The AP&P Committee met on Wednesday, March 1, 2017 at 3:00 p.m. in the William C. Strickland Conference Room of I.G. Greer Hall.

Committee members present: Dr. Teresa Carnevale, Dr. Jon Carter, Dr. Ellen Cowan, Dr. Jeff Hirst, Dr. René Horst, Dr. Joe Klein, Mr. Jason Miller, Dr. Ben Powell, Dr. Teressa Sumrall, Mr. John Wiswell, Mr. Rice Neese, Mr. Travis O’Shell

Committee members excused: Dr. Jon Beebe, Dr. Tanga Mohr, Dr. René Salinas

Committee members unexcused: Dr. Janice Pope

At 3:00 p.m., Dr. Ben Powell noted that we have a quorum and he called the meeting to order.

Subcommittee

Approval of Minutes
January 18, 2017

Vote 1 – To approve the January 18, 207 minutes – PASSED

Announcements
The General Education Council meeting on February 17, 2017 was cancelled.

“For Information Only” list of semester offering changes 2/2/2017 through 2/15/2017.
- SD 2800 changed from Fall to On Demand
- FIN 3600 changed from Fall; Spring to On Demand
- FIN 4700 changed from Fall to Fall, Spring
- COM 2300 changed from Fall; Spring to On Demand

New Business

Procedural note: All dual-listed graduate course changes are also approved through the Graduate AP&P Committee. The complete action of the proposal will be listed but only the undergraduate curriculum is voted on by Undergraduate AP&P.

Order of presentation (Total 13)
College of Fine and Applied Arts (13)

Dr. Dru Henson presented proposals from the College of Arts and Sciences for the Department of Mathematical Sciences

The proposals from the Department of Mathematical Sciences were approved as follows: (EFFECTIVE: Fall 2017)

U_CAS_MAT_2016_01 Change the title and course description of MAT 4330. Senior Seminar in Actuarial Sciences (3).S.
MAT 4330. Senior Seminar in Actuarial Science (3).S.
GEN ED: Capstone Experience
A course designed to provide majors in Actuarial Science the opportunity to study actuarial problems from a variety of sources. The emphasis will be
on the oral and written presentation of results. The course should prepare
the student for making the transition from academic courses to actuarial
practice. Students taking this course should have completed most of the
Actuarial Science curriculum. Students are also encouraged to register for
at least one Society of Actuaries professional exam during this course.
Prerequisite: MAT 3330 and STT 3250.

POS affected: 106A

U_CAS_MAT_2016_02 Change the title of the Bachelor of Science in Actuarial Sciences
(106A/52.1304), to the Bachelor of Science in Actuarial Science (106A/52.1304)
(CONTINGENT ON APPROVAL BY UNC-GENERAL ADMINISTRATION)

U_CAS_MAT_2016_03 Change the credit hours and course description of MAT 2110.
Techniques of Proof (3).F;S. to read as follows:
MAT 2110. Techniques of Proof (4).F;S.
A study of methods of proof used in mathematics. Formal proof topics include
propositional calculus, predicate calculus, and several first order theories.
Informal proof topics are drawn from number theory, set theory, and other
areas of mathematics. Additional topics include introductions to writing
mathematics, searching for mathematical content and sources, and careers in
mathematics. Prerequisite: MAT 1120 or permission of the instructor.

SAC affected: Mathematical Sciences

U_CAS_MAT_2016_04 Change the course description and prerequisite statement of MAT 4310.
Numerical Methods (3).S. to read as follows:
MAT 4310. Numerical Methods (3).S.
Theoretical development and implementation of classical numerical
methods. Topics covered include computer arithmetic, interpolation, and
approximation. Numerical algorithms investigated may include root finding,
interpolation, linear system solutions, derivative and integral estimation, and
differential equation solutions. Knowledge of calculus, linear algebra, and
programming will be assumed. Prerequisites: MAT 2240 and MAT 2310 or
permission of the instructor, with MAT 2130 or MAT 3130 recommended.


U_CAS_MAT_2016_05 Course Addition:
MAT 4900. Internship (1-12).On Demand.
Independent, supervised work in mathematics or actuarial science for an
approved agency, business, or organization. The number of semester hours
taken must be approved by the department chair, and may not all be
approved to count toward major requirements. Prerequisite: approval of the
department chair. Graded on an S/U basis.

Course Addition:
STT 4900. Internship (1-12).On Demand.
Independent, supervised work in statistics for an approved agency, business,
or organization. The number of semester hours taken must be approved by
the department chair, and may not all be approved to count toward major
requirements. Prerequisite: approval of the department chair. Graded on an
S/U basis.
Course Additions:
MAT 1530-1549. Selected Topics (1-4). On Demand.
MAT 2530-2549. Selected Topics (1-4). On Demand.
MAT 4530-4549. Selected Topics (1-4). On Demand.
STT 1530-1549. Selected Topics (1-4). On Demand.
STT 2530-2549. Selected Topics (1-4). On Demand.
STT 4530-4549. Selected Topics (1-4). On Demand.

Course Additions:
MAT 4500. Independent Study (1-4). On Demand.
STT 2500. Independent Study (1-4). On Demand.
STT 4500. Independent Study (1-4). On Demand.

Change the credit hours and semester offering of MAT 2500. Independent Study (1-3). F; S. to read as follows:
MAT 2500. Independent Study (1-4). On Demand.

POS affected: 261A

Revise the program of study for the Bachelor of Arts in Mathematics (261A/27.0101). The program of study is at the end of the minutes.

Revise the program of study for the Bachelor of Science in Mathematics (260*/27.0101) with concentrations in General (260B), Computation (260E), Life Sciences (260F), Physical Sciences (260G), and Statistics (260H). The programs of study is at the end of the minutes.

Revise the program of study for the Bachelor of Science in Mathematics (260*/27.0101) with a concentration in Business (260D). The program of study is at the end of the minutes.

Revise the program of study for the Bachelor of Science in Mathematics (260*/27.0101) with a concentration in Secondary Education (260I). The program of study is at the end of the minutes.

Revise the Undergraduate Bulletin to remove MAT 1120. Calculus With Analytic Geometry II, Honors (4). F. from the MATHEMATICS HONORS list of courses. MAT 1120 is not being deleted.

Vote 2 – To approve the proposals from the Department of Mathematical Sciences - PASSED

Old Business

Other

Adjournment

Vote 3 – To approve the motion to adjourn – PASSED
UNDERGRADUATE ACADEMIC POLICIES AND PROCEDURES COMMITTEE  
March 1, 2017  
Unofficial Vote Record

<table>
<thead>
<tr>
<th>Committee Members</th>
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The recommendations from the March 1, 2017 Undergraduate Academic Policies and Procedures Committee meeting are approved.

[Signature] Darrell P. Kruger  
3/6/2017  
Provost and Executive Vice Chancellor
Bachelor of Arts (BA) 2016-20172017-2018

Degree Code 261A

Program of Study for Mathematics Majors

I. GENERAL EDUCATION CURRICULUM .................................................................................................................. 44

Math 1110 will count toward Quantitative Literacy general education requirement.

II. LANGUAGE (Completion of 6 semester hours at the *intermediate level, or higher) ............................................. 6

1040 __ and 1050 ___ or 1060 ___; or higher level courses

*NOTE: Language 1010 and 1020 (or 1030) are prerequisites for the intermediate levels. FL 1050 or 1060 may be used in Gen Ed Liberal Studies Experience

III. MAJOR REQUIREMENTS (not including 4 s.h. counted in Area I, above) ........................................................ 31

2. 0 major GPA is required for graduation. Major GPA calculation will include all courses taken in the major department, plus any other courses under III. No more than 46 semester hours of Mathematics courses may be counted toward the BA Degree.

1. Mathematics Major Requirements: (28-2929-30 s.h.)

MAT 1110 _____ (4) Calculus with Analytic Geometry I (Pre: MAT 1025 w/min grade C-)

MAT 1120 _____ (4) Calculus with Analytic Geometry II (Pre: MAT 1110 w/min grade C-)

MAT 2130 _____ (4) Calculus with Analytic Geometry III (Pre: MAT 1120 w/min grade C-)

MAT 2110 _____ (4) Techniques of Proof (Pre: MAT 1120)

MAT 2240 _____ (3) Introduction to Linear Algebra (Pre: MAT 1120)

Choose one:

MAT 3130 _____ (3) Intro Differential Equations (Pre: MAT 1120)

STT 3850 _____ (4) Statistical Data Analysis (Pre: MAT 1110)

Choose one WID course: (Pre for WID: RC 2003, MAT 2110 or 2510)

MAT 3110 _____ (3) Intro to Modern Algebra [WID] (Co: 2240)

MAT 3220 _____ (3) Intro to Real Analysis I [WID]

Choose one 4 hour combination (courses must be taken in same semester):

[CAP] Is Capstone course: each has corequisite of first class in each pair below

MAT 4010____ (1-3) Current Topics in Mathematics AND MAT 4011____ (1) Current Topics in Math [CAP]

MAT 4140____ (3) Differential Geometry (Pre: MAT 2130; Co: MAT 2240) AND MAT 4141____ (1) Differential Geometry [CAP]

MAT 4220____ (3) Intro to Real Analysis II (Pre: MAT 3220) AND MAT 4221____ (1) Intro to Real Analysis II [CAP]

MAT 4310____ (3) Numerical Meth (Pre: MAT 2310, 2240; rec: MAT 2130 or 3130) AND MAT 4311____ (1) Numerical Methods [CAP]

MAT 4340____ (3) Intro to Operations Research (Pre: MAT 2240, STT 3 850; Sr st) AND MAT 4341____ (1) Intro to Oper Research [CAP]

MAT 4420____ (3) Dynamical Systems Theory (Pre: MAT 3130 or 3310) AND MAT 4421____ (1) Dynamical Systems Theory [CAP]

MAT 4590____ (3) Adv Topics in Differential Equations (Pre: MAT 3130; Sr st) AND MAT 4591____ (1) Adv Topics in Diff Equations [CAP]

MAT 4710____ (3) Intro to Topology (Pre: MAT 3220; Sr st) AND MAT 4711____ (1) Introduction to Topology [CAP]

MAT 4720____ (3) Abstract Algebra (Pre: MAT 3110; Sr st) AND MAT 4721____ (1) Abstract Algebra [CAP]

MAT 4990____ (3) Numerical Linear Algebra (Pre: MAT 4310; Sr st) AND MAT 4991____ (1) Numerical Linear Algebra [CAP]

STT 4820____ (3) Design & Analysis of Experiments (Pre: STT 3820; Sr st) AND STT 4821____ (1) Design & Analysis of Exp [CAP]

STT 4830____ (3) Linear Regression Models (Pre: MAT 2240, STT 3830; Sr st) AND STT 4831____ (1) Linear Regression Models [CAP]

STT 4840____ (3) Regression & Time Series Forec (Pre: MAT 2240, STT 3250, 3850) AND STT 4841____ (1) Regression & Time Series Forec [CAP]

2. Mathematics Electives: (6-75-6 s.h. to bring total hours in AREA III to 35 hours; at least 3 hours must be from 4000 level)

Any course listed above but not used to meet requirements above, may be used in this section.

MAT 2310 ____ (3) Computational Math (Pre: MAT 1120)

MAT 2500 ____ (1-3) Independent Study

MAT 3010 ____ (2) Survey in History of Math (Pre: MAT 1120; MAT 2110 or 2510)

MAT 3310 ____ (3) Discrete & Continuous Math Models (Pre: MAT 1120; Co: 2240)

MAT 3330 ____ (3) Financial Mathematics (Pre: MAT 1120)

MAT 3350 ____ (3) Intro to Mathematical Biology (Pre: MAT 1120, Jr stdng)

MAT 3500 ____ (1-3) Independent Study

MAT 3510 ____ (3) Junior Seminar

MAT 3610 ____ (3) Intro to Geometry (Pre: MAT 1120; MAT 2110 or 2510)

MAT 4400 ____ (1-3) Senior Research (Pre:3 sh 4000 level MAT)

STT 3250 ____ (4) Fundamentals of Probability (Pre: MAT 2130)

STT 3820 ____ (3) Statistical Methods I (Pre: STT 2810 or 2820)

STT 3830 ____ (3) Statistical Methods II (Pre: STT 2830)

STT 3840 ____ (3) Elem Prob & Surv Smplg (Pre: STT 2810 or 2820)

STT 3851 ____ (3) Stat Data Anlys II [WID] (Pre: STT 3850; RC 2001)

STT 4811 ____ (3) Stat Concepts & Applications I (Pre: MAT 1120)

STT 4812 ____ (3) Stat Concepts & Applications II (Pre: STT 4811)

IV. MINOR REQUIRED ............................................................................................................................................. 12-21

Minimum of 9 semester hours of courses taken to fulfill minor requirements must be courses offered by Appalachian.

V. ELECTIVES (taken to total 122 hours for the degree) ...................................................................................... 20-29

2 semester hours of free electives must be outside the major discipline.
Bachelor of Science (BS)  
Degree Code 260*  
Concentration Code 260B  

I. GENERAL EDUCATION CURRICULUM ................................................................. 44  
Math 1110 will meet the Quantitative Literacy general education requirement.  

II. MAJOR REQUIREMENTS (not including 4 s.h. counted in Area I, above) .................. 61  
2.0 major GPA is required for graduation. Major GPA calculation will include all courses taken in the major department, plus any other courses under II. Minimum of 18 semester hours of courses taken to fulfill major requirements must be courses offered by Appalachian.  

A. Mathematics Common Core (14-15 hours)  
MAT 1110 ____ (4) Calculus with Analytic Geometry I (Pre: MAT 1025 w/min grade C-)  
MAT 1120 ____ (4) Calculus with Analytic Geometry II (Pre: MAT 1110 w/min grade C-)  
MAT 2110 ____ (4) Techniques of Proof (Pre: MAT 1120)  
MAT 2240 ____ (3) Introduction to Linear Algebra (Pre: MAT 1120)  

B. Mathematics Courses for the Concentration (17 hours)  
MAT 2130 ____ (4) Calculus with Analytic Geometry III (Pre: MAT 1120 w/min grade C-)  
MAT 3110 ____ (3) Intro to Modern Algebra [WID] (Pre: RC 2001, MAT 2110 or 2510; Co: 2240)  
MAT 3220 ____ (3) Intro to Real Analysis I [WID] (Pre: RC 2001, MAT 2110 or 2510)  
Choose one:  
MAT 3130 ____ (3) Intro to Differential Equations (Pre: MAT 1120)  
MAT 3310 ____ (3) Discrete & Continuous Mathematical Models (Pre: MAT 1120; Co: 2240)  
Choose one:  
STT 3250 ____ (4) Fundamentals of Probability (Pre: MAT 2130)  
STT 3850 ____ (4) Statistical Data Analysis (Pre: MAT 1110)  

C. Capstone Requirements (4 hours) Choose one 4-hour combination (courses to be taken in the same semester);  
[CAP] is Capstone course: each has corequisite of first course in each pair below  
MAT 4010__ (1-3) Current Topics in Mathematics AND MAT 4011__ (1) Current Topics in Math [CAP]  
MAT 4140__ (3) Differential Geometry (Pre: MAT 2130; Co: MAT 2240) AND MAT 4141__ (1) Differential Geometry [CAP]  
MAT 4220__ (3) Intro to Real Analysis II (Pre: MAT 3220) AND MAT 4221__ (1) Intro to Real Analysis II [CAP]  
MAT 4310__ (3) Numerical Meth (Pre: MAT 2310, 2240; rec: MAT 2130 or 3130) AND MAT 4311__ (1) Numerical Methods [CAP]  
MAT 4340__ (3) Intro to Operations Research (Pre: MAT 2240, STT 3850; Sr st) AND MAT 4341__ (1) Intro to Oper Research [CAP]  
MAT 4420__ (3) Dynamical Systems Theory (Pre: MAT 3130 or 3310) AND MAT 4421__ (1) Dynamical Systems Theory [CAP]  
MAT 4590__ (3) Adv Topics in Differential Equations (Pre: MAT 3130; Sr st) AND MAT 4591__ (1) Adv Topics in Diff Equations [CAP]  
MAT 4710__ (3) Intro to Topology (Pre: MAT 3220; Sr st) AND MAT 4711__ (1) Introduction to Topology [CAP]  
MAT 4720__ (3) Abstract Algebra (Pre: MAT 3110; Sr st) AND MAT 4721__ (1) Abstract Algebra [CAP]  
MAT 4990__ (3) Numerical Linear Algebra (Pre: MAT 4310; Sr st) AND MAT 4991__ (1) Numerical Linear Algebra [CAP]  
STT 4820__ (3) Design & Analysis of Experiments (Pre: STT 3820; Sr st) AND STT 4821__ (1) Design & Analysis of Exp [CAP]  
STT 4830__ (3) Linear Regression Models (Pre: MAT 2240; STT 3830; Sr st) AND STT 4831__ (1) Linear Regression Models [CAP]  
STT 4840__ (3) Regression & Time Series Forec (Pre: MAT 2240; STT 3250, 3850) AND STT 4841__ (1) Regression &Time Series Forec [CAP]  

D. Approved Major Electives: 18 hours in mathematical sciences to bring total hrs in AREA II to 65 hrs  
3 hours at the 4000 level  

Remaining 6-5 hours: (At least 3 hours in MAT if STT combination was chosen in Area C. Capstone)  

E. A Career Support Concentration (at least 21 hours, which must be approved by the mathematical sciences advisor)  

III. MINOR (optional)  

IV. ELECTIVES (taken to total 122 hours for the degree) ........................................................................ 17  
2 semester hours of free electives must be outside the major discipline  

HONORS STUDENTS  
You may substitute MAT 2510 Sophomore Honors Seminar for MAT 2110, and MAT 4510 Senior Honors Thesis for your Capstone. This will slightly change your elective requirements to ensure you earn 65 hours in Area II. Please see your advisor for approval and more information.
Bachelor of Science (BS)  
Degree Code 260*  
Concentration Code 260E  

I. GENERAL EDUCATION CURRICULUM

Math 1110 will meet the Quantitative Literacy general education requirement.

II. MAJOR REQUIREMENTS (not including 4 s.h. counted in Area I, above)

2.0 major GPA is required for graduation. Major GPA calculation will include all courses taken in the major department, plus any other courses under II. Minimum of 18 semester hours of courses taken to fulfill major requirements must be courses offered by Appalachian.

A. Mathematics Common Core

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<tr>
<th>Course</th>
<th>Hours</th>
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<td>MAT 1110</td>
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<td>Calculus with Analytic Geometry I (Pre: MAT 1025 w/min grade C-)</td>
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<td>MAT 1120</td>
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<td>Calculus with Analytic Geometry II (Pre: MAT 1110 w/min grade C-)</td>
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<td>MAT 2110</td>
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<td>Techniques of Proof (Pre: MAT 1120)</td>
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<td>MAT 2240</td>
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<td>Introduction to Linear Algebra (Pre: MAT 1120)</td>
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B. Mathematics Courses for the Concentration

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<th>Course</th>
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<tr>
<td>MAT 2310</td>
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<td>Computational Mathematics (Pre: MAT 1120)</td>
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<tr>
<td>MAT 4310</td>
<td>3</td>
<td>Numerical Methods (Pre: MAT 2310, 2240; rec: MAT 2130 or 3130)</td>
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<td>STT 3850</td>
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<td>Statistical Data Analysis I (Pre: MAT 1110)</td>
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Choose one:

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<th>Course</th>
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<tr>
<td>MAT 3110</td>
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<td>Introduction to Modern Algebra [WID] (Pre: RC 2001, MAT 2110 or 2510; Co: 2240)</td>
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<td>MAT 3220</td>
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<td>Intro to Real Analysis I [WID] (Pre: RC 2001, MAT 2110 or 2510)</td>
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C. Capstone Requirements (4 hours)

Choose one option:

OPTION 1: 4 hours

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<td>MAT 4311</td>
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<td>Capstone: Numerical Methods [CAP] (Co: MAT 4310)</td>
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3 hours MAT course

OPTION 2: Choose one 4-hour combination (courses taken in the same semester); [CAP] is Capstone course: each has CO: of first course in each pair below

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<td>Current Topics in Mathematics AND MAT 4011 (1) Current Topics in Math [CAP]</td>
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<td>MAT 4140</td>
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<td>Differential Geometry (Pre: MAT 2130; Co: MAT 2240) AND MAT 4141 (1) Differential Geometry [CAP]</td>
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<td>MAT 4220</td>
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<td>Intro to Real Analysis II (Pre: MAT 2240) AND MAT 4221 (1) Intro to Real Analysis II [CAP]</td>
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<td>MAT 4340</td>
<td>3</td>
<td>Intro to Operations Research (Pre: MAT 2240, STT 3850; Sr st) AND MAT 4341 (1) Intro to Oper Analysis [CAP]</td>
</tr>
<tr>
<td>MAT 4420</td>
<td>3</td>
<td>Dynamical Systems Theory (Pre: MAT 3130 or 3310) AND MAT 4421 (1) Dynamical Systems Theory [CAP]</td>
</tr>
<tr>
<td>MAT 4590</td>
<td>3</td>
<td>Adv Topics in Differential Equations (Pre: MAT 3130; Sr st) AND MAT 4591 (1) Adv Topics in Diff Equations [CAP]</td>
</tr>
<tr>
<td>MAT 4710</td>
<td>3</td>
<td>Intro to Topology (Pre: MAT 3220; Sr st) AND MAT 4711 (1) Introduction to Topology [CAP]</td>
</tr>
<tr>
<td>MAT 4720</td>
<td>3</td>
<td>Abstract Algebra (Pre: MAT 3110; Sr st) AND MAT 4721 (1) Abstract Algebra [CAP]</td>
</tr>
<tr>
<td>MAT 4990</td>
<td>3</td>
<td>Numerical Linear Algebra (Pre: MAT 3130; Sr st) AND MAT 4991 (1) Numerical Linear Algebra [CAP]</td>
</tr>
<tr>
<td>STT 4820</td>
<td>3</td>
<td>Design &amp; Analysis of Experiments (Pre: STT 3820; Sr st) AND STT 4821 (1) Design &amp; Analysis of Exper [CAP]</td>
</tr>
<tr>
<td>STT 4830</td>
<td>3</td>
<td>Linear Regression Models (Pre: MAT 2240; STT 3830; Sr st) AND STT 4831 (1) Linear Regression Models [CAP]</td>
</tr>
<tr>
<td>STT 4840</td>
<td>3</td>
<td>Regression &amp; Time Series Forec (Pre: MAT 2240; STT 3250, 3850) AND STT 4841 (1) Regression &amp;Time Series Forec [CAP]</td>
</tr>
</tbody>
</table>

D. Approved Electives: 14-10 hours in mathematical sciences** to bring total number of hours in AREA II to 65

(Against least 3 hours in MAT if STT combination was chosen in Area C. Capstone)

E. Computational Concentration (14 hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>C S 1440</td>
<td>4</td>
<td>Computer Science I (Pre: MAT 1020 or 1025 w/min grade C-)</td>
</tr>
<tr>
<td>C S 2440</td>
<td>4</td>
<td>Computer Science II (Pre: CS 1440 or 1445 w/min grade C; Co: CS 1100)</td>
</tr>
<tr>
<td>C S 3430</td>
<td>3</td>
<td>Database (Pre: CS 2440 with min grade of C)</td>
</tr>
<tr>
<td>C S 3460</td>
<td>3</td>
<td>Data Structures (Pre: CS 2440 with min grade of C)</td>
</tr>
</tbody>
</table>

F. Electives: 9 hours** of Approved courses in the sciences, which may include computer science** Must be approved by mathematical sciences advisor.

III. MINOR (optional)

IV. ELECTIVES (taken to total 122 hours for the degree)
Bachelor of Science (BS)
Degree Code 260*
Concentration Code 260F
LIFE SCIENCES

I. GENERAL EDUCATION CURRICULUM

CHE 1101/1110 & 1102/1120 fulfill the Science Inquiry perspective. MAT 1110 fulfills the Quantitative Literacy requirement.

II. MAJOR REQUIREMENTS

2.0 major GPA is required for graduation. Major GPA calculation will include all courses taken in the major department, plus any other courses under II. Minimum of 18 semester hours of courses taken to fulfill major requirements must be courses offered by Appalachian.

A. Mathematics Common Core

MAT 1110 (4 hours) Calculus with Analytic Geometry I (Pre: MAT 1025 w/min grade C-)
MAT 1120 (4 hours) Calculus with Analytic Geometry II (Pre: MAT 1110 w/min grade C-)
MAT 2110 (4 hours) Techniques of Proof (Pre: MAT 1120)
MAT 2240 (3 hours) Introduction to Linear Algebra (Pre: MAT 1120)

B. Mathematics Courses for the Concentration

MAT 2310 (3 hours) Computational Mathematics (Pre: MAT 1120)
MAT 3130 (3 hours) Introduction to Differential Equations (Pre: MAT 1120)
MAT 3220 (3 hours) Intro to Real Analysis [WID] (Pre: RC 2001, MAT 2110 or 2510)
MAT 3350 (3 hours) Intro to Mathematical Biology (Pre: MAT 1120; Jr. standing)
MAT 4420 (3 hours) Dynamical Systems Theory (Pre: MAT 3130 or 3310)
STT 3850 (4 hours) Statistical Data Analysis I (Pre: MAT 1110)

C. Capstone Requirements

OPTION 1: 4 hours
MAT 4421 (1) Capstone: Dynamical Systems Theory [CAP] (Co: MAT 4420)
3 hours MAT (Co: of first course in each pair below)

OPTION 2: Choose one 4-hour combination (courses taken in the same semester);
[CAP] is Capstone course: each has CO: of first course in each pair below

MAT 4010 (1-3) Current Topics in Mathematics AND MAT 4011 (1) Current Topics in Math [CAP]
MAT 4140 (3) Differential Geometry (Pre: MAT 2130; Co: MAT 2240) AND MAT 4141 (1) Differential Geometry [CAP]
MAT 4220 (3) Intro to Real Analysis II (Pre: MAT 3220) AND MAT 4221 (1) Intro to Real Analysis II [CAP]
MAT 4310 (3) Numerical Meth (Pre: MAT 2310, 2240; rec: MAT 2130 or 3130) AND MAT 4311 (1) Numerical Methods [CAP]
MAT 4340 (3) Intro to Operations Research (Pre: MAT 2240, STT 3850; Sr st) AND MAT 4341 (1) Intro to Oper Research [CAP]
MAT 4590 (3) Adv Topics in Differential Equations (Pre: MAT 3130; Sr st) AND MAT 4591 (1) Adv Topics in Diff Equations [CAP]
MAT 4710 (3) Intro to Topology (Pre: MAT 3220; Sr st) AND MAT 4711 (1) Introduction to Topology [CAP]
MAT 4720 (3) Abstract Algebra (Pre: MAT 3110; Sr st) AND MAT 4721 (1) Abstract Algebra [CAP]
MAT 4990 (3) Numerical Linear Algebra (Pre: MAT 4310; Sr st) AND MAT 4991 (1) Numerical Linear Algebra [CAP]
STT 4820 (3) Design & Analysis of Experiments (Pre: STT 3820; Sr st) AND STT 4821 (1) Design & Analysis of Exp [CAP]
STT 4830 (3) Linear Regression Models (Pre: MAT 2240; STT 3830; Sr st) AND STT 4831 (1) Linear Regression Models [CAP]
STT 4840 (3) Regression & Time Series Forec (Pre: MAT 2240; STT 3250, 3850) AND STT 4841 (1) Regression &Time Series Forec [CAP]

D. Life Sciences Concentration

CHE 1101/1110 (4) Introductory Chemistry I & Lab
CHE 1102/1120 (4) Introductory Chemistry II & Lab (Pre: CHE 1101 & 1110)
CHE 2101/2102 (4) Fundamentals of Organic Chemistry & Lab (Pre: CHE 1102 & 1120)
BIO 1801 (4) Biological Concepts I (Co: CHE 1101)
BIO 1802 (4) Biological Concepts II (Pre: BIO 1801 w/min grade C)

AND 10 hours of approved electives in BIO, CHE, GHY (at least one lab class; at least one class at 3000 level or higher)

E. Approved Major Electives

AND 2 hours in mathematical sciences to bring total hrs in AREA II to 70 hours:

III. MINOR (optional)

IV. ELECTIVES (taken to total 122 hours for the degree)

2 semester hours of free electives must be outside the major discipline.

HONORS STUDENTS
You may substitute MAT 2510 Sophomore Honors Seminar for MAT 2110, and MAT 4510 Senior Honors Thesis for your Capstone. This will slightly change your elective requirements to ensure you earn 70 hours in Area II. Please see your advisor for approval and more information.
### I. GENERAL EDUCATION CURRICULUM

Math 1110 will meet the Quantitative Literacy general education requirement.

### II. MAJOR REQUIREMENTS (not including 4 s.h. counted in Area I, above)

2.0 major GPA is required for graduation. Major GPA calculation will include all courses taken in the major department, plus any other courses under II. Minimum of 18 semester hours of courses taken to fulfill major requirements must be courses offered by Appalachian.

#### A. Mathematics Common Core (14-15 hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Prerequisite(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 1110</td>
<td>4</td>
<td>Calculus with Analytic Geometry I (Pre: MAT 1025 w/min grade C-)</td>
</tr>
<tr>
<td>MAT 1120</td>
<td>4</td>
<td>Calculus with Analytic Geometry II (Pre: MAT 1110 w/min grade C-)</td>
</tr>
<tr>
<td>MAT 2110</td>
<td>34</td>
<td>Techniques of Proof (Pre: MAT 1120)</td>
</tr>
<tr>
<td>MAT 2240</td>
<td>3</td>
<td>Introduction to Linear Algebra (Pre: MAT 1120)</td>
</tr>
</tbody>
</table>

#### B. Mathematics Courses for the Concentration (20 hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Prerequisite(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 2130</td>
<td>4</td>
<td>Calculus with Analytic Geometry III (Pre: MAT 1120 w/min grade C-)</td>
</tr>
<tr>
<td>MAT 2310</td>
<td>3</td>
<td>Computational Mathematics (Pre: MAT 1120)</td>
</tr>
<tr>
<td>MAT 3130</td>
<td>3</td>
<td>Introduction to Differential Equations (Pre: MAT 1120)</td>
</tr>
<tr>
<td>MAT 3220</td>
<td>3</td>
<td>Introduction to Real Analysis (Pre: MAT 1120)</td>
</tr>
</tbody>
</table>

#### C. Capstone Requirements (4 hours) Choose one option:

**OPTION 1**: 4 hours

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Prerequisite(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 4311</td>
<td>1</td>
<td>Capstone: Numerical Methods [CAP] (Co: MAT 4310)</td>
</tr>
</tbody>
</table>

3 hours MAT course (3)

**OPTION 2**: Choose one 4-hour combination (courses taken in the same semester); [CAP] is Capstone course: each has CO: of first course in each pair below

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Prerequisite(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAT 4010</td>
<td>1-3</td>
<td>Current Topics in Mathematics AND MAT 4011</td>
</tr>
<tr>
<td>MAT 4140</td>
<td>3</td>
<td>Differential Geometry (Pre: MAT 2130; Co: MAT 2240) AND MAT 4141</td>
</tr>
<tr>
<td>MAT 4220</td>
<td>3</td>
<td>Intro to Real Analysis II (Pre: MAT 3220) AND MAT 4221</td>
</tr>
<tr>
<td>MAT 4340</td>
<td>3</td>
<td>Intro to Operations Research (Pre: MAT 2240, STT 3850; Sr st) AND MAT 4341</td>
</tr>
<tr>
<td>MAT 4420</td>
<td>3</td>
<td>Dynamical Systems Theory (Pre: MAT 3130 or 3310) AND MAT 4421</td>
</tr>
<tr>
<td>MAT 4590</td>
<td>3</td>
<td>Adv Topics in Differential Equations (Pre: MAT 3130; Sr st) AND MAT 4591</td>
</tr>
<tr>
<td>MAT 4710</td>
<td>3</td>
<td>Intro to Topology (Pre: MAT 3220; Sr st) AND MAT 4711</td>
</tr>
<tr>
<td>MAT 4720</td>
<td>3</td>
<td>Abstract Algebra (Pre: MAT 3110; Sr st) AND MAT 4721</td>
</tr>
<tr>
<td>MAT 4990</td>
<td>3</td>
<td>Numerical Linear Algebra (Pre: MAT 4310; Sr st) AND MAT 4991</td>
</tr>
<tr>
<td>STT 4820</td>
<td>3</td>
<td>Design &amp; Analysis of Experiments (Pre: STT 3820; Sr st) AND STT 4821</td>
</tr>
<tr>
<td>STT 4830</td>
<td>3</td>
<td>Linear Regression Models (Pre: MAT 2240; STT 3830; Sr st) AND STT 4831</td>
</tr>
<tr>
<td>STT 4840</td>
<td>3</td>
<td>Regression &amp; Time Series Forec (Pre: MAT 2240; STT 3250, 3850) AND STT 4841</td>
</tr>
</tbody>
</table>

### D. Approved Electives: 40-9 hours in mathematical sciences to bring total hrs in AREA II to 65 hrs

- (At least 3 hours in MAT if STT combination was chosen in Area C. Capstone)

### E. Physical Sciences Concentration (17 hours)

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
<th>Prerequisite(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHY 2010</td>
<td>4</td>
<td>Intermediate Physics I (Pre: PHY 1104 or 1151, MAT 1120)</td>
</tr>
<tr>
<td>PHY 2020</td>
<td>4</td>
<td>Intermediate Physics II (Pre: PHY 1104, MAT 2130)</td>
</tr>
<tr>
<td>PHY 3210</td>
<td>3</td>
<td>Modern Physics I (Pre: PHY 1151 or Co: PHY 2010)</td>
</tr>
</tbody>
</table>

3 hours of approved electives** in physics at or above 2000 level

3 hours of approved electives** in physics or technology ** Must be approved by math sciences advisor.

### III. MINOR (optional)

### IV. ELECTIVES (taken to total 122 hours for the degree)

- 2 semester hours of free electives must be outside the major discipline.
I. GENERAL EDUCATION CURRICULUM 

Math 1110 will meet the Quantitative Literacy general education requirement.

II. MAJOR REQUIREMENTS (not including 4 s.h. counted in Area I, above)

2.0 major GPA is required for graduation. Major GPA calculation will include all courses taken in the major department, plus any other courses under II. Minimum of 18 semester hours of courses taken to fulfill major requirements must be courses offered by Appalachian.

A. Mathematics Common Core (14-15 hours)
- MAT 1110 (4) Calculus with Analytic Geometry I (Pre: MAT 1025 w/min grade C-)
- MAT 1120 (4) Calculus with Analytic Geometry II (Pre: MAT 1110 w/min grade C-)
- MAT 2110 (4) Techniques of Proof (Pre: MAT 1120)
- MAT 2240 (3) Introduction to Linear Algebra (Pre: MAT 1120)

B. Mathematics Courses for Concentration (16 hours)
- MAT 2130 (4) Calculus with Analytic Geometry III (Pre: MAT 1120 w/min grade C-)
- MAT 2310 (3) Computational Mathematics (Pre: MAT 1120)
- MAT 3130 (3) Introduction to Differential Equations (Pre: MAT 1120)
- MAT 3220 (3) Introduction to Real Analysis [WID] (Pre: RC 2001, MAT 2110 or 2510)
- MAT 4310 (3) Numerical Methods (Pre: MAT 2310, 2240; rec: MAT 2130 or 3130)

C. Capstone Requirements (4 hours) Choose one option:

OPTION 1: 4 hours
- MAT 4311 (1) Capstone: Numerical Methods [CAP] (Co: MAT 2310 and 4310)
3 hours MAT course (3)

OPTION 2: Choose one 4-hour combination (courses taken in the same semester); [CAP] is Capstone course: each has CO: of first course in each pair below
- MAT 4010 (1-3) Current Topics in Mathematics AND MAT 4011 (1) Current Topics in Math [CAP]
- MAT 4140 (3) Differential Geometry (Pre: MAT 2130; Co: MAT 2240) AND MAT 4141 (1) Differential Geometry [CAP]
- MAT 4220 (3) Intro to Real Analysis II (Pre: MAT 3220) AND MAT 4221 (1) Intro to Real Analysis II [CAP]
- MAT 4340 (3) Intro to Operations Research (Pre: MAT 2240, STT 3850; Sr st) AND MAT 4341 (1) Intro to Opera Research [CAP]
- MAT 4420 (3) Dynamical Systems Theory (Pre: MAT 3130 or 3310) AND MAT 4421 (1) Dynamical Systems Theory [CAP]
- MAT 4590 (3) Adv Topics in Differential Equations (Pre: MAT 3130; Sr st) AND MAT 4591 (1) Adv Topics in Diff Equations [CAP]
- MAT 4710 (3) Intro to Topology (Pre: MAT 3220; St st) AND MAT 4711 (1) Introduction to Topology [CAP]
- MAT 4720 (3) Abstract Algebra (Pre: MAT 3110; Sr st) AND MAT 4721 (1) Abstract Algebra [CAP]
- MAT 4990 (3) Numerical Linear Algebra (Pre: MAT 4310; Sr st) AND MAT 4991 (1) Numerical Linear Algebra [CAP]
- STT 4820 (3) Design & Analysis of Experiments (Pre: STT 3820; Sr st) AND STT 4821 (1) Design & Analysis of Exper [CAP]
- STT 4830 (3) Linear Regression Models (Pre: MAT 2240; STT 3830; Sr st) AND STT 4831 (1) Linear Regression Models [CAP]
- STT 4840 (3) Regression & Time Series Forec (Pre: MAT 2240; STT 3250, 3850) AND STT 4841 (1) Regression &Time Series Forec [CAP]

D. Approved Electives: 6-5 hours in mathematical sciences to bring total hrs in AREA II to 65

E. Statistics Concentration (25 hours)
- STT 3250 (4) Fundamentals of Probability (Pre: MAT 2130)
- STT 3850 (4) Statistical Data Analysis I (Pre: MAT 1110)
- STT 3851 (3) Statistical Data Analysis II [WID] (Pre: RC 2001, STT 3850)

5 hours of approved statistics electives** at or above STT 3830 (excluding STT 4811 and 4812)
9 hours of approved electives** in related coursework which may include courses from outside mathematical sciences

** Must be approved by mathematical sciences advisor.

III. MINOR (optional)

IV. ELECTIVES (taken to total 122 hours for the degree)

2 semester hours of free electives must be outside the major discipline.
Bachelor of Science (BS)  
Degree Code 260*  
Concentration Code 260D  

2016-2017 2018  
Program of Study for Mathematics Majors  

Math 1110 will meet the Quantitative Literacy general education requirement.  

II. MAJOR REQUIREMENTS (not including 4 s.h. counted in Area I, above)  
2.0 major GPA is required for graduation. Major GPA calculation will include all courses taken in the major department, plus any other courses under II. Minimum of 18 semester hours of courses taken to fulfill major requirements must be courses offered by Appalachian.

A. Mathematics Common Core (14-15 hours)
- MAT 1110 (4) Calculus with Analytic Geometry I (Pre: MAT 1025 w/min grade C-)
- MAT 1120 (4) Calculus with Analytic Geometry II (Pre: MAT 1110 w/min grade C-)
- MAT 2110 (4) Techniques of Proof (Pre: MAT 1120)
- MAT 2240 (3) Introduction to Linear Algebra (Pre: MAT 1120)

B. Mathematics Courses for the Concentration (14 hours)
- MAT 2130 (4) Calculus with Analytic Geometry III (Pre: MAT 1120 w/min grade C-)
- MAT 3220 (3) Intro to Real Analysis I (Pre: MAT 2110 or 2510)
- STT 3850 (4) Statistical Data Analysis I (Pre: MAT 1110)

Choose one:
- MAT 3130 (3) Intro to Differential Equations (Pre: MAT 1120)
- MAT 3310 (3) Discrete & Continuous Mathematical Models (Pre: MAT 1120; Co: 2240)

C. Capstone Requirement: (4 hours) - Choose one 4 hour combination (courses must be taken in same semester);
[CAP] is Capstone course: each has corequisite of first class in each pair below

- MAT 4010 (1-3) Current Topics in Mathematics
- MAT 4140 (3) Differential Geometry (Pre: MAT 2130; Co: MAT 2240)
- MAT 4220 (4) Calculus with Analytic Geometry IV (Pre: MAT 2240)
- MAT 4310 (3) Numerical Methods (Pre: MAT 2310, 2240; rec: MAT 2310 or 3130)
- MAT 4340 (3) Intro to Operations Research (Pre: MAT 2240, STT 3850; Sr st)
- MAT 4420 (3) Dynamical Systems Theory (Pre: MAT 3130 or 3310)
- MAT 4590 (3) Adv Topics in Differential Equations (Pre: MAT 3130; Sr st)
- MAT 4710 (3) Intro to Topology (Pre: MAT 3220; Sr st)
- MAT 4720 (3) Abstract Algebra (Pre: MAT 3110; Sr st)
- MAT 4990 (3) Numerical Linear Algebra (Pre: MAT 4310; Sr st)
- STT 4820 (3) Design & Analysis of Experiments (Pre: STT 3820; Sr st)
- STT 4830 (3) Linear Regression Models (Pre: MAT 2240; STT 3830; Sr st)
- STT 4840 (3) Regression & Time Series Forec (Pre: MAT 2240; STT 3250, 3850)

D. Major Approved Electives: 10-9 hours in mathematical sciences to bring total hours in AREA II to 65 hours

3 hours at the 4000 level
Remaining 7-6 hours: (At least 3 hours in MAT if STT combination was chosen in Area C. Capstone)

E. Business Concentration (at least 20-21 advisor-approved hours in business courses)

F. Concentration Electives (3-2 hours) Advisor-approved elective in business or mathematical sciences

III. MINOR (optional)

IV. ELECTIVES (taken to total 122 hours for the degree)  
2 semester hours of free electives must be outside the major discipline.
Bachelor of Science
Degree Code 260*
Concentration Code 260I

2016-2017
2017-2018

PROPOSED
MATHMATICS
SECONDARY EDUCATION LICENSURE

Math 1110 will count toward Quantitative Literacy general education requirement.

Math 1110 _____ (4) Calculus with Analytic Geometry I (Pre: MAT 1025 w/min grade C-)
MAT 1120 _____ (4) Calculus with Analytic Geometry II (Pre: MAT 1110 w/min grade C-)
MAT 2240 _____ (3) Introduction to Linear Algebra (Pre: MAT 1120)
MAT 3010 _____ (2) Survey in the History of Mathematics (Pre: MAT, 2110 or 2510)
MAT 3015 _____ (2) Junior Seminar for Mathematics Majors in Education (Pre: MAT 2240, 3010)

Choose one:
MAT 2110 _____ (3) Techniques of Proof (Pre: MAT 1120)
MAT 2510 _____ (4) Sophomore Honors Seminar (Pre: MAT 1120)

Choose one:
MAT 3110 _____ (3) Introduction to Modern Algebra [WID] (Pre: RC 2001, MAT 2110 or 2510; Co: MAT 2240)
MAT 3220 _____ (3) Introduction to Real Analysis I [WID] (Pre: RC 2001, MAT 2110 or 2510)

STT 4811 _____ (3) Statistical Concepts and Applications I (Pre: MAT 1120)
STT 4812 _____ (3) Statistical Concepts and Applications II with Probability Modeling (Pre: STT 4811)

* Grade of C required in MAT 1120, 3610, and 3110 or 3220 for CI 4900

5-67 s.h. approved courses in Mathematical Sciences to bring total hrs in AREA III to 48 hrs (at least 3 s.h. MAT at 4000 level):

B. Other Required Education Course (3 hours)
C I 4085* _____ (3) Teaching High School Mathematics (Pre: Sr. standing)

*Minimum “C” grade required

IV. MINOR (optional)

V. ELECTIVES (taken to total 122 hours for the degree)