

**Institute Graduate Curriculum Committee**  
**Minutes**  
**Thursday, March 2, 2017**

**Present:** Breedveld (ChBE), Pikowsky (Registrar), Bafna (CoD-ARCH), Cozzens (Vice Provost), Dixon (ME), Jagoda (AE), Jayaraman (MSE), Johnson (GCC Student Representative), Schmidt-Krey (BIOL), Sluss (CoB), Balch (CoC-IC), Bamburowski (Graduate Studies), Ceccagnoli (CoB), Macrakis (HSOC), Smith (AE)

**Visitors:** Laros (Registrar), Rubinoff (CoB), White (CoC), Woolard (Academic Effectiveness), Choi (Biology), Mitra (CoB), Bramblett (IRP), Buchanan (CoB), Drummond (CRP)

**Note:** All action items in these minutes require approval by the Academic Senate. In some instances, items may require further approval by the Board of Regents or the University System of Georgia. If the Regents' approval is required, the change is not official until notification is received from the Board to that effect. Academic units should take no action on these items until USG and/or BOR approval is secured. In addition, units should take no action on any of the items below until these minutes have been approved by the Academic Senate or the Executive Board. It may also be that approval of the Southern Association of Colleges and Schools is also required.

There are 24 voting members, 13 needed to reach a quorum. In the absence of a quorum, the full committee will vote via email on the Minutes as recommendations of those that were present and then they will vote to approve the Minutes.

All votes are unanimous except as noted.

**Academic Matters:**

1. A motion was made to *approve* a request from the School City and Regional Planning for a degree modification. The motion was seconded and approved.

**Degree modification - APPROVED**

Master of Science in Geographic Information Systems

**Overview**

Geographic Information Science (GIS) is an emerging field of study centered on the acquisition, management, analysis, and dissemination of information that is spatially-

referenced to locations on, above, and below the surface of the earth. This field is highly trans-disciplinary with substantial and growing importance in a number of traditional academic disciplines and related professions including city and regional planning, architecture, civil and environmental engineering, earth and atmospheric sciences, environmental science, demography, logistics, management, public policy and sustainability studies. Full-time students can complete the 34 credit-hour curriculum in one calendar year including two semesters of full-time coursework and a capstone project course offered during the summer. Part-time students may complete the program in two or three academic years plus one summer session for the capstone project course.

**What:** We are modifying the curriculum to (a) add a new, required 3-credit Programming for GIS course, (b) add a requirement to take an existing 1-credit Visualization course (c) add a requirement to take a new 1-credit Capstone Project Preparation course, (d) add a requirement to take a new 1-credit GIS Professional Seminar, (e) reduce the current requirement of students taking all three specialized GIS courses to take two of three (or more) specialized GIS courses (f) eliminate the current requirement of students taking two non-GIS substantive area content courses approved by the MS-GIST program director, and (g) allow students to take two free electives rather than the current single free elective . The MS-GIST degree will remain a 34 credit-hour program.

**Why:** After approval and implementation of the program in Fall 2013, changes within the geospatial technologies industry have increased expectations that new graduates entering the field be able to program in Python. The other changes are based upon student feedback from exit interviews of three cohorts of graduating students. Students recommended that (a) they be required to take only two of three specialized GIS courses, (b) they be granted two electives rather than one, (c) they receive additional help in making the transition from students to GIS professionals, (d) they start work on the Capstone Project in the spring semester, and (e) programming be taught as a separate required course in the first semester of the program.

## **Curriculum**

### **The components of the CURRENT MSGIST curriculum are:**

#### (1) Prerequisite Course

A basic understanding of GIS technology is required as a prerequisite of the degree program.

This may be achieved through one of four options:

- CP 4510 Geographic Information Systems (3-0-3) or

- CP 6514 Introduction to Geographic Information Systems (3-0-3) or
- Equivalent coursework at another institution (as evaluated by the program coordinator)
- One year of equivalent professional experience (as evaluated by the program coordinator)

## (2) Core Courses

The required GIS courses (with lecture hours, lab hours, and credit hours) are:

CP 6024 Quantitative and Computer Methods (3-3-4)  
 CP 6521 Advanced GIS (3-0-3)  
 CP 6531 Introduction to Remote Sensing (3-0-3)  
 CP 6551 Spatial Analysis of Socioeconomic Data (3-0-3)  
 CP 6541 Environmental GIS (3-0-3)  
 CP 6542 Transport & GIS (3-0-3)  
 CP 6950 Capstone Project (6-0-6)

## (3) Substantive Area Courses

Because GIS is a trans-disciplinary technology, GIST students will be required to take two courses from one of the many GIS-related disciplines. These could include, but are not limited to, courses drawn from civil and environmental engineering, industrial and systems engineering, computer science, earth and atmospheric sciences, public policy, management, city planning, and architecture. The substantive area courses must be approved by the program coordinator. Four substantive area examples are given below.

### Environment

CP 6214 Environmental Planning (3-0-3)  
 CP 6223 Policy Tools for Environmental Management (3-0-3)

### Land use

CP 6112 Introduction to Land Use (3-0-3)  
 CP 6105 Land Conservation (3-0-3)

### Transportation

CP 6311 Introduction to Transportation Planning (3-3-4)  
 CP 6321 Transportation Planning and Investment (3-3-4)

### GIS Application Development

CS 6675 Advanced Internet Computing and Application Development (3-0-3)  
 COA 8676 Design and Engineering Databases (3-0-3)

#### (4) Free Elective

This course can be selected by the student and will ordinarily either (1) give extra depth in the student's selected substantive area or (2) provide the student with a foundational understanding of a second substantive area.

### **The components of the PROPOSED MSGIST curriculum are:**

#### (1) Prerequisite Course

A basic understanding of GIS technology is required as a prerequisite of the degree program. This may be achieved through one of four options:

CP 4510 Geographic Information Systems (3-0-3) or  
CP 6514 Introduction to Geographic Information Systems (3-0-3) or  
Equivalent coursework at another institution (as evaluated by the program coordinator)  
One year of equivalent professional experience (as evaluated by the program coordinator)

#### (2) Core Courses

The required GIS courses (with lecture hours, lab hours, and credit hours) are:

CP 6024 Quantitative and Computer Methods (3-3-4)  
CP 6521 Advanced GIS (3-0-3)  
CP 6531 Introduction to Remote Sensing (3-0-3)  
CP 88XX Programming for GIS (3-0-3) - Course will be later requested as  
CP 6581  
CP 8811 Visualization (1-0-1)  
CP 6591 GIS Professional Seminar (1-0-1)  
CP 6592 Capstone Project Preparation (1-0-1)  
CP 6551 Spatial Analysis of Socioeconomic Data (3-0-3)  
CP 6541 Environmental GIS (3-0-3)  
CP 6542 Transport & GIS (3-0-3)  
CP 6950 Capstone Project (6-0-6)

#### (3) Substantive Area Courses

~~Because GIS is a trans-disciplinary technology, GIST students will be required to take two courses from one of the many GIS-related disciplines. These could include, but are not limited to, courses drawn from civil and environmental engineering, industrial and systems engineering, computer science, earth and atmospheric sciences, public policy, management, city planning, and architecture. The substantive area courses must be approved by the program coordinator. Four substantive area examples are given below.~~

## Environment

~~CP 6214 Environmental Planning (3-0-3)~~

~~CP 6223 Policy Tools for Environmental Management (3-0-3)~~

## Land use

~~CP 6112 Introduction to Land Use (3-0-3)~~

~~CP 6105 Land Conservation (3-0-3)~~

## Transportation

~~CP 6311 Introduction to Transportation Planning (3-3-4)~~

~~CP 6321 Transportation Planning and Investment (3-3-4)~~

## GIS Application Development

~~CS 6675 Advanced Internet Computing and Application Development (3-0-3)~~

~~COA 8676 Design and Engineering Databases (3-0-3)~~

### (3) Specialized GIS Courses

Beyond the basic core of geospatial technology there exists a wide range of specialized GIS data sources and analytical methods. MS-GIST students are required to take a minimum of two specialized GIS courses that focus on the application of GIS technology to specific areas. These courses must be approved by the MS-GIST program director. They may include (but are not limited to):

CP 6570 Socioeconomic GIS (3-0-3)

CP 6541 Environmental GIS (3-0-3)

CP 6542 Transport & GIS (3-0-3)

INFO 530 Geographic Information Systems for Public Health (in the Emory School of Public Health)

### (4) Free Electives

~~This course can be selected by the student and will ordinarily either (1) give extra depth in the student's selected substantive area or (2) provide the student with a foundational understanding of a second substantive area.~~

Students can select two additional courses as free electives. These will typically include additional specialized GIS courses or courses in GIS-related substantive areas such as city planning, architecture, public policy, civil engineering, or environmental engineering.

**A motion was made to *table* a request from the School of City and Regional Planning for a new course. The motion was seconded and approved.**

### **New Course – TABLED**

CP 6581: Programming for GIS (3-0-3)

**NOTE:** The Committee requests that Programming for GIS be taught at least once as a special topics before being resubmitted for a number. It could come back in Spring for a permanent number and 6581 can be reserved for its use. Consent of instructor was suggested as an addition to the NCP, #7 prerequisites. There was also a note to correct the syllabus to update reference to the Students with Disabilities section (ADAPTS is now the Office of Disability Services).

It was also noted during the discussion that CP 6950 with a 6-0-6 format may not be what is appropriate. Dr. Drummond should look at it to determine if a 3-9-6 format makes more sense for this course.

**A motion was made to *approve* a request from the School of City and Regional Planning for new courses. The motion was seconded and approved.**

### **New Courses – APPROVED**

CP 6591: GIS Professional Seminar (1-0-1)

CP 6592: Capstone Project Preparation (1-0-1)

2. A motion was made to *table* a request from the School of Biological Sciences for a BS/MS option. The motion was seconded and approved.

### **BS/MS Option – TABLED**

Bachelor of Science in Biology and a Master of Science in Bioinformatics

**NOTE:** The Committee asked for clarification on several items. It was suggested that an explanation in the admissions section be added to outline the Math sequence. GT undergraduates would already have it, but transfer students might not have it. The CS requirements should also be added to the admission section. This would make it clear that Math and CS requirements have to be met to be admitted to the program. AE's model might be a good one to look at it editing this proposal. Under eligibility requirements there was concern expressed about students being able to apply after completion of 30 hours. The Committee wondered if that number should be 60 hours.

3. A motion was made to *approve* a request from the Scheller College of Business for new courses. The motion was seconded and approved.

## **New Courses – APPROVED**

MGT 6118: Cross-Cultural Management	(3-0-3)
MGT 6119: Leading Teams in Organizations	(3-0-3)
MGT 6307: Integrated Marketing Communications	(3-0-3)
Note: Add consent of instructor in #7 on NCP.	
MGT 6311: Digital Marketing	(3-0-3)
MGT 6369: Sustainable Business Practicum	(2-3-3)
Note: Add Beryl Tokay as instructor.	
MGT 6614: Law for Entrepreneurs	(3-0-3)
MGT 6665: Strategy Execution	(3-0-3)
MGT 6667: Strategic Entrepreneurship	(3-0-3)

**NOTE:** The above courses will be listed at catalog level with all grade mode options. All syllabi need to be checked to be sure they refer to the Office of Disability Services not the ADAPTS office. Those that have no statement at all on students with disabilities need to add it.

4. A motion was made to *approve* a request from the College of Computing for a degree modification. The motion was seconded and approved.

## **Degree Modification – APPROVED**

Master of Science in Computer Science (Computing Systems concentration)

### **Overview**

We are proposing to add CSE 6220 High Performance Computing as an elective pick to the concentration in Computing Systems. This course is consistent with the other areas included in Computing Systems.

This request is being made by the Computing Systems group faculty and has been approved by the College of Computing's Graduate Curriculum Committee.

### **Curriculum**

#### **Concentration in Computing Systems**

##### **Core Courses (9 hours)**

CS 6505 Computability, Algorithms, and Complexity

And pick two (2) of:

CS 6210 Advanced Operating Systems

CS 6241 Compiler Design

CS 6250 Computer Networks

CS 6290 High-Performance Computer Architecture

CS 6300 Software Development Process

CS 6400 Database Systems Concepts and Design

##### **Electives (9 hours)**

Pick three (3) courses from:

CS 6035 Introduction to Information Security

CS 6235 Real Time Systems  
CS 6238 Secure Computer Systems  
CS 6260 Applied Cryptography  
CS 6262 Network Security  
CS 6310 Software Architecture and Design  
CS 6340 Software Analysis and Testing  
CS 6365 Introduction to Enterprise Computing  
CS 6422 Database System Implementation  
CS 6550 Design and Analysis of Algorithms  
CS 6675 Advanced Internet Computing Systems and Applications  
CS 7210 Distributed Computing  
CS 7260 Internetworking Architectures and Protocols  
CS 7270 Networked Applications and Services  
CS 7280 Network Science  
CS 7290 Advanced Topics in Microarchitecture  
CS 7292 Reliability and Security in Computer Architecture  
CS 7560 Theory of Cryptography  
CS 8803 FPL Special Topics: Foundations of Programming Languages  
**CSE 6220 High Performance Computing**

A motion was made to *approve* a request from the College of Computing for a degree modification. The motion was seconded and approved.

### **Degree Modification – APPROVED**

Master of Science in Computer Science (Machine Learning concentration)

#### **Overview**

We are proposing to add additional courses to the approved Machine Learning concentration elective list. These courses are both in the appropriate area of study and their addition to the list of approved electives gives the student more choices in fulfilling their concentration. This is increasingly important given the number of students pursuing this concentration.

This request is made at the request of the Machine Learning faculty group and has been approved by the Graduate Curriculum Committee within the College of Computing.

#### **Curriculum**

##### **Master's in Computer Science – Machine Learning concentration**

Course option: This option requires the student to complete 30 hours of coursework.

Total Course Credit Hours 30

Minimum Credit Hours in CS 24

Minimum Credit Hours(6000/8000 Level) in CS 24

Minimum Credit Hours (6000/8000 Level) 24



Project option: This option requires the student to complete 21 hours of coursework and a 9 hour project. The project requires approval by a faculty advisor and the MS program coordinator in the semester prior to its inception.

Total Credit Hours 30

MS Project Hours 9

Total Course Credit Hours 21

Minimum Credit Hours in CS 15\*

Minimum Credit Hours (6000/8000 Level) in CS 15\*

Thesis option: This option requires the student to complete 18 hours of coursework and a 12 hour thesis. The thesis process is defined elsewhere in this catalog.

Total Credit Hours 30

MS Thesis Hours 12 hour

Total Course Credit Hours 18

Minimum Credit Hours in CS 15\*

Minimum Credit Hours (6000/8000 Level) in CS 15\*

\*May not include MS project or thesis hours.

MSCS Machine Learning concentration

15 hours

CORE (6 hours)

Algorithms: Pick one (1) of:

CS 6505 Computability, Algorithms, and Complexity

CS 6520 Computational Complexity Theory

CS 6550 Design and Analysis of Algorithms

CS 7510 Graph Algorithms

CS 7520 Approximation Algorithms

CS 7530 Randomized Algorithms

CSE 6140 Computational Science and Engineering Algorithms

And pick one (1) of:

CS 7641 Machine Learning

CSE 6740 Computational Data Analysis: Learning, Mining, and Computation

ELECTIVES (9 Hours)

Elective ML courses must have at least 1/3 of their graded content based on Machine Learning.

Pick three (3) of:

CS 7535 Markov Chain Monte Carlo

CS 7476 Advanced Topics in Computer Vision

CS 7540 Spectral Algorithms

CS 7545 Machine Learning Theory

CS 7616 Pattern Recognition  
CS 7642 Reinforcement Learning and Decision Making (proposal 5216)  
CS 7646 Machine Learning for Trading  
CS 7650 Natural Language  
CS 8803 Special Topics: Probabilistic Graph Models  
CSE 6240 Web Search and Text Mining  
CSE 6242 Data and Visual Analytics  
CSE 6250 Big Data for Health  
ISYE 6420 Bayesian Methods  
ISYE 6416 Computational Statistics  
ISYE 6664 Stochastic Optimization

A motion was made to *approve* a request from the College of Computing for a new course. The motion was seconded and approved.

**New Course – APPROVED**

CS 7642: Reinforcement Learning and Decision Making (3-0-3)

**NOTE:** This course will be listed at catalog level with all grade mode options.

A motion was made to *approve* a request from the College of Computing for a new course. The motion was seconded and approved.

**New Course – APPROVED**

CS 7643: Deep Learning (3-0-3)

**NOTE:** This course will be listed at catalog level with all grade mode options.

**Discussion Item:**

1. The College of Computing addressed the Committee with a pre-presentation on a forthcoming proposal for a new degree Master of Science in Robotics.

**Administrative Item:**

1. The School of Industrial Systems and Engineering has requested to leave the title of ISYE 6501: *Introduction to Analytics Modeling* with this approved title.

**Student Petitions**

1. A motion was made to approve a request for full graduate standing and use of credits taken in non-degree status toward the degree. The motion was seconded and approved.

**Note:** The Office of Graduate Studies and the Office of the Registrar will work together to draft a policy to guide such requests in the future.

Adjourned,

Reta Pikowsky,  
Secretary