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Georgia Institute of Technology
Graduate Curriculum Committee
<u>**Minutes**</u>
April 10, 2014

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Present: Ashuri (BC), Breedveld (ChBE), Sharp (for Cozzens, Vice Provost), Dickson (CHEM), Ferri (ECE), Foley (CoC-IC), Jagoda (AE), Jayarman (MSE), Macrakis (HTS), Neitzel (ME), Pikowsky (Registrar), Storici (BIOL), Boldyreva (CoC-CS), Kvam (ISyE)

Visitors: Laros (Registrar), Merkousko (Registrar), Hodges (Registrar), Venkateswaran (CoC-CS), White (CoC), Fortnow (CoC-CS), Verhaeghen (PSYCH), Marsolan (ChBE), Black (EAS), Mark (PE), Jacobs (COE), Tyson (CHEM), Pedicino (INTA), Dixon (ME)

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.

<u>Academic Matters</u>

1. A motion was made to approve a request from the School of Earth and Atmospheric Sciences for a new course. The motion was seconded and approved.

   ### New Course – Approved

   EAS 6305: Physical and Chemical Oceanography 3-0-3
   > NOTE: Based on the syllabus, the Committee determined that the expected mode of presentation in item #11 on the NCP should be changed to 90% lecture and 10% discussion.

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

   ### New Courses – Approved

   CS 7492: Simulation of Biology
   CS 7499: 3D Reconstruction
   > NOTE: The word "reconstruction" was misspelled on the NCP. It will be corrected.
   CS 7632: Game AI
   > NOTE : CS 7632 needs a new syllabus that addresses specific requirements for graduate students. The syllabus that was attached was for the undergraduate version of the course, CS 4731.

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

4. A motion was made to approve a request from the School of Psychology for a new course. The motion was seconded and approved.

   New Course - Approved

   PSYC 6043: Engineering Psychology Research Seminar 1-0-1
   > NOTE: The word "seminar" on the NCP had the "r" capitalized. This will be fixed. Upon review of the syllabus, the Committee determined that the NCP should reflect 100% seminar as the expected mode of delivery rather than 50% each of lecture and discussion. In addition, the Committee felt that only P/F and Audit grade modes were appropriate for this type of course. The NCP was corrected to list P/F and Audit as allowable grade modes.

5. A motion was made to take no action on a request from the School of Psychology for a Special Topics course. The motion was seconded and approved.

   New Course – No Action

   PSYC 8807: Special Topics in Engineering Psychology 3-0-3
   > Note: The School may set up Special Topics courses without the approval of the Committee. Once this course has been taught at least once, it can come back to the Committee for a permanent number. It was noted that the School of Psychology appears to be using the "Special Topics" courses in an inconsistent manner than the rest of campus, and in a manner inconsistent with the intended purpose of this course number. A review of all the current numbers and a discussion with the School will be engaged to sort this out.

6. A motion was made to approve a request from the School of Mechanical Engineering for a new course. The motion was seconded and approved.

   New Course – Approved

   ME 6720: Biotransport 3-0-3
   > NOTE: This is request to create the ME version of the existing course BMED 6720. It was noted that all existing versions of this course need to be noted on the NCP and the Committee asked the Registrar's Office to check the records and make sure that the NCPs for the other versions are the same, including the grade modes.

7. A motion was made to approve a request from the School of Electrical and Computer Engineering for new courses. The motion was seconded and approved.

New Courses – Approved

ECE 6122: Advanced programming Techniques 2-3-3
ECE 6461: Carbon and Molecular Nanoelectronics 3-0-3
ECE 6515: Nanophotonics 3-0-3
ECE 6562: Autonomous Control of Robotics Systems 3-0-3
ECE 6563: Networked Control and Multiagent Systems 3-0-3
ECE 6616: Cognitive Radio Networks3-0-3

8. A motion was made to approve a request from the School of Electrical and Computer Engineering for a degree modification for the Ph.D. with a major in Electrical and Computing Engineering. The motion was seconded and approved.

Degree Modification, Ph.D. with a major in Electrical and Computer Engineering – Approved

Rationale for changing the approved program:

The School of Electrical and Computer Engineering (ECE) is requesting the elimination of the ECE 8010 Research Seminar (1-0-1) requirement for Ph.D. students. The seminar has existed since the early 1980s and has historically been used as a way for faculty members to present their research activities to graduate students and potentially find new students for their research groups. Since the School's website has information on the School's technical interest groups, detailed faculty profiles, and pages for faculty labs and research centers, a required seminar has become unnecessary. Additionally, an increasing percentage of students taking ECE 8010 have already found a research advisor. Note that the School of ECE is asking to eliminate the requirement of this course, **not** to eliminate the course itself. The School of ECE still sees value in occasionally offering the seminar as an elective to provide a way for graduate students to meet each other and to offer tips on how to choose a research advisor, conduct research, and other topics of interest to graduate students.

Note that the School is not requesting a change in the number of credit hours required for the degree.

This request is in response to feedback obtained from students who have taken ECE 8010 in recent years, both through the CIOS survey and a custom survey for the course. It is also the result of extensive review and discussion by the ECE Graduate Committee.

To support this degree change, no changes will be necessary in administration and support areas.

9. A motion was made to approve a request from the School of International Affairs for a degree modification to join the BS/MS program. The motion was seconded and approved.

Degree Modification, BS/MS Program in International Affairs – Approved

Rational and Justification.

A 5-year combined BS/MS program in INTA would address a number of challenges faced by INTA. For example it would...

- ...better serve our students by providing a MS degree to highly-qualified INTA undergrads in half the time of our standard program (and therefore at half the cost). It would enable students who otherwise might not get a Master's degree to compete better on the job market. It would also get those who would pursue a MS degree into the job market a year earlier, reducing their opportunity costs.

- ...improve the quality and increase the quantity of the MSIA candidate pool. Note also that, with increased student quality comes better job placement, more loyal alumni, and a better network for career/internship placement and policy-linkages.

- ...meet increasingly vocal demand for 5-yr MS programs from INTA undergrads. The UG Director and Assistant Director report that interest in a 5yr BS/MS degree program is rising amongst INTA undergrads and could possibly extend to applicants to our UG program.

Responses to Initial Concerns:

How much would this cost INTA?: Implementation of a BS/MS option in the School of International Affairs does add some additional administrative functions which might result in some additional costs. In order to keep the additional administrative functions from resulting in higher costs, the School will ensure that advising of these students from both the undergraduate and graduate sides of the program is closely coordinated and that oversight of the program itself is a shared function of both undergraduate and graduate programs within the School. It is the sense of the School at this time that the additional advising and program oversight can be absorbed into the current structure. This will be re-examined as the program grows The School of International Affairs has elected to not charge differential tuition. Therefore, all MSIA tuition generated goes into Georgia Tech's general revenues which are then reallocated to pay the costs of faculty, staff, and facilities for the program.

Over a dozen units at Georgia Tech offer a 5-year BS/MS, including[1]:

- Aerospace Engineering
- Civil Engineering
- Chemical & Biomolecular Engineering
- Electrical Engineering
- Computer Engineering
- Computational Media & Digital Media

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[1] http://www.catalog.gatech.edu/students/ugrad/degrees/fiveyear.php

- Environmental Engineering
- Public Policy
- Earth and Atmospheric Sciences
- Materials Science Engineering
- Mechanical Engineering
- Nuclear and Radiological Engineering
- Science, Technology, and Culture & Digital Media

-*Would this burden us with a flood of students?:* The UG and G assistant directors currently anticipate five students per year, which constitutes 10% of the MSIA student body. If too many apply, then we can also adjust the entry criteria so as to restrict entry to only the most capable students. Finally, if the MSIA gets flooded by highly qualified students, then we should welcome that.

-*When do we want this program up and running?*: As soon as possible. If we act quickly and adroitly, then we can start accepting applications in Spring 2015 for the Fall 2015 entering class. All courses and most of the infrastructure are already in place. We simple need to get it approved up through School, College, and Institute levels.

-*Who would administer this program*: as a joint BS/MS program, advising would fall under the directors and assistant directors of the undergraduate and graduate programs where appropriate. Admissions will be handled by the Graduate Committee. Administration will be handled by the assistant director of the graduate program.

INTA 5yr BS/MS Degree Eligibility Requirements

Students with a GPA of 3.5 or higher in IAC courses are eligible to apply for the program after completion of 30 semester credit hours at Georgia Tech, but before the completion of 75 semester credit hours, including transfer and advanced placement credits. Students who have more than 75 credit hours will be considered for the program on a case-by-case basis. Depending on demand, the required minimum GPA may be higher. Admissions decisions will be based on GPA and judgments of the Graduate Committee and faculty who have served as advisors or instructors. Continuation in the program will require the student to maintain a GPA of 3.5 or higher in IAC courses. The program will not penalize students who opt out after the bachelor's degree.

The curriculum changes for the BSINTA degree would be as follows:

Major Requirements

3	INTA 3110
3	~~INTA 3203~~ INTA 6202
3	~~INTA 3301~~ INTA 6302
3	INTA 4500

INTA 3203 Comparative Politics
Contrasts competing theoretical perspectives in the comparative analysis of political systems.

INTA 6202 Comparative Politics
This course surveys the major political types of the late twentieth century world and explores their various development characteristics.

INTA 3301 Int'l Political Econ
Analyzes the relationship between political and economic issues in international affairs. Examines the interaction of states and markets in the context of trade, investment, and production.

INTA 6302 Intl Political Economy
This course is an introduction to the politics of international economic relations. Major theoretical approaches are applied to international trade, international monetary relations, and global production in the modern era.

Sample Schedule

5-yr BS/MS Sample Schedule									
YEAR 1		**YEAR 2**		**YEAR 3**		**YEAR 4**		**YEAR 5**	
Semester 1		Semester 1		Semester 1		Semester 1		Semester 1	
ENGL 1101	3	**INTA 2040**	3	APPH 1040	2	Free Elective	3	**INTA 6003**	3
LANG XXXX	3	**INTA 2001**	1	INTA Elective	3	**INTA 6102**	3	Track Elective	3
INTA 1110	3	**INTA Elective**	3	INTA Elective	3	Cluster Req	3	Track Elective	3
GT 1000	1	LAB SCI	4	Cluster Req	3	**INTL Econ Req**	3	Free Elective	3
MATH 1711	4	LANG XXXX	3	Cluster Req	3	**INTA Elective**	3	Free Elective	3
INTA 1200	3	**INTA Elective**	3		14		15		15
	17		17						
Semester 2		Semester 2		Semester 2		Semester 2		Semester 2	
ECON 2100	3	LAB SCI	4	**INTA 4500**	3	**INTA 6302**	3	**INTA 6103**	3
INTA 2010	3	LANG XXXX	3	**INTA 6202**	3	Free Elective	3	Track Elective	3
MATH 1712	4	**INTA 3301**	3	**INTA Elective**	3	Cluster Req	3	Track Elective	3
ENGL 1102	3	CS 1315	3	Cluster Req	3	Tech Req	3	Free Elective	3
LANG XXXX	3	**INTA Elective**	3	Free Elective	3	HTS Req	3	Free Elective	3
	16		16		15		15		15
Satisfies both BS and MS requirements (6202 = Comp Poli; 6302 = IPE)									
Satisfies MS requirement but taken while undergrad (6102 = IR Theory)									
Note: Undergrads are required to take some classes in a "cluster" (i.e. a cohesive sub-field)									
Note: MS students must choose 2 "tracks" of 3 courses each (1 req + 2 track electives)									

Note: The committee raised a question about admission criteria. 3.5 GPA will be required in IAC classes for the student to qualify for admission to the BS/MS program. The student will need to maintain this GPA through his/her 4th year. Should a student fall below the minimum GPA in any given term, his/her case will be reviewed. There would not be an automatic disqualification from the program, but the GPA would be reviewed and would be expected to meet the requirement in the next term.

10. A motion was made to approve a prospectus proposal from the Scheller College of Business, the College of Engineering, the School of Chemical and Biomolecular Engineering, the School of Industrial and Systems Engineering, and the Department of Professional Education to move forward to the Board of Regents for Review. The motion was seconded and approved.

Prospectus for a new Professional Master's in Manufacturing Leadership (PMML) forwarded for BOR consideration - Approved

Prospectus for a New Academic Program

The Professional Master's in Manufacturing Leadership (PMML) will be a terminal degree for industry professionals possessing an undergraduate degree in science or engineering, 3-5 years of working experience, and seeking advancement to leadership positions in manufacturing. As opposed to a Master of Science degree, which typically has a research focus and serves as a gateway to a PhD program, the PMML program will provide applied, practical training through projects, teamwork, and industry-relevant case studies.

The two-year program will be delivered in a modular, online, cohort format, with four one-week visits to campus. The curriculum will combine seven core courses common to all manufacturing industries, with topics including accounting, finance, quality, reliability, sustainability, supply chain management, etc.; and three courses comprising an elective technical concentration focused on manufacturing processes relevant to the student's industry (e.g. Forest Bioproducts, Aerospace, etc.). A capstone course designed to integrate core curriculum topics to analyze and transform a hypothetical, underperforming manufacturing facility will make up the final course in year 1. A second capstone course in the elective technical concentration will be the final, culminating course in the program, intended to integrate all that was learned into a complex manufacturing system design specific to the student's industry.

Justification of Need for the Program

Manufacturing is critical to economic development, innovation, and prosperity in the State of Georgia, the nation, and the global economy. In Georgia, manufacturing accounts for 92% of exports [1] and is considered to be one the State's six strategic industries [2]. In the United States manufacturing supports an estimated one in six private-sector jobs, accounts for 47% of all exports, boasts the highest multiplier effect of any economic sector - every $1.00 spent in manufacturing adds another $1.48 to the economy, and is the leading driver of technological innovation [3, 4]. On a global scale, manufacturing value added continues to rise in both advanced and developing economies, climbing from $5.7 trillion to $7.5 trillion from 2000 to 2010 [5].

To thrive in a fiercely competitive global environment manufacturers need leaders who: (1) can lead diverse global teams; (2) understand and can apply fundamental business principles; (3) can implement best practices in manufacturing; and, (4) have a sound technical understanding of manufacturing processes. To secure this talent pipeline, President Obama's Advanced Manufacturing Partnership (AMP) steering committee, of which Georgia Tech was a key member, recommended in July of 2012 that research universities "establish new masters-level professional degrees in manufacturing leadership" that provide "a comprehensive overview of manufacturing as well as technological and operational perspectives [6]." Consequently, the PMML program has been designed around the following four knowledge pillars:

Knowledge Pillar	Number of
I. Leadership	2
II. Manufacturing Business Analysis and	2
III. Manufacturing Best Practices	3
IV. Technical Concentration in Manufacturing	3
Total	10

Demand for the Degree

The initial demand for the degree emanated from young engineering professionals employed at pulp and paper mills who expressed that their undergraduate degrees had not provided them with the interpersonal and leadership skills necessary to lead teams of people with several more years of experience. A preliminary survey of the pulp and paper industry performed by the Georgia Tech Institute of Paper Science and Technology confirmed interest in the blended technical and leadership PMML format from potential students, while senior corporate officials indicated that the degree would be critical for developing the next generation of manufacturing leaders.

Similar manufacturing programs at the University of Wisconsin-Madison, Massachusetts Institute of Technology, and University of Michigan enroll 48, 22, and 15 students per year, on average [7, 8, 9], respectively, with little or no emphasis placed on online learning. With over 8,000 manufacturing establishments in Georgia [1], more than 290,000 in the United States [10], and an estimated several million globally, student demand for the online PMML program is expected to significantly exceed the enrollment numbers of these existing programs.

Non-Duplication of Existing USG Programs

There are currently no masters-level professional degree programs in manufacturing leadership offered within the USG. The Georgia Tech Manufacturing Institute offers the Manufacturing Education Certificate which only serves as a complement to a Master of Science or PhD in engineering and does not require a leadership component. The

University of Georgia offers a Master of Biomanufacturing and Bioprocessing (MBB) Program that comprises courses in bioengineering, biomanufacturing, and management with little focus on supply chain, manufacturing best practices, or leadership principles common to all manufacturing industries. In addition, the Ernest Scheller Jr. College of Business at Georgia Tech offers an Executive MBA in Management of Technology, while several other USG institutions offer leadership and management education through MBA programs. However, none of these programs combine the manufacturing-specific, technical, leadership, and management training offered by the PMML.

11. The next, and last, Academic Senate meeting of the year is on April 22. The Chair and the Vice Chair are unable to attend. Dr. Breedveld volunteered to attend the meeting and present the GCC's action items. The Registrar will prepare some PowerPoint slides in draft form for review prior to the meeting.

Adjourned,

Reta Pikowsky
Registrar