<p style="text-align:center">**Institute Undergraduate Curriculum Committee**
Academic Matters, Appeals, & Petitions (Full Committee)
<u>**Minutes**</u>
Tuesday, November 8, 2016</p>

Present: Mayor (ME), Scott (CEE), Pikowsky (Registrar), Goodisman (BIOS-BIOL), Millard-Stafford (APPH), Moore (ECE), Parsons (CoB), Potts (Vice Provost), Shook (ML), Smith (ME), Stasko (CoC-IC), Wilkinson (CHEM & BCHEM), Zhou (ISYE)

Visitors: Hodges (Registrar), Cope (BIOS-APPH), Collard (CoS), Baron (Chem), Barke (PUBP), Masuda (ML), Sonnenberg-Klein (VIP), Alber (ECE-VIP), Singleton (PSYC), Bramblett (IRP/EDM/AE), Steinbart (MATH), Baker (MATH), Berry (PUBP), Castro (BC), Ferri (ME), Pikowsky (PUBP), Walsh (PUBP)

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. Notification or approval by the Southern Association of Colleges and Schools-CoC may also be required.

The presence of 12 voting members is needed to reach a quorum.

Note: All votes are unanimous unless specifically noted otherwise.

<u>**Administrative Item**</u>

1. LMC 3244 (Modern and Contemporary British Poetry) is a course that was submitted to the Board of Regents to receive the Humanities attribute. The Board of Regents suggested a title change to align better with USG/BOR standards. The new title is 'Critical Approaches to Modern and Contemporary British Poetry'. This information is offered as an administrative to the Committee.
2. Dr. David Scott (Chair of Gen Ed Subcommittee) presented the meeting Minutes from the Gen Ed Subcommittee on October 5, 2016. These minutes can be found under Proposal 5164 on the ICC site.
   - A motion was made to approve the action items as recommended by the IUCC General Education Subcommittee. The motion was seconded and approved.
   - A motion was made to approve the IUCC General Education Subcommittee Minutes for the October 5, 2016 meeting. The motion was seconded and approved.

3. Dr. Mike Goodisman (BIOS) presented the IUCC with a summary of the 2016 actions from the Study Abroad Subcommittee. The summary of actions can be found under Proposal 5165 on the ICC site.
   - A motion was made to approve the actions of the Study Abroad Committee regarding programs for Spring. The motion was seconded and approved.
   - A motion was made to approve the Study Abroad Committee meeting Minutes. The motion was seconded and approved.
4. There was a request to update the Start-up meeting minutes from August 23, 2016 to clarify that authority was granted to Reta Pikowsky, Secretary, to act on certain petitions. Committee members recalled the discussion, but somehow the delegation of authority statement did not make its way into the August 23 Minutes.

   The Registrar is hereby authorized to act on behalf of the Committee regarding petitions such as those for a waiver of the 10-year rule, changes in registration for the current term, return after withdrawing from the current semester, use of D grade when a grade of F was earned in the second attempt of the course, readmit after a 1st dismissal when the Major School supports the request, and other types of petitions where the documentation and rationale are clear.

Academic Items

1. A motion was made to *approve* a request from the School of Modern Languages for a new course. The motion was seconded and approved.

   ### New Course – APPROVED with Edits
   ### LING 3100: Applications in Linguistics (3-0-3)

   Note: The Committee approved this course upon contingency of requested edits and offered suggestions as follows:

   NCP:
   - The Committee offered a suggestion to update the transcript title which included abbreviating "Applications" and spelling out "Linguistics."
   - The Humanities attribute request should be removed.

   Syllabus:
   - The Committee requested that under "Course Requirements" and "Make-up Policy" that the Ga Tech excused absence policy should be reflected.

2. A motion was made to *table* a request from the School of Industrial and Systems Engineering for a new course. The motion was seconded and approved.

   ### New Course - TABLED
   ### ISYE 3134: Engineering Optimization (2-3-3)

Note: There was a lot of discussion about this proposal since what it appears to involve is offering the course in different formats for Fall/Spring and Summer. The Fall/Spring format would include a recitation and the course hours would be described as 2-3-3. The Summer version, due to the fact that the full term lasts only for 11 weeks would retain the current 3-0-3 format and not involve a recitation. The Committee was concerned that creating a new course with a new course number to address the desire to vary the format in Summer was not efficient and was perhaps not necessary. It was suggested that the School and the Registrar discuss the request further to determine if one format or the other would be better and how the request should be framed for Committee action.

3. 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 with Edits
PSYC 2130: Intro to Ed Psych (3-0-3)

Note: The Committee approved this course upon contingency of the following edits:

NCP:
- Credit hours (Box 2) updated to 3-0-3, rather than x-0-3
- The Social Science attribute request be removed from Box 10
- 'PSY' removed from Box 8

Syllabus:
- The Ga Tech excused absence policy should be reflected.

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

Degree Modification – APPROVED with Edits
Bachelor of Science in Applied Mathematics

Change title of degree to: Bachelor of Science in Mathematics and add concentrations.

Note: The Committee did request that continuity language be added to the School website to explain how the Bachelor of Science in Applied Mathematics or Bachelor of Science in Discrete Mathematics differs from the proposed new degree. Future graduates might find this information useful.

A suggestion was made by the Committee to rephrase the "Science/Engineering electives" to "Technical electives."

The School of Mathematics proposes changing the name of the B.S. in Applied Mathematics degree to a B.S. in Mathematics. The majority of the course requirements for the degree will stay the same, but there are a few differences which reflect changes to the mathematics curriculum in recent years. In addition, we propose to add four

optional concentrations to the degree, in Applied Mathematics, Discrete Mathematics, Probability and Statistics, and Pure Mathematics. The optional concentrations would be added to a student's transcript, e.g. a B.S. in Mathematics with a Concentration in Discrete Mathematics.

The School of Mathematics currently has two degrees, one in Applied Mathematics and one in Discrete Mathematics. However, the Applied Mathematics degree, as it currently stands, is not particularly applied in any sense, and is really just a degree in Mathematics. Many people in the School of Mathematics are unhappy with the mismatch between the degree's name and its actual contents, but until now no steps were taken to rectify the situation. Needless to say, the degree name is both confusing and misleading for students.

In addition, the School of Mathematics has evolved, over the last 15 years or so, into a very broad mathematics department, with widely recognized expertise in areas like geometry/topology, algebra/number theory, analysis, and probability/statistics. None of these subjects fit neatly into the false dichotomy of "discrete versus applied" mathematics. Our faculty overwhelmingly support the idea of unifying the undergraduate program under the umbrella of "Mathematics", with optional concentrations that students can add on in order to take advantage of particular specialties that we offer here at Georgia Tech.

One of our current goals is to increase the number of math majors, and we feel that renaming the Applied Math degree and updating the requirements accordingly is an essential step towards this goal. The new optional concentrations are also important steps in this direction (especially the concentrations in Probability & Statistics and Pure Mathematics). We conducted a "town hall" style meeting with approximately 12 Discrete Math and Applied Math majors last year, seeking their feedback on the proposed changes. The response was uniformly positive, and all of the students we talked to believed that the changes would result in more students majoring in Mathematics over the long term.

The Discrete Mathematics degree has attracted fewer majors than we would like, partly because the requirements are quite onerous, and partly because they involve a heavy Computer Science component. Many students potentially interested in this degree when they enroll at Georgia Tech end up majoring in Computer Science instead. Making things worse, in the current system, it is impossible to double major in Discrete Mathematics and the Theory thread of CS. We feel that our students will be much better served by a degree in Mathematics with an optional concentration in Discrete Mathematics than by a special degree in Discrete Mathematics. If the present proposal is adopted then at some point in the not-too-distant future we will propose a phasing out of the Discrete Mathematics degree (with an accompanying teach-out plan).

In addition to the name, some of the Course Requirements for the degree will change as well. The total number of required courses will stay the same (122 hours), but the new degree will offer students more flexibility by having more electives. Specifically, the main differences are as follows:

- Instead of Math 2406 (Abstract Vector Spaces), which is being phased out, we are requiring the recently introduced course Math 3406 (A Second Course in Linear Algebra).
- Instead of Math 3215 (Probability and Statistics), we are requiring the recently proposed course Math 3235 (Probability Theory).
- We are no longer requiring Math 4318 (Real Analysis II) or Math 4640 (Numerical Analysis I).
- Instead of 15 credits of upper level Math Electives, we are requiring 21 credits, 12 of which must be chosen from a list of courses which are considered "foundational" and the other 9 of which may be chosen from a broader list.
- Instead of requiring an upper level Physics class plus 2 Science/Engineering elective classes (which must be upper level courses from the same school), we will require 3 upper level Science/Engineering elective classes, at least two of which must be from the same school.

Business Option for Mathematics

Students in the College of Science business track complete 15 credits of approved coursework covering the principles of accounting, economics, and management (Areas A, B, and C). Two electives (D) allow students to take advanced coursework in these areas, or to explore the legal, international, entrepreneurial, technological or financial aspects of the business world.

Note that some of the elective courses (D) have prerequisites. Your choice of classes in Areas A, B, and C will influence the selection of elective classes available to you.

Some of the Management courses in Areas C and D require junior or senior standing. To minimize conflicts in scheduling these courses, students are recommended to take other courses, especially those carrying social science credit, at the earliest possible time in their major's eight-term plan.

Students pursuing the business option typically take PSYC 1101 as part of the Social Sciences requirement, and five classes in Areas A-D as outlined below. Note that PSYC 2220 and ECON 2106 also carry social science credit. Accordingly, these three classes, together with one US/Georgia history/constitution course, may be used to complete the 12-credit Social Sciences requirement.

Students must complete one course from each of categories A-C, and two from category D, with a minimum grade of D.

Mathematics Program: Six of the credit hours from the list of management (MGT) courses will replace six hours of engineering or science electives in the Mathematics program, and the other management and accounting courses will count as free electives. Mathematics majors in this option must still fulfill the other requirements for the Mathematics undergraduate degree.

A. Accounting

One class (3 h) chosen from:

- ⚐ ACCT 2101 - Accounting I
- ⚐ MGT 3000 - Financial & Managerial Accounting

B. Economics

One class (3 h)

⚲ ECON 2106 - Principles of Microeconomics (this class carries Social Sciences credit)

C. Management

One class (3 h) chosen from:

⚲ PSYC 2220 - Industrial/Organizational Psychology (this class carries Social Sciences credit) NOTE: This class has PSYC 1101 as a prerequisite, which also carries Social Science credit
⚲ MGT 3101 - Organizational Behavior (jr/sr standing required)
⚲ MGT 3150 - Principles of Management (jr/sr standing required)

D.1. Classes with no Additional Prerequisites

⚲ MGT 3078 - Finance & Investments (jr/sr standing required)
⚲ MGT 3300 - Marketing Management (this course serves as a prerequisite for classes listed below in Section D.5)
⚲ MGT 4191 - Entrepreneurship Forum
⚲ MGT 4192 - IMPACT Forum
⚲ MGT 4193 - Serv Lead Values Systems
⚲ MGT 4194 - Social Entrepreneurship
⚲ MGT 4610 - Law, Mgt, & Economics

D.2. Classes with ACCT 2101 as a Prerequisite

⚲ MGT 3062 - Financial Management
⚲ MGT 4026 - Fin Report & Analysis I
⚲ MGT 4028 - Fin Analy & Rpt - Tech Firms

D.3. Classes with MGT 3000 as a Prerequisite

⚲ MGT 4015 - Adv Managerial Acct
⚲ MGT 4026 - Fin Report & Analysis I
⚲ MGT 4028 - Fin Analy & Rpt - Tech Firms
⚲ MGT 4030 - International Accounting

D.4. Classes with MGT 3150 as a Prerequisite

⚲ MGT 3660 - International Business
⚲ MGT 4190 - Strategic Quality Mgt

D.5. Classes with MGT 3300 as a Prerequisite

⚲ MGT 4303 - Personal Sell & Sales Mgt
⚲ MGT 4304 - Strategic Brand Mgt
⚲ MGT 4307 - Strategic Marketing
⚲ MGT 4335 - International Marketing
⚲ MGT 4670 - Entrepreneurship (ACCT 2101 is an additional prerequisite for this class)

Research Option for Mathematics

A student conducts supervised research with a faculty advisor over two or three semesters and completes 9 hours of either MATH 2698/4698 (research for pay) or MATH 2699/4699 (research for credit). In addition,

- ⚲ the student takes two 1-hour writing courses:
  - ⚲ LMC 4701: Undergraduate Research Proposal Writing in which a short proposal on their research project is developed (typically taken during first or second semester of research), and
  - ⚲ LMC 4702: Undergraduate Research Thesis Writing in which the student prepares and completes a research report (research paper, project report/thesis) (taken during the thesis writing semester)
- ⚲ the student makes an oral presentation of the project.

Completion of this Research Option is noted by the designation "Research Option in Mathematics" on the student's transcript. For more information, see http://www.undergradresearch.gatech.edu/research-option/ .

Note: To get credit toward completion of the Research Option for research for pay, students must be registered for the appropriate audit-only, research for pay class (MATH 2698 or 4698). If work on research for pay begins after the close of registration and the student has not signed up for the appropriate class, unfortunately it is not possible to get credit toward the Research Option for work that term.

Mathematics Program: Six hours of MATH 4699 may be used as Upper Level Mathematics Electives for the BS in Applied Mathematics.

BS in Applied Mathematics: Course Requirements 2016

MATH Courses:
Core courses (16/18):
__MATH 1551 Differential Calc (2)
__MATH 1552 Integral Calculus (4)
__MATH 1553/1554/1564 Linear Alg (2/4)*
__MATH 2551 Multivariable Calculus (4)
__MATH 2552 Differential Eq. (4)
 *1554 or 1564 Recommended

Bridging courses:
__MATH 2406 Abstract Vector Spaces** (3)
__MATH 3012 Applied Combin. (3)
__MATH 3215 Prob. and Stat. (3)
 **MATH 2106 Found. Of Math. Proof (3) can be used in place of MATH 2406 Abst. Vector Spaces

Supporting courses:
__CS 1301 Intro to Computing (3)
__CS 1331 Intro Obj-oriented Prog. (3)
__Lab Sci (BIOL, CHEM, EAS) (4):
One of: BIOL 1220, BIOL 1510, BIOL 1520, CHEM 1211K, CHEM 1212K, CHEM 1310, EAS 1600, EAS 1601, EAS 2600
__PHYS 2211 Physics I (4)
__PHYS 2212 Physics II (4)

Upper level supporting courses:
__PHYS 3XXX Upper level Phys. (3)

Sci/Eng Electives (6 total) Two upper level courses (3000 level or higher) from same approved school;
 Approved schools: Biol, Chem, EAS, Phys, Psyc, Eng Schools, CS, Econ
 _____ _____

Upper level foundation courses:
___MATH 4107 Abstract Alg. I (3)
___MATH 4317 Real Analysis I (3)
___MATH 4318 Real Analysis II (3)
___MATH 4320 Complex Analysis (3)

Upper level courses:
___MATH 4640 Numerical Analysis I (3)

MATH 3XXX Math Elective*** (15)
Fifteen hours of Upper level MATH courses 3000 level or higher.
_____ _____ _____
_____ _____
*** *MATH 3670 and 3770 cannot be used as Math Elective or as Free Elective.*

General Requirements:
Humanities (12 total):
___ENGL 1101 (3)
___ENGL 1102 (3)
Humanities/Fine Arts/Ethics Elective (6):
Six hours of coursework from Core Area C
_____ _____

Social Sciences (12 total):
___One of HIST 2111, HIST 2112, POL 1101, INTA 1200, PUBP 3000 (3)
Nine additional hours of coursework from Core Area E
_____ _____
_____

___APPS 1040 or 1050 - Wellness (2)

Free Electives (14)
_____ _____
_____
Note: 12 hours of Free Electives is required is MATH 1554 or MATH 1564 is used.
Total: 122 hours

Additional Requirements

In addition to the institutional requirement of maintaining at least a 2.0 grade-point average for the entire academic program, the School of Mathematics requires a grade of C or higher in MATH 4107 Abstract Algebra I, MATH 4317 Real Analysis I, MATH 4318 Real Analysis II, MATH 4320 Complex Analysis. Students may count no more than two credit hours of coursework in physical education toward graduation. Only free electives and MATH 4999 in the degree program may be taken on a pass/fail basis, and no more than nine credit hours are allowed under this option.

Proposed requirements for the new B.S. in Mathematics

Core courses (16/19):
MATH 1550/1551 Differential Calc (3/2)
MATH 1552 Integral Calculus (4)
MATH 2551/2561 Multivariable Calculus (4)
MATH 2552/2562 Differential Equations (4)
Plus one course from the following list:
MATH 1553 Introduction to Linear Algebra (2)
MATH 1554 Linear Algebra (4)

MATH 1564 Linear Algebra with Abstract Vector Spaces (4)

Bridging courses (12):
___MATH 2106 Foundations Of Mathematical Proof (3)
___MATH 3012 Applied Combinatorics (3)
___MATH 3235 Probability Theory (3)
___MATH 3406 A Second Course in Linear Algebra (3)

Upper level foundation courses (21):
___MATH 4107 Abstract Algebra I (3)
___MATH 4317 Real Analysis I (3)
___MATH 4320 Complex Analysis (3)

Plus **four** courses from the following list:
___MATH 4022 Intro to Graph Theory (3)
___MATH 4032 Combinatorial Analysis (3)
___MATH 4108 Abstract Algebra II (3)
___MATH 4150 Intro to Number Theory (3)
___MATH 4221 Stochastic Processes I (3)
___MATH 4261 Mathematical Statistics I (3)
___MATH 4318 Real Analysis II (3)
___MATH 4347 Partial Differential Equations I (3)
___MATH 4431 Introduction to Topology (3)
___MATH 4432 Introduction to Algebraic Topology (3)
___MATH 4441 Differential Geometry (3)
___MATH 4541 Dynamics and Bifurcations I (3)
___MATH 4640 Numerical Analysis I (3)

Upper level math electives (9):
Nine credit hours chosen from the above list or the list below (must be different from the courses used to satisfy the above requirements):
___MATH 4080/4090 Senior Project (2)
___MATH 4222 Stochastic Processes II (3)
___MATH 4255 Monte Carlo Techniques (3)
___MATH 4262 Mathematical Statistics II (3)
___MATH 4280 Introduction to Information Theory (3)
___MATH 4348 Partial Differential Equations II (3)
___MATH 4542 Dynamics and Bifurcations II (3)
___MATH 4580 Linear Programming (3)
___MATH 4581 Classical Mathematical Methods in Engineering (3)
___MATH 4641 Numerical Analysis II (3)
___MATH 4699 Undergraduate Research (1/6)
___MATH 4755 Mathematical Biology (3)
___MATH 4777 Scientific Computing (3)
___MATH 4782 Quantum Information and Quantum Computing (3)
___MATH 4801 Undergraduate Seminar (1)
___MATH 4802 Mathematical Problem Solving (2)
___CS 3510/3511 Design and Analysis of Algorithms I (3)

___CS 4510 Automata and Complexity (3)
___CS 4540 Advanced Algorithms (3)
___CS 4641 Machine Learning (3)
___CX 4140 Computational Modeling Algorithms (3)
___CX 4240 Computational Data Analysis (3)
___ISYE 3133/3833 Engineering Optimization (3) **Course number can possibly
be updated to ISyE 3134, if approved
___ISyE 4133 Advanced Optimization (3)

Supporting courses (18):
___CS 1301 Intro to Computing (3)
___CS 1331 Intro to Object Oriented Programming (3)
___Lab Sci (BIOL, CHEM, EAS) (4)
___PHYS 2211/2231 Physics I (4)
___PHYS 2212/2232 Physics II (4)

Sci/Eng Electives (9):
Three upper level courses from an approved school, at least two of which must
be from the same school. (Approved schools: Biol, Chem, EAS, Phys, Psyc, Eng
Schools, CS, Econ)

Humanities (12):
___ENGL 1101 (3)
___ENGL 1102 (3)
Humanities/Fine Arts Elective (6): Approved HUM courses, such as Literature,
Phil, Foreign Language, etc.

Social Sciences (12):
___One of HIST 2111, HIST 2112, POL 1101, INTA 1200, PUBP 3000 (3)
Social Science Electives (9): approved SS courses, such as Economics,
Psychology, History, etc.

Wellness (2): APPS 1040 or 1050
Free Electives (11)

Total: 122 hours

Proposed New Concentrations

Applied Mathematics

Math 4640 Numerical Analysis I
Math 4347 Partial Differential Equations I
Math 4541 Dynamics and Bifurcations I

Three of:
Math 4348 Partial Differential Equations II
Math 4542 Dynamics and Bifurcations II

Math 4580 Linear Programming OR ISyE 3133/3833 Engineering Optimization
Math 4581 Classical Mathematical Methods in Engineering
Math 4641 Numerical Analysis II
Math 4699 Undergraduate Research (on an approved topic related to the
   concentration; can only be used once toward the concentration requirement)
Math 4755 Mathematical Biology
Math 4777 Scientific Computing
Math 4782 Quantum Information and Quantum Computing
CX4140 Computational Modeling Algorithms
CX4240 Computational Data Analysis

Discrete Mathematics

CS 3510/3511 Design & Analysis of Algorithms
Math 4022 Graph Theory
Math 4032 Combinatorial Analysis

One of:
ISyE 3133/3833 Engineering Optimization **OR** Math 4580 Linear Programming

Two of:
Math 4150 Intro to Number Theory
Math 4699 Undergraduate Research (on an approved topic related to the
   concentration; can only be used once toward the concentration requirement)
CS 4510 Automata & Complexity Theory
CS 4540 Advanced Algorithms
ISyE 4133 Advanced Optimization

Probability and Statistics

Math 3236 Statistical Theory **OR** Math 4261 Mathematical Statistics I
Math 4221 Stochastic Processes I

Four of:
Math 4222 Stochastic Processes II
Math 4255 Monte Carlo Techniques
Math 4262 Mathematical Statistics II
Math 4280 Intro to Information Theory
Math 4580 Linear Programming **OR** ISyE 4133 Advanced Optimization
Math 4699 Undergraduate Research (on an approved topic related to the
   concentration; can only be used once toward the concentration requirement)
CX 4240 Computational Data Analysis OR CS 4641 Machine Learning

Pure Mathematics

Math 4318 Real Analysis II

One of:
Math 4108 Abstract Algebra II

Math 4150 Intro to Number Theory

One of:
Math 4431 Introduction to Topology
Math 4432 Intro to Algebraic Topology
Math 4441 Differential Geometry

Three courses from the following list (must be different from the courses used to satisfy the above requirements):
Math 4022 Intro to Graph Theory
Math 4032 Combinatorial Analysis
Math 4108 Abstract Algebra II
Math 4150 Intro to Number Theory
Math 4221 Stochastic Processes I
Math 4222 Stochastic Processes II
Math 4347 Partial Differential Equations I
Math 4348 Partial Differential Equations II
Math 4431 Introduction to Topology
Math 4432 Intro to Algebraic Topology
Math 4441 Differential Geometry
Math 4541 Dynamics and Bifurcations I
Math 4542 Dynamics and Bifurcations II
Math 4699 Undergraduate Research (on an approved topic related to the concentration; can only be used once toward the concentration requirement)

NOTES:

- Students may not list more than one concentration on their transcript.
- Concentration requirements may also be used to satisfy the requirements for the B.S. in Mathematics.

A motion was made to *approve* a request from the School of Mathematics for a minor modification. The motion was seconded and approved.

Minor Modification - APPROVED
Minor in Mathematics

The School of Mathematics is requesting that the required number of hours be reduced from 18 hours to 15 hours. Further, the 15 hours can be chosen from MATH 2106 Foundations of Mathematical Proof and Mathematics courses 3000 level or higher.

These changes provide students more flexibility in completing a Minor in Mathematics. The current Mathematics minor program of study references courses rarely taught and requires 18 hours of 3000 level or higher mathematics courses.

The modified Mathematics minor program of study allows students more flexibility in choosing courses to better match the student's interests. The reduction in the number of required hours makes the Mathematics minor an option for more students.

The number of required hours will be reduced from 18 hours to 15 hours.

Students will not be able to use certain courses with overlapping content to be used toward the minor. Currently, students may count [MATH 3215 Introduction to Probability & Statistics or MATH 3225 Honors Probability & Statistics] and MATH 3760 Probability & Statistics with Applications for the minor. In the proposed minor, students may use at most one of MATH 3215, 3225, 3670, and 3770. [Note: MATH 3670 replaced MATH 3770 several years ago. MATH 3607 and MATH 3770 are equivalent courses.]
Currently, students may count MATH 3406 A Second Course in Linear Algebra and MATH 4305 Topics in Linear Algebra for the minor. In the proposed minor, students may use at most one of MATH 3406 and MATH 4305.
Students will be able to count the 2000 level course MATH 2106 Foundations of Mathematical Proof toward the minor.

Students will have more flexibility in selecting courses for the minor.

Currently Approved vs. Proposed Program Curriculum

~~The Mathematics minor must comprise 18 semester hours of upper-division coursework (numbered 3000 or above). A student may earn a minor in mathematics by fulfilling, in addition to the general Institute requirements, the requirements in one of the two tracks specified below.~~

~~Required courses include choosing either Track I or Track II:~~

~~Track I:~~
~~MATH 4317, 4107, 4305 and 9 additional hours of Mathematics courses at the 3000 level or above~~

~~Track II: Choose 9 hours in one of the following fields:~~
~~Analysis: MATH 4317, 4318, 4320, 4581, 4640, 4641~~
~~Algebra and Number Theory: MATH 4107, 4108, 4150, 4305, 4012~~
~~Probability and Statistics: MATH 3215, 3670, 4221, 4222, 4255, 4261, 4262, 4280~~
~~Dynamics and Differential Equations: MATH 4347, 4348, 4541, 4542, 4581~~
~~Discrete Mathematics: MATH 3012, 4012, 4022, 4032, 4580~~
~~Geometry and Topology: MATH 4431, 4432, 4441~~

~~And 9 additional hours of Mathematics courses at the 3000 level or above. See below for additional rules.~~

The Mathematics minor consists of 15 semester hours chosen from MATH 2106 and Mathematics courses 3000 level or higher.

It is the major advisor's responsibility to verify that students are using only courses from the designated block(s) from the student's major field of study that are allowed to satisfy a minor program, that they are not using any Core Area A-E courses (including humanities and social sciences), and that they are not using any courses for more than one minor or certificate. Any free elective course used to satisfy the course requirements of the student's major degree program may also be used to satisfy the course requirements for a minor.

> Additional Rules
> 1. A maximum of 6 semester hours of Special Topics courses may be included in a minor program. Or, students may take 3 hours of Special Topics and 3 hours of Undergraduate Research.
>
> 1. A maximum of 3 semester hours of Special Topics courses may be used to satisfy the course requirements for a minor.
>
> 2. A maximum of 3 semester hours of Undergraduate Research credit may be used to satisfy the course requirements for a minor.
>
> 2 3. No Special Problems or Internship coursework may be used.
>
> 3 4. All courses used to satisfy the course requirements for a minor must be completed with a grade of C (2.00) or better. higher.
>
> 4 5. Courses must be completed on a letter grade mode.
>
> 5 6. A maximum of 3 semester hours of transfer credit may be used to satisfy the course requirements for a minor. This includes courses taken at another institution or credit earned through the AP or IB program, assuming the scores meet Georgia Tech minimum standards.
>
> 7. A maximum of 3 semester hours of credit earned by an Advanced Standing Examination can be used to satisfy the course requirements for a minor.
>
> 8. At most one of MATH 3215, 3225, 3670, and 3770 can be included in the minor. At most one of MATH 3406 and MATH 4305 can be included in the minor.
>
> 6 9. Institute undergraduate minor guidelines must be satisfied.

5. A motion was made to *approve* a request from the School of Chemistry & Biochemistry to modify pre-requisites. The motion was seconded and approved.

Pre-requisite Modifications – APPROVED

CHEM 2380: CHEM (1212K or 2211) and 2311 and (2312 or 2313)
CHEM 3111: CHEM 1212K and 2312 or 2313
CHEM 3511: CHEM 1315 or 2312 or 2313
CHEM 4311: CHEM 2312 or 2313
CHEM 4341: CHEM 2312 or 2313
CHEM 4511: CHEM 2312 or 2313
CHEM 4775: CHEM 2312 or 2313

A motion was made to *approve* a request from the School of Chemistry & Biochemistry for a degree modification. The motion was seconded and approved.

Degree Modification - APPROVED
Bachelor of Science in Chemistry

The School of Chemistry and Biochemistry is requesting to modify the BS Chemistry degree requirements (all 8 tracks) to allow CHEM 2312 Organic Chemistry II or CHEM 2313 Bioorganic Chemistry to satisfy the second semester organic chemistry requirement. Currently CHEM 2312 is the degree requirement.

- In spring 2017 and beyond two versions of second semester Organic Chemistry will be offered.

- **CHEM 2312 Organic Chemistry II** for Physical Science career paths. The majors primarily impacted are CHEM and the CHBE standard option majors. The typical sequence for these students will be CHEM 2311-CHEM 2312.

- **CHEM 2313 Bioorganic Chemistry** for Life Science career paths. The majors primarily impacted are BIOL, BCHM, the CHBE biotech option majors, and any other pre-health majors. The typical sequence for these students will be CHEM 2311-CHEM 2313.

- On-sequence students taking the two semester Organic Chemistry sequence would take the common CHEM 2311 Organic Chemistry I course in fall 2016 and beyond and then have the option of taking one of two second semester courses in the spring.

The School of Chemistry and Biochemistry is requesting to modify the BS Chemistry degree requirements (5 tracks) to allow COOP 4000 and INTN 4000 to satisfy the "Research Experience" requirement.

- **Currently** the **BS CHEM** requirement is one semester of research or an internship (see IUCC Project 617)

- Research Experience may be obtained with one of the following courses.

- o CHEM 4694 Intern Assistantship (for Pay - outside GT)
- o CHEM 4695 Undergraduate Internship (for credit)

- o CHEM 4698 Research Assistantship (for pay)
- o CHEM 4699 Undergraduate Research (for credit)

The BS Chemistry tracks impacted are

- o BS CHEM – traditional track
- o BS CHEM – Business track
- o BS CHEM – Materials track
- o BS CHEM – Polymer track
- o BS CHEM – International Plan

- o If either internal or external research (CHEM 4698 or CHEM 4694 or COOP 4000 or INTN 4000) is conducted for pay rather than credit, additional free elective(s) may be substituted to achieve the required earned hours to graduate.

A motion was made to *approve* a request from the School of Chemistry & Biochemistry for a degree modification. The motion was seconded and approved.

Degree Modification - APPROVED
Bachelor of Science in Biochemistry

Proposal: revise second semester Organic Chemistry requirement to include CHEM 2312 or CHEM 2313

The School of Chemistry and Biochemistry is requesting to modify the Biochemistry minor degree requirements to allow CHEM 2312 Organic Chemistry II or CHEM 2313 Bioorganic Chemistry to satisfy the second semester organic chemistry requirement. Currently CHEM 2312 is one of the Chemistry minor degree elective requirements.

In spring 2017 and beyond two versions of second semester Organic Chemistry will be offered.

A motion was made to *approve* a request from the School of Chemistry & Biochemistry for a degree modification. The motion was seconded and approved.

Minor Modification - APPROVED
Minor in Biochemistry

Proposal: revise second semester Organic Chemistry requirement to include CHEM 2312 or CHEM 2313

The School of Chemistry and Biochemistry is requesting to modify the Biochemistry minor degree requirements to allow CHEM 2312 Organic Chemistry II or CHEM 2313 Bioorganic Chemistry to satisfy the second semester organic chemistry requirement. Currently CHEM 2312 is one of the Chemistry minor degree elective requirements.

In spring 2017 and beyond two versions of second semester Organic Chemistry will be offered.

A motion was made to *approve* a request from the School of Chemistry & Biochemistry for a minor modification. The motion was seconded and approved.

Minor Modification - APPROVED
Minor in Chemistry

Proposal: revise second semester Organic Chemistry requirement to include CHEM 2312 or CHEM 2313

The School of Chemistry and Biochemistry is requesting to modify the Chemistry minor degree requirements to allow CHEM 2312 Organic Chemistry II or CHEM 2313 Bioorganic Chemistry to satisfy the second semester organic chemistry requirement. Currently CHEM 2312 is one of the Chemistry minor degree elective requirements.

In spring 2017 and beyond two versions of second semester Organic Chemistry will be offered.

Degree Modification - APPROVED
Bachelor of Science in Chemistry (Pre-Health Concentration)

A motion was made to *approve* a request from the School of Chemistry & Biochemistry for a degree modification. The motion was seconded and approved.

Proposal: Add the following courses to the approved list of Pre-Health Science Electives for BS Chemistry Pre-Health Science tracks (concentrations)

- **APPH 4400** Human Neuroanatomy (3 credits, pre-req: None)

- **BIOL 4650** Bioethics (2 credits, pre-req BIOL 1510 or CIOL 1511)

- **BIOL 2345** Genetics Lab (1 credit, pre-req. BIOL 1510 or BIOL 1511; co-req BIOL 2344)

- **BIOL 3381** Intro Microbiology Lab (1 credit, pre-req BIOL 1510, or BIOL 1511, and CHEM 1212K; co-req BIOL 3380)

- **BIOL 3451** Cell Molecular Biology Lab (1 credit, pre-req BIOL 1510, or BIOL 1511, CHEM 2311 or CHEM 1315; co-req BIOL 3451)

- **BMED 3600** Physiology of Cellular and Molecular Systems (pre-req BMED 3100)

Current list of approved Pre-Health Science Electives (GT Catalog 2016-2017)

APPH 3753	Anatomy
APPH 3754	Anatomy Lab
APPH 3755	Human Physiology
APPH 3756	Physiology Lab
BIOL 2344	Genetics
BIOL 3450	Cell Molecular Biology
BIOL 3380	Intro Microbiology
BIOL 4015	Cancer Bio/Tech
BIOL 4340	Medical Microbiology
BIOL 4464	Developmental Biology
BIOL 4545	Human Genetics
BIOL 4570	Immunology & Immunochemistry
CHEM 4521	Biophysical Chemistry
CHEM 4765	Drug Design, Development & Delivery

Degree Modification - APPROVED
Bachelor of Science in Biochemistry (Pre-Health Concentration)

Proposal: Add the following courses to the approved list of Pre-Health Science Electives for BS Chemistry Pre-Health Science tracks (concentrations)

- **APPH 4400** Human Neuroanatomy (3 credits, pre-req: None)

- **BIOL 4650** Bioethics (2 credits, pre-req BIOL 1510 or CIOL 1511)

- **BIOL 2345** Genetics Lab (1 credit, pre-req. BIOL 1510 or BIOL 1511; co-req BIOL 2344)

- **BIOL 3381** Intro Microbiology Lab (1 credit, pre-req BIOL 1510, or BIOL 1511, and CHEM 1212K; co-req BIOL 3380)

- **BIOL 3451** Cell Molecular Biology Lab (1 credit, pre-req BIOL 1510, or BIOL 1511, CHEM 2311 or CHEM 1315; co-req BIOL 3451)

- **BMED 3600** Physiology of Cellular and Molecular Systems (pre-req BMED 3100)

Current list of approved Pre-Health Science Electives (GT Catalog 2016-2017)

APPH 3753	Anatomy
APPH 3754	Anatomy Lab
APPH 3755	Human Physiology
APPH 3756	Physiology Lab
BIOL 2344	Genetics
BIOL 3450	Cell Molecular Biology
BIOL 3380	Intro Microbiology
BIOL 4015	Cancer Bio/Tech
BIOL 4340	Medical Microbiology
BIOL 4464	Developmental Biology
BIOL 4545	Human Genetics
BIOL 4570	Immunology & Immunochemistry
CHEM 4521	Biophysical Chemistry
CHEM 4765	Drug Design, Development & Delivery

6. A motion was made to *approve* a request for a Collaborative Program with Georgia State University. The motion was seconded and approved.

New Collaborative Program – APPROVED

Approval of the collaborative program for a Bachelor of Science degree from Georgia Tech and a Juris Doctor degree from Georgia State University includes a blanket waiver of the 36-hour rule. This is necessary due to College of Law courses transferring back in the senior year at Georgia Tech.

<u>**Summary**</u>

Proposed
Georgia Tech-GSU College of Law Collaborative Agreement
BS/JD Dual Degree Program

A proposed Collaborative Agreement between Georgia Tech and GSU would establish a GT BS-GSU JD Dual Degree Program (DDP). The DDP would enable GT students to realize a time and cost saving of one semester to one year in completing a GSU JD (a three-year professional degree that qualifies graduates to sit for an exam for admission to the Bar and the practice of law). See attachments: Collaborative Agreement, Example DDP JD Class Options (fall & spring), and Hypothetical Schedules for JD Completion.

Under the DDP, GT juniors could apply for provisional admission to the GSU COL to begin coursework toward their GSU JD during their GT senior year. GSU COL would apply the same admission standards to DDP applicants as to applicants for regular admission to the GSU COL. DDP students would take first-year JD classes during fall and spring semesters of their senior year. These JD classes would count both as free electives toward their GT BS and as first-year classes toward their GSU JD. See attachment: <u>Waiver of 36-Hour Rule</u>.

DDP students would elect to pursue curricular Option 1, 2 or 3 (Option 3 would require consultation with and permission from the GSU COL Associate Dean):

    a. **Option 1: 30 credits**

<u>Fall Semester</u>	<u>Spring Semester</u>
Contracts I (3 CR)	Contracts II (3 CR)
Torts (4 CR)	Property (4 CR)
Civil Procedure I (3 CR)	Civil Procedure II (3 CR)
Lawyering Foundations I (3 CR)	Lawyering Foundations II (3 CR)
Research Methods in Law (1 CR)	Criminal Law (3 CR)

    b. **Option 2: 21 credits**

<u>Fall Semester</u>	<u>Spring Semester</u>
Contracts I (3 CR)	Contracts II (3 CR)
Lawyering Foundations I (3 CR)	Lawyering Foundations II (3 CR)
Research Methods in Law (1 CR)	Property (4 CR)
Torts (4 CR)	

    c. **Option 3: 13-20 credits**, including, at a minimum, all of the below, and, with the permission of the GSU Law Associate Dean, additional courses totaling up to 20 credits.

<u>Fall Semester</u>	<u>Spring Semester</u>
Contracts I (3 CR)	Contracts II (3 CR)
Lawyering Foundations I (3 CR)	Lawyering Foundations II (3 CR)
Research Methods in Law (1 CR)	

DDP applicants who complete their GT BS within 12 months after beginning their DDP coursework (or, with permission of the GSU COL Associate Dean, within 18 months) would become regular admits to the GSU COL, subject to the same requirements and standards for continuation as apply to regularly admitted JD students.

7. A motion was made to *approve* a request from the School of Public Policy for a new certificate. The motion was seconded and approved.

New Certificate – APPROVED with Edits
Certificate in Intellectual Property

Note: The Committee requested a revision on page 4 of the proposal to clarify the assessment criteria. It was later determined that the section on assessment was

unnecessary and the School agreed to remove it and resubmit a revised document to the Registrar's Office.

The certificate in IP is designed to provide our students a background in several facets of intellectual property. Although intellectual property is often associated with patent law, the IP certificate will go beyond this aspect of intellectual property to cover areas such as copyrights, trademarks, and trade secrets. Taking an interdisciplinary approach, the certificate in IP will also teach students about business strategies to monetize these legally recognized property rights. Moreover, the certificate will cover public policies affecting intellectual property rights and business strategies. In addition, the certificate in IP will expose students to the economic impact of intellectual property so that they will be aware of real-world implications of intellectual property policy. Although the certificate will not prepare students to sit for the patent bar exam, students will learn about career opportunities as patent agents; the only area in which people can practice law without passing a state bar exam and becoming an attorney.[1]

Curriculum
- o Students will take one core class and choose three more elective classes for a total of four 3-hour classes amounting to 12 credit hours.
- o Nine of the twelve hours must be at the 3000 level or above.
- o All courses must be taken on a letter-grade basis; each course must be completed with a grade of C or better.
- o A maximum of 9 semester hours of Special Topics courses may be included in the certificate program.
- o A maximum of 3 semester hours of Special Problems courses designated by the IP Certificate program director may be included in the certificate program.
- o The Director of the IP Certificate Program may designate Special Topics courses or graduate level courses offered from time to time by various units of the Institute as IP Certificate electives if the Director reviews the course content and determines that these courses contain significant relevant subject matter.

Approved courses include the following:

- o PUBP 4640 Technology Law, Policy, and Management (core)
- o HTS 3085 Law, Technology, and Politics
- o LMC 3414 Intellectual Property: Policy and Law
- o PUBP 3610 Pre-Law Seminar
- o MGT 3663 Technology Strategy
- o PUBP 4410 Science, Technology, and Public Policy
- o PUBP 4650 Internet Law
- o PUBP 4803 Advanced Science and Technology Policy

Public Policy faculty are preparing a new class in I.P. Transactions. Mechanical Engineering faculty are preparing a new class in Patent Prosecution. And

Electrical and Computer Engineering faculty are preparing a new class in I.P. Litigation. Assuming these classes are approved by their respective schools, they should be ready to offer in Academic Year 2017-2018.

PUBP 3610 Pre-Law Seminar does not specifically cover IP material. We include it because many IP students may go on to law school or careers as patent agents at law firms. These students should have some knowledge of legal methodology applicable to all areas of law. They can gain some foundation in this area by choosing this class as an elective.

Learning outcomes:

- To gain a background in the basics of the laws governing intellectual property
- To gain an understanding of the role of intellectual property in developing business strategy
- To gain an understanding of the policy and economic implications of intellectual property

Program Assessment (Section to be removed at recommendation of the Committee.)

- **Student Assignments:** Students will complete written and/or oral presentation assignments in some courses that demonstrate their analytical abilities, critical thinking, and communication skills.
- **Student Papers:** Students will write papers in some classes to develop their communication skills and learn to convey complex ideas in an articulate, organized manner.
- **In-Class Exams:** Students will take multiple choice and essay exams to demonstrate their knowledge of course material and apply it to hypothetical problems.
- **Faculty Evaluation:** IP Certificate faculty will meet to evaluate the curriculum annually and will recommend changes as needed.

Prerequisites, existing courses and newly developed courses:
The IP Certificate classes will generally be offered without prerequisites.

PUBP 4640 (core), HTS 3085, PUBP 3610, PUBP 4410, PUBP 4650, and PUBP 4803 above are existing classes taught at the undergraduate level without pre-requisites.

MGT 3663 and LMC 3414 are existing classes with pre-requisites.

We envision the large majority of classes to be offered without pre-requisites.

Advanced Science and Technology Policy is already offered as PUBP 8530. The School of Public Policy will offer an undergraduate section cross-listed as PUBP 4803.

We expect to offer classes on I.P. Litigation, I.P. Transactions, and Patent Prosecution in Academic Year 2017-2018.

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

New Course - APPROVED
PUBP 4725: Information Security Policies and Strategies (3-0-3)

8. A motion was made to *approve* a request from the School of Mechanical Engineering for a degree modification. The motion was seconded and approved.

Degree Modification – APPROVED
Bachelor of Science in Mechanical Engineering

- o Request to establish a new Concentration Area in Design
- o Adding three courses to the Concentration Area in Micro- and Nano-Engineering Systems (see Table A1)- ME 4803 *Multiscale Thermal Engineering,* MSE 4330 *Fundamentals of Nanomaterials and Nanotechnology* (offered every Fall), and ChBE 4050 *The Science and Engineering of Microelectronic Fabrication.*
- o Adding three courses to the Concentration Area in Thermal, Fluid, and Energy Systems (see Table A2)- ME 4013 *Hybrid Vehicle Powertrains*, ME 4803 *Multiscale Thermal Engineering*, and ME/ChBE 4759 *Electrochemical Energy Storage and Conversion.*
- o Changes to the Concentration Area in Automation and Robotics (see Table A3)- Add one course, ME 4013 *Hybrid Vehicle Powertrains.* Course name/number change- ME 4405 *Fundamentals of Mechatronic Systems.* Removal of course from elective list: ISyE 4257 *Applied Robotics and Auto Data* (this course has not been offered in several years.)
- o Changes to the Concentration Area in Manufacturing (see Table A4)- Course name/number change- ME 4405 *Fundamentals of Mechatronic Systems.*

The School of Mechanical Engineering currently has six Concentration Areas:

- o Automation and Robotics
- o Manufacturing
- o Mechanics of Materials
- o Micro- and Nanoengineering
- o Nuclear Energy
- o Thermal, Fluid, and Energy Systems

To this list, the School of Mechanical Engineering has developed a seventh Concentration Area in Design. Details of the proposal are included below. Design is one of the strongest areas of interest among ME undergraduates as evidenced by the high participation in the GT Minor in Industrial Design and in the high utilization rates for the Invention Studio housed in the School of ME. Having a Concentration Area in Design gives students another option for gaining more instruction and practice in design as it pertains to mechanical engineering systems. While the Minor in Industrial Design is more focused on the ergonomics, form, and beauty, the ME Concentration Area gives students courses that are more focused on design analysis, functionality, performance, and optimality.

Each year, the Concentration Areas are reviewed to see if some courses can be added to the list of requirements or if some courses should be removed. Over the past year, several new courses have been developed which we would like to add to one or more Concentration Areas. These changes are all indicated in the proposal (Proposal 5086). In addition to new courses, there was also a name change of a mechatronics class which was a part of the Concentration Areas in Robotics and Automation and the one in manufacturing. These changes are also indicated in the aforementioned tables.

The minor in Industrial Design requires 15 hours of courses, mostly within the School of Industrial Design of the College of Design. The Concentration Area in Design includes the ME Design Requirement, which is required of all BSMEs. It also makes use of the ME Elective. So, the additional effort to complete the Concentration Area in Design is 3 courses, which are drawn from the 5 free-elective courses in the ME curriculum.

Currently Approved vs. Proposed Program Curriculum

Design Concentration

Woodruff School of Mechanical Engineering, Georgia Institute of Technology

Introduction
- Concentrations are optional, not required.
- Concentrations are 15 hours and the classes satisfy the Design Elective, the ME Elective and 9 hours of free electives.
- Concentrations are different than minors because they allow students to specialize in a particular area within ME.
- Classes used for a concentration may not also be used towards a minor or an additional concentration.

- This concentration is only available to ME majors who are following the 2013-2014 Catalog Year or later.

Concentration Requirements - To satisfy a concentration, students must do each of the following:
- If necessary, change your curriculum to the correct Catalog Year. This is done by filling out a change of major form.
- Declare your concentration in OSCAR. http://www.degreeworks.gatech.edu/images/training/concentration_mgt.pdf
- Complete all of the required classes and the correct number of elective classes in the table listed below. The classes required for the concentration will satisfy the Design Elective, an ME Elective and 9 hours free electives.

Course Number and Name	Credit Hour	ME Elective
Required Class		
ME 3180 Machine Design OR ME 4315 Energy Systems Analysis & Design[1]	3	Design
Elective Classes (Choose 4)		
ME 4041 Interactive Computer Graphics and Computer-Aided Design	3	X
ME 4171 Environmentally Conscious Design and Manufacturing	3	X
ME 4193 Tribological Design	3	X
ME 3180 Machine Design OR ME 4315 Energy Systems Analysis & Design[1]	3	X
ME 4699 Undergraduate Research (in Design) (1-3 hours) [2]	1-3	X
ECE/VIP Vertically Integrated Projects[2] (1-6 hours, summing to 6 total hours with any ME 4699 hours)	1-6	
ME 4740 Bio-inspired Design[3]	3	X
ME 4790 Materials Selection and Design[4]	3	X
ME 4803 Capstone Design II	3	X

ME 4803 Model Based Systems Engineering[5]	3	X
ME 4803 Probabilistic Risk Assessment[6]	3	X
ME 4803 Design Special Topics course	3	X

ents may use a maximum of 3 hours of approved 4699 hours towards the concentration if it is listed as an optional elective class. The research MUST relate to the concentration and be approved by the concentration area faculty advisor.

Notes

[1] Students are required to take one of the design elective courses, ME 3180 or ME 4315, as part of the Mechanical Engineering curriculum. Both courses can be included in the Design Concentration; one is required and the other can be taken as an elective for the Design Concentration.

[2] Up to 6 credit-hours of ME 4699 and ECE/VIP coursework *combined* can be counted toward the Design Concentration. Only 3 hours maximum of ME 4699 can be applied to the Concentration.

[3] This course is cross-listed with BIOL, BMED, ISyE, ME, and MSE.

[4] This course is cross-listed with ME and MSE.

[5] This course is cross-listed with ISyE and ME.

[6] This course is cross-listed with ME and NRE.

9. A motion was made to *table* a request from the Vertically Integrated Project Program for a new subject code. The motion was seconded and approved.

New Subject Code – TABLED

Note: There was some discussion ask to the generally accepted use of the term "VIP" and whether that would create confusion or distraction on the transcript. Other options were discussed including using "VIPP," but the Committee determined that more thought from the program would be the best course of action. The program intends to bring forward some course proposals and will request a subject code at that time having done more research.

10. A motion was made to *approve* a request from the School of Building Construction for a new course. The motion was seconded and approved.

New Course – APPROVED
BC 4140: Construction Mgt Project (2-3-3)

A motion was made to *approve* a request from the School of Building Construction for a certificate modification. The motion

was seconded and approved.

Certificate Modification
Certificate in Construction Management

The undergraduate certificate in Construction Management requires two courses: BC 4130 - Intg Design Constr & Dev, and BC 4630 - Senior Capstone Project (NCP attached for a proposed name and number change to BC 4140 Construction Management Project); and two electives from a list that includes: BC 3600 - Construction Cost Mgt, BC 3610 - Construction Law, BC 3630 - Project Management I, BC 4610 - Value Engr & Bldg Econ, BC 4700 - Construction Management, and BC 4710 - Green Construction, and BC 4050 - BIM for Building Construction.

The School of Building Construction (BC) in the College of Architecture is proposing an undergraduate certificate in *Construction Management*. The certificate is designed to provide specialized education in evolving integrated management approaches to the delivery of built environment, from concept to implementation. The certificate exposes students to the multi-disciplinary nature of construction project development and management and introduces them to the latest technologies and processes developed to enhance inter-disciplinary collaboration and integration. Students must complete ~~twelve~~ six credit hours of required courses from the School of Building Construction and six credit hours of elective courses ~~that must be taken from the School of Building Construction~~ from a list shown below. The certificate is awarded upon graduation or the next semester after graduation.

Note: Due to the changes in the BC undergraduate program that is being phased out, the prerequisites listed for the courses no longer make sense. The Certificate is approved on the condition that the School comes back with the list of prerequisite changes that are necessary.

Required and elective courses with their respective student learning outcomes are as follows. Proposed prerequisites are indicated in parenthesis, as well as "new" or "existing" status.

Required Courses:
BC 4130 - Intg Design Constr & Dev (existing course, prerequisites: none)
BC ~~4630~~ 4140 - ~~Senior Capstone Project~~ Construction Management Project (~~existing~~ new course, prerequisite: BC 4130; prerequisites with concurrency: two electives)

Elective Courses:
Select two from the following:
BC 3600 - Construction Cost Mgt (existing, prerequisites: none)
BC 3610 - Construction Law (existing, prerequisite: BC 3600)
BC 3630 - Project Management I (existing, prerequisite: BC 3600)
BC 4610 - Value Engr & Bldg Econ (existing, prerequisite: BC 3600)
BC 4700 - Construction Management (existing course, prerequisites: none)

BC 4710 - Green Construction (existing, prerequisite: ARCH 3231)
BC 4050 - BIM for Multi-disciplinary Integration (new, prerequisites: none)
ARCH 2211 - Construction Tech I (existing, prerequisites: none)
CEE 4100 - Construction Engr & Mgt (existing, prerequisites: none)
CEE 4110 - Construction Plan & Est (existing, prerequisites: CEE 4100)
CEE 4120 - Construction Operations (existing, prerequisites: CEE 4100)
CEE 4130 - Constr. Safety & Health (existing, prerequisites: CEE 4100)

11. A motion was made to *approve* a request from the School of Psychology for a pre-requisite modification. The motion was seconded and approved.

Pre-requisite Modification – APPROVED
PSYC 4020 – Biopsychology (3-0-3)

Current:
Undergraduate Semester level PSYC 1101 Minimum Grade of D and Undergraduate Semester level BIOL 1520 Minimum Grade of D

Requested:
Undergraduate Semester level PSYC 1101 Minimum Grade of D and (Undergraduate Semester level BIOL 1520 Minimum Grade of D or Undergraduate Semester level NEUR 2001 Minimum Grade of D).

Rationale
The proposed change will allow students in the Neuroscience major to take PSYC 4020, a required course in the degree curriculum. These students are not required to take BIOL 1520. NEUR 2001 will provide students with sufficient background for the course.

12. A motion was made to *approve* a request from the School of Biological Sciences and the School of Psychology for a new subject code. The motion was seconded and approved.

New Subject Code – APPROVED

New Subject Code = NEUR

A motion was made to *approve* a request from the School of Biological Sciences and the School of Psychology for new courses. The motion was seconded and approved.

New Courses – APPROVED upon review

Note: The Committee determined the best course of action would be to have the Registrar's Office complete a final review of the courses to ensure all boiler items on NCP's and syllabi were included for each course.

NEUR 2001: Principles in Neuroscience	(3-3-4)
NEUR 3001: Cell and Molecular Neuroscience	(3-0-3)

NEUR 3010: Methods in Neuroscience   (3-0-3)
NEUR 4001: Neuroscience Research Project Laboratory   (2-6-4)
NEUR 2698: Research Assistantship
NEUR 2699: Undergraduate Research
NEUR 4698: Research Assistantship
NEUR 4699: Undergraduate Research
NEUR 4801: Special Topics
NEUR 4802: Special Topics
NEUR 4803: Special Topics
NEUR 4804: Special Topics
NEUR 4805: Special Topics
NEUR 4806: Special Topics

A motion was made to *approve* a request from the School of Biological Sciences and the School of Psychology for a new degree. The motion was seconded and approved.

New Degree – APPROVED
Bachelor of Science in Neuroscience

Brief program description

Students majoring in neuroscience will complete a 120 credit-hour curriculum (plus a required 2-credit class in health). They will learn fundamental principles and up-to-date advances in the field of neuroscience. The program will build on a strong foundation of required courses in the physical sciences and mathematics (chemistry, computer science, calculus, statistics and physics) in order to prepare students with the analytical skills needed to address the complexity of problems in neuroscience. The program will emphasize technological methods and innovations that have been critical, as well as ones needed to continue progress in neuroscience.

Program delivery
In line with the interdisciplinary nature of neuroscience, our program will be delivered by faculty from multiple colleges (Science, Engineering, and Computing). The faculty drawn from these units represents a formidable cohort of nearly 50 members who self-identify as neuroscientists with wide ranging expertise. Faculty effort will be coordinated, the curriculum will be assessed and managed, and student interests and concerns will be addressed by a committee, the Neuroscience Undergraduate Curriculum Committee (NUCC), comprised of members representing participating schools and departments coordinated and managed by program will be administered by College of Sciences and managed by a committee representing participating units (see sect 7b, Administration of the Program).

Methods of instructional delivery are described below (section 3i). Briefly, our faculty will deliver an educational environment that not only transmits information through lectures but that facilitates understanding through a variety of active learning exercises in which students participate in class and collaborate

with each other. Teaching strategies including problem solving exercises and group discussions will be applied to facilitate independent, critical, and creative thinking (see teachingcommons.stanford.edu/resources/learning-resources/promoting-active-learning).

Goals/objectives of the Program

A major goal of this program is to develop the next generation of experts who possess the deep understanding, sophisticated skills, and eye for innovation required to achieve discovery and/or inventive applications in neuroscience. Our program aims to deliver our students with core competencies in neuroscience enhanced through integration with physical and applied sciences and technology. It is our intention that this uncommon curriculum will distinguish Georgia Tech neuroscience students and give them a strong competitive edge in advancing their careers, whether through research, medical treatment, entrepreneurship, public policy, etc.

Another goal of our program is to gain Georgia Tech entry into the elite and growing group of peer universities committed to neuroscience. We are currently 'missing in action' among our peers in regards to neuroscience education. Fortunately, there has been great success with hiring highly accomplished neuroscientists. Thus we have broad expertise in neuroscience and have only to assemble our faculty to stake our claim to this field. Creating the degree program we propose will aid Georgia Tech in gaining visibility and in moving to a leadership role in neuroscience.

Program Purpose. The purpose of the B.S. in Neuroscience degree program is to provide a high quality undergraduate education that equips graduates with up to date knowledge and perspectives of neuroscience who are prepared to succeed in premier graduate and professional schools, and to immediately contribute as professional employees in a vast array of neuroscience-related fields. The program provides graduates with a strong foundation of knowledge in major areas of modern neuroscience, deep knowledge in a core area of the student's selection, and skills in conducting innovative and interdisciplinary research.

Objectives. The program has the following four objectives:
> Objective 1: Acquisition of specialized knowledge and perspectives in neuroscience.
> Objective 2: Deep knowledge and modern perspectives of a core discipline that is underpins neuroscience.
> Objective 3: Authentic undergraduate research experience.
> Objective 4: Quantitative skills, communication and ethics.

Methodology. The program will be subject to ongoing evaluation activities and reported annually via the institutes Online Assessment Tool (OATS). This forms the basis of an institutional review that becomes part of report to the SACSCOS accrediting agency. The assessment of our progress in attaining these goals will make use of a number of methods. These will include, surveys of students and alumni, review of student records, common questions deployed in multiple

section of courses, end-of-course student opinion surveys, the use of grading metrics for presentations and laboratory work, and in class observations.

Location of the program

The entire academic degree program will be delivered on the main campus of the Georgia Institute of Technology in in Atlanta, Georgia. Specific locations dedicated to courses which are part of this degree include the Clough Undergrad Learning Commons (one dedicated 24-person instructional laboratory, 4th floor) and Boggs Building (a dedicated 24-person instructional laboratory, ground floor). The location of lecture courses will be coordinated with the Office of Capital Planning and Space Management and with the Office of the Registrar. We will explore opportunities to include neuroscience classes in Georgia Tech faculty-led study abroad programs in, for e.g., Lyon, France; Oxford, UK; and Australia-New Zealand-Fiji).**Curriculum**

New and existing courses, course descriptions and prerequisites

An overview of the program of study for the B.S. in Neuroscience degree is provided in Table 1; a detailed list of requirements is listed in Table 2. Lists of Core Area F courses and major-specific courses, together with their prerequisites, are provided in Table 3. A sample eight-term schedule appears in Table 4. The Tables are viewable as part of the proposal packet on ICC website.

General Requirements

Completion of 21 credit hours of upper division courses in the major field

Satisfied with:

12 credits of Neuroscience Core

9 credits of Neuroscience Depth Electives (out of 14-18 Neuroscience Depth Electives credits)

Completion of 39 credit hours of upper division work overall

Students completing the Psychology Breadth Specialization will satisfy this requirement with:

12 credits of Neuroscience Core

14 credits of Neuroscience Depth Electives

13 credits of Breadth Electives

Students completing any of the other breadth specializations will satisfy this requirement with:

12 credits of Neuroscience Core

18 credits of Neuroscience Depth Electives

9 credits of Breadth Electives

Undergraduate Research and Degree Options

Research Option. A student may apply Undergraduate Research (XXXX 2699 or 4699) to satisfy degree requirements. Four credits of <u>NEUR</u> 4699 may be used in place of NEUR 4001 only if the student completes the Georgia Tech Research Option. This requires an additional 6 cr. of NEUR 2699 or 4699 (2 cr. of NEUR 4699 may be applied to "Additional Neuroscience Electives", the remaining 3 cr. will be applied to Free Electives), along with both LCC 4701 (1 cr.) and LCC 4703 (1 cr.) Both LCC courses are applied to free electives. A student may appeal via their academic advisor to the NEUR undergraduate curriculum committee to have any other XXXX 4699 to be considered equivalent to NEUR 4699 when the project is clearly related to neuroscience.

Other Research Credit. Undergraduate research credit (XXXX 2699 and 4699) may also be applied to Breadth Electives (subject to rules of the relevant Minor program of study) and to Free Electives.

CoS Business Option. Students may complete the 15-credit CoS Business Options with 12 cr. free electives and by substitution of 3 cr. of Additional Neuroscience Electives

All courses in the proposed curriculum have been approved by all relevant campus curriculum governance bodies.

New courses proposals for the B.S in Neuroscience program of study (NEUR 2001, 3001, 3010, 4001, 480X, 4698 and 4699), along with this new degree proposal, were approved by the Georgia Tech Institute Undergraduate Curriculum Committee on 11/08/16, and by the Institute's Faculty Senate on dd/mm/yy. All other classes in the curriculum have standing approval and already appear in the institute's Catalog.

Adjourned,
Reta Pikowsky, Registrar
Secretary