

Graduate Council Curriculum Subcommittee
March 5, 2008
1:30 p.m., 243 MH

Agenda

1. Welcome and call to order
2. Approval of the minutes from the 2/26 meeting
3. Course revisions and total credit hour reduction to the Urban Education Certificate, Ed
(Tabled at 2/26 meeting due to a request for additional information)
4. Curriculum revisions to the Ph.D. in Modeling and Simulation, GS
5. Review of courses and special topics
6. Announcements and adjournment. Next meeting: March 21, 12:30, MH 243.



Office of Student Affairs

- Clinical Experiences: 407-823-2436
- Minority Programs in Education: 407-823-3851
- Student Services: 407-823-3723

MEMORANDUM

February 12, 2008

TO: Dr. Patricia Bishop, Vice Provost and Dean, Graduate Studies

**FROM: Dr. Grant Hayes, Associate Dean for Graduate Studies,
College of Education**

**SUBJECT: Proposal for revisions to the Urban Education Certificate
program**

Attached please find a proposal for revisions to the Urban Education Certificate program. Inclusive in the revisions are a reduction in the total credit hours in the certificate program, as well as the development of new interdisciplinary electives that will be more readily available for students enrolled in the certificate program. This certificate program proposal was reviewed and approved at the College of Education Graduate Curriculum and Standards Committee meeting held Tuesday, February 12, 2008.

Deanne Martin 2/12/08
Scott Hayes 2/12/08

**INTERDISCIPLINARY GRADUATE CERTIFICATE PROGRAM
IN URBAN EDUCATION**

Catalog Description

The Interdisciplinary Graduate Certificate in Urban Education is designed to offer education to professionals who work with, or are interested in, urban issues. The program comprises of five graduate courses that address critical issues associated with life in urban schools.

REQUIRED COURSES-15 CREDIT HOURS MINIMUM

Core Courses (9 hrs)

- EDF 6725: Critical Issues in Urban Education 3 hrs
- EDF 6XXX: Teaching & Learning in Urban Settings 3 hrs
- EDG 6XXX: Social Contexts of the Urban Classroom 3 hrs

Electives

Students must select two courses from the following electives.

- EDF 6XXX: Public Policy and Urban Education 3 hrs
- EDF 6XXX: Teacher Leadership for Equity & Social Justice 3 hrs
- EDF 6884: Education as a Cultural Process 3 hrs
- EDF 6886: Multicultural Education, 3 credits 3 hrs
- EEX 6342: Seminar, Critical Issues in Special Education 3 hrs
- EGI 6426: Education of Special Populations of Gifted Students 3 hrs
- SYD 5795: Class, Race, and Gender in American Society 3 hrs

RATIONALE:

Students in our PK-12 grades are more culturally and linguistically diverse than ever. The overarching goal of the Interdisciplinary Graduate Certificate program in Urban Education is to enhance the preparation of professionals who work with, or are interested in urban issues.

The current certificate contains courses that are rarely offered, therefore making it difficult for students to graduate within a reasonable time. The department has replaced these courses with interdisciplinary electives that will be more readily available, and enriched the curriculum further with course offerings to include courses in public policy and its implications for urban education, as well as the education of gifted students.

CURRENT CATALOG COPY 2007-08

GRADUATE CERTIFICATE IN URBAN EDUCATION

Requirements

Required Courses—18 Credit Hours Minimum

Core Courses—12 Credit Hours

- EDF 6725 Critical Issues in Urban Education (3 credit hours)
- EDF 6936 Seminar in Improving Teaching and Learning in Urban Settings (1 credit hour for three semesters)
- EDF 6884 Education as a Cultural Process (3 credit hours)

Choose one of the following electives.

- EDF 6206 Challenges of Classroom Diversity (3 credit hours)
- EDF 6886 Multicultural Education (3 credit hours)
- EEX 6028 Challenges of Poverty in Special Education (3 credit hours)
- TSL 5143 ESOL Strategies (3 credit hours)
- SSE 5776 Democracy and Education (3 credit hours)

Urban Life in the United States—6 Credit Hours

Students must select one course from Group A and one course from Group B.

Group A: Urban Issues

- CCJ 5015 The Nature of Crime (3 credit hours)
- PUP 6007 Public Policy Analysis (3 credit hours)
- SYD 5795 Class, Race, and Gender in American Society (3 credit hours)
- SYO 6175 Social Research in the Family (3 credit hours)
- SYO 6515 Issues in Social Disorganization (3 credit hours)

Group B: Cultural Issues

- SPN 5502 Hispanic Culture of the United States (3 credit hours)
- AFA 5930 Topics in African American Studies (3 credit hours)
- EDF 5607 Language, Culture and Pedagogy: Impact and Implications (3 credit hours)

Contact Info

Martha Scott Lue, Ph.D., Professor
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mlue@mail.ucf.edu

MEMORANDUM

TO: Dr. Patricia Bishop, Graduate Council Curriculum Subcommittee
FROM: Dr. Karen L. Biraimah, Chair, Educational Studies
DATE: February 26, 2008
SUBJECT: Graduate Certificate in Urban Education

In response to the Subcommittee's questions regarding the previously proposed Interdisciplinary Graduate Certificate in Urban Education:

- 1) Course Title: We agree with the observation that "Interdisciplinary" should be dropped from the title as the majority of classes are within the College of Education.
- 2) EDF 6XXX: Teaching and Learning in Urban Settings: This is a replacement for EDF 6936: Seminar in Improving Teaching and Learning in Urban Settings. A limited number of topics within the course were revised, and the name was changed to better focus the course. It was our understanding that a new course name requires a new course number. We will forward the course deletion for EDF 6936.
- 3) EDG 6XXX: Social Context of the Urban Classroom is a totally new course added to the certificate's core. EDF 6884: Education as a Cultural Process, which was in the core, was moved to an elective which will be offered less often.
- 4) EDF 6XXX: Public Policy and Urban Education replaces EDF 6206: Challenges of Classroom Diversity, which we now only intend to offer every other year.
- 5) Following from the discussion on tracks and specializations we would like to list Urban Education as a specialization, not a track, in the M.Ed. in Teacher Leadership.
- 6) Since we would like to use Urban Education to recruit students into the M.Ed. in Teacher Leadership, is it possible to approve this certificate in time for the new 2008 catalog?

Thanks, as always, for your help with these matters.

From: Kincaid, Peter
Sent: Thursday, February 28, 2008 8:49 AM
To: pbishop@mail.ucf.edu
Cc: 'Carreen Krapf'; Jaganathan, Bala; Annie Wu (aswu@cs.ucf.edu)
Subject: Changes in M&S 2008-09 Graduate Catalog Entry

Pat, here is the revised catalog entry for the 2008-09 catalog M&S description. In addition to some minor changes we are adding a core course for the Ph.D. program, advanced research methods for which students will have a number of choices. Here is the rationale:

The addition of an advanced research methods course for the Ph.D. core is seen as necessary to better prepare students for dissertation research. While we have encouraged our doctoral students to take such a course, we have not required it, and only about half have done so. We expect a larger number of students to work more efficiently on their dissertation research and relieve some pressure on dissertation chairs and committee members with this requirement in place. Students may choose from four advanced research methods courses from several disciplines represented in the program including psychology, industrial engineering and computer science. Peter

J. Peter Kincaid, Ph.D.

Professor and Coordinator, M&S Graduate Program

Modeling and Simulation

[Description](#)

[Degrees Offered](#)

[Admission](#)

[Master of Science in Modeling and Simulation](#)

[Doctor of Philosophy in Modeling and Simulation](#)

[Contact Info](#)

Description

The University of Central Florida offers interdisciplinary master's and doctoral degrees in Modeling and Simulation (M&S). The Master of Science (M.S.) in Modeling and Simulation prepares scientists who can work with interdisciplinary teams to use simulation and modeling in solving important problems in both the public and private sectors. The Doctor of Philosophy (Ph.D.) in Modeling and Simulation is primarily intended for students with an academic or work

background in mathematics, engineering, or computer science who wish to pursue a career in academia, defense, entertainment, or manufacturing.

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. Simulation entails 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(s), 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.

Degrees Offered

Master of Science in Modeling and Simulation
Doctor of Philosophy in Modeling and Simulation

Admission

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the [Admissions and Registration](#) section of the Graduate Catalog. Applicants must [apply online](#). Please be sure to submit all requested material by the established deadline(s).

Master of Science in Modeling and Simulation

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, a 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 more technical 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).

Admission requirements include:

- GPA of 3.0 in last 60 hours of study
- A competitive GRE score
- TOEFL of 220 (computer test), for international students only
- Resume and goal statement
- Introductory calculus and statistics

Both GPA and test scores must be officially reported to UCF Graduate Studies.

Applications are accepted for the Fall and Spring terms only.

Doctor of Philosophy in Modeling and Simulation

The Doctor of Philosophy (Ph.D.) in Modeling and Simulation is an interdisciplinary program primarily intended for students with an academic or work background in mathematics, engineering, or computer science who wish to pursue a career in academia, defense, entertainment, or manufacturing.

Applicants must satisfy the admission criteria specified for graduate program admissions to UCF. Doctoral students are expected to score higher on the GRE exam than master's students. International students must have a Test of English as a Foreign Language (TOEFL) score of at least 220 (computer-based test). Selected outstanding applicants who have a GPA of at least 3.4 in the last 60 attempted semester hours of their undergraduate degrees and a very strong GRE score may be considered for direct entrance as doctoral students from their bachelor's degrees. Students meeting these criteria may be admitted into the program with the approval of the Academic Advisory Board.

Admission requirements include:

- GPA of 3.0 in last 60 hours of study
- A competitive GRE score
- TOEFL of 220 (computer test), for international students only
- Resume and goal statement
- Three letters of recommendation

Applications are accepted for the Fall and Spring terms only.

Application Due Dates

All application materials must be submitted by the appropriate deadline listed below.

All students applying for fellowships must apply by the Fall Priority deadline date.

U.S. Applicants

Program(s)	Fall Priority	Fall	Spring	Summer
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Doctor of Philosophy in Modeling and Simulation	Jan 15	Jul 15	Dec 1
Master of Science in Modeling and Simulation	Jan 15	Jul 15	Dec 1

International Applicants

Program(s)	Fall Priority	Fall	Spring	Summer
Doctor of Philosophy in Modeling and Simulation	Jan 15	Jan 15	Jul 1	
Master of Science in Modeling and Simulation	Jan 15	Jan 15	Jul 1	

International Transfer Applicants

Program(s)	Fall Priority	Fall	Spring	Summer
Doctor of Philosophy in Modeling and Simulation	Jan 15	Mar 1	Sep 1	
Master of Science in Modeling and Simulation	Jan 15	Mar 1	Sep 1	

Master of Science in Modeling and Simulation

Graduates of the Modeling and Simulation M.S. program will be able to establish depth in one of seven focus areas and have the diverse training necessary to enable them to work in varied capacities in government agencies, or in the defense, entertainment, and manufacturing industries. They 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. They will 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. They will be able to clearly communicate their findings to their peers.

The program offers seven focus areas from which students must choose their program of study:

- Quantitative Aspects of Simulation
- Simulation Infrastructure
- Simulation Management
- Computer Visualization in M&S
- Simulation Modeling and Analysis
- Interactive Simulation/Intelligent Systems
- Human Systems in M&S

These M&S focus areas have been identified and discussed with M&S leaders from industry and government. Each of these focus areas represents an area in which UCF has considerable faculty expertise, expertise that has developed and grown as UCF has grown with the M&S field in our community. Government and industry leaders in M&S endorse these focus areas because of their importance to the continued growth of the M&S field. For all of the focus areas, opportunities are available for students to work with researchers and M&S faculty on research and development projects. Descriptions of these focus areas are provided under "Curriculum."

In addition to UCF university-wide requirements for master's degrees, the Modeling and Simulation M.S. has special requirements because of its interdisciplinary nature. Courses will introduce students to the interdisciplinary aspects of the field and require students from different disciplines to work together in teams. Students may select from seven M&S focus areas in planning their program of study. Courses for the focus areas, including the cornerstone courses, are listed below. Cornerstone courses should be taken before the restricted electives can be taken. The culminating experience for nonthesis students in the masters program will be the project, paper, and presentation done as part of required core course, IDS 6916 Simulation Research Methods and Practicum. This project will serve as a capstone experience and will be reviewed by outside experts. For thesis-option students the thesis and its defense serve as the culminating experience.

Nonthesis Option

The nonthesis option requires 30 credit hours, including:

- Required core courses (9 credit hours)
- Cornerstone courses for two focus areas (6 credit hours)
- Electives for focus area (15 credit hours)
- No independent study, directed research, or thesis hours may be included in a program of study

Thesis Option

The thesis option requires 30 credit hours, including:

- Required core courses (9 credit hours)
- Cornerstone courses for focus areas (6 credit hours)
- Electives from focus area (9 credit hours)
- Thesis (6 credit hours)

Required Interdisciplinary Core

Three core courses provide an interdisciplinary framework for all students. Teams of program faculty teach these core courses. A brief description of the core courses follows.

- IDS 5717C Introduction to Modeling and Simulation. Introduction to the theory and practice of modeling and simulation with an emphasis on multidisciplinary scientific underpinnings. Led by one instructor augmented by a team.
- IDS 5719 Quantitative Aspects of Modeling and Simulation. An introduction to matrix algebra, probability and statistics, and high level programming languages for the M&S student who does not have a strong background in these areas. Students who have this background may select an elective instead.
- IDS 6916 Simulation Research Methods and Practicum. Pre-requisite or concurrent: ESI 5219 Engineering Statistics, PSY 6216 Advanced Research Methodology I, or equivalent. Project course in which interdisciplinary teams conduct and manage research projects on fundamental and applied issues in modeling and simulation and training. Led by one instructor and supported by a team.

Quantitative Aspects of Simulation Focus Area

The Quantitative Aspects of Simulation focus area caters to those who seek to develop skill in the application of advanced quantitative methods to modeling and simulation. Building on backgrounds in mathematics or statistics they will gain experience in modeling and simulation. Graduates will be able to apply mathematics and statistics to build multidisciplinary models and simulations. Typical courses include: Mathematical Modeling, Statistical Aspects of Digital Simulation, Advanced Systems Simulation, and Splines and Data Fitting.

Cornerstone Course

- MAP 5117 Mathematical Modeling (3 credit hours)

Restricted Electives

- EEL 5173 Linear Systems Theory (3 credit hours)
- EML 6062 Boundary Element Methods in Engineering (3 credit hours)
- EML 6067 Finite Elements in Mechanical, Materials, and Aerospace Engineering I (3 credit hours)
- ESI 6217 Statistical Aspects of Digital Simulation (3 credit hours)
- ESI 6358 Decision Analysis (3 credit hours)
- ESI 6529 Advanced Systems Simulation (3 credit hours)
- ESI 6546 Process Simulation (3 credit hours)
- MAP 5117 Mathematical Modeling (3 credit hours)
- MAP 5385 Applied Numerical Mathematics (3 credit hours)
- MAP 5407 Applied Mathematics I (3 credit hours)
- MAP 6118 Introduction to Nonlinear Dynamics (3 credit hours)

- MAP 6207 Optimization Theory (3 credit hours)
- MAP 6408 Applied Mathematics II (3 credit hours)
- MAP 6445 Approximation Techniques (3 credit hours)
- MAP 6465 Wavelets and Their Applications (3 credit hours)
- STA 6246 Linear Models (3 credit hours)
- STA 5703 Data Mining Methodology I (3 credit hours)
- STA 6704 Data Mining Methodology II (3 credit hours)
- STA 6326 Theoretical Statistics I (3 credit hours)
- STA 6327 Theoretical Statistics II (3 credit hours)
- STA 6714 Data Preparation (3 credit hours)
- STA 6236 Regression Analysis (3 credit hours)
- STA 6329 Statistical Applications of Matrix Algebra (3 credit hours)
- STA 6246 Linear Models (3 credit hours)
- ESI 5219 Engineering Statistics (3 credit hours)

Simulation Infrastructure Focus Area

The Simulation Infrastructure focus area caters to 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 will 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.

Cornerstone Course

- CDA 5530 Performance Models of Computers and Networks (3 credit hours)

Restricted Electives

- CDA 5106 Advanced Computer Architecture I (3 credit hours)
- CDA 5501 Computer Communication Networks Architecture (3 credit hours)
- CDA 6107 Parallel Computer Architecture (3 credit hours)
- COP 6615 Operating Systems Theory (3 credit hours)
- COT 5405 Design and Analysis of Algorithms (3 credit hours)
- EEL 5708 High Performance Computer Architecture (3 credit hours)
- EEL 5762 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 6893 Continuous System Simulation II (3 credit hours)
- ISM 6217 Advanced Database Administration (3 credit hours)
- EEL 5881 Software Engineering I (3 credit hours)
- EEL 6883 Software Engineering II (3 credit hours)

- EEL 6885 Software Engineering Quality Assurance Methods (3 credit hours)

Simulation Management Focus Area

The Simulation Management focus area caters to those who wish to gain expertise in the management of projects related to modeling, simulation, and training (MS&T). A graduate will 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.

Cornerstone Course

- [EIN 5108 The Environment of Technical Organizations \(3 credit hours\)](#) [or EIN 6528 Simulation Based Life Cycle Engineering \(3 credit hours\)](#)

Restricted Electives

- EEL 6887 Software Engineering Life-Cycle Control (3 credit hours)
- EIN 5117 Management Information Systems I (3 credit hours)
- EIN 5140 Project Engineering (3 credit hours)
- EIN 5346 Engineering Logistics (3 credit hours)
- EIN 6182 Engineering 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 5306 Operations Research (3 credit hours)
- ESI 6358 Decision Analysis (3 credit hours)
- EML 4024C Engineering Design Practice (3 credit hours)
- ESI 6224 Quality Management (3 credit hours)

Computer Visualization in M&S Focus Area

The Computer Visualization in M&S focus area caters to those who wish to gain expertise in technical aspects of computer graphic systems, virtual environments, and human-centered simulation systems. A graduate will have knowledge and experience in applying the state-of-the-art in computer graphics and other human-interface technologies. Typical courses include Computer Graphics Systems, Computer Vision, Machine Perception, Human-Virtual Environment Interaction, and Sensation and Perception. Some students in this focus area will also have an interest in UCF's Digital Media program.

Cornerstone Course

- CAP 5725 Computer Graphics I (3 credit hours)

Restricted Electives

- CAP 5415 Computer Vision (3 credit hours)
- CAP 6411 Computer Vision Systems (3 credit hours)
- CAP 6412 Advanced Computer Vision (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 6823 Pattern Recognition II (3 credit hours)
- EEL 6843 Machine Perception (3 credit hours)
- EIN 6258 Human Computer Interaction (3 credit hours)

Simulation Modeling and Analysis Focus Area

The Simulation Modeling and Analysis focus area caters to those who desire to gain expertise in using simulation as a tool for effective design, planning, analysis, and decision making. The emphasis of this track is on problem definition, model formulation, design of simulation experiments, and model-based analysis. 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 Discrete System Simulation, Experimental Design, and Object-Oriented Simulation.

Cornerstone Course

- ESI 5531 Discrete Systems Simulation (3 credit hours)

Restricted Electives

- EEL 4890 Continuous System Simulation I (3 credit hours)
- EEL 6878 Modeling and Artificial Intelligence (3 credit hours)
- EEL 5892 Continuous System Simulation II (3 credit hours)
- EIN 6524 Simulation Modeling Paradigms (3 credit hours)
- EIN 6529 Simulation Design and Analysis (3 credit hours)
- ESI 6217 Statistical Aspects of Digital Simulation (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- ESI 6529 Advanced Systems Simulation (3 credit hours)
- ESI 6532 Object-oriented Simulation (3 credit hours)
- ESI 6546 Process Simulation (3 credit hours)

Interactive Simulation/Intelligent Systems Focus Area

The Interactive Simulation/Intelligent Systems focus area responds to the needs of those who wish to pursue or are currently pursuing careers in the training simulation/simulator industries. Graduates specializing in this focus area possess the basic tools to create system designs for simulators and simulator-based training systems and to apply expert systems and other intelligent

systems in a simulation setting. Typical required courses include Training Systems Engineering, Simulation of Real-Time Processes, and Intelligent Simulation.

Cornerstone Course

- EIN 5255 Interactive Simulation (3 credit hours)

Restricted Electives

- CAP 5512 Evolutionary Computation (3 credit hours)
- CAP 5610 Machine Learning (3 credit hours)
- CAP 5636 Advanced Artificial Intelligence (3 credit hours)
- CAP 6637 Affective Computing with Artificial Intelligence (3 credit hours)
- EEL 5874 Expert Systems and Knowledge Engineering (3 credit hours)
- EEL 6875 Engineering of Artificial Intelligence Systems (3 credit hours)
- EEL 6876 Current Topics in Artificial Intelligence in Engineering Systems (3 credit hours)
- EEL 6878 Modeling Artificial Intelligence (3 credit hours)
- EEL 6895 Current Issues in Real-Time Simulation (3 credit hours)
- EIN 5251 Usability Engineering (3 credit hours)
- EIN 5317 Training System Design (3 credit hours)
- EIN 5602C Expert Systems in Industrial Engineering (3 credit hours)
- EIN 6645 Real-Time Simulation Agents (3 credit hours)
- EIN 6647 Intelligent Simulation (3 credit hours)
- EIN 6946 Simulation Practicum (3 credit hours)
- EIN 6649C Intelligent Tutoring Training System Design (3 credit hours)
- EME 6613 Instructional Systems Design (3 credit hours)
- TTE 6270 Intelligent Transportation Systems (3 credit hours)

Human Systems in M&S Focus Area

The Human Systems in M&S focus area caters to 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.

Cornerstone Course

- EXP 5256 Human Factors I (3 credit hours)
OR
- EIN 5251 Usability Engineering (3 credit hours)

Restricted Electives

- EIN 5248C Ergonomics (3 credit hours)
- EIN 6215 System Safety Engineering and Management (3 credit hours)
- EIN 6258 Human Computer Interaction (3 credit hours)
- EME 5051 Technologies of Instruction and Information Management (3 credit hours)
- EME 6457 Distance Education: Technology Process Product (3 credit hours)
- EME 6613 Instructional System Design (3 credit hours)
- EXP 5208 Sensation and Perception (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)
- INP 6215 Assessment Centers and Leadership (3 credit hours)
- INP 6317 Organizational Psychology and Motivation (3 credit hours)
- INP 6605 Training and Performance Appraisal (3 credit hours)
- PSY 6216 Advanced Research Methodology I (3 credit hours)
- DIG 5647C Science and Technology of Dynamic Media (3 credit hours)

Doctor of Philosophy in Modeling and Simulation

Total Hours Required for Ph.D.—Minimum of 72 credit hours beyond the bachelor’s degree; minimum of 42 credit hours beyond the master’s degree

The Ph.D. degree consists of at least 72 semester hours of course work, including a minimum of 15 dissertation hours. The core will consist of ~~four~~ five required courses ~~and two restricted core courses~~. These core courses will provide an interdisciplinary framework for all students. In addition, students are required to take ~~three~~ two ~~three~~ of the seven focus area cornerstone courses. Students are also expected to produce refereed publications as part of their doctoral studies.

Required Core—15 Credit Hours

- IDS 5717C Introduction to Modeling and Simulation (3 credit hours)
- IDS 5719 Quantitative Aspects of Modeling and Simulation (3 credit hours)
- EIN 6258 Human Computer Interaction (3 credit hours)
- IDS 6916 Simulation Research Methods and Practicum (3 credit hours)

- Choose one advanced research methods course
 - PSY 6216 Advanced Research Methodology I (4 credit hours)
 - ESI 6891 IEMS Research Methods (3 credit hours)
 - ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
 - CAP 5512 Evolutionary Computation (3 credit hours)

The purpose of the advanced research methods course is to give students an introduction to how to do research and prepare students for performing research for their dissertation.

Focus Area Cornerstone and Restricted Elective Courses—9 Credit Hours

The purpose of these courses is to ensure that students have depth in their focus area as well as have breadth in interdisciplinary modeling and simulation. To achieve depth, students must take the cornerstone course from their track plus one restricted elective 6000 level course in that focus area. In addition, to achieve breadth, students must take the cornerstone course from one other focus area.

- CAP 5725 Computer Graphics I (3 credit hours)
- CDA 5530 Performance Models of Computers and Networks (3 credit hours)
- EIN 5108 The Environment of Technical Organizations or EIN 6528 Simulation Based Life Cycle Engineering (3 credit hours)
- EIN 5255C Interactive Simulation (3 credit hours)
- ESI 5531 Discrete Systems Simulation (3 credit hours)
- EXP 5256 Human Factors I (3 credit hours) or EXP 6255
- MAP 5117 Mathematical Modeling (3 credit hours)

Required Core—12 15 Credit Hours

- ~~IDS 5717C Introduction to Modeling and Simulation (3 credit hours)~~
- ~~IDS 5719 Quantitative Aspects of Modeling and 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—one of the following or equivalent (3 credit hours)~~
 - ~~PSY 6216 Advanced Research Methodology I (4 credit hours)~~
 - ~~ESI 6891 IEMS Research Methods (3 credit hours)~~
 - ~~ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)~~
 - ~~CAP 5512 Evolutionary Computation (3 credit hours)~~

Restricted Core—96 Credit Hours

- ~~MAP 5117 Mathematical Modeling (3 credit hours) or EEL 5937 Continuous System Simulation (3 credit hours)~~
- ~~EIN 5255C Interactive Simulation (3 credit hours) or EEL 5892 Continuous System Simulation I (3 credit hours)~~

- ~~ESI 5531 Discrete Systems Simulation (3 credit hours) or ESI 6532 Object-oriented Simulation (3 credit hours)~~

~~Focus Area Cornerstone Courses—6 Credit Hours~~

- ~~CAP 5725 Computer Graphics I (3 credit hours)~~
- ~~CDA 5530 Performance Models of Computers and Networks (3 credit hours)~~
- ~~EIN 5108 The Environment of Technical Organizations (3 credit hours)~~
- ~~EIN 5255C Interactive Simulation (3 credit hours)~~
- ~~ESI 5531 Discrete Systems Simulation (3 credit hours)~~
- ~~EXP 5256 Human Factors I (3 credit hours)~~
- ~~MAP 5117 Mathematical Modeling (3 credit hours)~~

~~Note that students may fulfill the cornerstone course requirements through the courses chosen in the restricted core. Such students will meet the total credit hour requirements with additional elective courses.~~

Quantitative Aspects of Simulation Focus Area—Minimum 9 Credit Hours

The Quantitative Aspects of Simulation focus area caters to those who seek to develop skill in the application of advanced quantitative methods to modeling and simulation. Building on backgrounds in mathematics or statistics they will gain experience in modeling and simulation. Graduates will be able to apply mathematics and statistics to build multidisciplinary models and simulations. Typical courses include: Mathematical Modeling, Statistical Aspects of Digital Simulation, Advanced Systems Simulation, and Splines and Data Fitting.

Cornerstone Course

- MAP 5117 Mathematical Modeling (3 credit hours)

Restricted Electives

- EML 6062 Boundary Element Methods in Engineering (3 credit hours)
- EML 6067 Finite Elements in Mechanical, Materials, and Aerospace Engineering I (3 credit hours)
- EEL 5173 Linear Systems Theory (3 credit hours)
- ESI 6217 Statistical Aspects of Digital Simulation (3 credit hours)
- ESI 6358 Decision Analysis (3 credit hours)
- ESI 6529 Advanced Systems Simulation (3 credit hours)
- ESI 6546 Process Simulation (3 credit hours)
- MAP 5117 Mathematical Modeling (3 credit hours)
- MAP 5385 Applied Numerical Mathematics (3 credit hours)
- MAP 5407 Applied Mathematics I (3 credit hours)
- MAP 5396 Splines and Data Fitting (3 credit hours)

- MAP 6118 Introduction to Nonlinear Dynamics (3 credit hours)
- MAP 6207 Optimization Theory (3 credit hours)
- MAP 6408 Applied Mathematics II (3 credit hours)
- MAP 6445 Approximation Techniques (3 credit hours)
- MAP 6465 Wavelets and Their Applications (3 credit hours)
- STA 5825 Stochastic Processes and Applied Probability Theory (3 credit hours)
- STA 6246 Linear Models (3 credit hours)
- STA 5703 Data Mining Methodology I (3 credit hours)
- STA 6704 Data Mining Methodology II (3 credit hours)
- STA 6326 Theoretical Statistics I (3 credit hours)
- STA 6327 Theoretical Statistics II (3 credit hours)
- STA 6714 Data Preparation (3 credit hours)
- STA 6236 Regression Analysis (3 credit hours)
- STA 6329 Statistical Applications of Matrix Algebra (3 credit hours)
- ESI 5219 Engineering Statistics (3 credit hours)

Simulation Infrastructure Focus Area—Minimum 9 Credit Hours

The Simulation Infrastructure focus area caters to 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 will 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.

Cornerstone Course

- CDA 5530 Performance Models of Computers and Networks (3 credit hours)

Restricted Electives

- CDA 5106 Advanced Computer Architecture I (3 credit hours)
- CDA 5501 Computer Communication Networks Architecture (3 credit hours)
- CDA 6107 Advanced Computer Architecture II (3 credit hours)
- COP 6615 Operating Systems Theory (3 credit hours)
- COT 5405 Design and Analysis of Algorithms (3 credit hours)
- EEL 5708 High Performance Computer Architecture (3 credit hours)
- EEL 5762 Performance Analysis of Computer and Communication Systems (3 credit hours)
- EEL 4890 Continuous System Simulation I (3 credit hours)
- EEL 6785 Computer Network Design (3 credit hours)
- EEL 6878 Modeling and Artificial Intelligence (3 credit hours)

- EEL 6893 Advanced Topics in Continuous Simulation (3 credit hours)
- EEL 5881 Software Engineering I (3 credit hours)
- EEL 6885 Software Engineering Quality Assurance Methods (3 credit hours)

Simulation Management Focus Area—Minimum 9 Credit Hours

The Simulation Management focus area caters to those who wish to gain expertise in the management of projects related to modeling, simulation, and training (MS&T). A graduate will 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.

Cornerstone Course

- [EIN 5108 The Environment of Technical Organizations \(3 credit hours\)](#) [or EIN 6528 Simulation Based Life Cycle Engineering \(3 credit hours\)](#)

Restricted Electives

- EEL 6887 Software Engineering Life-Cycle Control (3 credit hours)
- EIN 5117 Management Information Systems I (3 credit hours)
- EIN 5140 Project Engineering (3 credit hours)
- EIN 5346 Engineering Logistics (3 credit hours)
- EIN 6182 Engineering 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 5306 Operations Research (3 credit hours)
- ESI 6358 Decision Analysis (3 credit hours)
- ESI 6224 Quality Management (3 credit hours)
- EML 5025 Engineering Design Practicum (3 credit hours)
- ISM 7027 Systems Support of Organizational Decision Making (3 credit hours)

Computer Visualization in M&S Focus Area—Minimum 9 Credit Hours

The Computer Visualization in M&S focus area caters to those who wish to gain expertise in technical aspects of computer graphic systems, virtual environments, and human-centered simulation systems. A graduate will have knowledge and experience in applying the state-of-the-art in computer graphics and other human-interface technologies. Typical courses include Computer Graphics Systems, Computer Vision, Machine Perception, Human-Virtual

Environment Interaction, and Sensation and Perception. Some students in this focus area will also have an interest in UCF's Digital Media program.

Cornerstone Course

- CAP 5725 Computer Graphics I (3 credit hours)

Restricted Electives

- CAP 5415 Computer Vision (3 credit hours)
- CAP 6411 Computer Vision Systems (3 credit hours)
- CAP 6412 Advanced Computer Vision (3 credit hours)
- EEL 5771C Engineering Applications of Computer Graphics (3 credit hours)
- EEL 5820 Image Processing (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)

Simulation Modeling and Analysis Focus Area—Minimum 9 Credit Hours

The Simulation Modeling and Analysis focus area caters to those who desire to gain expertise in using simulation as a tool for effective design, planning, analysis, and decision-making. The emphasis of this track is on problem definition, model formulation, design of simulation experiments, and model-based analysis. 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 Discrete System Simulation, Experimental Design, and Object-Oriented Simulation.

Cornerstone Course

- ESI 5531 Discrete Systems Simulation (3 credit hours)

Restricted Electives

- EEL 4890 Continuous System Simulation I (3 credit hours)
- EEL 6878 Modeling and Artificial Intelligence (3 credit hours)
- EEL 6893 Continuous System Simulation II (3 credit hours)
- EIN 6524 Simulation Modeling Paradigms (3 credit hours)
- EIN 6529 Simulation Design and Analysis (3 credit hours)
- ESI 6217 Statistical Aspects of Digital Simulation (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- ESI 6529 Advanced Systems Simulation (3 credit hours)
- ESI 6532 Object-oriented Simulation (3 credit hours)

- ESI 6546 Process Simulation (3 credit hours)

Interactive Simulation/Intelligent Systems Focus Area— Minimum 9 Credit Hours

The Interactive Simulation/Intelligent Systems focus area responds to the needs of those who wish to pursue or are currently pursuing careers in the training simulation/simulator industries. Graduates specializing in this focus area possess the basic tools to create system designs for simulators and simulator-based training systems and to apply expert systems and other intelligent systems in a simulation setting. Typical required courses include Training Systems Engineering, Simulation of Real-Time Processes, and Intelligent Simulation.

Cornerstone Course

- EIN 5255C Interactive Simulation (3 credit hours)

Restricted Electives

- CAP 5512 Evolutionary Computation (3 credit hours)
- CAP 5610 Machine Learning (3 credit hours)
- CAP 5636 Advanced Artificial Intelligence (3 credit hours)
- CAP 6637 Affective Computing with Artificial Intelligence (3 credit hours)
- EEL 5874 Expert Systems and Knowledge Engineering (3 credit hours)
- EEL 6875 Engineering of Artificial Intelligence Systems (3 credit hours)
- EEL 6876 Current Topics in Artificial Intelligence in Engineering Systems (3 credit hours)
- EEL 6878 Modeling Artificial Intelligence (3 credit hours)
- EEL 6895 Current Issues in Real-Time Simulation (3 credit hours)
- EIN 5251 Usability Engineering (3 credit hours)
- EIN 5317 Training System Design (3 credit hours)
- EIN 5602C Expert Systems in Industrial 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)
- EIN 6946 Simulation Practicum (3 credit hours)
- EME 6613 Instructional Systems Design (3 credit hours)
- TTE 6270 Intelligent Transportation Systems (3 credit hours)

Human Systems in M&S Focus Area—Minimum 9 Credit Hours

The Human Systems in M&S focus area caters to 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.

Cornerstone Course

- EXP 5256 Human Factors I (3 credit hours)
OR
- EIN 5251 Usability Engineering (3 credit hours)

Restricted Electives

- EIN 5248C Ergonomics (3 credit hours)
- EIN 6215 System Safety Engineering and Management (3 credit hours)
- EIN 6258 Human Computer Interaction (3 credit hours)
- EME 5051 Technologies of Instruction and Information Management (3 credit hours)
- EME 6457 Distance Education: Technology Process Product (3 credit hours)
- EME 6601 Instructional Simulation Design for Training and Education (3 credit hours)
- EME 6613 Instructional System Design (3 credit hours)
- EME 6614 Instructional Game Design for Training and Education (3 credit hours)
- EXP 5208 Sensation and Perception (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)
- FIL 5810 Transmedia Story Creation (3 credit hours)
- INP 5825 Human-Computer Interface (HCI) Design: A Team Approach (3 credit hours)
- INP 6215 Assessment Centers and Leadership (3 credit hours)
- INP 6317 Organizational Psychology and Motivation (3 credit hours)
- INP 6605 Training and Performance Appraisal (3 credit hours)
- PSY 6216 Advanced Research Methodology I (3 credit hours)
- IDS 5718 Science and Technology of Dynamic Media (3 credit hours)

Qualifying Examination

A written test is required covering content of the four core courses. This may be waived if the student is first or second author of: (1) a refereed journal article dealing with modeling and simulation, or (2) a proposal to a major funding agency, external to the candidate and to the candidates employer, that is rated as technically acceptable.

Students in the Modeling and Simulation program must also demonstrate consistent, strong performance in their required core courses, restricted core courses, and focus area corner stone courses. Specifically, students must receive a grade of "B" (3.0 out of 4.0) or better in each

required core, restricted core, and focus area cornerstone course that appear on their approved program of study. Additionally, students must earn a combined GPA of 3.4 (out of 4.0) in these required core, restricted core and focus area cornerstone courses.

Candidacy Examination

The Candidacy Examination evaluates the student's preparation 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 six credits or less of the courses prescribed in the plan of study.

The Candidacy Examination is based on the following:

- The Candidacy **Proposal** developed by the student to identify the chosen area of research.
- **Literature Review** on the topic of the dissertation.
- **A refereed publication (accepted) related to the dissertation research, which may be a proceedings publication.**
- An **Oral Defense** of the candidacy proposal to the dissertation committee.

Dissertation Committee

Students have the responsibility to select a dissertation adviser from a list of Modeling and Simulation faculty authorized to direct dissertations. The Program Director, assisted by the Program Academic Committee, will assist the student and his/her advisers with committee formation, additions, and deletions. The doctoral committee will consist of a minimum of five members. All committee members should hold a doctoral degree and be in fields related to the dissertation topic. At least three members must be regular Modeling and Simulation faculty (one to serve as chair) from at least two colleges. At least one member must be from outside the regular M&S faculty. Non-Modeling and Simulation faculty, adjunct faculty, and off-campus experts may serve on the committee, but not as chair. Only regular M&S faculty may serve as chair. In unusual cases, with approval from the Program Director, two committee members may chair the committee jointly. UCF Graduate Studies has the right to review appointments to advisory committees, place a representative on any advisory committee, or appoint a co-adviser.

All members vote on acceptance or rejection of the dissertation proposal and the final dissertation. The dissertation proposal and final dissertation must be approved with at most one dissenting member of the advisory committee. A student is normally given only one opportunity to pass the final dissertation defense, but the Program Director upon the recommendation of the Dissertation Committee may approve a second attempt.

Transfer Credits

The doctoral program will allow up to 30 credit hours to be transferred into the program, whether from UCF or another institution.

Financial Support

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see [Financing Grad School](#), 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.

Key points about financial support:

- If you are interested in financial assistance, you are strongly encouraged to apply for admission early. A complete application for admission, including all supporting documents, must be received by the priority date listed for your program under "Admissions."
- You must be admitted to a graduate program before the university can consider awarding financial assistance to you.
- If you want to be considered for loans and other need-based financial assistance, review the UCF Student Financial Assistance website at <http://finaid.ucf.edu> and complete the FAFSA (Free Application for Federal Student Aid) form, which is available online at <http://www.fafsa.ed.gov>. Apply early and allow up to six weeks for the FAFSA form to be processed.
- UCF Graduate Studies awards university graduate fellowships, with most decisions based on nominations from the colleges and programs. To be eligible for a fellowship, students must be accepted as a graduate student in a degree program and be enrolled full-time. University graduate fellowships are awarded based on academic merit and therefore are not affected by [FAFSA](#) determination of need.
- Please note that select fellowships do require students to fill out a fellowship application (either a university fellowship application, an external fellowship application, or a college or school fellowship application). For university fellowship applications, see [Financing Grad School](#).
- For information on assistantships (including teaching, research, and general graduate assistantships) or tuition support, contact the graduate program director of your major.

Contact Info

Doctor of Philosophy in Modeling and Simulation

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Graduate Council Curriculum Subcommittee **Course Agenda 03-05-08**

College of Education Special Topics

Tabled : Will review with the Urban Ed certificate.

EDF 6938 Sect 01 ED-Educational Studies 3(3,0)

ST:Public Policy and Urban Education: PR: Graduate standing. Critical analysis of public policy formation, implementation, and evaluation with regard to their impact on urban schools and communities.

30 character abbreviation: **ST:Public Policy & Urban Educ**

AGENDA NOTES: Course Addition also being proposed.

Tabled : Will review with the Urban Ed certificate.

EDF 6938 Sect 01 ED-Educational Studies 3(3,0)

ST:Teaching and Learning in Urban Settings: PR: Graduate Status. Analysis and discussion of instructional and assessment methods that seek to improve the quality of teaching and learning in urban schools.

30 character abbreviation: **ST:Teach & Learn in Urban Set**

AGENDA NOTES: Course Addition also being proposed.

Tabled : Will review with Urban Ed certificate.

EDG 6938 Sect 01 ED-Educational Studies 3(3,0)

ST:Social Contexts of the Urban Classroom: PR: Graduate Status. Review, analyze, and contextualize classroom dynamics embedded in urban communities and the institution of schooling.

30 character abbreviation: **ST:Social Contexts Urban Class**

AGENDA NOTES: Course Addition also being proposed.

Engineering & Computer Science Course Action Additions

CAP 6XXX ECS-Computer Science 3(3,0)

3D User Interfaces for Games and Virtual Reality: PR: CAP 5725 or C.I. A rigorous introduction to the design, implementation, and evaluation of the fundamental techniques in spatial 3D interaction.

30 character abbreviation: **3D User Interfaces Games & VR**

Tabled : pending question on prereq. New information received.

COP 6XXX ECS-Computer Science 3(3,0)

Network Optimization: Recent advances in theory and computational techniques for optimal design and analysis of large networks for computers communications, and transportation including Internet and WWW complex networks

30 character abbreviation: **Network Optimization**

Tabled : pending question on prereq. New information received.

EEL 6XXX ECS-Electrical & Computer Eng 3(3,0)

Semiconductor Material and Device Characterization: PR: EEL 3306 or C.I. Semiconductor materials, resistivity, mobility, doping, carrier lifetime, defects, contact resistance, threshold voltage, interface charges, channel length of MOS devices, optical and surface characterization
30 character abbreviation: **Semiconduct Matl & Device Char**

Engineering & Computer Science Course Action Deletions

EEL 5708 ECS-Electrical & Computer Eng 3(3,0)

High Performance Computer Architecture: PR: EEL 4767C. Engineering of high performance computer systems. Memory, processor and control sub-systems design tradeoffs. Virtual and cache memory. Pipelining, vector computing.

EEL 6707 ECS-Electrical & Computer Eng 3(3,0)

Parallel Processing: PR: EEL 5708. Systems with one or more central I/O processors. Types of parallelism granularity and memory organization. Processor/memory message passing systems. Shared memory multiprocessors.

College of Education Course Action Additions

Tabled : Will review with Urban Ed certificate.

EDF 6XXX ED-Educational Studies 3(3,0)

Public Policy and Urban Education: PR: Graduate Status. Critical analysis of public policy formation, implementation, and evaluation with regard to their impact on urban schools and communities.

30 character abbreviation: **Public Policy & Urban Educ**

AGENDA NOTES: Special Topic also being proposed.

Tabled : Will review with Urban Ed certificate.

EDF 6XXX ED-Educational Studies 3(3,0)

Teaching and Learning in Urban Settings: PR: Graduate Status. Analysis and discussion of instructional and assessment methods that seek to improve the quality of teaching and learning in urban schools.

30 character abbreviation: **Teach & Learn in Urban Set**

AGENDA NOTES: Special Topic also being proposed.

Tabled : Will review with Urban Ed certificate.

EDG 6XXX ED-Educational Studies 3(3,0)

Social Contexts of the Urban Classroom: PR: Graduate Status. Review, analyze, and contextualize classroom dynamics embedded in urban communities and the institution of schooling.

30 character abbreviation: **Social Contexts Urban Class**

AGENDA NOTES: Special Topic also being proposed.

Engineering & Computer Science Course Action Revisions

Tabled : clarification requested on the description.

COP 5021 Program Analysis 3(3,0)

PR: COP 4020 and COT ~~4210~~. 4210 or C.I.

~~Syntactic and Semantic Static~~ analysis of programs. Theoretical and practical limitations, ~~attribute evaluation,~~ data flow analysis, ~~program optimization,~~ ~~intermediate representations~~ ~~code generation.~~ abstract interpretation, type and effect systems. Tools to automate ~~analysis.~~ program analysis.