are expected to have an appropriate technical background in engineering, computer science or other simulation-related disciplines, through academic preparation and/or work experience. Students should have completed the introductory undergraduate calculus course, and have proficiency in both statistics and a higher order programming language such as C++. The Graduate Record Examination (GRE) is not required.

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
- Goal Statement
    - The goal statement should discuss all relevant professional background and any previous research and/or teaching experience. The statement should explain the motivation behind the pursuit of a Professional Science Master's degree in Modeling and Simulation. Future career goals after the completion of the applicant's master study should be discussed.
    - The goal statement should between 500 and 1,000 words.
- Two letters of recommendation
    - The letters of recommendation should be from a faculty member, administrator or employer. The letter, which must be current to the application, should address the educational and career goals of applicant. The letter writer should also know the applicant well enough to discuss the applicant's capacity to perform, excel and succeed in a graduate program.
- 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

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Applicants who are reapplying for admission need not resubmit transcripts if the transcripts are previously on file with UCF. However, the following application requirements do need to be current for the new application for readmission:

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International Transfer Applicants	-	Mar 1	Sep 1	-

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

Program Recommendation Form

This form is to be used to revise, add, suspend, or delete degree programs, tracks, or certificate programs. If there are changes to a program and the changes will affect the program tracks also, one form may be used for both the program and the track.

PLEASE NOTE: The deadline for new tracks or certificates is **February 1 of each year**. Any proposal for new tracks or certificates received after this date will not be included in the next year's catalog. Revisions to existing programs, tracks, or certificates are **due by March 15**. Any proposals for revisions received after that date will not be included in the next year's catalog. Please include catalog copy (description, curriculum, contact information, application requirements, and application deadlines). **For revisions – attach the catalog copy showing changes (use Track Changes in Word).**

College/Unit(s) Submitting Proposal: College of Health and Public Affairs

Proposed Effective Term/Year: Fall 2014

Unit(s) Housing Program: Public Affairs Doctoral Program and School of Public Administration

Name of program, track and/or certificate: Public Affairs PhD - Master of Public Administration Dual Degree Track

Brief description of program (this description will show up in the graduate catalog copy)**: Do not add complete catalog copy here.**

The Public Affairs PhD - Public Administration MPA Dual Degree Track provides academically talented students an opportunity to earn the Doctor of Philosophy in Public Affairs and the Master of Public Administration degrees concurrently. Students successfully completing the PhD/MPA Dual Degree program will have the skills and analytical techniques for careers in academia or in the public and nonprofit sectors. After successful completion of the PhD/MPA Dual Degree program, students will receive two diplomas, one for the Public Administration MPA degree and one for the Public Affairs PhD degree.

DELIVERY - Will program be delivered: ☐ **Face to face** ☐ **Completely online** ☐ **Mixed delivery**

Admissions deadlines: (Please specify if you have a different deadline for the track than for the program?)

Application requirements: (Please specify if you have different application requirements for the track than for the program? Will you admit directly to the track?)

Program Director(s) and contact information: (name, email, phone, campus address, program website address)

Lynette Feder

lynette.feder@ucf.edu

407-823-3650; HPA I, Room 220 http://www2.cohpa.ucf.edu/publicaffairs/

Please check one: this action affects a: ☐ Program ☐ Track ☐ Certificate

Please check one: this action is a(n):

☐ Addition. Please proceed to Part A.

☐ Revision. If a revision applies to multiple tracks, please list them here and then proceed to Part A:

☐ Inactivation

☐ Temporary Suspension of Admissions. Give Length of Suspension:

Temporary suspension of admissions: The program will be removed from the online application. A notation will be entered in the graduate catalog indicating the length of the suspension of admissions. Currently enrolled students will not experience any issues with continued enrollment.

Inactivation: Admissions will be suspended for new students and the program will be removed from the online application. Students active in the program are eligible to complete the program under the appropriate criteria and an appropriate teach-out plan is required. The program will be removed from the catalog as of the approved term.

If you checked inactivation or you are temporarily suspending admissions, please go to Part B and complete it.

Signature Page

Recommend Approval (all approval levels must be signed)

Department Chair (Print) Christopher D. Geiger **(Signature)** _____ **Date** _____

College Academic Standards (Print) _____ **(Signature)** _____ **Date** _____

College Dean (Print) _____ **(Signature)** _____ **Date** _____

Graduate Council (Print) _____ **(Signature)** _____ **Date** _____

Graduate Dean (Print) _____ **(Signature)** _____ **Date** _____

Approval

Provost and Executive Vice President: _____ **Date** _____

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

Department(s); College; Registrar; Associate Registrar; Institutional Research; Academic Services; Faculty Senate; University Analysis and Planning Support; College of Graduate Studies

Part A – For additions or revisions of programs, tracks or certificates

Brief statement of rationale: (Please indicate the rationale, how it affects the unit and faculty teaching in and students enrolled in the program, track or certificate.)

Two years ago the College of Health and Public Affairs decided to revise the doctoral program in Public Affairs (PAF) to be more in line with the community-based mission of the College and offer an interdisciplinary educational experience. The College put together a committee with at least one representative from each of the five tracks and four disciplines. The curriculum was revised using a competency-based approach. In the end, an interdisciplinary and methodologically rigorous program was developed that will provide graduates with the ability to have a significant and positive impact on our communities. We believe that this will provide students with a more enriched educational experience leaving them better able to have positive impact on the many social ills that affect our society.

Revisions to the main five tracks were approved in October. The Dual Degree track was omitted by accident and must now be approved to officially reflect the new PAF curriculum.

For Revisions:

Brief listing of Program Changes: (Please indicate the changes in bullet format. If there are changes to the credit hours of the program, required courses or other requirements, please state those changes. **Remember to attach the catalog copy showing changes, using Track Changes in Word.**)

-Total credit hours increased from 57 to 60
-Required courses restructured and increase from 42 credit hours to 45 credit hours
-Interdisciplinary Practicum course added as part of required courses

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 provide a list of students if possible:

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

Name Change

Are you changing the name of an existing program, track, or certificate? ☐ **Yes** ☐ **No**

If yes, provide the new name of the program, track, or certificate:

Provide the name of the current program, track, or certificate:

When is the name change effective? Please note: A name change will apply to the record of all students who are currently enrolled, readmitted or newly admitted into this program as of the effective date of this change.

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

If you are requesting a CIP Code change for an existing program, track, or certificate, please provide:

old CIP:

new CIP:

If a name change is your only revision, stop here. Otherwise, complete the rest of Part A.

Part A - Continued

Specify the faculty who will participate in the program, track or certificate and their credentials to do so: (List faculty and a brief paragraph of their credentials.)

See attached.

Impact of changes on students: Will current students be impacted by the addition or revision of a program, track or certificate? If so, how?

There are currently no active students in the MPA/PAF Dual Degree track.

If applicable, provide a written agreement (email is fine) from all involved units that they are in support of, will provide courses to, or will participate in the program, track, or certificate. Please attach the correspondence and also list the units here.

See attached.

If an addition, 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.

Not applicable as we already have a doctoral program in Public Affairs and we are only revising it to make it more consistent with the College's Mission Statement

	Year 1	Year 2	Year 3
Headcount	25	50	75
SCHs	198	396	585

If an addition, indicate likely career or student outcomes upon completion: (What will students do? What will their job titles be?)

Not applicable as we already have a doctoral program in Public Affairs and we are only revising it to make it more consistent with the College's Mission Statement

Part A - Continued

If an addition or there are substantial REVISIONS to existing tracks or certificates, please complete the following table on financial support: (Specify all forms of support – assistantships, fellowships, and tuition remission.)

	No. assistantship students	Source of funds	No. fellowship students (specify fellowship)	No. tuition remissions	Source of funds
Year 1					
Year 2					
Year 3					

Checklist of items to be provided:

☑ **Electronic graduate catalog copy for additions; track changes included if there are revisions. (required)**

☑ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☑ **Emails showing consultation with other units. (if applicable)**

☐ **If an addition, list of 1-3 students and 1-3 faculty for profiles in the graduate catalog (provide email address so Graduate Studies can contact them to write profiles and take photos). You may provide draft copy of profiles if you wish.**

☐ **If an addition, what disciplines does this program, track or certificate belong to? What other UCF graduate programs, tracks, or certificates are related to it? This information will be used to provide additional links for prospective students to search in the online graduate catalog.**

Part B – For inactivations or suspensions of programs, tracks, or certificates

Are students currently enrolled in the program? ☐ **Yes** ☐ **No**

If yes, number of current students:

Please specify the intended time period of inactivation or suspension:

If program, track, or certificate is being inactivated or suspended, then attach a "teach out" plan for all current students specifying how they can finish the program or where students will be placed if moving to another program. The "teach out" plan should specify when courses will be offered to enable students to finish. Specify whether students will remain in the existing program to finish, and if so, when the completion date will be, whether students will be moved to another program, etc. Please provide a list of students where applicable.

Sample teach out plan: Enter the terms and courses that will be taught for each term throughout the last semester. **Please delete course prefixes and numbers in this section if no teach out plan is required.**

Fall 2012	Spring 2013	Summer 2013	Fall 2013	Spring 2014

Checklist of items to be provided:

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **E-mails showing consultation with other units. (if applicable)**

Current Graduate Catalog Description

Modeling and Simulation MS

PROGRAM DESCRIPTION

Input from industry and government M&S researchers and practitioners has been instrumental in identifying the key competencies for M&S professionals and has been critical to the development of this program. The curriculum is designed to provide a broad overall perspective of the developing simulation industry and an awareness of the economic considerations. Upon completion of the program, graduates will have the diverse training necessary to enable them to work in varied capacities in government agencies, or in the defense, service, entertainment, and manufacturing industries.

Graduates of the Modeling and Simulation MS degree program will:

- have an interdisciplinary core body of knowledge on modeling approaches, human factors, computing infrastructure, and visual representation and will be capable of critically reviewing the literature in the field;
- have developed the capacity to solve complex problems by building simulation models, designing and carrying out experiments, collecting data, analyzing results, and managing M&S programs; and
- be able to clearly communicate their findings to their peers.

Students in the Modeling and Simulation graduate program have often focused their study and research efforts in one or more of the following research areas:

- ***Human Systems***

  The Human Systems in M&S research area has attracted those who wish to gain expertise in the content and techniques of human behavior in simulation systems, including human factors, human-computer interaction, virtual worlds, statistical and quantitative procedures, experimental design, computer techniques, and other research methodologies. Typical problem areas for R&D include human-in-the-loop simulation; team performance under stress; and use of visual, audio, haptic, and other sensory input/output modalities to coordinate human-machine activities. Typical courses include Human Factors, Training Systems Engineering, Human Computer Interaction, Intelligent Simulation, and Distributed Learning.

- ***Computer Visualization***

  Computer Visualization in M&S is a research area that attracts those who wish to gain expertise in technical aspects of computer graphic systems, virtual environments, and human-centered simulation systems applying the state-of-the-art in computer graphics and other human-interface technologies. Typical courses include Human Computer Interaction, Computer Graphics Systems, Computer Vision, Machine Perception, Human-Virtual Environment Interaction, and

Sensation and Perception. Students in this research area typically have an interest in the area of Emerging Media, which focuses on the
development of new forms of interactive media and the creation of story-driven content for them such as interactive works of art, electronic games, virtual reality, the Internet, portable devices and mobile applications, wearable computers, etc.

- ***Simulation Modeling and Analysis***

  The Simulation Modeling and Analysis research area attracts those who desire to gain expertise in using simulation as a optimization tool for effective design, planning, analysis, and decision-making. The emphasis of this area is on problem definition, model formulation, design of simulation experiments, and model-based analysis. This area attracts those who seek to develop skills in the application of advanced quantitative methods to modeling and simulation. Building on backgrounds in operations research, mathematics or statistics, they should gain experience in modeling and simulation through the application of optimization, mathematical and statistical theory to build multidisciplinary simulation models and conducting rigorous simulation experimentation. A graduate will be prepared to work with corporate and government decision-makers as they model and evaluate the impacts of proposed policies and system designs. Typical courses include Engineering Statistics, Statistical Aspects of Digital Simulation, and Mathematical Modeling, Discrete Systems Simulation, Object-Oriented Simulation, Experimental Design, and Quantitative Aspects of Modeling and Simulation.

- ***Simulation in Healthcare***

  Simulation in Healthcare is a fast growing new area in M&S. Issues related to bringing down the cost of healthcare and reducing costly medical errors are generating many new opportunities related to systems analysis, communication between healthcare providers and patients, and simulation-based training, to name a few. Currently a disproportionate amount of the US economy goes to healthcare, at least twice as much as the average of the 25 richest nations, and health outcomes in the US place the country near the bottom of this group of countries. M&S can contribute significantly towards improving this situation. Typical courses include Discrete Systems Simulation, Experimental Design, and Object-Oriented Simulation, Engineering Statistics, Human Computer Interaction.

- ***Interactive Simulation and Intelligent Systems***

  Interactive Simulation and Intelligent Systems research attracts those who wish to pursue or are currently pursuing careers in the training simulation/simulator industries. Graduates specializing in this research area typically are interested in creating designs for simulators and simulator-based training systems and to apply expert systems and other intelligent systems in a simulation setting. Typical courses include Training Systems Engineering, Simulation of Real-Time Processes, and Intelligent
  Simulation.

- ***Simulation Infrastructure***

  The research area of Simulation Infrastructure attracts those who wish to gain an in-depth understanding of the basic components of simulation systems and their patterns of configuration and communication, including hardware and software issues. They will gain experience in the development of distributed simulation and training environments. Graduates should be able to implement such systems or manage a team capable of developing such systems. Typical courses include Performance Models of Computers and Networks, Simulation Design and Analysis, High Performance Computer Architecture, and Analysis of Computer and Communication Systems. Simulation Management: Simulation Management research area attracts those who wish to gain expertise in the management of projects related to modeling, simulation, and training (MS&T). Graduates who focus in this area of study should be prepared to manage such projects for military agencies or MS&T companies. Typical courses include Environment of Technical Organizations, Modeling and Simulation of Real-Time Processes, Management Information Systems, and Project Engineering.

- ***Simulation Management***

  Simulation Management research area attracts those who wish to gain expertise in the management of projects related to modeling, simulation, and training (MS&T). Graduates who focus in this area of study should be prepared to manage such projects for military agencies or MS&T companies. Typical courses include Environment of Technical Organizations, Modeling and Simulation of Real-Time Processes, Management Information Systems, and Project Engineering.

Read More ▼▲

CURRICULUM

The Modeling and Simulation Master of Science program requires a minimum of 30 credit hours beyond the bachelor’s degree.

The M&S MS program offers a thesis option and a nonthesis option. Each option requires 9 credit hours of required core courses.

- Students who select the thesis option must take 15 credit hours of unrestricted electives and 6 thesis credit hours.
- Students who select the nonthesis option must take 21 credit hours of unrestricted electives.

The culminating experience for thesis-option students in the MS program is the final thesis document and the oral defense of the thesis research.

The culminating, capstone experience for nonthesis students is a technical project, which requires a written and oral presentation of the work, completed as part of the required core course IDS 6916Simulation Research Methods and Practicum. This project is reviewed by panel experts.

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

Required Courses—9 Credit Hours

Core—9 Credit Hours

Three core courses provide an interdisciplinary framework for all Modeling and Simulation students. Teams of M&S program faculty teach these core courses. Course descriptions can be found in the Catalog Menu at the top of the page under the heading "Courses."

- DIG 5875C Introduction to Modeling and Simulation (3 credit hours)
- DIG 5876 Quantitative Aspects of Modeling and Simulation (3 credit hours)
- IDS 6916 Simulation Research Methods and Practicum (3 credit hours)

Unrestricted Electives—15 Credit Hours

All M&S MS students must take at least 15 credit hours of unrestricted electives that support the student's area of graduate study. Unrestricted electives must consist of at least 15 credit hours of formal courses, which may include independent study (up to 6 credit hours). The remaining credit may consist of additional thesis (for thesis option students only), directed research, and additional courses as advised appropriately by the faculty adviser and/or program director.

Thesis Option—6 Credit Hours

Thesis-option students are required to take an additional 6 credit hours of thesis.

- IDS 6971 Thesis (6 credit hours)

Nonthesis Option—6 Credit Hours

Nonthesis-option students are required to take an additional 6 credit hours of unrestricted electives that support the student's area of graduate study.

Modeling and Simulation MS Electives

In addition to successfully enrolling and completing the core courses, students are required to carefully select electives with the guidance of a faculty adviser. Elective choices should be made with the intent to

strengthen a research interest and/or area of focus in order to meet the individual student's educational goals and objectives.

Listed below are suggested courses in various areas of focus or specialization. These course groupings are mere guides, are not exhaustive and are only meant to assist with advising and course selection in order to meet the individual student's educational goals and objectives. They are not intended to restrict elective choices among focus areas as we strongly encourage Modeling and Simulation students to maintain an interdisciplinary approach to their graduate studies.

If a student identifies another UCF course which may be of value to his/her M&S research area, but is not already identified in a list below, he/she may request approval from the Graduate Program Director for the course to be used as an elective in the Graduate Plan of Study. All such requests must be made in advance of enrolling in the course.

Those electives categorized as "General" would be appropriate for all students regardless of focus area. The remaining categories are grouped by area of research interest.

General

- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- ESI 6891 IEMS Research Methods (3 credit hours)
- IDS 5907 Independent Study (variable)
- IDS 5917 Directed Research (variable)
- IDS 6908 Independent Study (variable)
- IDS 6918 Directed Research (variable)
- IDS 6946 Internship (variable)
- IDS 7919 Doctoral Research (variable)
- PHI 5340 Research Methods in Cognitive Sciences (3 credit hours)
- PSY 6216C Research Methodology (4 credit hours)
- STA 5205 Experimental Design (3 credit hours)

Fundamentals of Modeling and Simulation

- EEL 5892 Continuous System Simulation II (3 credit hours)
- EIN 6258 Human Computer Interaction (3 credit hours)
- ESI 5219 Engineering Statistics (3 credit hours)
- ESI 5531 Discrete Systems Simulation (3 credit hours)
- ESI 6217 Statistical Aspects of Digital Simulation (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- ESI 6532 Object-Oriented Simulation (3 credit hours)
- IDS 6146 Modeling and Simulation Systems (3 credit hours)
- IDS 6147 Perspectives on Modeling and Simulation (3 credit hours)

Human Systems

- CAP 6515 Algorithms in Computational Biology (3 credit hours)
- CAP 6671 Intelligent Systems: Robots, Agents, and Humans (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- DIG 6812 Digital Interaction for Informal Learning (3 credit hours)
- EIN 5248C Ergonomics (3 credit hours)
- EIN 5248C Ergonomics (3 credit hours)
- EIN 5317 Training System Design (3 credit hours)
- EIN 6215 System Safety Engineering and Management (3 credit hours)
- EIN 6649C Intelligent Tutoring Training System Design (3 credit hours)
- EME 6458 Virtual Teaching and the Digital Educator (3 credit hours)
- EME 6507 Multimedia for Education and Training (3 credit hours)
- EME 6601 Instructional Simulation Design for Training and Education (3 credit hours)
- EXP 5208 Sensation and Perception (3 credit hours)
- EXP 5256 Human Factors I (3 credit hours)
- EXP 6255 Human Performance (3 credit hours)
- EXP 6257 Human Factors II (3 credit hours)
- EXP 6258 Human Factors III (3 credit hours)
- EXP 6506 Human Cognition and Learning (3 credit hours)
- EXP 6541 Advanced Human Computer Interaction (3 credit hours)
- IDS 6148 Human Systems Integration for Modeling and Simulation (3 credit hours)
- DIG 6775 Virtual Reality (3 credit hours)
- PHI 5225 Philosophy of Language (3 credit hours)
- PHI 5325 Topics in Philosophy of Mind (3 credit hours)
- PHI 5327 Topics in Cognitive Sciences (3 credit hours)
- PHI 5329 Philosophy of Neuroscience (3 credit hours)
- PSB 5005 Physiological Psychology (3 credit hours)
- TTE 6270 Intelligent Transportation Systems (3 credit hours)

Computer Visualization

- CAP 5725 Computer Graphics I (3 credit hours)
- CAP 6411 Computer Vision Systems (3 credit hours)
- CAP 6412 Advanced Computer Vision (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- CDA 5106 Advanced Computer Architecture (3 credit hours)
- COT 5405 Design and Analysis of Algorithms (3 credit hours)
- DIG 6605 Physical Computing (3 credit hours)
- DIG 6647 Science and Technology of Dynamic Media (3 credit hours)
- EEL 5173 Linear Systems Theory (3 credit hours)
- EEL 5771C Engineering Applications of Computer Graphics (3 credit hours)
- EEL 5820 Image Processing (3 credit hours)

- EEL 5825 Pattern Recognition (3 credit hours)
- EEL 5874 Expert Systems and Knowledge Engineering (3 credit hours)
- EEL 6823 Image Processing II (3 credit hours)
- EEL 6843 Machine Perception (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- DIG 6775 Virtual Reality (3 credit hours)
- MAP 5117 Mathematical Modeling (3 credit hours)
- MAP 6118 Introduction to Nonlinear Dynamics (3 credit hours)

Quantitative Methods for Simulation, Modeling and Analysis

- CAP 5512 Evolutionary Computation (3 credit hours)
- CAP 6515 Algorithms in Computational Biology (3 credit hours)
- CDA 6530 Performance Models of Computers and Networks (3 credit hours)
- COT 5405 Design and Analysis of Algorithms (3 credit hours)
- EEL 5173 Linear Systems Theory (3 credit hours)
- EEL 5892 Continuous System Simulation II (3 credit hours)
- EEL 6878 Modeling and Artificial Intelligence (3 credit hours)
- EIN 6528 Simulation Based Life Cycle Engineering (3 credit hours)
- ESI 5306 Operations Research (3 credit hours)
- ESI 5531 Discrete Systems Simulation (3 credit hours)
- ESI 6217 Statistical Aspects of Digital Simulation (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- MAP 5117 Mathematical Modeling (3 credit hours)
- MAP 6118 Introduction to Nonlinear Dynamics (3 credit hours)
- MAP 6207 Optimization Theory (3 credit hours)
- MAP 6385 Applied Numerical Mathematics (3 credit hours)
- MAP 6407 Applied Mathematics I (3 credit hours)
- MAP 6408 Applied Mathematics II (3 credit hours)
- MAP 6445 Approximation Techniques (3 credit hours)
- STA 5703 Data Mining Methodology I (3 credit hours)
- STA 5825 Stochastic Processes and Applied Probability Theory (3 credit hours)
- STA 6236 Regression Analysis (3 credit hours)
- STA 6246 Linear Models (3 credit hours)
- STA 6326 Theoretical Statistics I (3 credit hours)
- STA 6327 Theoretical Statistics II (3 credit hours)
- STA 6329 Statistical Applications of Matrix Algebra (3 credit hours)
- STA 6704 Data Mining Methodology II (3 credit hours)
- STA 6714 Data Preparation (3 credit hours)

Simulation in Healthcare

- CAP 6515 Algorithms in Computational Biology (3 credit hours)

- CAP 6671 Intelligent Systems: Robots, Agents, and Humans (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- DIG 6647 Science and Technology of Dynamic Media (3 credit hours)
- DIG 6812 Digital Interaction for Informal Learning (3 credit hours)
- EEL 5820 Image Processing (3 credit hours)
- EEL 6823 Image Processing II (3 credit hours)
- HUM 5802 Applied Contemporary Humanities (3 credit hours)
- DIG 6775 Virtual Reality (3 credit hours)
- PHI 5329 Philosophy of Neuroscience (3 credit hours)
- PSB 5005 Physiological Psychology (3 credit hours)
- SPA 6417 Cognitive/Communicative Disorders (3 credit hours)
- SPA 6451 Theory and Clinical Aspects Cognitive-Comm Disorders in Traumatic Brain Injury (3 credit hours)
- SPA 6452 Assessment of Cognitive-Communication Disorders in Traumatic Brain Injury (3 credit hours)

Interactive Simulation and Intelligent Systems

- CAP 5512 Evolutionary Computation (3 credit hours)
- CAP 5610 Machine Learning (3 credit hours)
- CAP 5636 Advanced Artificial Intelligence (3 credit hours)
- CAP 6671 Intelligent Systems: Robots, Agents, and Humans (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- DIG 6812 Digital Interaction for Informal Learning (3 credit hours)
- EEL 5771C Engineering Applications of Computer Graphics (3 credit hours)
- EEL 5874 Expert Systems and Knowledge Engineering (3 credit hours)
- EEL 6878 Modeling and Artificial Intelligence (3 credit hours)
- EIN 5251 Usability Engineering (3 credit hours)
- EIN 5255C Interactive Simulation (3 credit hours)
- EIN 6645 Real-Time Simulation Agents (3 credit hours)
- EIN 6647 Intelligent Simulation (3 credit hours)
- EIN 6649C Intelligent Tutoring Training System Design (3 credit hours)
- EME 6613 Instructional System Design (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- DIG 6775 Virtual Reality (3 credit hours)

Simulation Infrastructure

- CAP 6671 Intelligent Systems: Robots, Agents, and Humans (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- CDA 5106 Advanced Computer Architecture (3 credit hours)
- CDA 6107 Parallel Computer Architecture (3 credit hours)
- CDA 6530 Performance Models of Computers and Networks (3 credit hours)

- CNT 5008 Computer Communication Networks Architecture (3 credit hours)
- COT 5405 Design and Analysis of Algorithms (3 credit hours)
- DIG 6605 Physical Computing (3 credit hours)
- EEL 5173 Linear Systems Theory (3 credit hours)
- EEL 5771C Engineering Applications of Computer Graphics (3 credit hours)
- EEL 5892 Continuous System Simulation II (3 credit hours)
- EEL 6762 Performance Analysis of Computer and Communication Systems (3 credit hours)
- EEL 6785 Computer Network Design (3 credit hours)
- EEL 6878 Modeling and Artificial Intelligence (3 credit hours)
- EEL 6883 Software Engineering II (3 credit hours)
- EEL 6885 Software Engineering Quality Assurance Methods (3 credit hours)
- EEL 6887 Software Engineering Life-Cycle Control (3 credit hours)
- ESI 6551C Systems Engineering (3 credit hours)

Simulation Management

- EIN 5108 The Environment of Technical Organizations (3 credit hours)
- EIN 5117 Management Information Systems I (3 credit hours)
- EIN 5140 Project Engineering (3 credit hours)
- EIN 5356 Cost Engineering (3 credit hours)
- EIN 6182 Engineering Management (3 credit hours)
- EIN 6215 System Safety Engineering and Management (3 credit hours)
- EIN 6339 Operations Engineering (3 credit hours)
- EIN 6357 Advanced Engineering Economic Analysis (3 credit hours)
- EIN 6528 Simulation Based Life Cycle Engineering (3 credit hours)
- ESI 5227 Total Quality Improvement (3 credit hours)
- ESI 6224 Quality Management (3 credit hours)
- ESI 6358 Decision Analysis (3 credit hours)
- ESI 6551C Systems Engineering (3 credit hours)
- ISM 6217 Advanced Database Administration (3 credit hours)
- ISM 7027 Systems Support of Organizational Decision Making (3 credit hours)

Plan of Study

After admission to the Modeling and Simulation MS program, students should file a Graduate Plan of Study (GPS) with the Modeling and Simulation Graduate Program Office.

The purpose of the GPS is to design an appropriate program of coursework to support a student's area of graduate study and to meet the specific educational needs, goals and objectives of that student. The coursework must be selected to form a unified, cohesive plan of study. The plan of study must have 50 percent of its content composed of 6000-level courses.

For thesis students, the GPS should be developed under the supervision of the thesis adviser(s) and members of the Thesis Advisory Committee, although initially it may be constructed under the supervision of the M&S Graduate Program Office. For nonthesis students, the plan of study should be developed under the supervision of the M&S Graduate Program Office.

Changes in the Graduate Plan of Study can be made (due to course offering deletions, schedule conflicts, etc.) and with the approval of the M&S Graduate Program Office.

Graduate Plans of Study for MS students should be on file with the College of Graduate Studies by the end of the student's second major term (based on full-time enrollment) and must be on file by the end of the term prior to the term of expected graduation.

Equipment Fee

Full-time students in the Modeling and Simulation MS program pay a $27 equipment fee each semester that they are enrolled. Part-time students pay a $13.50 equipment fee each semester that they are enrolled.

INDEPENDENT LEARNING

IDS 6916 Simulation Research Methods and Practicum provides the independent learning experience for the Modeling and Simulation MS program.

APPLICATION REQUIREMENTS

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

Students who enter the Master of Science in Modeling and Simulation program are expected to have an academic and/or work background that has prepared them in mathematics (introductory calculus and probability and statistics) and computer “literacy,” including proficiency with word processing, spreadsheet, and database programs, and, preferably, familiarity with at least one higher order programming language (e.g., C++). Students with undergraduate degrees in Engineering, Computer Science, or Mathematics will generally have this background.

For students with less technical academic preparation, the core course IDS 5719 Introduction to Quantitative Aspects of Modeling and Simulation, will prepare them to pursue several, but not all, of the focus areas. For example, these students could pursue the Simulation Management or Human Systems focus areas, but would need a number of prerequisite courses in mathematics, statistics, and computer science to pursue focus areas such as Simulation Infrastructure. IDS 5719 Introduction to Quantitative Aspects of Modeling and Simulation has a math prerequisite of a one semester introductory to calculus course (e.g., MAC 2233 Concepts of Calculus or MAC 2241 Calculus for Life Sciences).

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
- Goal statement
    - The goal statement should discuss all relevant professional background and any previous research and/or teaching experience. The statement should explain the motivation behind the pursuit of a Master's degree in Modeling and Simulation. Future educational and career goals after the completion of the applicant's master study should be discussed.
    - If the applicant is interested in completing a Master thesis, then the applicant must clearly describe the particular area of research interest. The applicant should identify at least one UCF faculty member who shares a similar research focus and is believed to be best suited to serve as a potential thesis advisor.
    - The goal statement should between 500 and 1,000 words.
- Two letters of recommendation
    - The letters of recommendation should be from faculty members, university administrators and employers. The letters, which must be current to the application, should address the educational and career goals of applicant. The letter writers should also know the applicant well enough to discuss the applicant's capacity to perform, excel and succeed in a graduate program. Letters for Master's thesis students must discuss the applicant's ability to perform graduate-level research.
- 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.

Readmission

Applicants who are reapplying for admission need not resubmit transcripts and GRE scores if the transcripts and scores are previously on file with UCF. However, the following application requirements do need to be current for the new application for readmission:

- Résumé/Curriculum Vitae
- Goal Statement
- Letters of Recommendation

Prerequisites

Students who enter the Modeling and Simulation Program are expected to have an academic and/or work background that has prepared them in mathematics (introductory calculus and probability and statistics) and computer literacy, including proficiency with word processing, spreadsheet, and database programs, and, preferably, familiarity with at least one higher order programming language (e.g., C/C++, Visual Basic, Java, etc.). Students with undergraduate or graduate degrees in Engineering, Computer Science, or Mathematics will generally have this background.

For students with less technical academic preparation, the core course DIG 5876 Introduction to Quantitative Aspects of Modeling and Simulation, will prepare them for several, but not all, aspects of the program. However, some students may need a number of prerequisite courses in Mathematics, Statistics, and Computer Science in order to pursue one or more areas of study.

Application Deadlines

Modeling and Simulation MS	Fall Priority	Fall	Spring	Summer
Domestic Applicants	Jan 15	Jul 15	Dec 1	-
International Applicants	Jan 15	Jan 15	Jul 1	-
International Transfer Applicants	Jan 15	Mar 1	Sep 1	-

Proposed Curriculum - Showing marked up revisions

Modeling and Simulation MS

PROGRAM DESCRIPTION

Input from industry and government M&S researchers and practitioners has been instrumental in identifying the key competencies for M&S professionals and has been critical to the development of this program. The curriculum is designed to provide a broad overall perspective of the developing simulation industry and an awareness of the economic considerations. Upon completion of the program, graduates will have the diverse training necessary to enable them to work in varied capacities in government agencies, or in the defense, service, entertainment, and manufacturing industries.

Graduates of the Modeling and Simulation MS degree program will:

- have an interdisciplinary core body of knowledge on modeling approaches, human factors, computing infrastructure, and visual representation and will be capable of critically reviewing the literature in the field;
- have developed the capacity to solve complex problems by building simulation models, designing and carrying out experiments, collecting data, analyzing results, and managing M&S programs; and
- be able to clearly communicate their findings to their peers.

Students in the Modeling and Simulation graduate program have often focused their study and research efforts in one or more of the following research areas:

- ***Human Systems***

  The Human Systems in M&S research area has attracted those who wish to gain expertise in the content and techniques of human behavior in simulation systems, including human factors, human-computer interaction, virtual worlds, statistical and quantitative procedures, experimental design, computer techniques, and other research methodologies. Typical problem areas for R&D include human-in-the-loop simulation; team performance under stress; and use of visual, audio, haptic, and other sensory input/output modalities to coordinate human-machine activities. Typical courses include Human Factors, Training Systems Engineering, Human Computer Interaction, Intelligent Simulation, and Distributed Learning.

- ***Computer Visualization***

  Computer Visualization in M&S is a research area that attracts those who wish to gain expertise in technical aspects of computer graphic systems, virtual environments, and human-centered simulation systems applying the state-of-the-art in computer graphics and other human-interface technologies. Typical courses include Human Computer Interaction, Computer Graphics Systems, Computer Vision, Machine Perception, Human-Virtual Environment Interaction, and

Sensation and Perception. Students in this research area typically have an interest in the area of Emerging Media, which focuses on the
development of new forms of interactive media and the creation of story-driven content for them such as interactive works of art, electronic games, virtual reality, the Internet, portable devices and mobile applications, wearable computers, etc.

- ***Simulation Modeling and Analysis***

  The Simulation Modeling and Analysis research area attracts those who desire to gain expertise in using simulation as a optimization tool for effective design, planning, analysis, and decision-making. The emphasis of this area is on problem definition, model formulation, design of simulation experiments, and model-based analysis. This area attracts those who seek to develop skills in the application of advanced quantitative methods to modeling and simulation. Building on backgrounds in operations research, mathematics or statistics, they should gain experience in modeling and simulation through the application of optimization, mathematical and statistical theory to build multidisciplinary simulation models and conducting rigorous simulation experimentation. A graduate will be prepared to work with corporate and government decision-makers as they model and evaluate the impacts of proposed policies and system designs. Typical courses include Engineering Statistics, Statistical Aspects of Digital Simulation, and Mathematical Modeling, Discrete Systems Simulation, Object-Oriented Simulation, Experimental Design, and Quantitative Aspects of Modeling and Simulation.

- ***Simulation in Healthcare***

  Simulation in Healthcare is a fast growing new area in M&S. Issues related to bringing down the cost of healthcare and reducing costly medical errors are generating many new opportunities related to systems analysis, communication between healthcare providers and patients, and simulation-based training, to name a few. Currently a disproportionate amount of the US economy goes to healthcare, at least twice as much as the average of the 25 richest nations, and health outcomes in the US place the country near the bottom of this group of countries. M&S can contribute significantly towards improving this situation. Typical courses include Discrete Systems Simulation, Experimental Design, and Object-Oriented Simulation, Engineering Statistics, Human Computer Interaction.

- ***Interactive Simulation and Intelligent Systems***

  Interactive Simulation and Intelligent Systems research attracts those who wish to pursue or are currently pursuing careers in the training simulation/simulator industries. Graduates specializing in this research area typically are interested in creating designs for simulators and simulator-based training systems and to apply expert systems and other intelligent systems in a simulation setting. Typical courses include Training Systems Engineering, Simulation of Real-Time Processes, and Intelligent
  Simulation.

- ***Simulation Infrastructure***

  The research area of Simulation Infrastructure attracts those who wish to gain an in-depth understanding of the basic components of simulation systems and their patterns of configuration and communication, including hardware and software issues. They will gain experience in the development of distributed simulation and training environments. Graduates should be able to implement such systems or manage a team capable of developing such systems. Typical courses include Performance Models of Computers and Networks, Simulation Design and Analysis, High Performance Computer Architecture, and Analysis of Computer and Communication Systems. Simulation Management: Simulation Management research area attracts those who wish to gain expertise in the management of projects related to modeling, simulation, and training (MS&T). Graduates who focus in this area of study should be prepared to manage such projects for military agencies or MS&T companies. Typical courses include Environment of Technical Organizations, Modeling and Simulation of Real-Time Processes, Management Information Systems, and Project Engineering.

- ***Simulation Management***

  Simulation Management research area attracts those who wish to gain expertise in the management of projects related to modeling, simulation, and training (MS&T). Graduates who focus in this area of study should be prepared to manage such projects for military agencies or MS&T companies. Typical courses include Environment of Technical Organizations, Modeling and Simulation of Real-Time Processes, Management Information Systems, and Project Engineering.

Read More ▼▲

CURRICULUM

The Modeling and Simulation Master of Science program requires a minimum of 30 credit hours beyond the bachelor's degree.

The M&S MS program offers a thesis option and a nonthesis option. Each option requires ~~9~~ 12 credit hours of required core courses.

- Students who select the thesis option must take ~~15~~ 12 credit hours of unrestricted electives and 6 thesis credit hours.
- Students who select the nonthesis option must take ~~21~~ 18 credit hours of unrestricted electives.

The culminating experience for thesis-option students in the MS program is the final thesis document and the oral defense of the thesis research.

The culminating, capstone experience for nonthesis students is a technical project, which requires a written and oral presentation of the work, completed as part of the required core course IDS 6916 Simulation Research Methods and Practicum. This project is reviewed by panel experts.

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

Required Courses—~~9~~ 12 Credit Hours

Core—~~9~~ 12 Credit Hours

~~Three c~~Core courses provide an interdisciplinary framework for all Modeling and Simulation students. Teams of M&S program faculty teach these core courses. Course descriptions can be found in the Catalog Menu at the top of the page under the heading "Courses."

- IDS 6147 Perspectives on Modeling and Simulation (3 credit hours)
- ~~DIG 5875C Introduction to Modeling and Simulation (3 credit hours)~~
- DIG 5876 Quantitative Aspects of Modeling and Simulation (3 credit hours) or
  An advanced higher level quantitative course as approved by Graduate Program Director
- IDS 6148 Human Systems Integration for Modeling and Simulation (3 credit hours) or
  EIN 6258 Human Computer Interaction (3 credit hours) or
  EXP 6541 Advanced Human-Computer Interaction (3 credit hours)
- IDS 6916 Simulation Research Methods and Practicum (3 credit hours)

Unrestricted Electives—~~15~~ 12 Credit Hours

All M&S MS students must take at least ~~15~~ 12 credit hours of unrestricted electives that support the student's area of graduate study. Unrestricted electives must consist of at least ~~15~~ 12 credit hours of formal courses, which may include independent study (up to 6 credit hours). The remaining credit may consist of additional thesis (for thesis option students only), directed research, and additional courses as advised appropriately by the faculty adviser and/or program director.

Thesis Option—6 Credit Hours

Thesis-option students are required to take an additional 6 credit hours of thesis.

- IDS 6971 Thesis (6 credit hours)

Nonthesis Option—6 Credit Hours

Nonthesis-option students are required to take an additional 6 credit hours of unrestricted electives that support the student's area of graduate study.

Modeling and Simulation MS Electives

In addition to successfully enrolling and completing the core courses, students are required to carefully select electives with the guidance of a faculty adviser. Elective choices should be made with the intent to strengthen a research interest and/or area of focus in order to meet the individual student's educational goals and objectives.

Listed below are suggested courses in various areas of focus or specialization. These course groupings are mere guides, are not exhaustive and are only meant to assist with advising and course selection in order to meet the individual student's educational goals and objectives. They are not intended to restrict elective choices among focus areas as we strongly encourage Modeling and Simulation students to maintain an interdisciplinary approach to their graduate studies.

If a student identifies another UCF course which may be of value to his/her M&S research area, but is not already identified in a list below, he/she may request approval from the Graduate Program Director for the course to be used as an elective in the Graduate Plan of Study. All such requests must be made in advance of enrolling in the course.

Those electives categorized as "General" would be appropriate for all students regardless of focus area. The remaining categories are grouped by area of research interest.

General

- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- ESI 6891 IEMS Research Methods (3 credit hours)
- IDS 5907 Independent Study (variable)
- IDS 5917 Directed Research (variable)
- IDS 6908 Independent Study (variable)
- IDS 6918 Directed Research (variable)
- IDS 6946 Internship (variable)
- IDS 7919 Doctoral Research (variable)
- PHI 5340 Research Methods in Cognitive Sciences (3 credit hours)
- PSY 6216C Research Methodology (4 credit hours)
- STA 5205 Experimental Design (3 credit hours)

Fundamentals of Modeling and Simulation

- EEL 5892 Continuous System Simulation II (3 credit hours)
- EIN 6258 Human Computer Interaction (3 credit hours)
- ESI 5219 Engineering Statistics (3 credit hours)
- ESI 5531 Discrete Systems Simulation (3 credit hours)
- ESI 6217 Statistical Aspects of Digital Simulation (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)

- ESI 6532 Object-Oriented Simulation (3 credit hours)
- IDS 6146 Modeling and Simulation Systems (3 credit hours)
- IDS 6147 Perspectives on Modeling and Simulation (3 credit hours)

Human Systems

- CAP 6515 Algorithms in Computational Biology (3 credit hours)
- CAP 6671 Intelligent Systems: Robots, Agents, and Humans (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- DIG 6812 Digital Interaction for Informal Learning (3 credit hours)
- EIN 5248C Ergonomics (3 credit hours)
- EIN 5248C Ergonomics (3 credit hours)
- EIN 5317 Training System Design (3 credit hours)
- EIN 6215 System Safety Engineering and Management (3 credit hours)
- EIN 6258 Human Computer Interaction (3 credit hours)
- EIN 6649C Intelligent Tutoring Training System Design (3 credit hours)
- EME 6458 Virtual Teaching and the Digital Educator (3 credit hours)
- EME 6507 Multimedia for Education and Training (3 credit hours)
- EME 6601 Instructional Simulation Design for Training and Education (3 credit hours)
- EXP 5208 Sensation and Perception (3 credit hours)
- EXP 5256 Human Factors I (3 credit hours)
- EXP 6255 Human Performance (3 credit hours)
- EXP 6257 Human Factors II (3 credit hours)
- EXP 6258 Human Factors III (3 credit hours)
- EXP 6506 Human Cognition and Learning (3 credit hours)
- EXP 6541 Advanced Human Computer Interaction (3 credit hours)
- IDS 6148 Human Systems Integration for Modeling and Simulation (3 credit hours)
- DIG 6775 Virtual Reality (3 credit hours)
- PHI 5225 Philosophy of Language (3 credit hours)
- PHI 5325 Topics in Philosophy of Mind (3 credit hours)
- PHI 5327 Topics in Cognitive Sciences (3 credit hours)
- PHI 5329 Philosophy of Neuroscience (3 credit hours)
- PSB 5005 Physiological Psychology (3 credit hours)
- TTE 6270 Intelligent Transportation Systems (3 credit hours)

Computer Visualization

- CAP 5725 Computer Graphics I (3 credit hours)
- CAP 6411 Computer Vision Systems (3 credit hours)
- CAP 6412 Advanced Computer Vision (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- CDA 5106 Advanced Computer Architecture (3 credit hours)
- COT 5405 Design and Analysis of Algorithms (3 credit hours)

- DIG 6605 Physical Computing (3 credit hours)
- DIG 6647 Science and Technology of Dynamic Media (3 credit hours)
- EEL 5173 Linear Systems Theory (3 credit hours)
- EEL 5771C Engineering Applications of Computer Graphics (3 credit hours)
- EEL 5820 Image Processing (3 credit hours)
- EEL 5825 Pattern Recognition (3 credit hours)
- EEL 5874 Expert Systems and Knowledge Engineering (3 credit hours)
- EEL 6823 Image Processing II (3 credit hours)
- EEL 6843 Machine Perception (3 credit hours)
- EIN 6258 Human Computer Interaction (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- DIG 6775 Virtual Reality (3 credit hours)
- MAP 5117 Mathematical Modeling (3 credit hours)
- MAP 6118 Introduction to Nonlinear Dynamics (3 credit hours)

Quantitative Methods for Simulation, Modeling and Analysis

- CAP 5512 Evolutionary Computation (3 credit hours)
- CAP 6515 Algorithms in Computational Biology (3 credit hours)
- CDA 6530 Performance Models of Computers and Networks (3 credit hours)
- COT 5405 Design and Analysis of Algorithms (3 credit hours)
- EEL 5173 Linear Systems Theory (3 credit hours)
- EEL 5892 Continuous System Simulation II (3 credit hours)
- EEL 6878 Modeling and Artificial Intelligence (3 credit hours)
- EIN 6528 Simulation Based Life Cycle Engineering (3 credit hours)
- ESI 5306 Operations Research (3 credit hours)
- ESI 5531 Discrete Systems Simulation (3 credit hours)
- ESI 6217 Statistical Aspects of Digital Simulation (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- MAP 5117 Mathematical Modeling (3 credit hours)
- MAP 6118 Introduction to Nonlinear Dynamics (3 credit hours)
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- MAP 6407 Applied Mathematics I (3 credit hours)
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- MAP 6445 Approximation Techniques (3 credit hours)
- STA 5703 Data Mining Methodology I (3 credit hours)
- STA 5825 Stochastic Processes and Applied Probability Theory (3 credit hours)
- STA 6236 Regression Analysis (3 credit hours)
- STA 6246 Linear Models (3 credit hours)
- STA 6326 Theoretical Statistics I (3 credit hours)
- STA 6327 Theoretical Statistics II (3 credit hours)
- STA 6329 Statistical Applications of Matrix Algebra (3 credit hours)

- STA 6704 Data Mining Methodology II (3 credit hours)
- STA 6714 Data Preparation (3 credit hours)

Simulation in Healthcare

- CAP 6515 Algorithms in Computational Biology (3 credit hours)
- CAP 6671 Intelligent Systems: Robots, Agents, and Humans (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- DIG 6647 Science and Technology of Dynamic Media (3 credit hours)
- DIG 6812 Digital Interaction for Informal Learning (3 credit hours)
- EEL 5820 Image Processing (3 credit hours)
- EEL 6823 Image Processing II (3 credit hours)
- EIN 6645 Real-Time Simulation Agents (3 credit hours)
- ESI 5531 Discrete Systems Simulation (3 credit hours)
- HUM 5802 Applied Contemporary Humanities (3 credit hours)
- DIG 6775 Virtual Reality (3 credit hours)
- PHI 5329 Philosophy of Neuroscience (3 credit hours)
- PSB 5005 Physiological Psychology (3 credit hours)
- SPA 6417 Cognitive/Communicative Disorders (3 credit hours)
- SPA 6451 Theory and Clinical Aspects Cognitive-Comm Disorders in Traumatic Brain Injury (3 credit hours)
- SPA 6452 Assessment of Cognitive-Communication Disorders in Traumatic Brain Injury (3 credit hours)

Interactive Simulation and Intelligent Systems

- CAP 5512 Evolutionary Computation (3 credit hours)
- CAP 5610 Machine Learning (3 credit hours)
- CAP 5636 Advanced Artificial Intelligence (3 credit hours)
- CAP 6671 Intelligent Systems: Robots, Agents, and Humans (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- DIG 6812 Digital Interaction for Informal Learning (3 credit hours)
- EEL 5771C Engineering Applications of Computer Graphics (3 credit hours)
- EEL 5874 Expert Systems and Knowledge Engineering (3 credit hours)
- EEL 6878 Modeling and Artificial Intelligence (3 credit hours)
- EIN 5251 Usability Engineering (3 credit hours)
- EIN 5255C Interactive Simulation (3 credit hours)
- EIN 6258 Human Computer Interaction (3 credit hours)
- EIN 6645 Real-Time Simulation Agents (3 credit hours)
- EIN 6647 Intelligent Simulation (3 credit hours)
- EIN 6649C Intelligent Tutoring Training System Design (3 credit hours)
- EME 6613 Instructional System Design (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)

- DIG 6775 Virtual Reality (3 credit hours)

Simulation Infrastructure

- CAP 6671 Intelligent Systems: Robots, Agents, and Humans (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- CDA 5106 Advanced Computer Architecture (3 credit hours)
- CDA 6107 Parallel Computer Architecture (3 credit hours)
- CDA 6530 Performance Models of Computers and Networks (3 credit hours)
- CNT 5008 Computer Communication Networks Architecture (3 credit hours)
- COT 5405 Design and Analysis of Algorithms (3 credit hours)
- DIG 6605 Physical Computing (3 credit hours)
- EEL 5173 Linear Systems Theory (3 credit hours)
- EEL 5771C Engineering Applications of Computer Graphics (3 credit hours)
- EEL 5892 Continuous System Simulation II (3 credit hours)
- EEL 6762 Performance Analysis of Computer and Communication Systems (3 credit hours)
- EEL 6785 Computer Network Design (3 credit hours)
- EEL 6878 Modeling and Artificial Intelligence (3 credit hours)
- EEL 6883 Software Engineering II (3 credit hours)
- EEL 6885 Software Engineering Quality Assurance Methods (3 credit hours)
- EEL 6887 Software Engineering Life-Cycle Control (3 credit hours)
- ESI 6551C Systems Engineering (3 credit hours)

Simulation Management

- EIN 5108 The Environment of Technical Organizations (3 credit hours)
- EIN 5117 Management Information Systems I (3 credit hours)
- EIN 5140 Project Engineering (3 credit hours)
- EIN 5356 Cost Engineering (3 credit hours)
- EIN 6182 Engineering Management (3 credit hours)
- EIN 6215 System Safety Engineering and Management (3 credit hours)
- EIN 6339 Operations Engineering (3 credit hours)
- EIN 6357 Advanced Engineering Economic Analysis (3 credit hours)
- EIN 6528 Simulation Based Life Cycle Engineering (3 credit hours)
- ESI 5227 Total Quality Improvement (3 credit hours)
- ESI 6224 Quality Management (3 credit hours)
- ESI 6358 Decision Analysis (3 credit hours)
- ESI 6551C Systems Engineering (3 credit hours)
- ISM 6217 Advanced Database Administration (3 credit hours)
- ISM 7027 Systems Support of Organizational Decision Making (3 credit hours)

Plan of Study

After admission to the Modeling and Simulation MS program, students should file a Graduate Plan of Study (GPS) with the Modeling and Simulation Graduate Program Office.

The purpose of the GPS is to design an appropriate program of coursework to support a student's area of graduate study and to meet the specific educational needs, goals and objectives of that student. The coursework must be selected to form a unified, cohesive plan of study. The plan of study must have 50 percent of its content composed of 6000-level courses.

For thesis students, the GPS should be developed under the supervision of the thesis adviser(s) and members of the Thesis Advisory Committee, although initially it may be constructed under the supervision of the M&S Graduate Program Office. For nonthesis students, the plan of study should be developed under the supervision of the M&S Graduate Program Office.

Changes in the Graduate Plan of Study can be made (due to course offering deletions, schedule conflicts, etc.) and with the approval of the M&S Graduate Program Office.

Graduate Plans of Study for MS students should be on file with the College of Graduate Studies by the end of the student's second major term (based on full-time enrollment) and must be on file by the end of the term prior to the term of expected graduation.

Equipment Fee

Full-time students in the Modeling and Simulation MS program pay a $27 equipment fee each semester that they are enrolled. Part-time students pay a $13.50 equipment fee each semester that they are enrolled.

INDEPENDENT LEARNING

IDS 6916 Simulation Research Methods and Practicum provides the independent learning experience for the Modeling and Simulation MS program.

APPLICATION REQUIREMENTS

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

Students who enter the Master of Science in Modeling and Simulation program are expected to have an academic and/or work background that has prepared them in mathematics (introductory calculus and probability and statistics) and computer “literacy,” including proficiency with word processing, spreadsheet, and database programs, and, preferably, familiarity with at least one higher order programming language (e.g., C++). Students with undergraduate degrees in Engineering, Computer Science, or Mathematics will generally have this background.

For students with less technical academic preparation, the core course ~~IDS 5719 Introduction to~~DIG 5876 Quantitative Aspects of Modeling and Simulation, will prepare them to pursue several, but not all, of the focus areas. For example, these students could pursue the Simulation Management or Human Systems focus areas, but would need a number of prerequisite courses in mathematics, statistics, and computer science to pursue focus areas such as Simulation Infrastructure. ~~IDS 5719 Introduction to Quantitative Aspects of Modeling and Simulation has a math prerequisite of a one semester introductory to calculus course (e.g., MAC 2233 Concepts of Calculus or MAC 2241 Calculus for Life Sciences).~~

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
- Goal statement
    - The goal statement should discuss all relevant professional background and any previous research and/or teaching experience. The statement should explain the motivation behind the pursuit of a Master's degree in Modeling and Simulation. Future educational and career goals after the completion of the applicant's master study should be discussed.
    - If the applicant is interested in completing a Master thesis, then the applicant must clearly describe the particular area of research interest. The applicant should identify at least one UCF faculty member who shares a similar research focus and is believed to be best suited to serve as a potential thesis advisor.
    - The goal statement should between 500 and 1,000 words.
- Two letters of recommendation
    - The letters of recommendation should be from faculty members, university administrators and employers. The letters, which must be current to the application, should address the educational and career goals of applicant. The letter writers should also know the applicant well enough to discuss the applicant's capacity to perform, excel and succeed in a graduate program. Letters for Master's thesis students must discuss the applicant's ability to perform graduate-level research.
- 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.

Readmission

Applicants who are reapplying for admission need not resubmit transcripts and GRE scores if the transcripts and scores are previously on file with UCF. However, the following application requirements do need to be current for the new application for readmission:

- Résumé/Curriculum Vitae
- Goal Statement
- Letters of Recommendation

Prerequisites

Students who enter the Modeling and Simulation Program are expected to have an academic and/or work background that has prepared them in mathematics (introductory calculus and probability and statistics) and computer literacy, including proficiency with word processing, spreadsheet, and database programs, and, preferably, familiarity with at least one higher order programming language (e.g., C/C++, Visual Basic, Java, etc.). Students with undergraduate or graduate degrees in Engineering, Computer Science, or Mathematics will generally have this background.

For students with less technical academic preparation, the core course DIG 5876 Introduction to Quantitative Aspects of Modeling and Simulation, will prepare them for several, but not all, aspects of the program. However, some students may need a number of prerequisite courses in Mathematics, Statistics, and Computer Science in order to pursue one or more areas of study.

Application Deadlines

Modeling and Simulation MS	Fall Priority	Fall	Spring	Summer
Domestic Applicants	Jan 15	Jul 15	Dec 1	-
International Applicants	Jan 15	Jan 15	Jul 1	-
International Transfer Applicants	Jan 15	Mar 1	Sep 1	-

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

Program Recommendation Form

This form is to be used to revise, add, suspend, or delete degree programs, tracks, or certificate programs. If there are changes to a program and the changes will affect the program tracks also, one form may be used for both the program and the track.

PLEASE NOTE: The deadline for new tracks or certificates is **February 1 of each year**. Any proposal for new tracks or certificates received after this date will not be included in the next year's catalog. Revisions to existing programs, tracks, or certificates are **due by March 15**. Any proposals for revisions received after that date will not be included in the next year's catalog. Please include catalog copy (description, curriculum, contact information, application requirements, and application deadlines). **For revisions – attach the catalog copy showing changes (use Track Changes in Word).**

College/Unit(s) Submitting Proposal: College of Health and Public Affairs

Proposed Effective Term/Year: Fall 2014

Unit(s) Housing Program: Public Affairs Doctoral Program and School of Public Administration

Name of program, track and/or certificate: Public Affairs PhD - Master of Public Administration Dual Degree Track

Brief description of program (this description will show up in the graduate catalog copy)**: Do not add complete catalog copy here.**

The Public Affairs PhD - Public Administration MPA Dual Degree Track provides academically talented students an opportunity to earn the Doctor of Philosophy in Public Affairs and the Master of Public Administration degrees concurrently. Students successfully completing the PhD/MPA Dual Degree program will have the skills and analytical techniques for careers in academia or in the public and nonprofit sectors. After successful completion of the PhD/MPA Dual Degree program, students will receive two diplomas, one for the Public Administration MPA degree and one for the Public Affairs PhD degree.

DELIVERY - Will program be delivered: ☐ **Face to face** ☐ **Completely online** ☐ **Mixed delivery**

Admissions deadlines: (Please specify if you have a different deadline for the track than for the program?)

Application requirements: (Please specify if you have different application requirements for the track than for the program? Will you admit directly to the track?)

Program Director(s) and contact information: (name, email, phone, campus address, program website address)

Lynette Feder

lynette.feder@ucf.edu

407-823-3650; HPA I, Room 220 http://www2.cohpa.ucf.edu/publicaffairs/

Please check one: this action affects a: ☐ Program ☐ Track ☐ Certificate

Please check one: this action is a(n):

☐ Addition. Please proceed to Part A.

☐ Revision. If a revision applies to multiple tracks, please list them here and then proceed to Part A:

☐ Inactivation

☐ Temporary Suspension of Admissions. Give Length of Suspension:

Temporary suspension of admissions: The program will be removed from the online application. A notation will be entered in the graduate catalog indicating the length of the suspension of admissions. Currently enrolled students will not experience any issues with continued enrollment.

Inactivation: Admissions will be suspended for new students and the program will be removed from the online application. Students active in the program are eligible to complete the program under the appropriate criteria and an appropriate teach-out plan is required. The program will be removed from the catalog as of the approved term.

If you checked inactivation or you are temporarily suspending admissions, please go to Part B and complete it.

Signature Page

Recommend Approval (all approval levels must be signed)

Department Chair (Print) Christopher D. Geiger **(Signature)** _____ **Date** _____

College Academic Standards (Print) _____ **(Signature)** _____ **Date** _____

College Dean (Print) _____ **(Signature)** _____ **Date** _____

Graduate Council (Print) _____ **(Signature)** _____ **Date** _____

Graduate Dean (Print) _____ **(Signature)** _____ **Date** _____

Approval

Provost and Executive Vice President: _____ **Date** _____

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

Department(s); College; Registrar; Associate Registrar; Institutional Research; Academic Services; Faculty Senate; University Analysis and Planning Support; College of Graduate Studies

Part A – For additions or revisions of programs, tracks or certificates

Brief statement of rationale: (Please indicate the rationale, how it affects the unit and faculty teaching in and students enrolled in the program, track or certificate.)

Two years ago the College of Health and Public Affairs decided to revise the doctoral program in Public Affairs (PAF) to be more in line with the community-based mission of the College and offer an interdisciplinary educational experience. The College put together a committee with at least one representative from each of the five tracks and four disciplines. The curriculum was revised using a competency-based approach. In the end, an interdisciplinary and methodologically rigorous program was developed that will provide graduates with the ability to have a significant and positive impact on our communities. We believe that this will provide students with a more enriched educational experience leaving them better able to have positive impact on the many social ills that affect our society.

Revisions to the main five tracks were approved in October. The Dual Degree track was omitted by accident and must now be approved to officially reflect the new PAF curriculum.

For Revisions:

Brief listing of Program Changes: (Please indicate the changes in bullet format. If there are changes to the credit hours of the program, required courses or other requirements, please state those changes. **Remember to attach the catalog copy showing changes, using Track Changes in Word.**)

-Total credit hours increased from 57 to 60
-Required courses restructured and increase from 42 credit hours to 45 credit hours
-Interdisciplinary Practicum course added as part of required courses

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 provide a list of students if possible:

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

Name Change

Are you changing the name of an existing program, track, or certificate? ☐ **Yes** ☐ **No**

If yes, provide the new name of the program, track, or certificate:

Provide the name of the current program, track, or certificate:

When is the name change effective? Please note: A name change will apply to the record of all students who are currently enrolled, readmitted or newly admitted into this program as of the effective date of this change.

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

If you are requesting a CIP Code change for an existing program, track, or certificate, please provide:

old CIP:

new CIP:

If a name change is your only revision, stop here. Otherwise, complete the rest of Part A.

Part A - Continued

Specify the faculty who will participate in the program, track or certificate and their credentials to do so: (List faculty and a brief paragraph of their credentials.)

See attached.

Impact of changes on students: Will current students be impacted by the addition or revision of a program, track or certificate? If so, how?

There are currently no active students in the MPA/PAF Dual Degree track.

If applicable, provide a written agreement (email is fine) from all involved units that they are in support of, will provide courses to, or will participate in the program, track, or certificate. Please attach the correspondence and also list the units here.

See attached.

If an addition, 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.

Not applicable as we already have a doctoral program in Public Affairs and we are only revising it to make it more consistent with the College's Mission Statement

	Year 1	Year 2	Year 3
Headcount	25	50	75
SCHs	198	396	585

If an addition, indicate likely career or student outcomes upon completion: (What will students do? What will their job titles be?)

Not applicable as we already have a doctoral program in Public Affairs and we are only revising it to make it more consistent with the College's Mission Statement

Part A - Continued

If an addition or there are substantial REVISIONS to existing tracks or certificates, please complete the following table on financial support: (Specify all forms of support – assistantships, fellowships, and tuition remission.)

	No. assistantship students	Source of funds	No. fellowship students (specify fellowship)	No. tuition remissions	Source of funds
Year 1					
Year 2					
Year 3					

Checklist of items to be provided:

☑ **Electronic graduate catalog copy for additions; track changes included if there are revisions. (required)**

☑ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☑ **Emails showing consultation with other units. (if applicable)**

☐ **If an addition, list of 1-3 students and 1-3 faculty for profiles in the graduate catalog (provide email address so Graduate Studies can contact them to write profiles and take photos). You may provide draft copy of profiles if you wish.**

☐ **If an addition, what disciplines does this program, track or certificate belong to? What other UCF graduate programs, tracks, or certificates are related to it? This information will be used to provide additional links for prospective students to search in the online graduate catalog.**

Part B – For inactivations or suspensions of programs, tracks, or certificates

Are students currently enrolled in the program? ☐ **Yes** ☐ **No**

If yes, number of current students:

Please specify the intended time period of inactivation or suspension:

If program, track, or certificate is being inactivated or suspended, then attach a "teach out" plan for all current students specifying how they can finish the program or where students will be placed if moving to another program. The "teach out" plan should specify when courses will be offered to enable students to finish. Specify whether students will remain in the existing program to finish, and if so, when the completion date will be, whether students will be moved to another program, etc. Please provide a list of students where applicable.

Sample teach out plan: Enter the terms and courses that will be taught for each term throughout the last semester. **Please delete course prefixes and numbers in this section if no teach out plan is required.**

Fall 2012	Spring 2013	Summer 2013	Fall 2013	Spring 2014

Checklist of items to be provided:

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **E-mails showing consultation with other units. (if applicable)**

E-mail documentation with IEMS department

Sabrina Kalish

From:	Christopher Geiger
Sent:	Wednesday, August 21, 2013 11:11 PM
To:	Waldemar Karwowski
Cc:	Ahmad Elshennawy; William Thompson; Sabrina Kalish; Kincaid, Peter (pkincaid@ist.ucf.edu); Max Poole; Ross Hinkle
Subject:	Update on the M&S Graduate Degree Programs

Dear Dr. Karwowski:

On behalf of the UCF Modeling & Simulation Graduate Program, I am writing to you regarding some challenges that have become very troubling for the M&S Graduate Program in recent months and involve courses offered by the Department of Industrial Engineering and Management Systems (IEMS). These IEMS courses are key courses for M&S degree programs.

As you know, as truly interdisciplinary programs at UCF, the M&S PhD, PSM and MS degree program curricula and, ultimately, our student plans of study greatly depend on the course offerings of and the communications with many academic units across the university. While we very much appreciate partnering with and are extremely grateful for the support from the UCF departments and academic units, including the IEMS Department, we have strong concerns regarding some IEMS courses that are key courses for the M&S degree program curricula. The courses and the concerns of the M&S Program are the following:

- EIN5255C Interactive Simulation: This is an M&S PhD core course and M&S MS elective course that has long been a challenge of the M&S Program over the past few years due to the physical constraints of the laboratory space in the Engineering 2 building in which the course meets; these physical constraints enforce a course enrollment maximum of no more than 25 students and the course fills quickly; in addition, the face-to-face only instruction preferred by the regular instructor makes it very difficult for our students in the two M&S degree programs, who are pursuing their degrees at a distance; we have been in contact with Dr. Michael Proctor over the years, who regularly teaches this course, and he has been accommodating to as many M&S students as he can by holding a single digit number of seats in the course as long as he can or by offering a course alternative to interested students; but oftentimes, Dr. Proctor's hands are tied and many M&S PhD students cannot take this core course when needed and are delayed in their progress to their degree; and
- EIN6258 Human Computer Interaction: This is an M&S PhD core course and M&S MS elective course that has recently become a challenge over the last year (since Fall 2012) due to the two Institute for Simulation & Training instructors' preference to reduce the class enrollment maximum from previous years to 25 students with little advanced notice; similar to EIN5255C, many of our M&S PhD students cannot take this core course when needed and are delayed in their progress to their degree.

Other IEMS courses that have recently become troubling for the M&S Graduate Programs are:

- ESI6532 Object-Oriented Simulation: This is an M&S PSM core course whose offering has been canceled without notice; and
- EIN6339 Operations Engineering: This is an M&S PhD and MS elective course whose offering has been canceled without notice.

These two classes are strong and popular electives for our PhD, PSM and MS degree programs. In fact, ESI6532 is a core course for our M&S PSM degree program.

I am sure you can understand that the above-described situations puts our program in a very precarious situation in that our students cannot enroll in the courses which are needed for their graduation. Therefore, I wanted to inform you that I am charging the M&S Program Curriculum Committee to review the core courses of the PhD, PSM and MS degree programs, whereby revisions to the M&S degree curricula may result. Of course, curricula revisions are not ideal

because we recognize that these subjects are quite relevant to the modeling and simulation field, and know that, historically, our students enjoy the courses offered by IEMS and the other academic units. We also know that academic units rely on SCHs in their budgets. However, curricula revisions for the M&S degree programs may be warranted. But, we wanted to make you aware of these troubling concerns as well as the plans of the M&S Graduate Program as soon as possible.

Only for the purposes of identifying constructive solutions and keeping the main administrators of the M&S Graduate Programs in the College of Graduate Studies to whom I report in the loop, I am copying Dr. Ross Hinkle and Dr. Max Poole on this message.

Regards,
Chris

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Christopher D. Geiger, Ph.D.
Associate Professor, Department of Industrial Engineering and Management Systems
Director, Modeling and Simulation Graduate Program
University of Central Florida
4000 Central Florida Blvd
P.O. Box 162993
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UCF Modeling & Simulation Graduate Program

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UCF 50 1963–2013 YEARS

Current Graduate Catalog Description

Modeling and Simulation PhD

PROGRAM DESCRIPTION

Simulation is the quintessential utility tool. In one way or another, just about every engineering or scientific field uses simulation as an exploration, modeling, or analysis technique. Simulation is not limited to engineering or science. Simulation is used in training, management, and concept exploration and involves constructing human-centered, equipment-centered, and/or stand-alone computer-based models of existing as well as conceptual systems or processes. The purpose of simulation is to evaluate the behavior of the human, organization, equipment, and/or systems under study through the evaluation of output from the corresponding simulation construct. Because of the scale and complexity of modeling and simulation, practitioners have developed both generalized and specialized skills.

Input from industry and government M&S users and developers has been instrumental in identifying the key competencies for M&S professionals and has been critical to the development of this curriculum. The curriculum is designed to provide a broad overall perspective of the developing simulation industry and an awareness of the economic considerations. Upon completion of the program, graduates will have the diverse training necessary to enable them to work in varied capacities in government agencies, or in the defense, service, entertainment, and manufacturing industries.

Students in the Modeling and Simulation graduate program have often focused their study and research efforts in one or more of the following research areas:

- ***Human Systems***

  The Human Systems in M&S research area has attracted those who wish to gain expertise in the content and techniques of human behavior in simulation systems, including human factors, human-computer interaction, virtual worlds, statistical and quantitative procedures, experimental design, computer techniques, and other research methodologies. Typical problem areas for R&D include human-in-the-loop simulation; team performance under stress; and use of visual, audio, haptic, and other sensory input/output modalities to coordinate human-machine activities. Typical courses include Human Factors, Training Systems Engineering, Human Computer Interaction, Intelligent Simulation, and Distributed Learning.

- ***Computer Visualization***

  Computer Visualization in M&S is a research area that attracts those who wish to gain expertise in technical aspects of computer graphic systems, virtual environments, and human-centered simulation systems applying the state-of-the-art in computer graphics and other human-interface technologies. Typical courses include Human Computer Interaction, Computer Graphics Systems, Computer Vision, Machine Perception, Human-Virtual Environment Interaction, and Sensation and Perception. Students in this research area typically have an interest in the area of

Emerging Media, which focuses on the
development of new forms of interactive media and the creation of story-driven content for them such as interactive works of art, electronic games, virtual reality, the Internet, portable devices and mobile applications, wearable computers, etc.

- ***Simulation Modeling and Analysis***

  The Simulation Modeling and Analysis research area attracts those who desire to gain expertise in using simulation as a optimization tool for effective design, planning, analysis, and decision-making. The emphasis of this area is on problem definition, model formulation, design of simulation experiments, and model-based analysis. This area attracts those who seek to develop skills in the application of advanced quantitative methods to modeling and simulation. Building on backgrounds in operations research, mathematics or statistics, they should gain experience in modeling and simulation through the application of optimization, mathematical and statistical theory to build
  multidisciplinary simulation models and conducting rigorous simulation experimentation. A graduate will be prepared to work with corporate and government decision-makers as they model and evaluate the impacts of proposed policies and system designs. Typical courses include Engineering Statistics, Statistical Aspects of Digital Simulation, and Mathematical Modeling, Discrete Systems Simulation, Object-Oriented Simulation, Experimental Design, and Quantitative Aspects of Modeling and Simulation.

- ***Simulation in Healthcare***

  Simulation in Healthcare is a fast growing new area in M&S. Issues related to bringing down the cost of healthcare and reducing costly medical errors are generating many new opportunities related to systems analysis, communication between healthcare providers and patients, and simulation-based training, to name a few. Currently a disproportionate amount of the US economy goes to healthcare, at least twice as much as the average of the 25 richest nations, and health outcomes in the US place the country near the bottom of this group of countries. M&S can contribute significantly towards improving this situation. Typical courses include Discrete Systems Simulation, Experimental Design, and
  Object-Oriented Simulation, Engineering Statistics, Human Computer Interaction.

- ***Interactive Simulation and Intelligent Systems***

  Interactive Simulation and Intelligent Systems research attracts those who wish to pursue or are currently pursuing careers in the training simulation/simulator industries. Graduates specializing in this research area typically are interested in creating designs for simulators and simulator-based training systems and to apply expert systems and other intelligent systems in a simulation setting. Typical courses include Training Systems Engineering, Simulation of Real-Time Processes, and Intelligent
  Simulation.

- ***Simulation Infrastructure***

  The research area of Simulation Infrastructure attracts those who wish to gain an in-depth understanding of the basic components of simulation systems and their patterns of configuration and communication, including hardware and software issues. They will gain experience in the development of distributed simulation and training environments. Graduates should be able to implement such systems or manage a team capable of developing such systems. Typical courses include Performance Models of Computers and Networks, Simulation Design and Analysis, High Performance Computer Architecture, and Analysis of Computer and Communication Systems. Simulation Management: Simulation Management research area attracts those who wish to gain expertise in the management of projects related to modeling, simulation, and training (MS&T). Graduates who focus in this area of study should be prepared to manage such projects for military agencies or MS&T companies. Typical courses include Environment of Technical Organizations, Modeling and Simulation of Real-Time Processes, Management Information Systems, and Project Engineering.

- ***Simulation Management***

  Simulation Management research area attracts those who wish to gain expertise in the management of projects related to modeling, simulation, and training (MS&T). Graduates who focus in this area of study should be prepared to manage such projects for military agencies or MS&T companies. Typical courses include Environment of Technical Organizations, Modeling and Simulation of Real-Time Processes, Management Information Systems, and Project Engineering.

Read More

CURRICULUM

The Modeling and Simulation PhD requires a minimum of 72 credit hours of coursework beyond the bachelor's degree, including a minimum of 15 dissertation hours.

The M&S PhD program requires 15 credit hours of 5 required core courses. These core courses will provide an interdisciplinary framework for all students.

The remaining 42 credit hours may consist of additional unrestricted elective courses and research hours. At least 27 hours of the total program must consist of formal coursework, exclusive of independent study.

Total Credit Hours Required:
72 Credit Hours Minimum beyond the Bachelor's Degree
42 Credit Hours Minimum beyond the Master's Degree

Students may fulfill the restricted elective requirements through the courses chosen in the restricted core. Such students will meet the total credit hour requirements with additional unrestricted elective courses.

Required Courses—15 Credit Hours

Core—15 Credit Hours

- ESI 5531 Discrete Systems Simulation (3 credit hours)
- EIN 5255C Interactive Simulation (3 credit hours)
- EIN 6258 Human Computer Interaction (3 credit hours)
- IDS 6916 Simulation Research Methods and Practicum (3 credit hours)
- An advanced research methods course (at least 3 credit hours). The purpose of the advanced research methods course is to provide background and analysis of the interpretive act in all educational research and to prepare students to perform independent research for their dissertations. Topics covered in these types of courses typically include research questions/hypotheses formulation, critical analysis of journal articles when performing a survey of the open literature, data collection and sampling methods, experimental and quasi-experimental designs, statistical methods, quantitative and qualitative data analysis and research report writing. Eligible advanced research methods courses for the M&S PhD program are:
    - ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
    - ESI 6891 IEMS Research Methods (3 credit hours)
    - PHI 5340 Research Methods in the Cognitive Sciences (3 credit hours)
    - PSY 6216C Research Methodology (4 credit hours)
    - STA 5205 Experimental Design (3 credit hours)
    - A graduate-level advanced research methods course approved by a M&S Program Director

Unrestricted Electives—42 Credit Hours

All M&S PhD degree program students must take at least 42 credit hours of unrestrictive elective courses that support the student's area of graduate study.

A student must carefully select a set of courses in order to design an appropriate plan of coursework. The purpose of the courses is to ensure that students have depth in their research area as well as have breadth in the interdisciplinary area of modeling and simulation. The set of courses should also support a student's area of graduate study and to meet the specific educational needs, goals and objectives of that student.

Unrestricted electives must consist of at least 12 credit hours of formal courses, excluding independent study. The remaining credits may consist of additional coursework, directed research, independent study, and additional dissertation as advised appropriately by faculty adviser and/or program director.

Modeling and Simulation PhD Elective Courses

In addition to successfully completing the core courses for the M&S PhD program, students are required to carefully select electives with the guidance of a Program Director or faculty adviser. Elective choices should be made with the intent to strengthen a research interest and/or area of focus in order to meet the individual student's educational goals and objectives.

Listed below are suggested courses in various areas of focus or specialization. These course groupings are mere guides, are not exhaustive and are only meant to assist with advising and course selection in order to meet the individual student's educational goals and objectives. They are not intended to restrict elective choices among focus areas as we strongly encourage Modeling and Simulation students to maintain an interdisciplinary approach to their graduate studies.

If a student identifies another UCF course which may be of value to his/her M&S research area, but is not already identified in a list below, that student may request approval from the Graduate Program Director for the course to be used as an elective in the Graduate Plan of Study. All such requests must be made in advance of enrolling in the course.

Those electives categorized as "General" and "Fundamentals of Modeling and Simulation" would be appropriate for all students regardless of interest area. The remaining categories are grouped by area of interest.

General

- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- ESI 6891 IEMS Research Methods (3 credit hours)
- IDS 5907 Independent Study (variable)
- IDS 5917 Directed Research (variable)
- IDS 6908 Independent Study (variable)
- IDS 6918 Directed Research (variable)
- IDS 6946 Internship (variable)
- IDS 7919 Doctoral Research (variable)
- PHI 5340 Research Methods in Cognitive Sciences (3 credit hours)
- PSY 6216C Research Methodology (4 credit hours)
- STA 5205 Experimental Design (3 credit hours)

Fundamentals of Modeling and Simulation

- DIG 5876 Quantitative Aspects of Modeling and Simulation (3 credit hours)
- EEL 5892 Continuous System Simulation II (3 credit hours)
- ESI 5219 Engineering Statistics (3 credit hours)
- ESI 6217 Statistical Aspects of Digital Simulation (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- ESI 6532 Object-Oriented Simulation (3 credit hours)
- IDS 6146 Modeling and Simulation Systems (3 credit hours)

- IDS 6147 Perspectives on Modeling and Simulation (3 credit hours)

Human Systems

- CAP 6515 Algorithms in Computational Biology (3 credit hours)
- CAP 6671 Intelligent Systems: Robots, Agents, and Humans (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- DIG 6775 Virtual Reality (3 credit hours)
- DIG 6812 Digital Interaction for Informal Learning (3 credit hours)
- EIN 5248C Ergonomics (3 credit hours)
- EIN 5317 Training System Design (3 credit hours)
- EIN 6215 System Safety Engineering and Management (3 credit hours)
- EIN 6649C Intelligent Tutoring Training System Design (3 credit hours)
- EME 6458 Virtual Teaching and the Digital Educator (3 credit hours)
- EME 6507 Multimedia for Education and Training (3 credit hours)
- EME 6601 Instructional Simulation Design for Training and Education (3 credit hours)
- EXP 5208 Sensation and Perception (3 credit hours)
- EXP 5256 Human Factors I (3 credit hours)
- EXP 6255 Human Performance (3 credit hours)
- EXP 6257 Human Factors II (3 credit hours)
- EXP 6258 Human Factors III (3 credit hours)
- EXP 6506 Human Cognition and Learning (3 credit hours)
- EXP 6541 Advanced Human Computer Interaction (3 credit hours)
- IDS 6148 Human Systems Integration for Modeling and Simulation (3 credit hours)
- PHI 5225 Philosophy of Language (3 credit hours)
- PHI 5325 Topics in Philosophy of Mind (3 credit hours)
- PHI 5327 Topics in Cognitive Sciences (3 credit hours)
- PHI 5329 Philosophy of Neuroscience (3 credit hours)
- PSB 5005 Physiological Psychology (3 credit hours)
- TTE 6270 Intelligent Transportation Systems (3 credit hours)

Computer Visualization

- CAP 5725 Computer Graphics I (3 credit hours)
- CAP 6411 Computer Vision Systems (3 credit hours)
- CAP 6412 Advanced Computer Vision (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- CDA 5106 Advanced Computer Architecture (3 credit hours)
- COT 5405 Design and Analysis of Algorithms (3 credit hours)
- DIG 6605 Physical Computing (3 credit hours)
- DIG 6647 Science and Technology of Dynamic Media (3 credit hours)
- DIG 6775 Virtual Reality (3 credit hours)
- EEL 5173 Linear Systems Theory (3 credit hours)

- EEL 5771C Engineering Applications of Computer Graphics (3 credit hours)
- EEL 5820 Image Processing (3 credit hours)
- EEL 5825 Pattern Recognition (3 credit hours)
- EEL 5874 Expert Systems and Knowledge Engineering (3 credit hours)
- EEL 6823 Image Processing II (3 credit hours)
- EEL 6843 Machine Perception (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- MAP 5117 Mathematical Modeling (3 credit hours)
- MAP 6118 Introduction to Nonlinear Dynamics (3 credit hours)

Quantitative Methods for Simulation, Modeling and Analysis

- CAP 5512 Evolutionary Computation (3 credit hours)
- CAP 6515 Algorithms in Computational Biology (3 credit hours)
- CDA 6530 Performance Models of Computers and Networks (3 credit hours)
- COT 5405 Design and Analysis of Algorithms (3 credit hours)
- DIG 5876 Quantitative Aspects of Modeling and Simulation (3 credit hours)
- EEL 5173 Linear Systems Theory (3 credit hours)
- EEL 5892 Continuous System Simulation II (3 credit hours)
- EEL 6878 Modeling and Artificial Intelligence (3 credit hours)
- EIN 6528 Simulation Based Life Cycle Engineering (3 credit hours)
- ESI 5306 Operations Research (3 credit hours)
- ESI 6217 Statistical Aspects of Digital Simulation (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- MAP 5117 Mathematical Modeling (3 credit hours)
- MAP 6118 Introduction to Nonlinear Dynamics (3 credit hours)
- MAP 6207 Optimization Theory (3 credit hours)
- MAP 6385 Applied Numerical Mathematics (3 credit hours)
- MAP 6407 Applied Mathematics I (3 credit hours)
- MAP 6408 Applied Mathematics II (3 credit hours)
- MAP 6445 Approximation Techniques (3 credit hours)
- STA 5703 Data Mining Methodology I (3 credit hours)
- STA 5825 Stochastic Processes and Applied Probability Theory (3 credit hours)
- STA 6236 Regression Analysis (3 credit hours)
- STA 6246 Linear Models (3 credit hours)
- STA 6326 Theoretical Statistics I (3 credit hours)
- STA 6327 Theoretical Statistics II (3 credit hours)
- STA 6329 Statistical Applications of Matrix Algebra (3 credit hours)
- STA 6704 Data Mining Methodology II (3 credit hours)
- STA 6714 Data Preparation (3 credit hours)

Simulation in Healthcare

- CAP 6515 Algorithms in Computational Biology (3 credit hours)
- CAP 6671 Intelligent Systems: Robots, Agents, and Humans (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- DIG 6647 Science and Technology of Dynamic Media (3 credit hours)
- DIG 6812 Digital Interaction for Informal Learning (3 credit hours)
- EEL 5820 Image Processing (3 credit hours)
- EEL 6823 Image Processing II (3 credit hours)
- HUM 5802 Applied Contemporary Humanities (3 credit hours)
- DIG 6775 Virtual Reality (3 credit hours)
- PHI 5329 Philosophy of Neuroscience (3 credit hours)
- PSB 5005 Physiological Psychology (3 credit hours)
- SPA 6417 Cognitive/Communicative Disorders (3 credit hours)
- SPA 6451 Theory and Clinical Aspects Cognitive-Comm Disorders in Traumatic Brain Injury (3 credit hours)
- SPA 6452 Assessment of Cognitive-Communication Disorders in Traumatic Brain Injury (3 credit hours)

Interactive Simulation and Intelligent Systems

- CAP 5512 Evolutionary Computation (3 credit hours)
- CAP 5610 Machine Learning (3 credit hours)
- CAP 5636 Advanced Artificial Intelligence (3 credit hours)
- CAP 6671 Intelligent Systems: Robots, Agents, and Humans (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- DIG 6775 Virtual Reality (3 credit hours)
- DIG 6812 Digital Interaction for Informal Learning (3 credit hours)
- EEL 5771C Engineering Applications of Computer Graphics (3 credit hours)
- EEL 5874 Expert Systems and Knowledge Engineering (3 credit hours)
- EEL 6878 Modeling and Artificial Intelligence (3 credit hours)
- EIN 5251 Usability Engineering (3 credit hours)
- EIN 6645 Real-Time Simulation Agents (3 credit hours)
- EIN 6647 Intelligent Simulation (3 credit hours)
- EIN 6649C Intelligent Tutoring Training System Design (3 credit hours)
- EME 6613 Instructional System Design (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)

Simulation Infrastructure

- CAP 6671 Intelligent Systems: Robots, Agents, and Humans (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- CDA 5106 Advanced Computer Architecture (3 credit hours)
- CDA 6107 Parallel Computer Architecture (3 credit hours)
- CDA 6530 Performance Models of Computers and Networks (3 credit hours)

- CNT 5008 Computer Communication Networks Architecture (3 credit hours)
- COT 5405 Design and Analysis of Algorithms (3 credit hours)
- DIG 6605 Physical Computing (3 credit hours)
- EEL 5173 Linear Systems Theory (3 credit hours)
- EEL 5771C Engineering Applications of Computer Graphics (3 credit hours)
- EEL 5892 Continuous System Simulation II (3 credit hours)
- EEL 6762 Performance Analysis of Computer and Communication Systems (3 credit hours)
- EEL 6785 Computer Network Design (3 credit hours)
- EEL 6878 Modeling and Artificial Intelligence (3 credit hours)
- EEL 6883 Software Engineering II (3 credit hours)
- EEL 6885 Software Engineering Quality Assurance Methods (3 credit hours)
- EEL 6887 Software Engineering Life-Cycle Control (3 credit hours)
- ESI 6551C Systems Engineering (3 credit hours)

Simulation Management

- EIN 5108 The Environment of Technical Organizations (3 credit hours)
- EIN 5117 Management Information Systems I (3 credit hours)
- EIN 5140 Project Engineering (3 credit hours)
- EIN 5356 Cost Engineering (3 credit hours)
- EIN 6182 Engineering Management (3 credit hours)
- EIN 6215 System Safety Engineering and Management (3 credit hours)
- EIN 6339 Operations Engineering (3 credit hours)
- EIN 6357 Advanced Engineering Economic Analysis (3 credit hours)
- EIN 6528 Simulation Based Life Cycle Engineering (3 credit hours)
- ESI 5227 Total Quality Improvement (3 credit hours)
- ESI 6224 Quality Management (3 credit hours)
- ESI 6358 Decision Analysis (3 credit hours)
- ESI 6551C Systems Engineering (3 credit hours)
- ISM 6217 Advanced Database Administration (3 credit hours)
- ISM 7027 Systems Support of Organizational Decision Making (3 credit hours)

Waived Credits

The doctoral program will allow up to 30 credit hours to be waived from an earned master's degree.

Dissertation—15 Credit Hours Minimum

- XXX 7980 Dissertation Research (15 credit hours minimum)

Qualifying Examination

A written test is required covering content of the core courses, excluding the research methods course, which prepares students for dissertation research.

Dissertation Adviser and Dissertation Advisory Committee

Students have the responsibility to select a Dissertation Adviser from a list of faculty authorized to direct dissertations. The student and the Dissertation Adviser, then, must identify and select the other members of the student's Dissertation Advisory Committee. The Dissertation Advisory Committee consists of a minimum of four members.

All committee members should hold a doctoral or terminal degree and be in fields related to the dissertation topic, and at least three members must be regular Modeling and Simulation graduate faculty (one to serve as chair) from at least two UCF colleges. At least one member of the committee must have served as a committee member on a prior M&S Thesis or Dissertation Advisory Committee. In some cases, with approval from the Program Director, a committee member may serve as co-chair of the committee. The M&S Program Director can assist students with selection of their adviser as well as with committee formation, additions, and deletions. The UCF College of Graduate Studies has the right to review appointments to advisory committees, place a representative on any advisory committee, or appoint a co-adviser.

Candidacy Examination

The Candidacy Examination evaluates the student's preparation to perform independent research to undertake the research in the student's dissertation topic. A student may sit for the Candidacy Examination upon:

1. passing the Qualifying Examination;
2. completing all conditions placed as a result thereof; and
3. completing all but 6 credit hours or less of the courses prescribed in the student's Graduate Plan of Study.

The Candidacy Examination includes all of the following:

The Dissertation Research Proposal

The research proposal is a written exposition of a academic or scientific topic and specific research question(s)/hypothesis(es) that is/are developed by the student; the research proposal identifies the chosen area(s) of research and offers convincing support of the need for the research investigation being proposed. Specifically, the research proposal includes at least the following components:

- ***Motivation of the research investigation***. Background and the motivation for the pursuit of the dissertation topic should be clearly and thoroughly explained including the historical and modern view of the topic and the rationale and need for the proposed research. The specific research

questions(s)/hypothesis(es) that is/are being addressed and the research objectives must be described;

- ***Literature review on the topic of the dissertation***. A good literature review expands upon the reasons behind selecting the research question(s)/hypothesis(es). The review is an extensive summary and synopsis of the area(s) of research, and it provides a critical and in-depth evaluation of previous related research on the topic. It is an abstracting and synthesis of previous research, and the review explains how it integrates into the proposed research investigation. All sides of an argument must be clearly explained, to avoid bias, and areas of agreement and disagreement should be highlighted; and
- ***A detailed proposed methodology for conducting the research***. This ethodology must be consistent with the requirements of the field. It is customary to include any preliminary modeling and results in this discussion to show the potential of strengths and weaknesses of the methodology.

An oral defense of the Dissertation Research Proposal

This defense includes a formal, oral presentation of the written Dissertation Research Proposal before the Dissertation Advisory Committee.

A refereed published or accepted for publication manuscript

Students preparing for the Candidacy Examination should have at least one refereed published or accepted for publication manuscript directly related to the dissertation research, and the student must be a significant contributor to the work and the paper. If the refereed manuscript is not published, it should be fully accepted, and not conditionally accepted. This manuscript may be a journal or proceedings publication from a reputable conference.

All members vote on acceptance or rejection of the Dissertation Research Proposal and the Dissertation Proposal must be approved with at most one dissenting member of the advisory committee. A student is normally given one opportunity to pass the oral defense of the Dissertation Research Proposal, but the M&S Program Director, upon the recommendation of the student's Dissertation Advisory Committee, may approve at most a second attempt.

Admission to Candidacy

In summary, the following are required for a student to be admitted to candidacy and subsequently enroll in dissertation hours:

- Completion of all course work, except for dissertation hours;
- The Dissertation Advisory Committee is formed, consisting of approved graduate faculty and graduate faculty scholars;
- Submission of an approved Graduate Plan of Study;

- Successful completion of the Candidacy Examination (see Candidacy Examination section above for details).

Dissertation Defense

The Dissertation Defense is a formal, oral examination of the written dissertation before the Dissertation Advisory Committee. All members vote either “Pass” or “Fail” of the written dissertation, and the dissertation and Dissertation Defense must be approved with at most one dissenting member of the advisory committee. A student is normally given one opportunity to pass the oral defense of the dissertation, but the M&S Program Director, upon the recommendation of the student’s Dissertation Advisory Committee, may approve at most a second attempt.

Plan of Study

After admission to the PhD program, students should file a Graduate Plan of Study (GPS) with the Modeling and Simulation Graduate Program Office.

The purpose of the GPS is to design an appropriate program of coursework to support a student’s area of graduate study and to meet the specific educational needs, goals and objectives of that student. The coursework must be selected to form a unified, cohesive plan of study. All graduate credit in a doctoral program must be at 5000 level or higher, and at least one-half of the credit hours used to meet program requirements must be in 6000-level or 7000-level courses.

The GPS should be developed under the supervision of the Dissertation Adviser(s) and members of the Dissertation Advisory Committee, although initially it may be constructed under the supervision of the M&S Graduate Program Office.

Changes in the Graduate Plan of Study can be made (due to course offering deletions, schedule conflicts, etc.) and with the approval of the M&S Graduate Program Office.

Programs of Study for students seeking a doctoral degree should be on file with the College of Graduate Studies by the end of the third major term of enrollment (based on full-time enrollment) and must be on file prior to the change to candidacy status.

Equipment Fee

Full-time students in the Modeling and Simulation PhD program pay a $27 equipment fee each semester that they are enrolled. Part-time students pay a $13.50 equipment fee each semester that they are enrolled.

INDEPENDENT LEARNING

The dissertation is a project that constitutes independent learning conducted under the guidance of a Dissertation Advisory Committee. Three must be members of the Modeling and Simulation graduate faculty. All members vote on acceptance or rejection of the Dissertation Research Proposal and the Dissertation Proposal must be approved with at most one dissenting member of the advisory committee. A student is normally given one opportunity to pass the oral defense of the Dissertation Research Proposal, but the M&S Program Director, upon the recommendation of the student's Dissertation Advisory Committee, may approve at most a second attempt.

APPLICATION REQUIREMENTS

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissionssection 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
- Official, competitive score on the GRE taken within the last five years
- Résumé or Curriculum Vitae
- Goal statement
    - The goal statement should discuss all relevant professional background and any previous research experience. The statement should explain the motivation behind the pursuit of a Doctoral degree in Modeling and Simulation. Future career goals after the completion of the applicant's doctoral study should be discussed.
    - Most importantly, the applicant must clearly describe the particular area(s) of research interest. The applicant should identify at least one UCF faculty member who shares a similar research focus and is believed to be best suited to serve as a potential dissertation advisor.
    - The goal statement should between 500 and 1,000 words.
- Three letters of recommendation
    - The letters of recommendation should be from faculty members, university administrators and employers. The letters, which must be current to the application, should address the educational and career goals of applicant. The letter writers should also know the applicant well enough to discuss the applicant's capacity to perform, excel and succeed in a graduate program. Letters for PhD applicants must discuss the applicant's ability to perform graduate-level research. At least two of the letters should be furnished by college or university professors who are acquainted with the applicant.
- Applicants to this program are strongly encouraged to complete the necessary information requested for the ETS PPI (Personal Potential Index) report that is available during the GRE examination. All official PPI reports must be submitted directly to the UCF College of Graduate Studies (use UCF Institution Code: 5233).

Applications are accepted for the fall and spring terms only.

Readmission

Applicants who are reapplying for admission need not resubmit transcripts and GRE scores if the transcripts and scores are previously filed with UCF. However, the following application requirements do need to be current for the new application for readmission:

- Résumé/Curriculum Vitae
- Goal Statement
- Letters of Recommendation

Prerequisites

Students who enter the Modeling and Simulation Program are expected to have an academic and/or work background that has prepared them in mathematics (introductory calculus and probability and statistics) and computer literacy, including proficiency with word processing, spreadsheet, and database programs, and, preferably, familiarity with at least one higher order programming language (e.g., C/C++, Visual Basic, Java, etc.). Students with undergraduate or graduate degrees in Engineering, Computer Science, or Mathematics will generally have this background.

For students with less technical academic preparation, the core course DIG 5876 Quantitative Aspects of Modeling and Simulation, will prepare them for several, but not all, aspects of the program. However, some students may need a number of prerequisite courses in Mathematics, Statistics, and Computer Science in order to pursue one or more areas of study.

Application Deadlines

Modeling and Simulation PhD	Fall Priority	Fall	Spring	Summer
Domestic Applicants	Jan 15	Jul 15	Dec 1	-
International Applicants	Jan 15	Jan 15	Jul 1	-
International Transfer Applicants	Jan 15	Mar 1	Sep 1	-

Modeling and Simulation PhD

PROGRAM DESCRIPTION

Simulation is the quintessential utility tool. In one way or another, just about every engineering or scientific field uses simulation as an exploration, modeling, or analysis technique. Simulation is not limited to engineering or science. Simulation is used in training, management, and concept exploration and involves constructing human-centered, equipment-centered, and/or stand-alone computer-based models of existing as well as conceptual systems or processes. The purpose of simulation is to evaluate the behavior of the human, organization, equipment, and/or systems under study through the evaluation of output from the corresponding simulation construct. Because of the scale and complexity of modeling and simulation, practitioners have developed both generalized and specialized skills.

Input from industry and government M&S users and developers has been instrumental in identifying the key competencies for M&S professionals and has been critical to the development of this curriculum. The curriculum is designed to provide a broad overall perspective of the developing simulation industry and an awareness of the economic considerations. Upon completion of the program, graduates will have the diverse training necessary to enable them to work in varied capacities in government agencies, or in the defense, service, entertainment, and manufacturing industries.

Students in the Modeling and Simulation graduate program have often focused their study and research efforts in one or more of the following research areas:

- ***Human Systems***

  The Human Systems in M&S research area has attracted those who wish to gain expertise in the content and techniques of human behavior in simulation systems, including human factors, human-computer interaction, virtual worlds, statistical and quantitative procedures, experimental design, computer techniques, and other research methodologies. Typical problem areas for R&D include human-in-the-loop simulation; team performance under stress; and use of visual, audio, haptic, and other sensory input/output modalities to coordinate human-machine activities. Typical courses include Human Factors, Training Systems Engineering, Human Computer Interaction, Intelligent Simulation, and Distributed Learning.

- ***Computer Visualization***

  Computer Visualization in M&S is a research area that attracts those who wish to gain expertise in technical aspects of computer graphic systems, virtual environments, and human-centered simulation systems applying the state-of-the-art in computer graphics and other human-interface technologies. Typical courses include Human Computer Interaction, Computer Graphics Systems, Computer Vision, Machine Perception, Human-Virtual Environment Interaction, and Sensation and Perception. Students in this research area typically have an interest in the area of

Emerging Media, which focuses on the
development of new forms of interactive media and the creation of story-driven content for them such as interactive works of art, electronic games, virtual reality, the Internet, portable devices and mobile applications, wearable computers, etc.

- ***Simulation Modeling and Analysis***

  The Simulation Modeling and Analysis research area attracts those who desire to gain expertise in using simulation as a optimization tool for effective design, planning, analysis, and decision-making. The emphasis of this area is on problem definition, model formulation, design of simulation experiments, and model-based analysis. This area attracts those who seek to develop skills in the application of advanced quantitative methods to modeling and simulation. Building on backgrounds in operations research, mathematics or statistics, they should gain experience in modeling and simulation through the application of optimization, mathematical and statistical theory to build
  multidisciplinary simulation models and conducting rigorous simulation experimentation. A graduate will be prepared to work with corporate and government decision-makers as they model and evaluate the impacts of proposed policies and system designs. Typical courses include Engineering Statistics, Statistical Aspects of Digital Simulation, and Mathematical Modeling, Discrete Systems Simulation, Object-Oriented Simulation, Experimental Design, and Quantitative Aspects of Modeling and Simulation.

- ***Simulation in Healthcare***

  Simulation in Healthcare is a fast growing new area in M&S. Issues related to bringing down the cost of healthcare and reducing costly medical errors are generating many new opportunities related to systems analysis, communication between healthcare providers and patients, and simulation-based training, to name a few. Currently a disproportionate amount of the US economy goes to healthcare, at least twice as much as the average of the 25 richest nations, and health outcomes in the US place the country near the bottom of this group of countries. M&S can contribute significantly towards improving this situation. Typical courses include Discrete Systems Simulation, Experimental Design, and
  Object-Oriented Simulation, Engineering Statistics, Human Computer Interaction.

- ***Interactive Simulation and Intelligent Systems***

  Interactive Simulation and Intelligent Systems research attracts those who wish to pursue or are currently pursuing careers in the training simulation/simulator industries. Graduates specializing in this research area typically are interested in creating designs for simulators and simulator-based training systems and to apply expert systems and other intelligent systems in a simulation setting. Typical courses include Training Systems Engineering, Simulation of Real-Time Processes, and Intelligent
  Simulation.

- ***Simulation Infrastructure***

  The research area of Simulation Infrastructure attracts those who wish to gain an in-depth understanding of the basic components of simulation systems and their patterns of configuration and communication, including hardware and software issues. They will gain experience in the development of distributed simulation and training environments. Graduates should be able to implement such systems or manage a team capable of developing such systems. Typical courses include Performance Models of Computers and Networks, Simulation Design and Analysis, High Performance Computer Architecture, and Analysis of Computer and Communication Systems. Simulation Management: Simulation Management research area attracts those who wish to gain expertise in the management of projects related to modeling, simulation, and training (MS&T). Graduates who focus in this area of study should be prepared to manage such projects for military agencies or MS&T companies. Typical courses include Environment of Technical Organizations, Modeling and Simulation of Real-Time Processes, Management Information Systems, and Project Engineering.

- ***Simulation Management***

  Simulation Management research area attracts those who wish to gain expertise in the management of projects related to modeling, simulation, and training (MS&T). Graduates who focus in this area of study should be prepared to manage such projects for military agencies or MS&T companies. Typical courses include Environment of Technical Organizations, Modeling and Simulation of Real-Time Processes, Management Information Systems, and Project Engineering.

Read More

CURRICULUM

The Modeling and Simulation PhD requires a minimum of 72 credit hours of coursework beyond the bachelor's degree, including a minimum of 15 dissertation hours.

The M&S PhD program requires 15 credit hours of 5 required core courses. These core courses will provide an interdisciplinary framework for all students.

The remaining 42 credit hours may consist of additional unrestricted elective courses and research hours. At least 27 hours of the total program must consist of formal coursework, exclusive of independent study.

Total Credit Hours Required:
72 Credit Hours Minimum beyond the Bachelor's Degree
42 Credit Hours Minimum beyond the Master's Degree

Students may fulfill the restricted elective requirements through the courses chosen in the restricted core. Such students will meet the total credit hour requirements with additional unrestricted elective courses.

Required Courses—15 Credit Hours

Core—15 Credit Hours

- ESI 5531 Discrete Systems Simulation (3 credit hours)
- EIN 5255C Interactive Simulation (3 credit hours)
- EIN 6258 Human Computer Interaction (3 credit hours)
- IDS 6916 Simulation Research Methods and Practicum (3 credit hours)
- An advanced research methods course (at least 3 credit hours). The purpose of the advanced research methods course is to provide background and analysis of the interpretive act in all educational research and to prepare students to perform independent research for their dissertations. Topics covered in these types of courses typically include research questions/hypotheses formulation, critical analysis of journal articles when performing a survey of the open literature, data collection and sampling methods, experimental and quasi-experimental designs, statistical methods, quantitative and qualitative data analysis and research report writing. Eligible advanced research methods courses for the M&S PhD program are:
    - ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
    - ESI 6891 IEMS Research Methods (3 credit hours)
    - PHI 5340 Research Methods in the Cognitive Sciences (3 credit hours)
    - PSY 6216C Research Methodology (4 credit hours)
    - STA 5205 Experimental Design (3 credit hours)
    - A graduate-level advanced research methods course approved by a M&S Program Director

Unrestricted Electives—42 Credit Hours

All M&S PhD degree program students must take at least 42 credit hours of unrestrictive elective courses that support the student's area of graduate study.

A student must carefully select a set of courses in order to design an appropriate plan of coursework. The purpose of the courses is to ensure that students have depth in their research area as well as have breadth in the interdisciplinary area of modeling and simulation. The set of courses should also support a student's area of graduate study and to meet the specific educational needs, goals and objectives of that student.

Unrestricted electives must consist of at least 12 credit hours of formal courses, excluding independent study. The remaining credits may consist of additional coursework, directed research, independent study, and additional dissertation as advised appropriately by faculty adviser and/or program director.

Modeling and Simulation PhD Elective Courses

In addition to successfully completing the core courses for the M&S PhD program, students are required to carefully select electives with the guidance of a Program Director or faculty adviser. Elective choices should be made with the intent to strengthen a research interest and/or area of focus in order to meet the individual student's educational goals and objectives.

Listed below are suggested courses in various areas of focus or specialization. These course groupings are mere guides, are not exhaustive and are only meant to assist with advising and course selection in order to meet the individual student's educational goals and objectives. They are not intended to restrict elective choices among focus areas as we strongly encourage Modeling and Simulation students to maintain an interdisciplinary approach to their graduate studies.

If a student identifies another UCF course which may be of value to his/her M&S research area, but is not already identified in a list below, that student may request approval from the Graduate Program Director for the course to be used as an elective in the Graduate Plan of Study. All such requests must be made in advance of enrolling in the course.

Those electives categorized as "General" and "Fundamentals of Modeling and Simulation" would be appropriate for all students regardless of interest area. The remaining categories are grouped by area of interest.

General

- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- ESI 6891 IEMS Research Methods (3 credit hours)
- IDS 5907 Independent Study (variable)
- IDS 5917 Directed Research (variable)
- IDS 6908 Independent Study (variable)
- IDS 6918 Directed Research (variable)
- IDS 6946 Internship (variable)
- IDS 7919 Doctoral Research (variable)
- PHI 5340 Research Methods in Cognitive Sciences (3 credit hours)
- PSY 6216C Research Methodology (4 credit hours)
- STA 5205 Experimental Design (3 credit hours)

Fundamentals of Modeling and Simulation

- DIG 5876 Quantitative Aspects of Modeling and Simulation (3 credit hours)
- EEL 5892 Continuous System Simulation II (3 credit hours)
- ESI 5219 Engineering Statistics (3 credit hours)
- ESI 6217 Statistical Aspects of Digital Simulation (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- ESI 6532 Object-Oriented Simulation (3 credit hours)
- IDS 6146 Modeling and Simulation Systems (3 credit hours)

- IDS 6147 Perspectives on Modeling and Simulation (3 credit hours)

Human Systems

- CAP 6515 Algorithms in Computational Biology (3 credit hours)
- CAP 6671 Intelligent Systems: Robots, Agents, and Humans (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- DIG 6775 Virtual Reality (3 credit hours)
- DIG 6812 Digital Interaction for Informal Learning (3 credit hours)
- EIN 5248C Ergonomics (3 credit hours)
- EIN 5317 Training System Design (3 credit hours)
- EIN 6215 System Safety Engineering and Management (3 credit hours)
- EIN 6649C Intelligent Tutoring Training System Design (3 credit hours)
- EME 6458 Virtual Teaching and the Digital Educator (3 credit hours)
- EME 6507 Multimedia for Education and Training (3 credit hours)
- EME 6601 Instructional Simulation Design for Training and Education (3 credit hours)
- EXP 5208 Sensation and Perception (3 credit hours)
- EXP 5256 Human Factors I (3 credit hours)
- EXP 6255 Human Performance (3 credit hours)
- EXP 6257 Human Factors II (3 credit hours)
- EXP 6258 Human Factors III (3 credit hours)
- EXP 6506 Human Cognition and Learning (3 credit hours)
- EXP 6541 Advanced Human Computer Interaction (3 credit hours)
- IDS 6148 Human Systems Integration for Modeling and Simulation (3 credit hours)
- PHI 5225 Philosophy of Language (3 credit hours)
- PHI 5325 Topics in Philosophy of Mind (3 credit hours)
- PHI 5327 Topics in Cognitive Sciences (3 credit hours)
- PHI 5329 Philosophy of Neuroscience (3 credit hours)
- PSB 5005 Physiological Psychology (3 credit hours)
- TTE 6270 Intelligent Transportation Systems (3 credit hours)

Computer Visualization

- CAP 5725 Computer Graphics I (3 credit hours)
- CAP 6411 Computer Vision Systems (3 credit hours)
- CAP 6412 Advanced Computer Vision (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- CDA 5106 Advanced Computer Architecture (3 credit hours)
- COT 5405 Design and Analysis of Algorithms (3 credit hours)
- DIG 6605 Physical Computing (3 credit hours)
- DIG 6647 Science and Technology of Dynamic Media (3 credit hours)
- DIG 6775 Virtual Reality (3 credit hours)
- EEL 5173 Linear Systems Theory (3 credit hours)

- EEL 5771C Engineering Applications of Computer Graphics (3 credit hours)
- EEL 5820 Image Processing (3 credit hours)
- EEL 5825 Pattern Recognition (3 credit hours)
- EEL 5874 Expert Systems and Knowledge Engineering (3 credit hours)
- EEL 6823 Image Processing II (3 credit hours)
- EEL 6843 Machine Perception (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- MAP 5117 Mathematical Modeling (3 credit hours)
- MAP 6118 Introduction to Nonlinear Dynamics (3 credit hours)

Quantitative Methods for Simulation, Modeling and Analysis

- CAP 5512 Evolutionary Computation (3 credit hours)
- CAP 6515 Algorithms in Computational Biology (3 credit hours)
- CDA 6530 Performance Models of Computers and Networks (3 credit hours)
- COT 5405 Design and Analysis of Algorithms (3 credit hours)
- DIG 5876 Quantitative Aspects of Modeling and Simulation (3 credit hours)
- EEL 5173 Linear Systems Theory (3 credit hours)
- EEL 5892 Continuous System Simulation II (3 credit hours)
- EEL 6878 Modeling and Artificial Intelligence (3 credit hours)
- EIN 6528 Simulation Based Life Cycle Engineering (3 credit hours)
- ESI 5306 Operations Research (3 credit hours)
- ESI 6217 Statistical Aspects of Digital Simulation (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- MAP 5117 Mathematical Modeling (3 credit hours)
- MAP 6118 Introduction to Nonlinear Dynamics (3 credit hours)
- MAP 6207 Optimization Theory (3 credit hours)
- MAP 6385 Applied Numerical Mathematics (3 credit hours)
- MAP 6407 Applied Mathematics I (3 credit hours)
- MAP 6408 Applied Mathematics II (3 credit hours)
- MAP 6445 Approximation Techniques (3 credit hours)
- STA 5703 Data Mining Methodology I (3 credit hours)
- STA 5825 Stochastic Processes and Applied Probability Theory (3 credit hours)
- STA 6236 Regression Analysis (3 credit hours)
- STA 6246 Linear Models (3 credit hours)
- STA 6326 Theoretical Statistics I (3 credit hours)
- STA 6327 Theoretical Statistics II (3 credit hours)
- STA 6329 Statistical Applications of Matrix Algebra (3 credit hours)
- STA 6704 Data Mining Methodology II (3 credit hours)
- STA 6714 Data Preparation (3 credit hours)

Simulation in Healthcare

- CAP 6515 Algorithms in Computational Biology (3 credit hours)
- CAP 6671 Intelligent Systems: Robots, Agents, and Humans (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- DIG 6647 Science and Technology of Dynamic Media (3 credit hours)
- DIG 6812 Digital Interaction for Informal Learning (3 credit hours)
- EEL 5820 Image Processing (3 credit hours)
- EEL 6823 Image Processing II (3 credit hours)
- HUM 5802 Applied Contemporary Humanities (3 credit hours)
- DIG 6775 Virtual Reality (3 credit hours)
- PHI 5329 Philosophy of Neuroscience (3 credit hours)
- PSB 5005 Physiological Psychology (3 credit hours)
- SPA 6417 Cognitive/Communicative Disorders (3 credit hours)
- SPA 6451 Theory and Clinical Aspects Cognitive-Comm Disorders in Traumatic Brain Injury (3 credit hours)
- SPA 6452 Assessment of Cognitive-Communication Disorders in Traumatic Brain Injury (3 credit hours)

Interactive Simulation and Intelligent Systems

- CAP 5512 Evolutionary Computation (3 credit hours)
- CAP 5610 Machine Learning (3 credit hours)
- CAP 5636 Advanced Artificial Intelligence (3 credit hours)
- CAP 6671 Intelligent Systems: Robots, Agents, and Humans (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- DIG 6775 Virtual Reality (3 credit hours)
- DIG 6812 Digital Interaction for Informal Learning (3 credit hours)
- EEL 5771C Engineering Applications of Computer Graphics (3 credit hours)
- EEL 5874 Expert Systems and Knowledge Engineering (3 credit hours)
- EEL 6878 Modeling and Artificial Intelligence (3 credit hours)
- EIN 5251 Usability Engineering (3 credit hours)
- EIN 6645 Real-Time Simulation Agents (3 credit hours)
- EIN 6647 Intelligent Simulation (3 credit hours)
- EIN 6649C Intelligent Tutoring Training System Design (3 credit hours)
- EME 6613 Instructional System Design (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)

Simulation Infrastructure

- CAP 6671 Intelligent Systems: Robots, Agents, and Humans (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- CDA 5106 Advanced Computer Architecture (3 credit hours)
- CDA 6107 Parallel Computer Architecture (3 credit hours)
- CDA 6530 Performance Models of Computers and Networks (3 credit hours)

- CNT 5008 Computer Communication Networks Architecture (3 credit hours)
- COT 5405 Design and Analysis of Algorithms (3 credit hours)
- DIG 6605 Physical Computing (3 credit hours)
- EEL 5173 Linear Systems Theory (3 credit hours)
- EEL 5771C Engineering Applications of Computer Graphics (3 credit hours)
- EEL 5892 Continuous System Simulation II (3 credit hours)
- EEL 6762 Performance Analysis of Computer and Communication Systems (3 credit hours)
- EEL 6785 Computer Network Design (3 credit hours)
- EEL 6878 Modeling and Artificial Intelligence (3 credit hours)
- EEL 6883 Software Engineering II (3 credit hours)
- EEL 6885 Software Engineering Quality Assurance Methods (3 credit hours)
- EEL 6887 Software Engineering Life-Cycle Control (3 credit hours)
- ESI 6551C Systems Engineering (3 credit hours)

Simulation Management

- EIN 5108 The Environment of Technical Organizations (3 credit hours)
- EIN 5117 Management Information Systems I (3 credit hours)
- EIN 5140 Project Engineering (3 credit hours)
- EIN 5356 Cost Engineering (3 credit hours)
- EIN 6182 Engineering Management (3 credit hours)
- EIN 6215 System Safety Engineering and Management (3 credit hours)
- EIN 6339 Operations Engineering (3 credit hours)
- EIN 6357 Advanced Engineering Economic Analysis (3 credit hours)
- EIN 6528 Simulation Based Life Cycle Engineering (3 credit hours)
- ESI 5227 Total Quality Improvement (3 credit hours)
- ESI 6224 Quality Management (3 credit hours)
- ESI 6358 Decision Analysis (3 credit hours)
- ESI 6551C Systems Engineering (3 credit hours)
- ISM 6217 Advanced Database Administration (3 credit hours)
- ISM 7027 Systems Support of Organizational Decision Making (3 credit hours)

Waived Credits

The doctoral program will allow up to 30 credit hours to be waived from an earned master's degree.

Dissertation—15 Credit Hours Minimum

- XXX 7980 Dissertation Research (15 credit hours minimum)

Qualifying Examination

A written test is required covering content of the core courses, excluding the research methods course, which prepares students for dissertation research.

Dissertation Adviser and Dissertation Advisory Committee

Students have the responsibility to select a Dissertation Adviser from a list of faculty authorized to direct dissertations. The student and the Dissertation Adviser, then, must identify and select the other members of the student's Dissertation Advisory Committee. The Dissertation Advisory Committee consists of a minimum of four members.

All committee members should hold a doctoral or terminal degree and be in fields related to the dissertation topic, and at least three members must be regular Modeling and Simulation graduate faculty (one to serve as chair) from at least two UCF colleges. At least one member of the committee must have served as a committee member on a prior M&S Thesis or Dissertation Advisory Committee. In some cases, with approval from the Program Director, a committee member may serve as co-chair of the committee. The M&S Program Director can assist students with selection of their adviser as well as with committee formation, additions, and deletions. The UCF College of Graduate Studies has the right to review appointments to advisory committees, place a representative on any advisory committee, or appoint a co-adviser.

Candidacy Examination

The Candidacy Examination evaluates the student's preparation to perform independent research to undertake the research in the student's dissertation topic. A student may sit for the Candidacy Examination upon:

1. passing the Qualifying Examination;
2. completing all conditions placed as a result thereof; and
3. completing all but 6 credit hours or less of the courses prescribed in the student's Graduate Plan of Study.

The Candidacy Examination includes all of the following:

The Dissertation Research Proposal

The research proposal is a written exposition of a academic or scientific topic and specific research question(s)/hypothesis(es) that is/are developed by the student; the research proposal identifies the chosen area(s) of research and offers convincing support of the need for the research investigation being proposed. Specifically, the research proposal includes at least the following components:

- ***Motivation of the research investigation***. Background and the motivation for the pursuit of the dissertation topic should be clearly and thoroughly explained including the historical and modern view of the topic and the rationale and need for the proposed research. The specific research

questions(s)/hypothesis(es) that is/are being addressed and the research objectives must be described;

- ***Literature review on the topic of the dissertation***. A good literature review expands upon the reasons behind selecting the research question(s)/hypothesis(es). The review is an extensive summary and synopsis of the area(s) of research, and it provides a critical and in-depth evaluation of previous related research on the topic. It is an abstracting and synthesis of previous research, and the review explains how it integrates into the proposed research investigation. All sides of an argument must be clearly explained, to avoid bias, and areas of agreement and disagreement should be highlighted; and
- ***A detailed proposed methodology for conducting the research***. This ethodology must be consistent with the requirements of the field. It is customary to include any preliminary modeling and results in this discussion to show the potential of strengths and weaknesses of the methodology.

An oral defense of the Dissertation Research Proposal

This defense includes a formal, oral presentation of the written Dissertation Research Proposal before the Dissertation Advisory Committee.

A refereed published or accepted for publication manuscript

Students preparing for the Candidacy Examination should have at least one refereed published or accepted for publication manuscript directly related to the dissertation research, and the student must be a significant contributor to the work and the paper. If the refereed manuscript is not published, it should be fully accepted, and not conditionally accepted. This manuscript may be a journal or proceedings publication from a reputable conference.

All members vote on acceptance or rejection of the Dissertation Research Proposal and the Dissertation Proposal must be approved with at most one dissenting member of the advisory committee. A student is normally given one opportunity to pass the oral defense of the Dissertation Research Proposal, but the M&S Program Director, upon the recommendation of the student's Dissertation Advisory Committee, may approve at most a second attempt.

Admission to Candidacy

In summary, the following are required for a student to be admitted to candidacy and subsequently enroll in dissertation hours:

- Completion of all course work, except for dissertation hours;
- The Dissertation Advisory Committee is formed, consisting of approved graduate faculty and graduate faculty scholars;
- Submission of an approved Graduate Plan of Study;

- Successful completion of the Candidacy Examination (see Candidacy Examination section above for details).

Dissertation Defense

The Dissertation Defense is a formal, oral examination of the written dissertation before the Dissertation Advisory Committee. All members vote either “Pass” or “Fail” of the written dissertation, and the dissertation and Dissertation Defense must be approved with at most one dissenting member of the advisory committee. A student is normally given one opportunity to pass the oral defense of the dissertation, but the M&S Program Director, upon the recommendation of the student’s Dissertation Advisory Committee, may approve at most a second attempt.

Plan of Study

After admission to the PhD program, students should file a Graduate Plan of Study (GPS) with the Modeling and Simulation Graduate Program Office.

The purpose of the GPS is to design an appropriate program of coursework to support a student’s area of graduate study and to meet the specific educational needs, goals and objectives of that student. The coursework must be selected to form a unified, cohesive plan of study. All graduate credit in a doctoral program must be at 5000 level or higher, and at least one-half of the credit hours used to meet program requirements must be in 6000-level or 7000-level courses.

The GPS should be developed under the supervision of the Dissertation Adviser(s) and members of the Dissertation Advisory Committee, although initially it may be constructed under the supervision of the M&S Graduate Program Office.

Changes in the Graduate Plan of Study can be made (due to course offering deletions, schedule conflicts, etc.) and with the approval of the M&S Graduate Program Office.

Programs of Study for students seeking a doctoral degree should be on file with the College of Graduate Studies by the end of the third major term of enrollment (based on full-time enrollment) and must be on file prior to the change to candidacy status.

Equipment Fee

Full-time students in the Modeling and Simulation PhD program pay a $27 equipment fee each semester that they are enrolled. Part-time students pay a $13.50 equipment fee each semester that they are enrolled.

INDEPENDENT LEARNING

The dissertation is a project that constitutes independent learning conducted under the guidance of a Dissertation Advisory Committee. Three must be members of the Modeling and Simulation graduate faculty. All members vote on acceptance or rejection of the Dissertation Research Proposal and the Dissertation Proposal must be approved with at most one dissenting member of the advisory committee. A student is normally given one opportunity to pass the oral defense of the Dissertation Research Proposal, but the M&S Program Director, upon the recommendation of the student's Dissertation Advisory Committee, may approve at most a second attempt.

APPLICATION REQUIREMENTS

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissionssection 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
- Official, competitive score on the GRE taken within the last five years
- Résumé or Curriculum Vitae
- Goal statement
    - The goal statement should discuss all relevant professional background and any previous research experience. The statement should explain the motivation behind the pursuit of a Doctoral degree in Modeling and Simulation. Future career goals after the completion of the applicant's doctoral study should be discussed.
    - Most importantly, the applicant must clearly describe the particular area(s) of research interest. The applicant should identify at least one UCF faculty member who shares a similar research focus and is believed to be best suited to serve as a potential dissertation advisor.
    - The goal statement should between 500 and 1,000 words.
- Three letters of recommendation
    - The letters of recommendation should be from faculty members, university administrators and employers. The letters, which must be current to the application, should address the educational and career goals of applicant. The letter writers should also know the applicant well enough to discuss the applicant's capacity to perform, excel and succeed in a graduate program. Letters for PhD applicants must discuss the applicant's ability to perform graduate-level research. At least two of the letters should be furnished by college or university professors who are acquainted with the applicant.
- Applicants to this program are strongly encouraged to complete the necessary information requested for the ETS PPI (Personal Potential Index) report that is available during the GRE examination. All official PPI reports must be submitted directly to the UCF College of Graduate Studies (use UCF Institution Code: 5233).

Applications are accepted for the fall and spring terms only.

Readmission

Applicants who are reapplying for admission need not resubmit transcripts and GRE scores if the transcripts and scores are previously filed with UCF. However, the following application requirements do need to be current for the new application for readmission:

- Résumé/Curriculum Vitae
- Goal Statement
- Letters of Recommendation

Prerequisites

Students who enter the Modeling and Simulation Program are expected to have an academic and/or work background that has prepared them in mathematics (introductory calculus and probability and statistics) and computer literacy, including proficiency with word processing, spreadsheet, and database programs, and, preferably, familiarity with at least one higher order programming language (e.g., C/C++, Visual Basic, Java, etc.). Students with undergraduate or graduate degrees in Engineering, Computer Science, or Mathematics will generally have this background.

For students with less technical academic preparation, the core course DIG 5876 Quantitative Aspects of Modeling and Simulation, will prepare them for several, but not all, aspects of the program. However, some students may need a number of prerequisite courses in Mathematics, Statistics, and Computer Science in order to pursue one or more areas of study.

Application Deadlines

Modeling and Simulation PhD	Fall Priority	Fall	Spring	Summer
Domestic Applicants	Jan 15	Jul 15	Dec 1	-
International Applicants	Jan 15	Jan 15	Jul 1	-
International Transfer Applicants	Jan 15	Mar 1	Sep 1	-

Proposed Curriculum - Showing marked up revisions

Modeling and Simulation PhD

PROGRAM DESCRIPTION

Simulation is the quintessential utility tool. In one way or another, just about every engineering or scientific field uses simulation as an exploration, modeling, or analysis technique. Simulation is not limited to engineering or science. Simulation is used in training, management, and concept exploration and involves constructing human-centered, equipment-centered, and/or stand-alone computer-based models of existing as well as conceptual systems or processes. The purpose of simulation is to evaluate the behavior of the human, organization, equipment, and/or systems under study through the evaluation of output from the corresponding simulation construct. Because of the scale and complexity of modeling and simulation, practitioners have developed both generalized and specialized skills.

Input from industry and government M&S users and developers has been instrumental in identifying the key competencies for M&S professionals and has been critical to the development of this curriculum. The curriculum is designed to provide a broad overall perspective of the developing simulation industry and an awareness of the economic considerations. Upon completion of the program, graduates will have the diverse training necessary to enable them to work in varied capacities in government agencies, or in the defense, service, entertainment, and manufacturing industries.

Students in the Modeling and Simulation graduate program have often focused their study and research efforts in one or more of the following research areas:

- ***Human Systems***

  The Human Systems in M&S research area has attracted those who wish to gain expertise in the content and techniques of human behavior in simulation systems, including human factors, human-computer interaction, virtual worlds, statistical and quantitative procedures, experimental design, computer techniques, and other research methodologies. Typical problem areas for R&D include human-in-the-loop simulation; team performance under stress; and use of visual, audio, haptic, and other sensory input/output modalities to coordinate human-machine activities. Typical courses include Human Factors, Training Systems Engineering, Human Computer Interaction, Intelligent Simulation, and Distributed Learning.

- ***Computer Visualization***

  Computer Visualization in M&S is a research area that attracts those who wish to gain expertise in technical aspects of computer graphic systems, virtual environments, and human-centered simulation systems applying the state-of-the-art in computer graphics and other human-interface technologies. Typical courses include Human Computer Interaction, Computer Graphics Systems, Computer Vision, Machine Perception, Human-Virtual Environment Interaction, and Sensation and Perception. Students in this research area typically have an interest in the area of

Emerging Media, which focuses on the
development of new forms of interactive media and the creation of story-driven content for them such as interactive works of art, electronic games, virtual reality, the Internet, portable devices and mobile applications, wearable computers, etc.

- ***Simulation Modeling and Analysis***

  The Simulation Modeling and Analysis research area attracts those who desire to gain expertise in using simulation as a optimization tool for effective design, planning, analysis, and decision-making. The emphasis of this area is on problem definition, model formulation, design of simulation experiments, and model-based analysis. This area attracts those who seek to develop skills in the application of advanced quantitative methods to modeling and simulation. Building on backgrounds in operations research, mathematics or statistics, they should gain experience in modeling and simulation through the application of optimization, mathematical and statistical theory to build
  multidisciplinary simulation models and conducting rigorous simulation experimentation. A graduate will be prepared to work with corporate and government decision-makers as they model and evaluate the impacts of proposed policies and system designs. Typical courses include Engineering Statistics, Statistical Aspects of Digital Simulation, and Mathematical Modeling, Discrete Systems Simulation, Object-Oriented Simulation, Experimental Design, and Quantitative Aspects of Modeling and Simulation.

- ***Simulation in Healthcare***

  Simulation in Healthcare is a fast growing new area in M&S. Issues related to bringing down the cost of healthcare and reducing costly medical errors are generating many new opportunities related to systems analysis, communication between healthcare providers and patients, and simulation-based training, to name a few. Currently a disproportionate amount of the US economy goes to healthcare, at least twice as much as the average of the 25 richest nations, and health outcomes in the US place the country near the bottom of this group of countries. M&S can contribute significantly towards improving this situation. Typical courses include Discrete Systems Simulation, Experimental Design, and
  Object-Oriented Simulation, Engineering Statistics, Human Computer Interaction.

- ***Interactive Simulation and Intelligent Systems***

  Interactive Simulation and Intelligent Systems research attracts those who wish to pursue or are currently pursuing careers in the training simulation/simulator industries. Graduates specializing in this research area typically are interested in creating designs for simulators and simulator-based training systems and to apply expert systems and other intelligent systems in a simulation setting. Typical courses include Training Systems Engineering, Simulation of Real-Time Processes, and Intelligent
  Simulation.

- ***Simulation Infrastructure***

  The research area of Simulation Infrastructure attracts those who wish to gain an in-depth understanding of the basic components of simulation systems and their patterns of configuration and communication, including hardware and software issues. They will gain experience in the development of distributed simulation and training environments. Graduates should be able to implement such systems or manage a team capable of developing such systems. Typical courses include Performance Models of Computers and Networks, Simulation Design and Analysis, High Performance Computer Architecture, and Analysis of Computer and Communication Systems. Simulation Management: Simulation Management research area attracts those who wish to gain expertise in the management of projects related to modeling, simulation, and training (MS&T). Graduates who focus in this area of study should be prepared to manage such projects for military agencies or MS&T companies. Typical courses include Environment of Technical Organizations, Modeling and Simulation of Real-Time Processes, Management Information Systems, and Project Engineering.

- ***Simulation Management***

  Simulation Management research area attracts those who wish to gain expertise in the management of projects related to modeling, simulation, and training (MS&T). Graduates who focus in this area of study should be prepared to manage such projects for military agencies or MS&T companies. Typical courses include Environment of Technical Organizations, Modeling and Simulation of Real-Time Processes, Management Information Systems, and Project Engineering.

Read More

CURRICULUM

The Modeling and Simulation PhD requires a minimum of 72 credit hours of coursework beyond the bachelor's degree, including a minimum of 15 dissertation hours.

The M&S PhD program requires 15 credit hours of 5 required core courses. These core courses will provide an interdisciplinary framework for all students.

The remaining 42 credit hours may consist of additional unrestricted elective courses and research hours. At least 27 hours of the total program must consist of formal coursework, exclusive of independent study.

Total Credit Hours Required:
72 Credit Hours Minimum beyond the Bachelor's Degree
42 Credit Hours Minimum beyond the Master's Degree

Students may fulfill the restricted elective requirements through the courses chosen in the restricted core. Such students will meet the total credit hour requirements with additional unrestricted elective courses.

Required Courses—15 Credit Hours

Core—15 Credit Hours

- IDS 6147 Perspectives on Modeling and Simulation (3 credit hours)
- DIG 5876 Quantitative Aspects of Modeling and Simulation (3 credit hours) or
  An advanced higher level quantitative course as approved by Graduate Program Director
- IDS 6148 Human Systems Integration for Modeling and Simulation (3 credit hours) or
  EIN 6258 Human Computer Interaction (3 credit hours) or
  EXP 6541 Advanced Human-Computer Interaction (3 credit hours)
- ~~ESI 5531 Discrete Systems Simulation (3 credit hours)~~
- ~~EIN 5255C Interactive Simulation (3 credit hours)~~
- ~~EIN 6258 Human Computer Interaction (3 credit hours)~~
- IDS 6916 Simulation Research Methods and Practicum (3 credit hours)
- An advanced research methods course (at least 3 credit hours). The purpose of the advanced research methods course is to provide background and analysis of the interpretive act in all educational research and to prepare students to perform independent research for their dissertations. Topics covered in these types of courses typically include research questions/hypotheses formulation, critical analysis of journal articles when performing a survey of the open literature, data collection and sampling methods, experimental and quasi-experimental designs, statistical methods, quantitative and qualitative data analysis and research report writing. Eligible advanced research methods courses for the M&S PhD program are:
  - DIG 6825 Digital Media Research Methods (3 credit hours)
  - ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
  - ESI 6891 IEMS Research Methods (3 credit hours)
  - PHI 5340 Research Methods in the Cognitive Sciences (3 credit hours)
  - PSY 6216C Research Methodology (4 credit hours)
  - STA 5205 Experimental Design (3 credit hours)
  - A graduate-level advanced research methods course approved by a M&S Program Director

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Unrestricted Electives—42 Credit Hours

All M&S PhD degree program students must take at least 42 credit hours of unrestrictive elective courses that support the student's area of graduate study.

A student must carefully select a set of courses in order to design an appropriate plan of coursework. The purpose of the courses is to ensure that students have depth in their research area as well as have breadth in the interdisciplinary area of modeling and simulation. The set of courses should also support a

student's area of graduate study and to meet the specific educational needs, goals and objectives of that student.

Unrestricted electives must consist of at least 12 credit hours of formal courses, excluding independent study. The remaining credits may consist of additional coursework, directed research, independent study, and additional dissertation as advised appropriately by faculty adviser and/or program director.

Modeling and Simulation PhD Elective Courses

In addition to successfully completing the core courses for the M&S PhD program, students are required to carefully select electives with the guidance of a Program Director or faculty adviser. Elective choices should be made with the intent to strengthen a research interest and/or area of focus in order to meet the individual student's educational goals and objectives.

Listed below are suggested courses in various areas of focus or specialization. These course groupings are mere guides, are not exhaustive and are only meant to assist with advising and course selection in order to meet the individual student's educational goals and objectives. They are not intended to restrict elective choices among focus areas as we strongly encourage Modeling and Simulation students to maintain an interdisciplinary approach to their graduate studies.

If a student identifies another UCF course which may be of value to his/her M&S research area, but is not already identified in a list below, that student may request approval from the Graduate Program Director for the course to be used as an elective in the Graduate Plan of Study. All such requests must be made in advance of enrolling in the course.

Those electives categorized as "General" and "Fundamentals of Modeling and Simulation" would be appropriate for all students regardless of interest area. The remaining categories are grouped by area of interest.

General

- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- ESI 6891 IEMS Research Methods (3 credit hours)
- IDS 5907 Independent Study (variable)
- IDS 5917 Directed Research (variable)
- IDS 6908 Independent Study (variable)
- IDS 6918 Directed Research (variable)
- IDS 6946 Internship (variable)
- IDS 7919 Doctoral Research (variable)
- PHI 5340 Research Methods in Cognitive Sciences (3 credit hours)
- PSY 6216C Research Methodology (4 credit hours)
- STA 5205 Experimental Design (3 credit hours)

Fundamentals of Modeling and Simulation

- DIG 5876 Quantitative Aspects of Modeling and Simulation (3 credit hours)
- EEL 5892 Continuous System Simulation II (3 credit hours)
- ESI 5219 Engineering Statistics (3 credit hours)
- ESI 6217 Statistical Aspects of Digital Simulation (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- ESI 6532 Object-Oriented Simulation (3 credit hours)
- IDS 6146 Modeling and Simulation Systems (3 credit hours)
- IDS 6147 Perspectives on Modeling and Simulation (3 credit hours)

Human Systems

- CAP 6515 Algorithms in Computational Biology (3 credit hours)
- CAP 6671 Intelligent Systems: Robots, Agents, and Humans (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- DIG 6775 Virtual Reality (3 credit hours)
- DIG 6812 Digital Interaction for Informal Learning (3 credit hours)
- EIN 5248C Ergonomics (3 credit hours)
- EIN 5317 Training System Design (3 credit hours)
- EIN 6215 System Safety Engineering and Management (3 credit hours)
- EIN 6258 Human Computer Interaction (3 credit hours)
- EIN 6649C Intelligent Tutoring Training System Design (3 credit hours)
- EME 6458 Virtual Teaching and the Digital Educator (3 credit hours)
- EME 6507 Multimedia for Education and Training (3 credit hours)
- EME 6601 Instructional Simulation Design for Training and Education (3 credit hours)
- EXP 5208 Sensation and Perception (3 credit hours)
- EXP 5256 Human Factors I (3 credit hours)
- EXP 6255 Human Performance (3 credit hours)
- EXP 6257 Human Factors II (3 credit hours)
- EXP 6258 Human Factors III (3 credit hours)
- EXP 6506 Human Cognition and Learning (3 credit hours)
- EXP 6541 Advanced Human Computer Interaction (3 credit hours)
- IDS 6148 Human Systems Integration for Modeling and Simulation (3 credit hours)
- PHI 5225 Philosophy of Language (3 credit hours)
- PHI 5325 Topics in Philosophy of Mind (3 credit hours)
- PHI 5327 Topics in Cognitive Sciences (3 credit hours)
- PHI 5329 Philosophy of Neuroscience (3 credit hours)
- PSB 5005 Physiological Psychology (3 credit hours)
- TTE 6270 Intelligent Transportation Systems (3 credit hours)

Computer Visualization

- CAP 5725 Computer Graphics I (3 credit hours)
- CAP 6411 Computer Vision Systems (3 credit hours)
- CAP 6412 Advanced Computer Vision (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- CDA 5106 Advanced Computer Architecture (3 credit hours)
- COT 5405 Design and Analysis of Algorithms (3 credit hours)
- DIG 6605 Physical Computing (3 credit hours)
- DIG 6647 Science and Technology of Dynamic Media (3 credit hours)
- DIG 6775 Virtual Reality (3 credit hours)
- EIN 6258 Human Computer Interaction (3 credit hours)
- EEL 5173 Linear Systems Theory (3 credit hours)
- EEL 5771C Engineering Applications of Computer Graphics (3 credit hours)
- EEL 5820 Image Processing (3 credit hours)
- EEL 5825 Pattern Recognition (3 credit hours)
- EEL 5874 Expert Systems and Knowledge Engineering (3 credit hours)
- EEL 6823 Image Processing II (3 credit hours)
- EEL 6843 Machine Perception (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- MAP 5117 Mathematical Modeling (3 credit hours)
- MAP 6118 Introduction to Nonlinear Dynamics (3 credit hours)

Quantitative Methods for Simulation, Modeling and Analysis

- CAP 5512 Evolutionary Computation (3 credit hours)
- CAP 6515 Algorithms in Computational Biology (3 credit hours)
- CDA 6530 Performance Models of Computers and Networks (3 credit hours)
- COT 5405 Design and Analysis of Algorithms (3 credit hours)
- DIG 5876 Quantitative Aspects of Modeling and Simulation (3 credit hours)
- EEL 5173 Linear Systems Theory (3 credit hours)
- EEL 5892 Continuous System Simulation II (3 credit hours)
- EEL 6878 Modeling and Artificial Intelligence (3 credit hours)
- EIN 6528 Simulation Based Life Cycle Engineering (3 credit hours)
- ESI 5306 Operations Research (3 credit hours)
- ESI 5531 Discrete Systems Simulation (3 credit hours)
- ESI 6217 Statistical Aspects of Digital Simulation (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- MAP 5117 Mathematical Modeling (3 credit hours)
- MAP 6118 Introduction to Nonlinear Dynamics (3 credit hours)
- MAP 6207 Optimization Theory (3 credit hours)
- MAP 6385 Applied Numerical Mathematics (3 credit hours)
- MAP 6407 Applied Mathematics I (3 credit hours)
- MAP 6408 Applied Mathematics II (3 credit hours)
- MAP 6445 Approximation Techniques (3 credit hours)

- STA 5703 Data Mining Methodology I (3 credit hours)
- STA 5825 Stochastic Processes and Applied Probability Theory (3 credit hours)
- STA 6236 Regression Analysis (3 credit hours)
- STA 6246 Linear Models (3 credit hours)
- STA 6326 Theoretical Statistics I (3 credit hours)
- STA 6327 Theoretical Statistics II (3 credit hours)
- STA 6329 Statistical Applications of Matrix Algebra (3 credit hours)
- STA 6704 Data Mining Methodology II (3 credit hours)
- STA 6714 Data Preparation (3 credit hours)

Simulation in Healthcare

- CAP 6515 Algorithms in Computational Biology (3 credit hours)
- CAP 6671 Intelligent Systems: Robots, Agents, and Humans (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- DIG 6647 Science and Technology of Dynamic Media (3 credit hours)
- DIG 6812 Digital Interaction for Informal Learning (3 credit hours)
- EEL 5820 Image Processing (3 credit hours)
- EEL 6823 Image Processing II (3 credit hours)
- EIN 6645 Real-Time Simulation Agents (3 credit hours)
- ESI 5531 Discrete Systems Simulation (3 credit hours)
- HUM 5802 Applied Contemporary Humanities (3 credit hours)
- DIG 6775 Virtual Reality (3 credit hours)
- PHI 5329 Philosophy of Neuroscience (3 credit hours)
- PSB 5005 Physiological Psychology (3 credit hours)
- SPA 6417 Cognitive/Communicative Disorders (3 credit hours)
- SPA 6451 Theory and Clinical Aspects Cognitive-Comm Disorders in Traumatic Brain Injury (3 credit hours)
- SPA 6452 Assessment of Cognitive-Communication Disorders in Traumatic Brain Injury (3 credit hours)

Interactive Simulation and Intelligent Systems

- CAP 5512 Evolutionary Computation (3 credit hours)
- CAP 5610 Machine Learning (3 credit hours)
- CAP 5636 Advanced Artificial Intelligence (3 credit hours)
- CAP 6671 Intelligent Systems: Robots, Agents, and Humans (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- DIG 6775 Virtual Reality (3 credit hours)
- DIG 6812 Digital Interaction for Informal Learning (3 credit hours)
- EEL 5771C Engineering Applications of Computer Graphics (3 credit hours)
- EEL 5874 Expert Systems and Knowledge Engineering (3 credit hours)
- EEL 6878 Modeling and Artificial Intelligence (3 credit hours)

- EIN 5251 Usability Engineering (3 credit hours)
- EIN 5255C Interactive Simulation (3 credit hours)
- EIN 6258 Human Computer Interaction (3 credit hours)
- EIN 6645 Real-Time Simulation Agents (3 credit hours)
- EIN 6647 Intelligent Simulation (3 credit hours)
- EIN 6649C Intelligent Tutoring Training System Design (3 credit hours)
- EME 6613 Instructional System Design (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)

Simulation Infrastructure

- CAP 6671 Intelligent Systems: Robots, Agents, and Humans (3 credit hours)
- CAP 6676 Knowledge Representation (3 credit hours)
- CDA 5106 Advanced Computer Architecture (3 credit hours)
- CDA 6107 Parallel Computer Architecture (3 credit hours)
- CDA 6530 Performance Models of Computers and Networks (3 credit hours)
- CNT 5008 Computer Communication Networks Architecture (3 credit hours)
- COT 5405 Design and Analysis of Algorithms (3 credit hours)
- DIG 6605 Physical Computing (3 credit hours)
- EEL 5173 Linear Systems Theory (3 credit hours)
- EEL 5771C Engineering Applications of Computer Graphics (3 credit hours)
- EEL 5892 Continuous System Simulation II (3 credit hours)
- EEL 6762 Performance Analysis of Computer and Communication Systems (3 credit hours)
- EEL 6785 Computer Network Design (3 credit hours)
- EEL 6878 Modeling and Artificial Intelligence (3 credit hours)
- EEL 6883 Software Engineering II (3 credit hours)
- EEL 6885 Software Engineering Quality Assurance Methods (3 credit hours)
- EEL 6887 Software Engineering Life-Cycle Control (3 credit hours)
- ESI 6551C Systems Engineering (3 credit hours)

Simulation Management

- EIN 5108 The Environment of Technical Organizations (3 credit hours)
- EIN 5117 Management Information Systems I (3 credit hours)
- EIN 5140 Project Engineering (3 credit hours)
- EIN 5356 Cost Engineering (3 credit hours)
- EIN 6182 Engineering Management (3 credit hours)
- EIN 6215 System Safety Engineering and Management (3 credit hours)
- EIN 6339 Operations Engineering (3 credit hours)
- EIN 6357 Advanced Engineering Economic Analysis (3 credit hours)
- EIN 6528 Simulation Based Life Cycle Engineering (3 credit hours)
- ESI 5227 Total Quality Improvement (3 credit hours)
- ESI 6224 Quality Management (3 credit hours)

- ESI 6358 Decision Analysis (3 credit hours)
- ESI 6551C Systems Engineering (3 credit hours)
- ISM 6217 Advanced Database Administration (3 credit hours)
- ISM 7027 Systems Support of Organizational Decision Making (3 credit hours)

Waived Credits

The doctoral program will allow up to 30 credit hours to be waived from an earned master's degree.

Dissertation—15 Credit Hours Minimum

- XXX 7980 Dissertation Research (15 credit hours minimum)

Qualifying Examination

A written test is required covering content of the core courses, excluding the research methods course, which prepares students for dissertation research.

Dissertation Adviser and Dissertation Advisory Committee

Students have the responsibility to select a Dissertation Adviser from a list of faculty authorized to direct dissertations. The student and the Dissertation Adviser, then, must identify and select the other members of the student's Dissertation Advisory Committee. The Dissertation Advisory Committee consists of a minimum of four members.

All committee members should hold a doctoral or terminal degree and be in fields related to the dissertation topic, and at least three members must be regular Modeling and Simulation graduate faculty (one to serve as chair) from at least two UCF colleges. At least one member of the committee must have served as a committee member on a prior M&S Thesis or Dissertation Advisory Committee. In some cases, with approval from the Program Director, a committee member may serve as co-chair of the committee. The M&S Program Director can assist students with selection of their adviser as well as with committee formation, additions, and deletions. The UCF College of Graduate Studies has the right to review appointments to advisory committees, place a representative on any advisory committee, or appoint a co-adviser.

Candidacy Examination

The Candidacy Examination evaluates the student's preparation to perform independent research to undertake the research in the student's dissertation topic. A student may sit for the Candidacy Examination upon:

1. passing the Qualifying Examination;
2. completing all conditions placed as a result thereof; and

3. completing all but 6 credit hours or less of the courses prescribed in the student's Graduate Plan of Study.

The Candidacy Examination includes all of the following:

The Dissertation Research Proposal

The research proposal is a written exposition of a academic or scientific topic and specific research question(s)/hypothesis(es) that is/are developed by the student; the research proposal identifies the chosen area(s) of research and offers convincing support of the need for the research investigation being proposed. Specifically, the research proposal includes at least the following components:

- ***Motivation of the research investigation***. Background and the motivation for the pursuit of the dissertation topic should be clearly and thoroughly explained including the historical and modern view of the topic and the rationale and need for the proposed research. The specific research questions(s)/hypothesis(es) that is/are being addressed and the research objectives must be described;
- ***Literature review on the topic of the dissertation***. A good literature review expands upon the reasons behind selecting the research question(s)/hypothesis(es). The review is an extensive summary and synopsis of the area(s) of research, and it provides a critical and in-depth evaluation of previous related research on the topic. It is an abstracting and synthesis of previous research, and the review explains how it integrates into the proposed research investigation. All sides of an argument must be clearly explained, to avoid bias, and areas of agreement and disagreement should be highlighted; and
- ***A detailed proposed methodology for conducting the research***. This ethodology must be consistent with the requirements of the field. It is customary to include any preliminary modeling and results in this discussion to show the potential of strengths and weaknesses of the methodology.

An oral defense of the Dissertation Research Proposal

This defense includes a formal, oral presentation of the written Dissertation Research Proposal before the Dissertation Advisory Committee.

A refereed published or accepted for publication manuscript

Students preparing for the Candidacy Examination should have at least one refereed published or accepted for publication manuscript directly related to the dissertation research, and the student must be a significant contributor to the work and the paper. If the refereed manuscript is not published, it should be fully accepted, and not conditionally accepted. This manuscript may be a journal or proceedings publication from a reputable conference.

All members vote on acceptance or rejection of the Dissertation Research Proposal and the Dissertation Proposal must be approved with at most one dissenting member of the advisory committee. A student is normally given one opportunity to pass the oral defense of the Dissertation Research Proposal, but the M&S Program Director, upon the recommendation of the student's Dissertation Advisory Committee, may approve at most a second attempt.

Admission to Candidacy

In summary, the following are required for a student to be admitted to candidacy and subsequently enroll in dissertation hours:

- Completion of all course work, except for dissertation hours;
- The Dissertation Advisory Committee is formed, consisting of approved graduate faculty and graduate faculty scholars;
- Submission of an approved Graduate Plan of Study;
- Successful completion of the Candidacy Examination (see Candidacy Examination section above for details).

Dissertation Defense

The Dissertation Defense is a formal, oral examination of the written dissertation before the Dissertation Advisory Committee. All members vote either "Pass" or "Fail" of the written dissertation, and the dissertation and Dissertation Defense must be approved with at most one dissenting member of the advisory committee. A student is normally given one opportunity to pass the oral defense of the dissertation, but the M&S Program Director, upon the recommendation of the student's Dissertation Advisory Committee, may approve at most a second attempt.

Plan of Study

After admission to the PhD program, students should file a Graduate Plan of Study (GPS) with the Modeling and Simulation Graduate Program Office.

The purpose of the GPS is to design an appropriate program of coursework to support a student's area of graduate study and to meet the specific educational needs, goals and objectives of that student. The coursework must be selected to form a unified, cohesive plan of study. All graduate credit in a doctoral program must be at 5000 level or higher, and at least one-half of the credit hours used to meet program requirements must be in 6000-level or 7000-level courses.

The GPS should be developed under the supervision of the Dissertation Adviser(s) and members of the Dissertation Advisory Committee, although initially it may be constructed under the supervision of the M&S Graduate Program Office.

Changes in the Graduate Plan of Study can be made (due to course offering deletions, schedule conflicts,

etc.) and with the approval of the M&S Graduate Program Office.

Programs of Study for students seeking a doctoral degree should be on file with the College of Graduate Studies by the end of the third major term of enrollment (based on full-time enrollment) and must be on file prior to the change to candidacy status.

Equipment Fee

Full-time students in the Modeling and Simulation PhD program pay a $27 equipment fee each semester that they are enrolled. Part-time students pay a $13.50 equipment fee each semester that they are enrolled.

INDEPENDENT LEARNING

The dissertation is a project that constitutes independent learning conducted under the guidance of a Dissertation Advisory Committee. Three must be members of the Modeling and Simulation graduate faculty. All members vote on acceptance or rejection of the Dissertation Research Proposal and the Dissertation Proposal must be approved with at most one dissenting member of the advisory committee. A student is normally given one opportunity to pass the oral defense of the Dissertation Research Proposal, but the M&S Program Director, upon the recommendation of the student's Dissertation Advisory Committee, may approve at most a second attempt.

APPLICATION REQUIREMENTS

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissionssection 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
- Official, competitive score on the GRE taken within the last five years
- Résumé or Curriculum Vitae
- Goal statement
    - The goal statement should discuss all relevant professional background and any previous research experience. The statement should explain the motivation behind the pursuit of a Doctoral degree in Modeling and Simulation. Future career goals after the completion of the applicant's doctoral study should be discussed.
    - Most importantly, the applicant must clearly describe the particular area(s) of research interest. The applicant should identify at least one UCF faculty member who shares a similar research focus and is believed to be best suited to serve as a potential dissertation advisor.

    - The goal statement should between 500 and 1,000 words.
- Three letters of recommendation
    - The letters of recommendation should be from faculty members, university administrators and employers. The letters, which must be current to the application, should address the educational and career goals of applicant. The letter writers should also know the applicant well enough to discuss the applicant's capacity to perform, excel and succeed in a graduate program. Letters for PhD applicants must discuss the applicant's ability to perform graduate-level research. At least two of the letters should be furnished by college or university professors who are acquainted with the applicant.
- Applicants to this program are strongly encouraged to complete the necessary information requested for the ETS PPI (Personal Potential Index) report that is available during the GRE examination. All official PPI reports must be submitted directly to the UCF College of Graduate Studies (use UCF Institution Code: 5233).

Applications are accepted for the fall and spring terms only.

Readmission

Applicants who are reapplying for admission need not resubmit transcripts and GRE scores if the transcripts and scores are previously filed with UCF. However, the following application requirements do need to be current for the new application for readmission:

- Résumé/Curriculum Vitae
- Goal Statement
- Letters of Recommendation

Prerequisites

Students who enter the Modeling and Simulation Program are expected to have an academic and/or work background that has prepared them in mathematics (introductory calculus and probability and statistics) and computer literacy, including proficiency with word processing, spreadsheet, and database programs, and, preferably, familiarity with at least one higher order programming language (e.g., C/C++, Visual Basic, Java, etc.). Students with undergraduate or graduate degrees in Engineering, Computer Science, or Mathematics will generally have this background.

For students with less technical academic preparation, the core course DIG 5876 Quantitative Aspects of Modeling and Simulation, will prepare them for several, but not all, aspects of the program. However, some students may need a number of prerequisite courses in Mathematics, Statistics, and Computer Science in order to pursue one or more areas of study.

Application Deadlines

Modeling and Simulation	Fall	Fall	Spring	Summer

PhD	Priority			
Domestic Applicants	Jan 15	Jul 15	Dec 1	-
International Applicants	Jan 15	Jan 15	Jul 1	-
International Transfer Applicants	Jan 15	Mar 1	Sep 1	-

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

Program Recommendation Form

This form is to be used to revise, add, suspend, or delete degree programs, tracks, or certificate programs. If there are changes to a program and the changes will affect the program tracks also, one form may be used for both the program and the track.

PLEASE NOTE: The deadline for new tracks or certificates is **February 1 of each year**. Any proposal for new tracks or certificates received after this date will not be included in the next year's catalog. Revisions to existing programs, tracks, or certificates are **due by March 15**. Any proposals for revisions received after that date will not be included in the next year's catalog. Please include catalog copy (description, curriculum, contact information, application requirements, and application deadlines). **For revisions – attach the catalog copy showing changes (use Track Changes in Word).**

College/Unit(s) Submitting Proposal: College of Health and Public Affairs

Proposed Effective Term/Year: Fall 2014

Unit(s) Housing Program: Public Affairs Doctoral Program and School of Public Administration

Name of program, track and/or certificate: Public Affairs PhD - Master of Public Administration Dual Degree Track

Brief description of program (this description will show up in the graduate catalog copy)**: Do not add complete catalog copy here.**

The Public Affairs PhD - Public Administration MPA Dual Degree Track provides academically talented students an opportunity to earn the Doctor of Philosophy in Public Affairs and the Master of Public Administration degrees concurrently. Students successfully completing the PhD/MPA Dual Degree program will have the skills and analytical techniques for careers in academia or in the public and nonprofit sectors. After successful completion of the PhD/MPA Dual Degree program, students will receive two diplomas, one for the Public Administration MPA degree and one for the Public Affairs PhD degree.

DELIVERY - Will program be delivered: ☐ **Face to face** ☐ **Completely online** ☐ **Mixed delivery**

Admissions deadlines: (Please specify if you have a different deadline for the track than for the program?)

Application requirements: (Please specify if you have different application requirements for the track than for the program? Will you admit directly to the track?)

Program Director(s) and contact information: (name, email, phone, campus address, program website address)

Lynette Feder

lynette.feder@ucf.edu

407-823-3650; HPA I, Room 220 http://www2.cohpa.ucf.edu/publicaffairs/

Please check one: this action affects a: ☐ Program ☐ Track ☐ Certificate

Please check one: this action is a(n):

☐ Addition. Please proceed to Part A.

☐ Revision. If a revision applies to multiple tracks, please list them here and then proceed to Part A:

☐ Inactivation

☐ Temporary Suspension of Admissions. Give Length of Suspension:

Temporary suspension of admissions: The program will be removed from the online application. A notation will be entered in the graduate catalog indicating the length of the suspension of admissions. Currently enrolled students will not experience any issues with continued enrollment.

Inactivation: Admissions will be suspended for new students and the program will be removed from the online application. Students active in the program are eligible to complete the program under the appropriate criteria and an appropriate teach-out plan is required. The program will be removed from the catalog as of the approved term.

If you checked inactivation or you are temporarily suspending admissions, please go to Part B and complete it.

Signature Page

Recommend Approval (all approval levels must be signed)

Department Chair (Print) Christopher D. Geiger **(Signature)** _____ **Date** _____

College Academic Standards (Print) _____ **(Signature)** _____ **Date** _____

College Dean (Print) _____ **(Signature)** _____ **Date** _____

Graduate Council (Print) _____ **(Signature)** _____ **Date** _____

Graduate Dean (Print) _____ **(Signature)** _____ **Date** _____

Approval

Provost and Executive Vice President: _____ **Date** _____

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

Department(s); College; Registrar; Associate Registrar; Institutional Research; Academic Services; Faculty Senate; University Analysis and Planning Support; College of Graduate Studies

Part A – For additions or revisions of programs, tracks or certificates

Brief statement of rationale: (Please indicate the rationale, how it affects the unit and faculty teaching in and students enrolled in the program, track or certificate.)

Two years ago the College of Health and Public Affairs decided to revise the doctoral program in Public Affairs (PAF) to be more in line with the community-based mission of the College and offer an interdisciplinary educational experience. The College put together a committee with at least one representative from each of the five tracks and four disciplines. The curriculum was revised using a competency-based approach. In the end, an interdisciplinary and methodologically rigorous program was developed that will provide graduates with the ability to have a significant and positive impact on our communities. We believe that this will provide students with a more enriched educational experience leaving them better able to have positive impact on the many social ills that affect our society.

Revisions to the main five tracks were approved in October. The Dual Degree track was omitted by accident and must now be approved to officially reflect the new PAF curriculum.

For Revisions:

Brief listing of Program Changes: (Please indicate the changes in bullet format. If there are changes to the credit hours of the program, required courses or other requirements, please state those changes. **Remember to attach the catalog copy showing changes, using Track Changes in Word.**)

-Total credit hours increased from 57 to 60
-Required courses restructured and increase from 42 credit hours to 45 credit hours
-Interdisciplinary Practicum course added as part of required courses

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 provide a list of students if possible:

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

Name Change

Are you changing the name of an existing program, track, or certificate? ☐ **Yes** ☐ **No**

If yes, provide the new name of the program, track, or certificate:

Provide the name of the current program, track, or certificate:

When is the name change effective? Please note: A name change will apply to the record of all students who are currently enrolled, readmitted or newly admitted into this program as of the effective date of this change.

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

If you are requesting a CIP Code change for an existing program, track, or certificate, please provide:

old CIP:

new CIP:

If a name change is your only revision, stop here. Otherwise, complete the rest of Part A.

Part A - Continued

Specify the faculty who will participate in the program, track or certificate and their credentials to do so: (List faculty and a brief paragraph of their credentials.)

See attached.

Impact of changes on students: Will current students be impacted by the addition or revision of a program, track or certificate? If so, how?

There are currently no active students in the MPA/PAF Dual Degree track.

If applicable, provide a written agreement (email is fine) from all involved units that they are in support of, will provide courses to, or will participate in the program, track, or certificate. Please attach the correspondence and also list the units here.

See attached.

If an addition, 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.

Not applicable as we already have a doctoral program in Public Affairs and we are only revising it to make it more consistent with the College's Mission Statement

	Year 1	Year 2	Year 3
Headcount	25	50	75
SCHs	198	396	585

If an addition, indicate likely career or student outcomes upon completion: (What will students do? What will their job titles be?)

Not applicable as we already have a doctoral program in Public Affairs and we are only revising it to make it more consistent with the College's Mission Statement

Part A - Continued

If an addition or there are substantial REVISIONS to existing tracks or certificates, please complete the following table on financial support: (Specify all forms of support – assistantships, fellowships, and tuition remission.)

	No. assistantship students	Source of funds	No. fellowship students (specify fellowship)	No. tuition remissions	Source of funds
Year 1					
Year 2					
Year 3					

Checklist of items to be provided:

☑ **Electronic graduate catalog copy for additions; track changes included if there are revisions. (required)**

☑ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☑ **Emails showing consultation with other units. (if applicable)**

☐ **If an addition, list of 1-3 students and 1-3 faculty for profiles in the graduate catalog (provide email address so Graduate Studies can contact them to write profiles and take photos). You may provide draft copy of profiles if you wish.**

☐ **If an addition, what disciplines does this program, track or certificate belong to? What other UCF graduate programs, tracks, or certificates are related to it? This information will be used to provide additional links for prospective students to search in the online graduate catalog.**

Part B – For inactivations or suspensions of programs, tracks, or certificates

Are students currently enrolled in the program? ☐ **Yes** ☐ **No**

If yes, number of current students:

_____

Please specify the intended time period of inactivation or suspension:

_____

If program, track, or certificate is being inactivated or suspended, then attach a "teach out" plan for all current students specifying how they can finish the program or where students will be placed if moving to another program. The "teach out" plan should specify when courses will be offered to enable students to finish. Specify whether students will remain in the existing program to finish, and if so, when the completion date will be, whether students will be moved to another program, etc. Please provide a list of students where applicable.

Sample teach out plan: Enter the terms and courses that will be taught for each term throughout the last semester. **Please delete course prefixes and numbers in this section if no teach out plan is required.**

Fall 2012	Spring 2013	Summer 2013	Fall 2013	Spring 2014

Checklist of items to be provided:

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **E-mails showing consultation with other units. (if applicable)**

Reattached memo show appropriate market-rate tuition.

University of Central Florida

Regional Campus Administration
Office of the Vice Provost

MODELING AND SIMULATION CERTIFICATE PROGRAM
PROPOSED STATE DATE: FALL 2012

The Corporate Education Advisory Board has met, reviewed and approved for consideration the addition of the "Modeling and Simulation Graduate Certificate Program" for the University of Central Florida's graduate offerings beginning fall 2012. This approval is contingent upon review and approval of the Provost of the University of Central Florida.

This program is a fully sponsored program that will be run through Continuing Education's Corporate Education Division. The Department of the Navy has agreed to fund students at $800 a credit hour and pay these funds directly to the University.

The program will be offered completely online or use of other distance learning modalities and have a delayed start date in the fall semester of 2012. The curriculum calls for students to complete this lock step program by taking one course each semester. The University or the Office of Continuing Education will make no commitment to offer courses after Spring 2014 should the cohort not be continued.

The program of study is as following 3 credit hour courses:

1. IDS-6147 Perspectives on Modeling and Simulation
2. ESI-5531 Discrete Systems Simulation
3. IDS-6146 Modeling and Simulation Systems
4. IDS-XXXX Modeling and Simulation for Testing and Evaluation
5. IDS-6916 Simulation Research Methods and Practicum

Approval & Signatures:

Director of Continuing Education: _____ Date: 7/25/12
Interim Vice Provost of Regional Campus: _____ Date: 7/25/12
Dean of College of Graduate Studies: _____ Date: 7/26/12
Provost & Executive Vice President: _____ Date: 7-30-12

Regional Campus Administration
12201 Research Parkway • Orlando, FL 32816-0060 • Phone: 407-823-3654 • Fax: 407-823-1399

Current Graduate Catalog Description

Modeling and Simulation of Technical Systems Certificate

PROGRAM DESCRIPTION

The Graduate Certificate in Modeling and Simulation of Technical Systems provides students with the necessary knowledge in modeling and simulation fundamentals, including modeling techniques and applications, with special emphasis on M&S in testing and evaluation. This graduate certificate is beneficial to technical professionals involved with constructing and using simulation models of dynamic systems. All courses of the certificate program will be delivered electronically via distance education.

CURRICULUM

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

Students must complete a total of 15 credit hours of courses in the required competency areas of Modeling and Simulation Fundamentals, Testing and Evaluation, and Modeling Techniques and Applications.

Required Courses—15 Credit Hours

- IDS 6147 Perspectives on Modeling and Simulation (3 credit hours) (Fall)
- ESI 5531 Discrete Systems Simulation (3 credit hours) (Spring)
- IDS 6146 Modeling and Simulation Systems (3 credit hours) (Summer)
- IDS 6149 Modeling and Simulation for Testing and Evaluation (3 credit hours) (Fall)
- IDS 6916 Simulation Research Methods and Practicum (3 credit hours) (Spring)

Cost Per Credit Hour

For the Modeling and Simulation of Technical Systems Graduate Certificate, the cost per credit hour is $800.00.*

*Fee is subject to change.

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

Please note: Due to restrictive state regulations, UCF is not permitted to provide online courses or instruction to students in the following states. If you reside in one of these states, you may not be permitted to enroll in or be admitted to a UCF online program. Please contact your state's higher education regulation authorities or the UCF Graduate Program (see contact information above) for more details.

- Alabama
- Maryland
- Minnesota

Application Deadlines

Modeling and Simulation of Technical Systems Certificate	Fall Priority	Fall	Spring	Summer
Domestic Applicants	-	Jul 15	-	-
International Applicants	-	-	-	-
International Transfer Applicants	-	-	-	-

Proposed edits - Out-of-State Cohort Track

Modeling and Simulation of Technical Systems Certificate

Out-of-State Cohort Track

PROGRAM DESCRIPTION

The Graduate Certificate in Modeling and Simulation of Technical Systems provides students with the necessary knowledge in modeling and simulation fundamentals, including modeling techniques and applications, with special emphasis on M&S in testing and evaluation. This graduate certificate is beneficial to technical professionals involved with constructing and using simulation models of dynamic systems. All courses of the certificate program will be delivered electronically via distance education.

CURRICULUM

Total Credit Hours Required:
~~15~~ 16 Credit Hours Minimum beyond the Bachelor's Degree

Students must complete a total of ~~15~~16 credit hours of courses in the required competency areas of Modeling and Simulation Fundamentals, Testing and Evaluation, and Modeling Techniques and Applications.

Required Courses—~~15~~ 16 Credit Hours

- IDS 6147 Perspectives on Modeling and Simulation (3 credit hours) (Fall)
- ESI 5531 Discrete Systems Simulation (3 credit hours) (Spring)
- IDS 6146 Modeling and Simulation Systems (3 credit hours) (Summer)
- IDS 6XXX Modeling and Simulation Capstone Report Planning (1 credit hour) (Summer)
- IDS 6149 Modeling and Simulation for Testing and Evaluation (3 credit hours) (Fall)
- IDS 6916 Simulation Research Methods and Practicum (3 credit hours) (Spring)

Cost Per Credit Hour

For the Modeling and Simulation of Technical Systems Graduate Certificate, the cost per credit hour for non-Florida residents is $800.00.*

*Fee is subject to change.

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

Please note: Due to restrictive state regulations, UCF is not permitted to provide online courses or instruction to students in the following states. If you reside in one of these states, you may not be permitted to enroll in or be admitted to a UCF online program. Please contact your state's higher education regulation authorities or the UCF Graduate Program (see contact information above) for more details.

- Alabama
- Maryland
- Minnesota

Application Deadlines

Modeling and Simulation of Technical Systems Certificate	Fall Priority	Fall	Spring	Summer
Domestic Applicants	-	Jul 15	-	-
International Applicants	-	-	-	-
International Transfer Applicants	-	-	-	-

Proposed edits - In-State Cohort Track

Modeling and Simulation of Technical Systems Certificate

In-State Cohort Track

PROGRAM DESCRIPTION

The Graduate Certificate in Modeling and Simulation of Technical Systems provides students with the necessary knowledge in modeling and simulation fundamentals, including modeling techniques and applications, with special emphasis on M&S in testing and evaluation. This graduate certificate is beneficial to technical professionals involved with constructing and using simulation models of dynamic systems. All courses of the certificate program will be delivered electronically via distance education.

CURRICULUM

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

Students must complete a total of 15 credit hours of courses in the required competency areas of Modeling and Simulation Fundamentals, Testing and Evaluation, and Modeling Techniques and Applications.

Required Courses—15 Credit Hours

- IDS 6147 Perspectives on Modeling and Simulation (3 credit hours) (Fall)
- ESI 5531 Discrete Systems Simulation (3 credit hours) (Spring)
- IDS 6146 Modeling and Simulation Systems (3 credit hours) (Summer)
- IDS 6149 Modeling and Simulation for Testing and Evaluation (3 credit hours) (Fall)
- IDS 6916 Simulation Research Methods and Practicum (3 credit hours) (Spring)

Optional Course – 1 Credit Hour

In-State Cohort students who are not enrolled in any other UCF degree or certificate program are strongly advised to enroll in IDS 6XXX Modeling and Simulation Capstone Report Planning (1 credit hour) in the summer term prior to enrolling in IDS 6916 Simulation Research Methods and Practicum. This added 1 credit hour course is essential to planning a successful capstone project, especially for students who are pursuing the certificate and completing the courses at a distance.

Cost Per Credit Hour

For the Modeling and Simulation of Technical Systems Graduate Certificate, Florida residents will follow the regular in-state tuition schedule for the university. ~~the cost per credit hour is $800.00.*~~

~~*Fee is subject to change.~~

APPLICATION REQUIREMENTS

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- Alabama
- Maryland
- Minnesota

Application Deadlines

Modeling and Simulation of Technical Systems Certificate	Fall Priority	Fall	Spring	Summer
Domestic Applicants	-	Jul 15	-Dec 1	-
International Applicants	-	-	-	-
International Transfer Applicants	-	-	-	-

Course Agenda

March 17, 2014

1. Course Additions

College of Business Administration Course Additions

GEB 6XXX **BA-Department of Management** **3(3,0)**

Business Intelligence: PR: Consent of College of Business Graduate Studies. Study of the sources, acquisition, warehousing, analysis, and application of data pertaining to business decision-making in the firm. *Occasional.*

Abbrev: (16 of 30 chars) Bus Intelligence

Discussion with others: No duplications or conflicts noted. Course is a component of a new collaborative venture between College of Business Administration and College of Science.

Rationale: Course is the first students take in a new Business Analytics track of the PMSM program offered by the College of Business Administration. Demand for the new track is projected to be robust.

Majors taking course: All PMSM students in the Business Analytics track

College of Graduate Studies Course Additions

IDS 6XXX **GRDST-Interdisciplinary Grad** **3(3,0)**

Bioanalytical Technology: PR: Admission to the PSM in Nanotechnology and IDS 6XXX Intro to Nanoscience and Nanotechnology, or C.I. Analytical technologies and products for biomolecular detection and analysis, nanotechnology-based medical diagnostics. *Fall.*

Abbrev: (24 of 30 chars) Bioanalytical Technology

Discussion with others: None

Majors taking course: PSM in Nanotechnology

IDS 6XXX **GRDST-Interdisciplinary Grad** **3(3,0)**

Biomedical Nanotechnology: PR: Admission to the PSM in Nanotechnology and IDS 6XXX Intro to Nanoscience and Nanotechnology, UG General and Organic Chemistry, or C.I. Synthesis and properties of nanomaterials related to biomedical applications, nanotechnology for in vitro and in vivo diagnostics, and therapeutics. *Spring.*

Abbrev: (25 of 30 chars) Biomedical Nanotechnology

Discussion with others: None

Majors taking course: PSM in Nanotechnology

IDS 6XXX **GRDST-Interdisciplinary Grad** **3(3,0)**

Computation, Simulation and Modeling in Nanotechnology: PR: Admission to the PSM in Nanotechnology and background in chemistry and computer science, or C.I. Modeling methods and computational approaches applicable to nanotechnology problems. *Spring.*

Abbrev: (30 of 30 chars) Comput. & Modeling in Nanotech

Discussion with others: None

Majors taking course: PSM in Nanotechnology

IDS 6XXX **GRDST-Interdisciplinary Grad** **3(3,0)**
Introduction to Nanoscience and Nanotechnology: PR: Admission to the PSM in Nanotechnology or C.I. A general overview of nanomaterials and nanodevices, including their synthesis, new properties and applications. *Fall.*
Abbrev: (26 of 30 chars) Intro to Nanscience & Tech
Discussion with others: None
Majors taking course: PSM in Nanotechnology

IDS 6XXX **GRDST-Interdisciplinary Grad** **3(3,0)**
Nanofabrication and Characterization: PR: Admission to the PSM in Nanotechnology and IDS 6XXX Intro to Nanoscience and Nanotechnology, or C.I. Techniques for fabrication and characterization of nanoscale materials, nanoelectronics and devices. *Spring.*
Abbrev: (26 of 30 chars) Nanofab & Characterization
Discussion with others: None
Majors taking course: PSM in Nanotechnology

IDS 6XXX **GRDST-Interdisciplinary Grad** **3(3,0)**
Nanotechnology in Energy and Sustainability: PR: Admission to the PSM in Nanotechnology or C.I. Energy generation and storage, sustainability of materials and device fabrication and deployment, application of nanotechnology in improving the device efficiency in energy generation and storage. *Fall.*
Abbrev: (25 of 30 chars) Nanotech Energy & Sustain
Discussion with others: None
Majors taking course: PSM in Nanotechnology

2. Special Topics Additions

College of Health and Public Affairs Special Topics Additions

SPA 6938C **HPA-** **3(1,6)**
ST: Intermediate Clinical Practicum: PR: Admission to Communication Sciences master's program or C.I. Intermediate supervised practicum in evaluation and management of speech, language and hearing disorders. Includes 1 hour weekly meeting. *Occasional.*
Abbrev: (28 of 30 chars) ST: Intermediate Clinical Pr
Discussion with others: No duplications or conflicts are anticipated.

HIM 6938C **HPA-Department of Health Management and Informatics** **4(3,1)**
Health Care Coding and Diagnosis: PR: Admission to Health Care Informatics master's degree or HIA graduate certificate or C.I. Medical Coding and the role it plays in informatics emphasizing document usage and extracting needed data for proper code selection. Data mapping related to ICD-9-CM and ICD-10-CM is explored. *Occasional.*
Abbrev: (29 of 30 chars) ST:Health Care Code&Diagnosis
Discussion with others: Existing course- No duplication or conflicts exist.

Rationale: This is an existing course in the Health Services Administration program that has not been taught in several years. It is being updated to be used in the HIA certificate program.

HSA 6938C	**HPA-Department of Health Management and Informatics**	**4(3,1)**

Health Care Procedural Coding and Reimbursement: PR: Admission to HIA certificate or Health Care Informatics degree program or C.I. Introduction and analysis of reimbursement systems. Focus on Current Procedural Terminology (CPT) code selection and audit tools, reimbursement methodologies and revenue cycle management. *Occasional.*
Abbrev: (29 of 30 chars) ST: HC Procedure Code & Reimb
Discussion with others: Existing course - No duplications or conflicts.
Rationale: This is an existing course in the Health Service Administration program that has not been taught in several years. It is being updated to be used in the HIA certificate program.

HSA 6938C	**HPA-Department of Health Management and Informatics**	**4(3,1)**

Health Care Outcomes Management: PR: Admission to HIA Certificate or Health Care Informatics Degree Program. Measure and methods of outcomes assessment and evaluation focusing on regulatory policies, use of data to investigate fraud, organizational compliance programs and health information system compliance. *Occasional.*
Abbrev: (29 of 30 chars) ST: Health Care Outcomes Mgmt
Discussion with others: Existing course - No duplication or conflicts
Rationale: This is an existing course in the Health Service Administration program that has not been taught in several years. It is being updated to be used in the HIA certificate program.

HSA 6938C	**HPA-Department of Management Information Systems**	**4(3,1)**

(see next page)

Health Care Analytics: PR: Admission to Health Information Administration Certificate. Computer based course focusing on analyzing health care data including using data for decision making, process improvements, efficient health care delivery and preparing reports for other mangers. *Occasional.*
Abbrev: (25 of 30 chars) ST: Health Care Analytics
Discussion with others: Existing course - No duplication or conflicts
Rationale: This is an existing course in the Health Services Administration program that has not been taught in several years. It is being updated to be used in the HIA certificate program.

College of Nursing Special Topics Additions

NGR 7XXXL **CON-Department of Nursing** **VAR(VAR,VAR)**
Executive Doctor of Nursing Practice Residency: PR: NGR 7911C, NGR 7912C. Implementation of the Executive DNP project. *Occasional.*
Abbrev: (29 of 30 chars) Exe Doc of Nsg Prac Residency
Discussion with others: Not applicable
Rationale: Content is not adaptable to the DNP Executive track.

3. Course Revisions

College of Business Administration Course Revisions

MAN 6915 **Applied Field Project** ~~**3(3,0)**~~ **3-6(3-6,0)**

PR: ~~MAN 6325 or C.I.~~ All other courses in the selected track in the program.
~~Supervised filed research project addressing a specific~~ Capstone course; applies concepts, theories and methods learned earlier in program to organizational ~~problem or approved practicum within an organization.~~ problems in business settings
Discussion with others: This course has already been taught in the Human Resources/Change Management track of the Masters of Science in Management. In the Business Analytics track of the Masters of Science in Management, this course will be co-taught by faculty in the Department of Statistics in the College of Science and in the College of Business Administration. It was developed in coordination with faculty and Deans in the Colleges of Science and Business Administration. Other departments were consulted (i.e., Computer Science, Engineering) but the consulted faculty did not see a good fit of the proposed program with their offerings.
Rationale: This course helps synthesize and apply the concepts, theories and methods learned during the rest of the program. It gives the students experience in solving organization problems. It provides the students with a broad view of issues and an expanded tool kit with which to deal with business problems and to provide actionable solutions. It is co-taught by Business and Statistics faculty.
Majors taking course: PMSM students
There are no programs that list MAN 6915.

MAR 6646 ~~**Marketing Engineering**~~ **3(3,0)**
Marketing Analytics for Strategic Decision Making

PR: ~~CBA master\'s program~~ Consent of ~~study foundation core.~~ College of Business Graduate Studies.

~~Acquire knowledge about~~ Study of a variety of ~~planning~~ data-driven models and ~~decision models~~ techniques used to ~~creatively solve marketing problems.~~ understand customers, improve results, and facilitate strategic decision making.

Abbrev (16 of 30): ~~Marketing Engineering~~ Mkting Analytics

Discussion with others: No duplications or conflicts noted; this is a revision of an existing masters level marketing course. Course is a component of a new collaborative venture between College of Business Administration and College of Science. Approximately half of the courses will be taught by Department of Statistics faculty members.

Rationale: Existing MAR 6646 course, titled Marketing Engineering, is being revised to fulfill an elective requirement in the new Business Analytics track of the PMSM program offered by the College of Business Administration. Demand for the new track is projected to be robust.

Majors taking course: All PMSM students in the Business Analytics track

There are no programs that list MAR 6646.

College of Education and Human Performance Course Revisions

Tabled. Check with department on S/U grading.

MH 6403

~~**Techniques of Play Therapy and Expressive Arts**~~ **3(3,0)**
Group and Family Play Therapy

PR: ~~Graduate standing in mental health counseling or related field.~~ MHS 6421.

This practical course provides an overview of using different mediums of play therapy, including expressive arts, groups of children, and families for a ~~theoretical foundation for using expressive arts in counseling.~~ systemic approach.

Abbrev (25 of 30): ~~Tech Play Therap & Express Art~~ Grp & Family Play Therapy

Term Offered: ~~Fall~~ Spring

Graded SU: ~~No~~ Yes

Rationale: This course will continue to include expressive art mediums; however, the course will focus specifically on utilizing this medium with specific populations: groups of children and families. Due to limited time, many therapists choose to see children in groups or to see the whole family. To best prepare students in this certificate program, it is important to create a course that prepares the students for their future work with children in play therapy.

There are no programs that list MHS 6403.

MHS 6421
~~**Foundations of Play Therapy and Play Process**~~ **3(3,0) Foundations of Play Therapy and Expressive Arts**

PR: Graduate standing ~~in mental health counseling~~ or ~~related field.~~ C.I.

~~Theories~~ This course addresses the theories and application of ~~the~~ principles of play and expressive arts in the counseling process with children.
Abbrev (28 of 30): ~~Foundn Play Therap & Play Proc~~ Fndn Play Thrpy & Exprss Art
Term Offered: Spring, Summer
Graded SU: ~~No~~ Yes
Rationale: Given that the advanced courses will include expressive art modalities, it is important to include the background and principles of applying this type of counseling with children. The major content areas, foundations of play therapy process and principles, will remain the same. There are no programs that list MHS 6421.

Tabled. Check with department on S/U grading.

MHS 6422 **~~Theories of Play Therapy and Play Process~~ Advanced Theories and Techniques of Play Therapy** **3(3,0)**
PR: MHS 6421.
This course ~~will provide~~ provides an ~~overview~~ in-depth study of ~~different~~ play therapy ~~theories~~ counseling theories, utilizing didactic and experiential mediums to enhance the ~~application~~ students' development of ~~those in the counseling process.~~ play therapy skills.
Abbrev (29 of 30): ~~Theor Play Therap & Play Proc~~ Adv Theor & Tech Play Therapy
Term Offered: ~~Spring~~ Fall
Graded SU: ~~No~~ Yes
Rationale: The current MHS 6422 course focuses solely on play therapy theories. These theories are woven into several of the other play courses. Additionally, the certificate program meets the didactic components for a registered play therapy certificate through the Association for Play Therapy; however, the current certificate offered by UCF does not include an application component to demonstrate that graduate students can apply the knowledge in the counseling room. The changes to this course will meet those needs by including an application component tot he study of play therapy theories.
There are no programs that list MHS 6422.

Tabled. Check with department on S/U grading.

MHS 6424
~~Applications of Play Therapy with Special~~ ~~Populations~~ **3(3,0) Filial Therapy**
PR: ~~Graduate standing in mental health counseling or related field.~~ MHS 6421.
This course ~~provides an overview of applications of~~ teaches students how to include parents in the play therapy ~~with~~ process through learning a specific ~~populations such as groups, parents, families and/or traumatized children.~~ model of filial in a 10-week group experience.
Abbrev (14 of 30): ~~Appl Play Therap w Spec Pops~~ Filial Therapy
Term Offered: ~~Even~~ Spring
Graded SU: ~~No~~ Yes
Rationale: The current course, Play Therapy with Special Populations, does not meet the need for working with parents. The current courses in the certificate do not include a practical component for working with the parents of play therapy clientele. Additionally, students in the course will receive hands on experience working with parents in groups. This course will also enhance the ability for research in this area of play therapy due to the increased number of

students trained in this area.

There are no programs that list MHS 6424.

College of Health and Public Affairs Course Revisions

Tabled. Bring back with Registered Health Care certificate.

HIM 6293 **Health Care Coding and Diagnosis** ~~**3(3,0)**~~ **4(3,1)**

PR: ~~Graduate status.~~ Admission to Health Care Informatics degree or HIA Certificate.
~~Analysis~~ Medical Coding and ~~use of ICD~~ the role it plays in informatics emphasizing document usage and ~~CPT coding procedures.~~ extracting needed data for proper code selection. Data mapping related to ICD-9-CM and ICD-10-CM is explored.
Abbrev (30 of 30): ~~Health Care Coding & Diag~~ Health Care Coding & Diagnosis
Term Offered: ~~Occasional~~ Fall
Discussion with others: Existing course - No duplications or conflicts exist.
Rationale: This is an existing course in the Health Services Administration program that has not been taught in several years. It is being updated to be used in the HIA certificate program.
Majors taking course: Health Information Administration Certificate
There are no programs that list HIM 6293.

Tabled. Bring back with Registered Health Care certificate.

HSA 6175
~~**Advanced Trends in Health Care Finance Theory**~~ ~~**3(3,0)**~~ **Advanced Trends in Health Care Finance and Management** **4(3,1)**PR: ~~CI~~ Admission to HIA certificate or ~~PHC 6160.~~ Health Care Informatics degree program.
~~Public~~ Focus on areas related to overall strategy of the health ~~funding philosophies; evolving market strategies of insurers~~ care organization including decision making practices; infrastructure investment; business partnerships; management staff competencies; and ~~managed care organizations; macroeconomic implication of alternative financing policies.~~ financial report analysis.
Abbrev (29 of 30): ~~Adv Trends Hlth Care Fin Thry~~ Adv Trends Hlth Care Fin Mgmt
Term Offered: ~~Occasional~~ Summer
Discussion with others: Existing course - No duplications or conflicts exist
Rationale: This is an existing course in the Health Services Administration program that has not been taught in several years. It is being updated to be used in the HIA certificate.
Majors taking course: Health Informatics Administration certificate
There are no programs that list HSA 6175.

Tabled. Bring back with Registered Health Care certificate.

HSA 6189 ~~**Health Care Coding and Diagnosis**~~ ~~**3(3,0)**~~ **Health Care Procedural Coding and Reimbursement** **4(3,1)**

PR: ~~Graduate standing.~~ Admission to HIA certificate or Health Care Informatics degree program or C.I.
~~Analysis~~ Introduction and ~~use~~ analysis of ~~ICD~~ reimbursement systems. Focus on Current

Procedural Terminology (CPT) code selection and ~~CPT coding procedures.~~ audit tools; reimbursement methodologies; and revenue cycle management.

Abbrev (26 of 30): ~~Health Care Coding & Diag~~ HC Procedural Code & Reimb
Term Offered: ~~Occasional~~ Spring
Discussion with others: Existing course - No duplications or conflicts.
Rationale: This is an existing course in the Health Services Administration program that has not been taught in several years. It is being updated to be used in the HIA certificate program.
Majors taking course: Health Information Administration certificate
There are no programs that list HSA 6189.

Tabled. Bring back with Registered Health Care certificate.

HSA 6752	**~~Health Care Statistical Tools~~**	**~~3(3,0)~~**
	Health Care Analytics	**4(3,1)**

PR: ~~Graduate status.~~ Admission to Health Information Administration graduate certificate.
Computer based course focusing on ~~statistical quality tools, such as cause~~ analyzing health care data including using data for decision making, process improvements, efficient health care delivery and ~~effect diagrams, pareto and control charts, and root cause analysis, used in the management of healthcare organizations.~~ preparing reports for other mangers.
Abbrev (21 of 30): ~~Health Care Statistical Tools~~ Health Care Analytics
Term Offered: ~~Occasional~~ Spring
Discussion with others: Existing course - No duplications or conflicts.
Rationale: This is an existing course in the Health Services Administration program that has not been taught in several years. It is being updated to be used in the HIA certificate program.
Majors taking course: Health Information Administration Certificate
There are no programs that list HSA 6752.

Tabled. Bring back with Registered Health Care certificate.

HSA 6759	**Health Care Outcomes Management**	**~~3(3,0)~~**
		4(3,1)

PR: ~~Graduate status.~~ Admission to Health Information Administration Certificate or Health Care Informatics degree program.
Measure and methods of outcomes assessment and ~~evaluation. Development, structure,~~ evaluation focusing on regulatory policies; use of data to investigate fraud; organizational compliance programs and ~~evaluation of performance of~~ health ~~system. Assessing quality of services and quality management.~~ information system compliance.
Term Offered: ~~Occasional~~ Fall
Discussion with others: Existing course - No duplication or conflicts
Rationale: This is an existing course in the Health Services Administration program that has not been taught in several years. It is being updated to be used in the HIA certificate program.
Majors taking course: Health Information Administration certificate.
There are no programs that list HSA 6759.