UNIVERSITY CURRICULUM COMMITTEE
2014-15 Meeting #8, November 10, 2014

Present: Don Crowley, Janine Darragh, Dan Eveleth (Chair), Rachel Fujita, Isaiah Gyan, Tim Johnson, Joe Law, Rick Stoddart, Todd Thorsteinson, Kerri Vierling.

Absent: Pilar Alfaro, Heather Chermak, Rodney Frey, Pat Hart, Tim Prather, Jeanne Stevenson, Sarah Vetsmany.

Others Present: Levan Elbakidze, Dwaine Hubbard, Jodi Johnson-Maynard, Ruprecht Machleidt, Mark Nielsen, Barrie Robison, David Tank, Charles Tibbals.

Call to order: A quorum being present, the chair called the meeting to order at 3:33 p.m. in the SUB Cataldo room. The minutes of the November 03, 2014 meeting were approved.

Other Business:

Old Business:

New Business:

UCC-15-041 College of Agricultural and Life Sciences
Agricultural Economics and Rural Sociology: It was motioned and seconded to approve the proposed change to Agricultural Economics and Rural Sociology. Committee member Vierling asked about the non-thesis option being available to students who start in the thesis option and later lose their funding due to no fault of their own. Levan Elbakidze said it would be up to the student’s major professor and graduate committee to determine if moving to non-thesis would be appropriate for the student in that situation. Elbakidze stressed that the spirit of the rule is that students who receive funding are expected to produce a thesis. Hearing no further questions the motion to approve the proposed change passed unanimously.

1. Change the curricular requirements of Applied Economics (M.S.):

Candidates must fulfill the requirements of the College of Graduate Studies and of the Department of Agricultural Economics and Rural Sociology. See the College of Graduate Studies section for the applicable general requirements.

Master of Science, Major in Applied Economics. The M.S. program in applied economics is designed to prepare students for management, research, and policy positions in the public and private sectors of the economy, and for further graduate study.

The M.S. thesis option is offered as a 32 credit stand-alone degree or as a 32 credit thesis degree with optional emphasis area(s). The minimum of 32 required credits can be satisfied by taking a combination of 500 and 400 level courses, with at least 18 credits at 500 level, plus no more than 3 credits of 300 level courses in supporting areas.

An emphasis may be selected in any of the following three areas: Agricultural Economics; Natural Resources; Agribusiness. Both thesis options include six letter graded thesis credits (AgEc 500) and 26 credits of course work including the following: AgEc 506 (0 cr), AgEc 525 (3 cr), AgEc 526 (3 cr), AgEc 527 (3 cr), AgEc 529 (2 cr), and 15 credits of AgEc electives.

A student has the option to not pursue an emphasis in which case the student must complete as part of the 15 credits of AgEc electives, 6-9 credits chosen from the following courses: AgEc 532 (3 cr), AgEc 533/3 cr, AgEc 534 (3 cr), AgEc 535 (3 cr), and either AgEc 566 (3 cr) or AgEc 587 (3 cr).

If an emphasis area is chosen, two courses must be selected from those specifically listed in that emphasis area, which will be used as part of the 15 credits of AgEc electives. Emphasis areas are: Agribusiness: AgEc 535 (3 cr) & either AgEc 533 or AgEc 534 (3 cr); Agricultural Economics: AgEc 534 (3 cr) & AgEc 535 (3 cr); or Natural Resources: AgEc 532 (3 cr) and one additional course (3 cr). More than one emphasis area may be completed as long as each emphasis area requirement is met. However only the declared emphasis area will appear on the student’s transcript.

Students may take a non-thesis option M.S. degree. Under this option a student will take a minimum of 32 credits of course work including the 26 credits of departmental course requirements, which are the same as the stand-alone thesis option. For the non-thesis option, a three-credit paper will be written and presented by the student addressing a topic determined jointly by the student and the student's graduate committee. This option is only available for students not receiving financial support from research funds.

UCC-15-043 College of Agricultural and Life Sciences
Jodi Johnson-Maynard introduced the new major in Sustainable Food Systems. Committee member Stoddart asked how the determination was made that the Library resources were sufficient. Johnson-Maynard indicated that she believed the existing CALS resources were sufficient. Stoddart indicated that he reviewed what Montana State University had for resources and they had several we do not currently have on campus. Committee chair Eveleth asked about recruitment efforts for this program. Hearing no further questions the motion to approve the proposal passed unanimously and will be forwarded to Faculty Senate for review.

UCC-15-046 College of Science
Biological Sciences: It was motioned and seconded to approve the proposed change to Biological Sciences. Mark Nielsen noted that Biological Sciences had increased the number of faculty in their department which would accommodate any new course offerings. Dwaine Hubbard asked about requiring Biol 114 as a prerequisite for Biol 115. Nielsen said Biol 114 was not intended as a prerequisite to Biol 115. Committee chair Eveleth asked for clarification on the enforcement of the minimum ‘C’ grade on Biol 114 and Biol 115. Barrie Robison provided some background and context on the major curriculum overhaul Biological Sciences has been undergoing. Hearing no further questions the motion to approve the proposed change passed unanimously.

1. Add the following courses:

   **Biol 301** Undergraduate Research (1-4 cr, max 8)
   Undergraduate research for students without senior standing.
   Prereq: Permission

   **Biol 416** Plant Diversity and Evolution (4 cr)
   Origin, evolution, and diversity of major land plant groups; emphasis on systematics, anatomy, morphology, ecological diversity, and macroevolution. Two lec and one 3-hr lab a wk; one field trip. Cooperative: open to WSU degree-seeking students. (Fall only)
   Prereq: Biol 114 and Biol 115

   **Biol J460/J560** Advanced Field Botany (3 cr)
   Hands-on training in field botany as applied to evolutionary, ecological, and floristic studies; two-week field course in the Inland Northwest. Additional projects/assignments reqd for grad cr. (Summer only)
   Prereq: Instructor Permission

   **Biol 536** Phylogenetics Reading Group (1 cr)
   Review recent articles in phylogenetics and systematics journals. Students choose, critically review, and discuss the articles to develop critical-thinking skills and confidence in their knowledge of the literature. Graded P/F. Cooperative: open to WSU degree-seeking students.

2. Reactivate and change the following course:

   **Biol 484** Invertebrate Zoology (4 cr)
   Morphology of freshwater, marine, and terrestrial invertebrates and phylogeny of major groups. Three lec and one 3-hr lab a wk.
   Prereq: Biol 114 and Biol 115 and 116

3. Change the following courses:

   **Biol 116–114** Organisms and Environments (4 cr)
   The evolution of diversity, the biology of plants and animals, and their environments. Three lec and one 3-hr lab a wk.
   Prereq: Biol 115 and Chem 104 or 111

   **Biol 401** Undergraduate Research (1-4 cr, max 8)
   Same as MMBB 401. Individual Study. Undergraduate research at the senior level.
   Prereq: Senior Standing and Permission of Instructor

   **Biol 456** Computer Skills for Biologists (3 cr)
   Management and analysis of complicated datasets such as those in molecular evolution, systematics, and genomics. Demonstrations, exercises, and student projects to teach advanced Unix skills, programming (e.g. Perl and R), and data management. Cooperative: open to WSU degree-seeking students. (Fall, alt/even yrs)
   Prereq: Biol 310; and Stat 251 or Stat 301; or Permission

   **Biol 522** Molecular Evolution (3 cr)
   Understanding evolutionary processes and patterns at the molecular level, techniques for using genetic and genomic data understand evolutionary history of organisms, 3 lectures per week. Cooperative: open to WSU degree-seeking students.
   Prereq: Undergraduate require permission of instructor

   **Biol 545** Principles of Systematic Biology (3 cr)
   The inference of evolutionary trees (phylogeny) and the processes that generate biodiversity from analyses of morphological, molecular, and behavioral data; uses of phylogenies in testing evolutionary and other hypotheses at both inter and intraspecific levels. Two hrs of lec and one 3-hr lab a wk. Cooperative: open to WSU degree-seeking students. (Spring, Alt/ys)
   Prereq: PlSc 205 or Biol 213; and Biol 310

   **MMBB Biol 154** Introductory Microbiology (3 cr)
   Carries no credit after Biol 250. May be taken by microbiology majors, but carries no cr after Biol 250. Introduction to microorganisms and their role in disease, health, foods, and the environment; current topics in microbiology. (Spring only)
4. Change the curricular requirements of **Biochemistry (B.S.Biochem.)**:

Required course work includes the university requirements (see regulation J-3) and:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Biol 101</td>
<td>Perspectives in Biology (1 cr)</td>
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<tr>
<td>Biol 114</td>
<td>Organisms and Environments (4 cr)</td>
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<tr>
<td>Biol 115</td>
<td>Cells and the Evolution of Life (4 cr)</td>
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<td>Biol 310</td>
<td>Genetics (3 cr)</td>
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<tr>
<td>Biol 312</td>
<td>Molecular and Cellular Biology (3 cr)</td>
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<tr>
<td>Biol 313</td>
<td>Molecular and Cellular Laboratory (1 cr)</td>
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<td>Biol 315</td>
<td>Genetics Lab (1 cr)</td>
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<td>Biol 380, Biol 382</td>
<td>Biochemistry I and Lab (6 cr)</td>
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<td>Biol 400</td>
<td>Seminar (1 cr)</td>
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<td>Biol 454</td>
<td>Biochemistry II (3 cr)</td>
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<tr>
<td>Chem 111</td>
<td>Principles of Chemistry I (4 cr)</td>
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<td>Chem 112</td>
<td>Principles of Chemistry II (5 cr)</td>
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<tr>
<td>Chem 253, 254</td>
<td>Quantitative Analysis and Lab (5 cr)</td>
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<td>Chem 277</td>
<td>Organic Chemistry I (3 cr)</td>
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<td>Chem 278</td>
<td>Organic Chemistry I: Lab (1 cr)</td>
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<tr>
<td>Chem 305</td>
<td>Physical Chemistry (3 cr)</td>
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<td>Chem 306</td>
<td>Physical Chemistry (3 cr)</td>
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<tr>
<td>Chem 372</td>
<td>Organic Chemistry II (3 cr)</td>
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<tr>
<td>Chem 374</td>
<td>Organic Chemistry II: Lab (1 cr)</td>
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<tr>
<td>Math 170</td>
<td>Analytic Geometry and Calculus I (4 cr)</td>
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<td>Math 175</td>
<td>Analytic Geometry and Calculus II (4 cr)</td>
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<tr>
<td>Math 275</td>
<td>Analytic Geometry and Calculus III (3 cr)</td>
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<tr>
<td>MMBB 409</td>
<td>Seminar (1 cr)</td>
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<tr>
<td>Phys 211</td>
<td>Engineering Physics I (4 cr)</td>
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<td>Phys 212</td>
<td>Engineering Physics II (4 cr)</td>
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<tr>
<td>Stat 251</td>
<td>Statistical Methods (3 cr)</td>
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<td>One of the following (3-4 cr):</td>
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<tr>
<td>Biol 310, Biol 315</td>
<td>Genetics and Lab (4-4 cr)</td>
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<td>Gene 314</td>
<td>General Genetics (3 cr)</td>
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<td>One of the following (3 cr):</td>
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<tr>
<td>Chem 302</td>
<td>Principles of Physical Chemistry (3 cr)</td>
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<td>Chem 305</td>
<td>Physical Chemistry (3 cr)</td>
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<td>Chem 306</td>
<td>Physical Chemistry (3 cr)</td>
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<td>One of the following (3 cr):</td>
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<tr>
<td>Engl 207</td>
<td>Persuasive Writing (3 cr)</td>
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<td>Engl 208</td>
<td>Personal and Exploratory Writing (3 cr)</td>
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<td>Engl 317</td>
<td>Technical Writing (3 cr)</td>
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<td>One of the following Senior Experience Courses (2 cr):</td>
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<tr>
<td>Biol 401</td>
<td>Undergraduate Research (1-4 cr, max 8)</td>
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<td>Biol 405</td>
<td>Practicum in Anatomy Laboratory Teaching (2 cr)</td>
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<td>Biol 407</td>
<td>Practicum in Biology Laboratory Teaching (2 cr)</td>
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<td>Biol 408</td>
<td>Practicum in Human Physiology Laboratory Teaching (2 cr)</td>
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<td>Biol 411</td>
<td>Senior Capstone (2 cr)</td>
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<td>Select two of the following (6 cr):</td>
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<td>Biol 432</td>
<td>Immunology (3 cr)</td>
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<td>Biol 444</td>
<td>Genomics (3 cr)</td>
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<td>Biol 461</td>
<td>Neurobiology (3 cr)</td>
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<tr>
<td>Biol 482</td>
<td>Protein Structure and Function (3 cr)</td>
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<tr>
<td>Biol 485</td>
<td>Prokaryotic Molecular Biology (3 cr)</td>
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<td>Biol 487</td>
<td>Eukaryotic Molecular Genetics (3 cr)</td>
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<td>Chem 374</td>
<td>Organic Chemistry II: Lab (1 cr)</td>
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<tr>
<td>Chem 472</td>
<td>Rational Design of Pharmaceuticals (3 cr)</td>
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<td>Chem 473</td>
<td>Intermediate Organic Chemistry (3 cr)</td>
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<tr>
<td>FS 520</td>
<td>Instrumental Analysis (2 cr)</td>
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<tr>
<td>MMBB 409</td>
<td>Immunology (3 cr)</td>
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<tr>
<td>MMBB 482</td>
<td>Protein Structure and Function (3 cr)</td>
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<tr>
<td>MMBB 485</td>
<td>Prokaryotic Molecular Biology (3 cr)</td>
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<tr>
<td>MMBB 486</td>
<td>Plant Biochemistry (3 cr)</td>
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<td>MMBB 487</td>
<td>Eukaryotic Molecular Genetics (3 cr)</td>
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<tr>
<td>MMBB 488</td>
<td>Genetic Engineering (3 cr)</td>
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</tbody>
</table>
PlSc 488   Genetic Engineering (3 cr)
Courses to total 120 credits for this degree

5. Change the curricular requirements of **Biology** (B.S. or B.A.):

To graduate in this program, students must earn a minimum grade of C in *Biol 114* and *Biol 115* and *Biol 116* and must have a minimum gpa of 2.40 in *Biol 115*, *Biol 116*, *Biol 213*, *Biol 310*, and *Biol 312*.

Required course work includes the university requirements (see regulation J-3) and the following major requirements (electives to be chosen in consultation with the departmental advisor):

- **Biol 101** Perspectives in Biology (1 cr)
- **Biol 114** Organisms & Environments (4 cr)
- **Biol 115** Cells and the Evolution of Life (4 cr)
- **Biol 116** Organisms & Environments (4 cr)
- **Biol 213** Principles of Biological Structure and Function (4 cr)
- **Biol 310**, **Biol 311** Genetics and Lab (4 cr)
- **Biol 312** Molecular and Cellular Biology (3 cr)
- **Biol 313** Molecular and Cellular Laboratory (1 cr)
- **Biol 314** Ecology and Population Biology (4 cr)
- **Biol 315** Genetics Lab (1 cr)
- **Biol 400** Seminar (1 cr)
- **Biol 421** Advanced Evolutionary Biology (3 cr)
- **Chem 111**, **Chem 112** General Chemistry I (4 cr)
- **Chem 277** Organic Chemistry and Lab (4 cr)

- **Math 170** Analytic Geometry and Calculus I (4 cr)
- **Phys 111**, **Phys 111L** General Physics I and Lab (4 cr)
- **Phys 112**, **Phys 112L** General Physics II and Lab (4 cr)
- **Stat 251** Statistical Methods (3 cr)

One of the following (3-4 cr):
- **Biol 300** Survey of Biochemistry (3 cr)
- **Biol 380** Biochemistry I (4 cr)

One of the following Senior Experience Courses (2 cr):
- **Biol 401** Undergraduate Research (1-4 cr, max 8)
- **Biol 405** Practicum in Anatomy Laboratory Teaching (2 cr)
- **Biol 407** Practicum in Biology Laboratory Teaching (2 cr)
- **Biol 408** Practicum in Human Physiology Laboratory Teaching (2 cr)

- **Biol 411** Senior Capstone (2 cr)
- **Engl 207** Persuasive Writing (3 cr)
- **Engl 208** Personal and Exploratory Writing (3 cr)
- **Engl 317** Technical Writing (3 cr)

One of the following (4 cr):
- **Phys 111**, **Phys 111L** General Physics I and Lab (4 cr)
- **Phys 211**, **Phys 211L** Engineering Physics I and Lab (4 cr)

One of the following (4 cr):
- **Phys 112**, **Phys 112L** General Physics II and Lab (4 cr)
- **Phys 212**, **Phys 212L** Engineering Physics II and Lab (4 cr)

One of the following (3 cr):
- **Stat 251** Statistical Methods (3 cr)
- **Stat 301** Probability and Statistics (3 cr)

One of the following (2 cr):
- **Biol 405** Practicum in Anatomy Laboratory Teaching (2 cr)
- **Biol 407** Practicum in Biology Laboratory Teaching (2 cr)
- **Biol 408** Practicum in Human Physiology Laboratory Teaching (2 cr)
- **Biol 411** Senior Capstone (2 cr)
- **Biol 495** Research in Molec/Cell/Dev Biology (2 cr)
Biol 496  Research in Ecology and Evolution (2 cr)
Biol 497  Research in Anatomy and Physiology (2 cr)

One of the following (4 cr):
Chem 275,  Carbon Compounds and Lab (4 cr)
Chem 276
Chem 277,  Organic Chemistry and Lab (4 cr)
Chem 278

One of the following (4 cr):
Math 160  Survey of Calculus (4 cr)
Math 170  Analytic Geometry and Calculus I (4 cr)

One of the following (3-4 cr):
Biol 300  Survey of Biochemistry (3 cr)
Biol 380  Biochemistry I (4 cr)

NOTE: Students considering graduate school in biology are strongly encouraged to take Math 170, Chem 277/278, and Biol 380.

9-14 credits of approved electives from the following list are required. (categories are intended only as a guide for student and advisor use). Additional classes can be substituted with prior approval of adviser and chairperson.

Biol 324  Comparative Vertebrate Anatomy (4 cr)
Biol 416  Plant Diversity and Evolution (4 cr)
Biol 423  Comparative Vertebrate Physiology (3 cr)
Biol 425  Special Topics: Experimental Field Ecology (3 cr)
Biol 428  Microscopic Anatomy (4 cr)
Biol 432  Immunology (3 cr)
Biol 444  Genomics (3 cr)
Biol 448  Plant-Animal Interactions (3 cr)
Biol 456  Computer Skills for Biologists (3 cr)
Biol 460  Advanced Field Botany (3 cr)
Biol 461  Neurobiology (3 cr)
Biol 474  Principles of Developmental Biology (3 cr)
Biol 478  Animal Behavior (3 cr)
Biol 482  Protein Structure and Function (3 cr)
Biol 483  Mammalogy (3 cr)
Biol 484  Invertebrate Zoology (4 cr)
Biol 487  Eukaryotic Molecular Genetics (3 cr)
Biol 489  Herpetology (4 cr)
Chem 414  Applications of Nanomaterials in Biomolecular Engineering (3 cr)
Ent 441  Insect Ecology (3 cr)
Fish 481  Ichthyology (4 cr)
Math 437  Mathematical Biology (3 cr)
PSc 415  Plant Pathology (3 cr)
PSc 440  Advanced Lab Techniques (4 cr)
PSc 476  Cell Biology (3 cr)
PSc 488  Genetic Engineering (3 cr)
REM 341  Systematic Botany (3 cr)
WLF 440  Conservation Biology (3 cr)
WLF 448  Fish and Wildlife Population Ecology (4 cr)
WLF 482  Ornithology (4 cr)

Natural History
Biol 478  Animal Behavior (3 cr)
Biol 481  Ichthyology (4 cr)
Biol 483  Mammalogy (3 cr)
Biol 489  Herpetology (4 cr)
REM 341  Systematic Botany (3 cr)
WLF 482  Ornithology (4 cr)

Anatomy/Physiology
Biol 324  Comparative Vertebrate Anatomy (4 cr)
Biol 423  Comparative Vertebrate Physiology (3 cr)
Biol 428  Microscopic Anatomy (4 cr)
MMBB 460  Microbial Physiology (3 cr)
PSc 415  Plant Pathology (3 cr)

Quantitative/Integrative Biology
Biol 425  ST: Experimental Field Ecology (3 cr)
Biol 448  Plant-Animal Interactions (3 cr)
Biol 456  Computer Skills for Biologists (3 cr)
Ent 441  Insect Ecology (3 cr)
Math 437  Mathematical Biology (3 cr)
6. Change the curricular requirements of Microbiology (B.S. Microbiol.):

To graduate in this program, students must earn a minimum grade of C in Biol 114 and Biol 115. Required course work includes the university requirements (see regulation J-3) and:

**Biol 101**: Perspectives in Biology (1 cr)
**Biol 114**: Organisms & Environments (4 cr)
**Biol 115**: Cells and the Evolution of Life (4 cr)
Biol 250, Biol 255: General Microbiology and Lab (5 cr)

**Biol 310, Biol 315**: Genetics and Lab (4 cr)
**Biol 312**: Molecular and Cellular Biology (3 cr)
**Biol 313**: Molecular and Cellular Laboratory (1 cr)
**Biol 380**: Biochemistry I (4 cr)
**Biol 400**: Seminar (1 cr)
**Chem 111**: Principles of Chemistry I (4 cr)
**Chem 112**: Principles of Chemistry II (5 cr)
**Chem 253**: Quantitative Analysis and Lab (5 cr)
**Chem 254**:
Chem 277  Organic Chemistry I (3 cr)
Chem 278  Organic Chemistry I: Lab (1 cr)
Chem 372  Organic Chemistry II (3 cr)
Gene 314  General Genetics (3 cr)
Math 170  Analytic Geometry and Calculus I (4 cr)
MMBB 154  Introductory Microbiology (3 cr)
MMBB 400  Seminar (1 cr)
Stat 251  Statistical Methods (3 cr)

One of the following (4 cr):
Biol 310, Biol 315
Majors

Biol 380  Biochemistry I (4 cr)

One of the following (4 cr):
Biol 401, Biol 407
Biol 408, Biol 411

One of the following Senior Experience Courses (2 cr):
Biol 401  Undergraduate Research (4 cr in one semester)
Biol 405  Practicum in Anatomy Laboratory Teaching (2 cr)
Biol 407  Practicum in Biology Laboratory Teaching (2 cr)
Biol 408  Practicum in Human Physiology Laboratory Teaching (2 cr)
Biol 411  Senior Capstone (2 cr)

One of the following (3 cr):
Engl 207  Persuasive Writing (3 cr)
Engl 208  Personal and Exploratory Writing (3 cr)
Engl 317  Technical Writing (3 cr)

One of the following (4 cr):
Math 160  Survey of Calculus (4 cr)
Math 170  Analytic Geometry and Calculus I (4 cr)

One of the following (4 cr):
MMBB 401  Undergraduate Research (4 cr in one semester)
MMBB 440  Advanced Laboratory Techniques (4 cr)

One of the following (4 cr):
Phys 111, Phys 111L
Phys 211, Phys 211L

One of the following (4 cr):
Phys 112, Phys 112L
Phys 212, Phys 212L

At least two 15 credits of the following microbiology electives (6 cr):
Biol 432  Immunology (3 cr)
Biol 433  Pathogenic Microbiology (3 cr)
Biol 441  Cellular and Molecular Basis of Disease (3 cr)
Biol 447  Virology (3 cr)
Biol 452  Molecular Parasitology (3 cr)
Biol 482  Protein Structure and Function (3 cr)
Biol 485  Prokaryotic Molecular Biology (3 cr)
Biol 487  Eukaryotic Molecular Genetics (3 cr)
PSc 476  Cell Biology (3 cr)
PSc 488  Genetic Engineering (3 cr)
Soil 425  Microbial Ecology (3 cr)
MMBB 400  Immunology (3 cr)
MMBB 412  Pathogenic Microbiology (3 cr)
MMBB 432  Virology (3 cr)
MMBB 450  Microbial Physiology (3 cr)
MMBB 453  Molecular Parasitology (3 cr)

At least two of the following molecular biology electives (5-6 cr):
MMBB 422  Cellular and Molecular Basis of Disease (3 cr)
MMBB 475  Cell Biology (3 cr)
MMBB 485  Prokaryotic Molecular Biology (3 cr)
MMBB 487  Eukaryotic Molecular Genetics (3 cr)
MMBB 488  Genetic Engineering (3 cr)
Science Electives (6 cr)
One of the following (3 cr):
Stat 251 Statistical Methods (3 cr)
Stat 301 Probability and Statistics (3 cr)

Courses to total 120 credits for this degree

Note for double majors in Molecular Biology and Microbiology: Elective courses that count toward one degree cannot be counted as a science elective in the second degree.

7. Change the curricular requirements of Molecular Biology and Biotechnology (B.S.M.B.B.):

To graduate in this program, students must earn a minimum grade of C in Biol 114 and Biol 115. Required course work includes the university requirements (see regulation J-3) and:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>Biol 101</td>
<td>Perspectives in Biology (1 cr)</td>
</tr>
<tr>
<td>Biol 114</td>
<td>Organisms &amp; Environments (4 cr)</td>
</tr>
<tr>
<td>Biol 115</td>
<td>Cells and the Evolution of Life (4 cr)</td>
</tr>
<tr>
<td>Biol 250, Biol 255</td>
<td>General Microbiology and Lab (5 cr)</td>
</tr>
<tr>
<td>Biol 310, Biol 315</td>
<td>Genetics and Lab (4 cr)</td>
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<tr>
<td>Biol 312</td>
<td>Molecular and Cellular Biology (3 cr)</td>
</tr>
<tr>
<td>Biol 313</td>
<td>Molecular and Cellular Laboratory (1 cr)</td>
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<tr>
<td>Biol 380, Biol 382</td>
<td>Biochemistry I and Lab (6 cr)</td>
</tr>
<tr>
<td>Biol 400</td>
<td>Seminar (1 cr)</td>
</tr>
<tr>
<td>Biol 454</td>
<td>Biochemistry II (3 cr)</td>
</tr>
<tr>
<td>Chem 111</td>
<td>Principles of Chemistry I (4 cr)</td>
</tr>
<tr>
<td>Chem 112</td>
<td>Principles of Chemistry II (5 cr)</td>
</tr>
<tr>
<td>Chem 253, Chem 254</td>
<td>Quantitative Analysis and Lab (5 cr)</td>
</tr>
<tr>
<td>Chem 277</td>
<td>Organic Chemistry I (3 cr)</td>
</tr>
<tr>
<td>Chem 278</td>
<td>Organic Chemistry I: Lab (1 cr)</td>
</tr>
<tr>
<td>Chem 372</td>
<td>Organic Chemistry II (3 cr)</td>
</tr>
<tr>
<td>Math 170</td>
<td>Analytic Geometry and Calculus I (4 cr)</td>
</tr>
<tr>
<td>MMBB 400</td>
<td>Seminar (1 cr)</td>
</tr>
<tr>
<td>MMBB PlSc</td>
<td>Genetic Engineering (3 cr)</td>
</tr>
<tr>
<td>Stat 251</td>
<td>Statistical Methods (3 cr)</td>
</tr>
<tr>
<td>Biol 310, Biol 315</td>
<td>Genetics and Lab (4 cr)</td>
</tr>
<tr>
<td>Gene 314</td>
<td>General Genetics (3 cr)</td>
</tr>
</tbody>
</table>

One of the following (3 cr):

Math 150 Survey of Calculus (4 cr)
Math 170 Analytic Geometry and Calculus I (4 cr)

One of the following (3 cr):

MMBB Biol Prokaryotic Molecular Biology (3 cr)
485
MMBB Biol Eukaryotic Molecular Genetics (3 cr)
487

Select three of the following (8-10 cr):

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biol 432</td>
<td>Immunology (3 cr)</td>
</tr>
<tr>
<td>Biol 433</td>
<td>Pathogenic Microbiology (3 cr)</td>
</tr>
<tr>
<td>Biol 444</td>
<td>Virology (3 cr)</td>
</tr>
<tr>
<td>Biol 447</td>
<td>Virology (3 cr)</td>
</tr>
<tr>
<td>Biol 461</td>
<td>Neurobiology (3 cr)</td>
</tr>
<tr>
<td>Biol 462</td>
<td>Molecular Parasitology (3 cr)</td>
</tr>
<tr>
<td>Biol 474</td>
<td>Principles of Developmental Biology (3 cr)</td>
</tr>
<tr>
<td>Biol 482</td>
<td>Protein Structure and Function (3 cr)</td>
</tr>
<tr>
<td>Biol 485</td>
<td>Prokaryotic Molecular Biology (3 cr)</td>
</tr>
<tr>
<td>Biol 487</td>
<td>Eukaryotic Molecular Genetics (3 cr)</td>
</tr>
<tr>
<td>FS 520</td>
<td>Instrumental Analysis (2 cr)</td>
</tr>
<tr>
<td>PlSc 476</td>
<td>Cell Biology (3 cr)</td>
</tr>
</tbody>
</table>

One of the following (4 cr):

Biol 401 Undergraduate Research (4 cr)
PlSc 440 Advanced Laboratory Techniques (4 cr)
Biol 499 Directed Study (4 cr)

One of the following Senior Experience Courses (2 cr):

Biol 401 Undergraduate Research (1-4 cr, max 8)
**Biol 405**  Practicum in Anatomy Laboratory Teaching (2 cr)
**Biol 407**  Practicum in Biology Laboratory Teaching (2 cr)
**Biol 408**  Practicum in Human Physiology Laboratory Teaching (2 cr)
**Biol 411**  Senior Capstone (2 cr)

One of the following (3 cr):
- **Engl 207**  Persuasive Writing (3 cr)
- **Engl 208**  Personal and Exploratory Writing (3 cr)
- **Engl 317**  Technical Writing (3 cr)

One of the following (4 cr):
- **Phys 111**  General Physics I (4 cr)
- **Phys 111L**  General Physics I Lab (4 cr)
- **Phys 211**  Engineering Physics I (4 cr)
- **Phys 211L**  Engineering Physics I Lab (4 cr)

One of the following (4 cr):
- **Phys 112**  General Physics II (4 cr)
- **Phys 112L**  General Physics II Lab (4 cr)
- **Phys 212**  Engineering Physics II (4 cr)
- **Phys 212L**  Engineering Physics II Lab (4 cr)

One of the following (4 cr):
- **MMBB 401**  Undergraduate Research (4 cr)
- **MMBB 440**  Advanced Laboratory Techniques (4 cr)
- **MMBB 499**  Directed Study (4 cr)

Select two of the following (5-6 cr):
- **Biol 444**  Genomics (3 cr)
- **MMBB 409**  Immunology (3 cr)
- **MMBB 412**  Pathogenic Microbiology (2 cr)
- **MMBB 422**  Cellular and Molecular Basis of Disease (3 cr)
- **MMBB 432**  Virology (3 cr)
- **MMBB 475**  Cell Biology (3 cr)
- **MMBB 485**  Prokaryotic Molecular Biology (3 cr)*
- **MMBB 487**  Eukaryotic Molecular Genetics (3 cr)*

One of the following (3 cr):
- **Stat 251**  Statistical Methods (3 cr)
- **Stat 301**  Probability and Statistics (3 cr)

Courses to total 120 credits for this degree

*Note: Either **MMBB-Biol 485** or **MMBB-Biol 487** may be used as an elective if not taken above as a required course.

**Geography:** It was motioned and seconded to approve the proposed changes to Geography. Hearing no questions the motion to **approve** the proposed changes passed unanimously.

1. Add the following courses:
   - **Geog 260**  Introduction to Geopolitics (3 cr)
     The course introduces students to contemporary approaches to geopolitics through the exploration of key geographic concepts and the ideas of structure and agency. Topics include terrorism, nationalism, militarism, borders, and environmental geopolitics. Current events are discussed to exemplify the concepts.

   - **Geog 430**  Climate Change Ecology (3 cr)
     Climate change impacts on ecosystems, plants, and animals; feedbacks to climate change; climate change mitigation related to ecosystems and species.
     **Prereq:** Biol 114 or EnvS 101 or Geog 100 or For 221 or REM 221 or Permission of Instructor

   - **Geog 489**  Capstone Preparation (1 cr)
     Planning and preparation for senior project to be carried out in subsequent semester. Students learn expectations for the senior project, plan their project, gather data and other resources and develop an agreement with their faculty mentor.

2. Change the following courses:
   - **Geog 240--J345/J545  Global** Economic Geography (3 cr)
     An overview of major developments and contemporary debates in the economic geography literature; economic globalization, the spatial dimensions of resource use, agriculture, industry, and post-industry landscapes, economic aspects of land-use change, location theory and case studies. Additional projects required for graduate credit. Reciprocal relations between people and the earth environment within an economic framework: resources, distribution, developmental alternatives, movement, processing and industrialization, local to global perspective, theories and case studies.
**Geog 440 The New Global Alternative Spatial Economy (3 cr)**

Course will explore alternative approaches to neoclassical economics and classical economic geography at the global and regional scale useful in economic geography. Steady state economy, New-Keynesianism, dependence and uneven development, the world-systems perspective, evolutionary economics and Marxist perspectives are presented. The course will explore the structures of globalization from convergence and labor migration to trade bloc formation and regional specialization. An understanding of the role of location in the creation and modification of global, national and regional economic landscapes will be emphasized. (Alt/yr)

**Prereq:** Geog 345 or Geog 350 or Permission of Instructor

3. **Change the curricular requirements of Geography (B.S.):**

   This program is offered through the College of Science. Required course work includes the university requirements (see regulation J-3) and:

   **Note:** Students must earn a grade of "C" or better in all Geography courses.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engl 313</td>
<td>Business Writing or Engl 317 Technical Writing (3 cr)</td>
</tr>
<tr>
<td>Geog 100</td>
<td>Physical Geography and Lab (4 cr)</td>
</tr>
<tr>
<td>Geog 100L</td>
<td>Human Geography (3 cr)</td>
</tr>
<tr>
<td>Geog 200</td>
<td>World Regional Geography (3 cr)</td>
</tr>
<tr>
<td>Geog 313</td>
<td>Global Climate Change (3 cr)</td>
</tr>
<tr>
<td>Geog 385</td>
<td>GIS Primer (3 cr)</td>
</tr>
<tr>
<td>Geog 390</td>
<td>Cartographic Design &amp; Geovisualization (3 cr)</td>
</tr>
<tr>
<td>Geog 493</td>
<td>Senior Capstone in Geography (3 cr)</td>
</tr>
<tr>
<td>Math 143</td>
<td>Pre-calculus Algebra and Analytic Geometry (3 cr)</td>
</tr>
<tr>
<td>Stat 251</td>
<td>Statistical Methods (3 cr)</td>
</tr>
<tr>
<td>Engl 313</td>
<td>Business Writing (3 cr)</td>
</tr>
<tr>
<td>Engl 317</td>
<td>Technical Writing (3 cr)</td>
</tr>
</tbody>
</table>

   **One of the following (3 cr):**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 143</td>
<td>Pre-calculus Algebra and Analytic Geometry (3 cr)</td>
</tr>
<tr>
<td>Math 160</td>
<td>Survey of Calculus (4 cr)</td>
</tr>
<tr>
<td>Math 170</td>
<td>Analytic Geometry and Calculus I (4 cr)</td>
</tr>
<tr>
<td>Math 175</td>
<td>Analytic Geometry and Calculus II (4 cr)</td>
</tr>
</tbody>
</table>

   Students must also choose 3 credits from the following courses in human geography (3 cr):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geog 240</td>
<td>Economic Geography (3 cr)</td>
</tr>
<tr>
<td>Geog 330</td>
<td>Urban Geography (3 cr)</td>
</tr>
<tr>
<td>Geog 340</td>
<td>Business Location Decisions (3 cr)</td>
</tr>
<tr>
<td>Geog 350</td>
<td>Geography of Development (3-4 cr)</td>
</tr>
<tr>
<td>Geog 360</td>
<td>Population Dynamics and Distribution (3-4 cr)</td>
</tr>
<tr>
<td>Geog 365</td>
<td>Political Geography (3 cr)</td>
</tr>
<tr>
<td>Geog 409</td>
<td>Rural Development (3 cr)</td>
</tr>
<tr>
<td>Geog 420</td>
<td>Land, Resources, and Environment (3 cr)</td>
</tr>
<tr>
<td>Geog 440</td>
<td>The New Global Economy (3 cr)</td>
</tr>
</tbody>
</table>

   Students must also choose 3 credits from the following courses in physical geography (3 cr):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geog 301</td>
<td>Meteorology (3 cr)</td>
</tr>
<tr>
<td>Geog 401</td>
<td>Climatology (3 cr)</td>
</tr>
<tr>
<td>Geog 410</td>
<td>Biogeography (3 cr)</td>
</tr>
<tr>
<td>Geog 430</td>
<td>Climate Change Ecology (3 cr)</td>
</tr>
<tr>
<td>Geog 412</td>
<td>Applied Meteorology and Climatology (3 cr)</td>
</tr>
<tr>
<td>REM 450</td>
<td>Global Environmental Change (3 cr)</td>
</tr>
</tbody>
</table>

   Students must also choose 3 credits from the following courses in human-environment interactions (3 cr):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geog 364</td>
<td>Idaho and the Pacific Northwest (3 cr)</td>
</tr>
<tr>
<td>Geog 411</td>
<td>Natural Hazards and Society (3 cr)</td>
</tr>
<tr>
<td>Geog 420</td>
<td>Land, Resources, and Environment (3 cr)</td>
</tr>
<tr>
<td>Geog 435</td>
<td>Climate Change Mitigation (3 cr)</td>
</tr>
<tr>
<td>Geog 455</td>
<td>Societal Resilience and Adaptation to Climate Change (3 cr)</td>
</tr>
<tr>
<td>Geog 491</td>
<td>Field Techniques (3 cr)</td>
</tr>
</tbody>
</table>

   6 additional credits in Geography courses, for a total minimum number of 36 credits in Geography

4. **Change the curricular requirements of Climate Change (Minor):**
Geog 313  Global Climate Change (3 cr)

Choose **two-three** of the following courses (6-9 cr):
- Geog 401  Climatology (3 cr)
- Geog 430  Climate Change Ecology (3 cr)
- Geog 435  Climate Change Mitigation (3 cr)
- Geog 455  Societal Resilience and Adaptation to Climate Change (3 cr)

Geog 493  Senior Capstone in Geography (3 cr)

Choose one of the following courses (3 cr):
- EnvS 497  Senior Research (3 cr)
- Geog 493  Senior Capstone in Geography (3 cr)
- REM 450  Global Environmental Change (3 cr)

An additional six credits chosen from the following (6 cr):
- AgEc 451  Applied Environmental and Natural Resource Economics (3 cr)
- AgEc 477  Law, Ethics, and Environment (3 cr)
- CSS 383  Natural Resource and Ecosystem Service Economics (3 cr)
- Econ 385  Environmental Economics (3 cr)
- EDCI 329  Elementary Science Education (3 cr)
- EDCI 433  Secondary Science Methods (3 cr)
- EnvS 101  Introduction to Environmental Science (3 cr)
- EnvS 235  International Environmental Issues Seminar (3 cr)
- EnvS 438  Western US Water Resource Policy and Environmental Equity (3 cr)

EnvS 483 or EnvS 583  Water and Energy Systems (3 cr)
- EnvS 484  History of Energy (3 cr)
- EnvS 485  Energy Efficiency and Conservation (3 cr)
- For 221  Ecology (3 cr)
- For 235  Society and Natural Resources (3 cr)
- For 326  Fire Ecology and Management (3 cr)
- For 330  Forest Soil and Canopy Processes (4 cr)
- For 426  Global Fire Ecology and Management (3 cr)
- For 463  Watershed Science and Management (3 cr)

Geog 100, 100L  Physical Geography and Lab (4 cr)
- Geog 301  Meterology (3 cr)

Geog 345  Global Economic Geography (3 cr)
- Geog 350  Geography of Development (3-4 cr)
- Geog 410  Biogeography (3 cr)
- Geog 411  Natural Hazards and Society (3 cr)
- JAMM 341  Mass Media Ethics (3 cr)
- JAMM 428  Environmental Journalism (3 cr)

REM 221  Ecology (3 cr)
- REM 429  Landscape Ecology (3 cr)
- Soil 205  The Soil Ecosystem (3 cr)

Courses to total **18 credits for this minor**

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5. **Change the curricular requirements of Geography information Systems (UG Academic Certificate):**

*Note: A grade of 'C' or higher is required in all coursework for this academic certificate.*

Geog 385  GIS Primer (3 cr)
- Geog 475  Intermediate GIS (3 cr)

Electives (9 cr)
- Geog 390  Cartographic Design & Geovisualization (3 cr)
- Geog 407 or Geog 507  Spatial Analysis and Modeling (3 cr)
- Geog 424 or Geog 524  Hydrologic Applications of GIS and Remote Sensing (3 cr)
- Geog 483 or Geog 583  Remote Sensing/GIS Integration (3 cr)
- Geog 486 or Geog 586  Transportation, GIS and Planning (3 cr)
- Geog 479  GIS Programming (3 cr)
- Geog 587  Advanced Topics in Remote Sensing (3 cr)

Courses to total **15 credits for this certificate**
**Mathematics:** It was motioned and seconded to approve the proposed changes to Mathematics. Mark Nielsen reviewed the proposed changes. Hearing no questions the motion to **approve** the proposed changes passed unanimously.

1. **Add the following subject prefix:**

   MthE – Mathematics Education

2. **Add the following courses:**

   **Math 427 Transformational Geometry (3 cr)**
   See MthE 527.

   **MthE 527 Transformational Geometry (3 cr)**
   Same as Math 427. Geometry concepts of congruence, parallelism, and similarity using rigid motions; the group structure of the collection of isometries and their matrix representations. For graduate credit, additional transformational approaches for calculus integration strategies are required. The course is of particular interest to secondary mathematics teaching majors.
   **Prereq:** Math 330 or equivalent

3. **Change the following courses:**

   **Math MthE 235 Mathematics for Elementary Teachers I (3 cr)**
   Mathematical development of arithmetic and problem solving as those subjects are currently taught in elementary schools. Three lec and one 1-hr lab a wk.
   **Prereq:** Math 137 or Math 143 or sufficient score on SAT, ACT, or COMPASS Math Test.

   **Math MthE 236 Mathematics for Elementary Teachers II (3 cr)**
   Mathematical development of informal geometry, problem solving, and probability and statistics as those subjects are currently taught in elementary schools. Three lec and one 1-hr lab a wk.
   **Prereq:** Math 235

   **Math MthE 301 Early Childhood Mathematics (4 cr)**
   Focus on the mathematics for early childhood: numbers and operations, algebraic thinking, geometry, measurement, probability and statistics. Emphasis will be placed on reasoning, representation, connections and communication. This course is restricted to students from either the School of Family and Consumer Sciences or the College of Education. This course will not count as a 300-level mathematics course in any major or minor in the College of Science. Recommended preparation: Stat 150. (Fall Only)
   **Prereq:** One general education math course

   **Math MthE 303 Early Childhood Math I (2 cr)**
   Focus on the mathematics of early childhood: numbers and operations. Emphasis is placed on reasoning, representation, connections and communication. This course is restricted to students from either the School of Family and Consumer Sciences or the College of Education. This course will not count as a 300-level mathematics course in any major or minor in the College of Science. Recommended preparation: general education math course.

   **Math MthE 304 Early Childhood Math II (2 cr)**
   Focus on the mathematics of early childhood: algebraic reasoning, geometry, measurement, probability and statistics. Emphasis is placed on reasoning, representation, connections and communication. This course is restricted to students from either the School of Family and Consumer Sciences or the College of Education. This course will not count as a 300-level mathematics course in any major or minor in the College of Science. Recommended preparation: general education math cores.

   **Math 388 History of Mathematics (3 cr)**
   Same as Hist 388. History of the development of mathematical ideas from ancient cultures to the present, including the relationship of those ideas to the cultures that produced them as well as an understanding of the mathematics involved. Cooperative: open to WSU degree-seeking students.
   **Prereq:** Math 175 and 330; or Permission

   **Math J453/J538 Stochastic Models (3 cr)**
   Same as Stat J453/J544. Markov chains, stochastic processes, and other stochastic models; applications. Additional projects/assignments reqd for grad cr. Cooperative: open to WSU degree-seeking students. (Spring, Alt/ysr)
   **Prereq:** Math 451 or Permission

   **Math MthE 513 Problem Solving Through History (3 cr)**
   Historical study of approaches to solving problems in geometry, number theory, and set theory. This course is specifically designed for the MAT program, and will not satisfy the requirements of other mathematics degree programs.
Math MthE 514  Foundations of Calculus (3 cr)
Real numbers, sequences, topology of the real numbers, continuous functions, differentiation, and integration; emphasis on
developing the conceptual understanding needed to teach calculus in secondary school. This course is specifically designed for the
MAT program, and will not satisfy the requirements of other mathematics degree programs.

Math MthE 515  Problems in Geometry (3 cr)
Exploration of topics in geometry with emphasis on developing geometric reasoning and problem solving. This course is specifically
designed for the MAT program, and will not satisfy the requirements of other mathematics degree programs.

Math MthE 516  Groups and Symmetry (3 cr)
Exploration of groups, symmetry, and permutations. This course is specifically designed for the MAT program, and will not satisfy the
requirements of other mathematics degree programs.

Math MthE 590  Seminar in Math Education (1-3 cr, max arr)
Topics in Mathematics Education. May be repeated for credit. Cooperative: open to WSU degree-seeking students.

Physics:  It was motioned and seconded to approve the proposed changes to Physics. Ruprecht Machleidt reviewed
the proposed changes. Hearing no questions the motion to approve the proposed changes passed unanimously.

1. Drop the following courses:

Phys 301  Junior Physics Lab (2 cr)
Experimental techniques in modern physics, including optics, atomic, nuclear, and solid state physics; computer uses, error analysis,
and scientific literature searches. One 1-hr lec and one 3-hr lab a wk. (Spring only)
Prereq: Phys 213/213L or Permission
Recommended Course Equivalent: None

Phys 412  Physical Instrumentation II (3 cr)
Methods and instruments used in experimental physics; electronic techniques; design problems in electronic measurement of
physical quantities encountered in research. Two lec and one 3-hr lab a wk.
Prereq: Phys 411
Recommended Course Equivalent: None

2. Add the following courses:

Phys 407  Communicating Science (1 cr)
Writing scientific abstracts, manuscripts, and grant proposals; peer review; presenting concepts to scientists in oral and poster form;
communicating to non-scientists.
Prereq: Junior or Senior Standing

Phys J438/J538 Biological Physics (3 cr)
Physics principles applied to biological systems including organisms, cells, and biomolecules. Techniques for studying biological
systems and phenomena. Additional projects/assignments required for graduate credit.
Prereq for Phys 438: Phys 212 or Phys 213; and Junior or Senior Standing
Prereq for Phys 538: Graduate Standing or Permission

Phys 492  Senior Research (1 cr)
Undergraduate research in one of the department focus areas. Scientific communication through one presentation to the scientific
community and one written report.
Prereq: Junior or Senior Standing; or Permission of Instructor

3. Change the following courses:

Phys 200  (s) Physics Seminar (1 cr, max 8)
Introductory-level discussion of topics in modern physics; introduction to physics research topics and scientific information search
techniques; written and/or oral reports of a pertinent topic in current physics. (Fall only)

Phys 211L Engineering Physics I Lab (1 cr)
Kinematics and dynamics, Newton's laws, work and energy, rotational dynamics, linear and angular momentum, collisions, static
equilibrium, oscillations, gravity and central forces. Three lec, one recitation, and one 2-hr lab a wk.
Prereq or Correq: Math 170 or Phys 211
Phys 212L  Engineering Physics II Lab (1 cr)
Electric fields and potentials, magnetic fields, capacitance and inductance, DC and AC circuits, electromagnetic waves. Three lec, one recitation, and one 2-hr lab a wk.  
Prereq: Phys 211/211L
Prereq or Coreq: Math 175

Phys 213L  Engineering Physics III Lab (1 cr)
Fluid dynamics, waves in elastic media, sound waves, temperature, heat and thermodynamics, kinetic theory, geometric and physical optics. Three lec, one recitation, and one 2-hr lab a wk. (Spring only)  
Prereq: Phys 211/211L
Prereq or Coreq: Math 175

Phys 321  Analytical Mechanics (3 cr)
Review of single-particle kinematics and dynamics; linear oscillations; Lagrangian dynamics; orbital dynamics; motion in non-inertial systems; space rotation of rigid bodies; kinematics and dynamics of particles; oscillating systems; dynamics of the rigid body. 
Prereq: Phys 212/212L and Math 275

Phys 322  Analytical Mechanics (3 cr)
Advanced topics in theoretical mechanics which may include: coupled linear oscillators; transition to a continuous system (vibrating string); Hamiltonian dynamics; non-linear dynamics; Principle of least action, dynamics of systems of particles, theory of oscillations, mechanics of continuous media. 
Prereq: Phys 321

Phys 341  Electromagnetic Fields I (3 cr)
This course is designed to provide undergraduate physics majors advanced instruction in electrostatics. The specific areas which will be covered are electric fields, electric potentials, work and energy in electrostatics, the technique of using the concept of image charges to solve for the electric field and electric potential of complex charge distributions, Laplace’s and Poisson’s equations, electric dipoles, polarization and polarizable materials, and the electric dipole approximation. Theory using vector calculus; electostatics; magnetostatics, electromagnetism, analysis of AC and DC circuits; Maxwell’s equations; radiation and propagation of electromagnetic waves. 
Prereq: Phys 212/212L and Math 275

Phys 342  Electromagnetic Fields II (3 cr)
This course is designed to provide undergraduate physics majors advanced instruction in electrodynamics and magnetism. The specific areas that will be covered are magnetostatics, magnetic fields in matter, the vector potential, electrodynamics, the complete set of Maxwell’s equations, electromagnetic waves, waveguides, electric and magnetic dipole radiation, retarded and advanced potentials, and radiation arising from accelerated charges and charge distributions. Theory using vector calculus; electostatics; magnetostatics, electromagnetism, analysis of AC and DC circuits; Maxwell’s equations; radiation and propagation of electromagnetic waves. 
Prereq: Phys 341

Phys 411  Physical Instrumentation I Advanced Physics Lab (3 cr)
Research skills, group dynamics, scientific literature research/drafting, automation and design techniques to prepare students for post-graduate life in a physics laboratory setting. 1-hr distributed lecture time and 3-hr effective lab time per week. Some weeks requiring scheduling machine utilization time outside of standard class hours per student. Methods and instruments used in experimental physics; electronic techniques; design problems in electronic measurement of physical quantities encountered in research. Two lec and one 3-hr lab a wk.  
Prereq: Phys 305 or Permission Phys 212/212L or Phys 213/213L and Math 275

Phys 433  Statistical Thermodynamics (3 cr)
Phys 433 same as Chem 495. Classical thermodynamics, entropy, thermodynamic potentials, kinetic theory, classical and quantum statistical mechanics, ensembles, partition functions, introduction to phase transitions. Additional assignments required for graduate credit. 
Prereq: Chem 306 or Phys 305 or equivalent

Phys 490  Research (1-6 cr, max 6)
Undergraduate research or thesis.  
Prereq: Junior standing in physics and Permission of department

Phys 533 Statistical Mechanics Thermodynamics (3 cr)
Ensembles, partition functions, classical and quantum statistics renormalization group, criticality, scaling, interacting systems, simulation. Cooperative: open to WSU degree-seeking students. See Phys 433/533.  
Prereq: Phys 333
Phys 541 Electromagnetic Theory I (3 cr)
Analytical tools and techniques describing electromagnetic phenomena, particularly Maxwell’s equations, electrostatic and magnetostatic systems, including currents and their interactions and boundary value problems. Includes Maxwell’s equations, electrostatics, magnetostatics, currents, and their interactions, general theory of emission, propagation, and absorption of electromagnetic waves, boundary value problems, relativistic formulation of electrodynamics. Cooperative: open to WSU degree-seeking students.
Prereq: Phys 322, Phys 342

Phys 542 Electromagnetic Theory II (3 cr)
Further examinations of the analytical tools and techniques that describe electromagnetic phenomena, particularly electrodynamics, the general theory of emission, propagation, and absorption of electromagnetic waves, and the relativistic formulation of electrodynamics. Includes Maxwell’s equations, electrostatics, magnetostatics, currents and their interactions, general theory of emission, propagation and absorption of electromagnetic waves, boundary value problems, relativistic formulation of electrodynamics. Cooperative: open to WSU degree-seeking students.
Prereq: Phys 322, Phys 342, Phys 541

Phys 550 Quantum Mechanics I (3 cr)
Fundamental concepts, base kets and matrix representation, position and momentum space; Schroedinger and Heisenberg picture, Schroedinger’s wave equation and solutions; theory of angular momentum. Physical basis; Schroedinger wave formulation, Heisenberg matrix formulation, transformation theory, approximation methods, radiation theory, theory of scattering; application to atomic systems. Cooperative: open to WSU degree-seeking students.
Prereq: Phys 305, Phys 322, Phys 351

Phys 551 Quantum Mechanics II (3 cr)
Theory of angular momentum continued: symmetries in quantum mechanics; approximation methods, time-dependent and time-independent perturbation theory, applications to atomic systems; radiation theory, theory of scattering. Physical basis; Schroedinger wave formulation, Heisenberg matrix formulation, transformation theory, approximation methods, radiation theory, theory of scattering; application to atomic systems. Cooperative: open to WSU degree-seeking students.
Prereq: Phys 305, Phys 322, Phys 550

4. Change the curricular requirements of Physics (B.S.):

Required course work includes the university requirements (see regulation J-3) and:

Chem 111 Principles of Chemistry I (4 cr)
Chem 112 Principles of Chemistry II (5 cr)
Math 170 Analytic Geometry and Calculus I (4 cr)
Math 175 Analytic Geometry and Calculus II (4 cr)
Math 275 Analytic Geometry and Calculus III (3 cr)
Phys 200 Physics Seminar (1 cr)
Phys 211, Phys 211L Engineering Physics I and Lab (4 cr)
Phys 212, Phys 212L Engineering Physics II and Lab (4 cr)
Phys 213, Phys 213L Engineering Physics III and Lab (4 cr)
Phys 305 Modern Physics (3 cr)
Phys 321 Analytical Mechanics (3 cr)
Phys 341 Electromagnetic Fields I (3 cr)
Phys 351 Introductory Quantum Mechanics I (3 cr)

And one of the following emphases:

A. General Physics Emphasis
Phys 342 Electromagnetic Fields II (3 cr)
Phys 371 Mathematical Physics (3 cr)
Phys 433 Statistical Thermodynamics (3 cr)

Upper-division mathematics electives (6 cr)

B. Applied Physics Emphasis
Math 310 Ordinary Differential Equations (3 cr)
Math 330 Linear Algebra (3 cr)
Phys 411 Advanced Physics Lab (4 cr) Physical Instrumentation I (3 cr)

Courses to total 120 credits for this degree

Four credits of upper-division lab work in physics and engineering
Physics and engineering electives (27 credit, of which at least 21 credits must be upper-division and at least 9 credits must be 400-level and 21 credits must come from the following: ECE 350 + ECE 351, ECE 460, ECE 462, Engr 210, Engr 240, Engr 335, Engr 350, ME 301, ME 412, ME 413, ME 420, MSE 201, MSE 313, MSE 427, MSE 464, Phys 333, Phys 428, Phys 433, Phys 443, Phys 444, Phys 464, Phys 490, Phys 491.)

Courses to total 120 credits for this degree

Statistical Science: It was motioned and seconded to approve the proposed changes to Statistical Science. Hearing no questions the motion to approve the proposed changes passed unanimously.

1. Change the status of the following courses from dormant to active:
   
   Stat J453/J544 Stochastic Models (3 cr)
   See Math J453/J538.

2. Add the following course:
   
   Stat 525 Master’s Econometrics (3 cr)
   Same as AgEc 525.

3. Change the following courses:
   
   Stat 251 Statistical Methods (3 cr)
   Credit not awarded for Stat 251 after Stat 301 or Stat 416, or for Stat 416 after Stat 251 or Stat 301. Credit awarded for only one of Stat 251, Stat 301, and Stat 416. Intro to statistical methods including design of statistical studies, basic sampling methods, descriptive statistics, probability and sampling distributions; inference in surveys and experiments, regression, and analysis of variance.
   Prereq: One of the following: Math 108, Math 137, Math 143, Math 160, Math 170, or Sufficient score on SAT, ACT, or COMPASS Math Test to qualify for registration in Math 130

   Stat 301 Probability and Statistics (3 cr)
   Credit not awarded for Stat 251 after Stat 301 or Stat 416, or for Stat 416 after Stat 251 or Stat 301. Credit awarded for only one of Stat 251, Stat 301, and Stat 416. Intended for engineers, mathematicians, and physical scientists. Intro to sample spaces, random variables, statistical distributions, hypothesis testing, basic experimental design, regression, and correlation.
   Prereq: Math 175

   Stat 416 Statistical Methods for Research (3 cr)
   Credit not awarded for Stat 251 after Stat 301 or Stat 416, or for Stat 416 after Stat 251 or Stat 301. Credit awarded for only one of Stat 251, Stat 301, and Stat 416. Concepts and methods in quantitative research including observational and experimental study design, point estimation, hypothesis testing, effect size, sample size, causation, one and two-way ANOVA, simple linear regression, interpreting and reporting results.
   Prereq: One of the following: Math 108, Math 137, Math 143, Math 160, Math 170, or Sufficient score on SAT, ACT, or COMPASS Math Test to qualify for registration in Math 130

   Stat 422 Sample Survey Sampling Methods (3 cr)
   Introduction to survey sampling designs and inference including simple, stratified, and cluster sampling. Ratio and regression estimators, unequal probability sampling, and population size estimation. Simple random, systematic, stratified random, one and two stage cluster sampling; introduction to variable probability sampling and estimation of population size. Two lec and one 1-hr lab a wk. Cooperative: open to WSU degree-seeking students.
   Prereq: Stat 251 or Stat 301 or Stat 416

   Stat 426 SAS Programming (3 cr)
   Coverage of a variety of methods for data manipulation, data management, and programming in the SAS language. DATA step programming methods including data transformation, functions for numeric and character data, input of complicated data files, and do loop usage. Data management topics include concatenating data files, sorting and merging data files and ARRAY statement usage. SAS programming with SAS modules such as SAS/Graph, SAS/IML, and SAS/Macro language. Other topics in SAS programming, such as covering other SAS modules in depth.
   Prereq: Stat 251 or Stat 301 or Stat 416

4. Change the curricular requirements of Statistics (Minor):
   
   Stat 422 Sample Survey Sampling Methods (3 cr)
   Stat 431Statistical Analysis (3 cr)
   One of the following (4 cr)
   Math 160  Survey of Calculus (4 cr)
   Math 170  Analytic Geometry and Calculus (4 cr)
One of the following (3 cr)
Stat 251  Statistical Methods (3 cr)
Stat 301  Probability and Statistics (3 cr)

Three of the following courses (9 cr):
Bus 421  Marketing Research and Analysis (3 cr)
Math 330  Linear Algebra (3 cr)
Math 451  Probability Theory (3 cr)
Math 452  Mathematical Statistics (3 cr)
Stat 433  Econometrics (3 cr)
Stat 456  Quality Management (3 cr)
Stat 514  Nonparametric Statistics (3 cr)
Stat 519  Multivariate Analysis (3 cr)

Courses to total 20 22 credits for this minor

UCC-15-047 College of Agricultural and Life Sciences
**Agricultural Economics and Rural Sociology:** It was motioned and seconded to approve the proposed change to Agricultural Economics and Rural Sociology. Committee chair Eveleth asked if the prerequisite of Stat 431 was offered regularly. Committee member Johnson said it was offered very regularly during the Fall and Spring and even some Summer semesters. Hearing no further questions the motion to **approve** the proposed change passed unanimously.

1. Change the following course:

   **AgEc 525 Master's Econometrics (3 cr)**
   
   *Same as Stat 525, Sampling techniques, Multivariate*
   
   Linear regression and analysis of variance with economic applications.
   
   Cooperative: open to WSU degree-seeking students.
   
   *Prereq: 3 cr in statistics Stat 431 or equivalent; or Permission of Instructor*

UCC-15-044 Army ROTC, Military Science

**Military Science:** It was motioned and seconded to approve the proposed change to Military Science. Committee chair Eveleth expressed some concern with combining the Military Science labs into the “lecture” course and not increasing the credits to account for the added work. This sentiment was shared by several committee members. Hearing no further questions the motion to **approve** the proposed change passed unanimously.

1. Drop the following courses:

   **MS 111 Leadership Lab (1 cr)**
   
   Building fundamental characteristics of leadership using a military model; hands-on training in small group leadership. Challenging outdoor activities such as mountaineering, rifle marksmanship, and land navigation skills. Two hours of lab every other week. Uniforms are furnished and wear is required during lab. By permission only, for those with an interest in pursuing an Army commission.
   
   *Coreq: Concurrent registration in MS 101*
   
   Recommended Equivalent Course: None

   **MS 112 Leadership Lab (1 cr)**
   
   Building fundamental characteristics of leadership using a military model; hands-on training in small group leadership. Challenging outdoor activities such as mountaineering, rifle marksmanship, and land navigation skills. Two hours of lab every other week. Uniforms are furnished and wear is required during lab. By permission only, for those with an interest in pursuing an Army commission.
   
   *Coreq: Concurrent registration in MS 102*
   
   Recommended Equivalent Course: None

   **MS 151 Physical Fitness Training (1 cr)**
   
   Physical fitness training focused on Army Standards for instruction and testing. Open to all UI students. (Fall only)
   
   Recommended Equivalent Course: None

   **MS 152 Physical Fitness Training (1 cr)**
   
   Physical fitness training focused on Army Standards for instruction and testing. Open to all UI students. (Spring only)
   
   Recommended Equivalent Course: None
MS 211 Leadership Lab (1 cr)
Building fundamental characteristics of leadership using a military model; hands-on training in small group leadership. Practical field training in variety of outdoor skills. Uniforms are furnished and wear is required during lab. Two hrs of lab every other week. By permission only, for those with a potential interest in pursuing an Army commission.

Coreq: Concurrent registration MS 201

Recommended Equivalent Course: None

MS 212 Leadership Lab (1 cr)
Building fundamental characteristics of leadership using a military model; hands-on training in small group leadership. Practical field training in variety of outdoor skills. Uniforms are furnished and wear is required during lab. Two hours of lab every other week. By permission only, for those with a potential interest in pursuing an Army commission.

Coreq: Concurrent registration MS 202

Recommended Equivalent Course: None

MS 251 Physical Fitness Training (1 cr)
Physical fitness training focused on Army Standards for instruction and testing. (Fall only)

Recommended Equivalent Course: None

MS 252 Physical Fitness Training (1 cr)
Physical fitness training focused on Army Standards for instruction and testing. (Spring only)

Recommended Equivalent Course: None

MS 311 Leadership Lab (1 cr)
Building fundamental characteristics of leadership using a military model; hands-on training in small group leadership. Two hrs of lab every other week.

Coreq: MS 301

Recommended Equivalent Course: None

MS 312 Leadership Lab (1 cr)
Building fundamental characteristics of leadership using a military model; hands-on training in small group leadership. Two hrs of lab every other week.

Coreq: MS 302

Recommended Equivalent Course: None

MS 351 Physical Fitness Training (1 cr)
Physical fitness training focused on Army Standards for instruction and testing. (Fall only)

Coreq: MS 301

Recommended Equivalent Course: None

MS 352 Physical Fitness Training (1 cr)
Physical fitness training focused on Army Standards for instruction and testing. (Spring only)

Coreq: MS 302

Recommended Equivalent Course: None

MS 411 Leadership Lab (1 cr)
Building fundamental characteristics of leadership using a military model; hands-on training in small group leadership. Two hrs of lab every other week.

Coreq: MS 401

Recommended Equivalent Course: None

MS 412 Leadership Lab (1 cr)
Building fundamental characteristics of leadership using a military model; hands-on training in small group leadership. Two hrs of lab every other week.

Coreq: MS 402
MS 451 Physical Fitness Training (1 cr)
Physical fitness training focused on Army Standards for instruction and testing. (Fall only)
Coreq: MS 401

Recommended Equivalent Course: None

MS 452 Physical Fitness Training (1 cr)
Physical fitness training focused on Army Standards for instruction and testing. (Spring only)
Coreq: MS 402

Recommended Equivalent Course: None

MS 489 Leadership Development Assessment Course (cr arr)
Intensive and broad-ranging leadership training provided to cadets at Fort Lewis over a four week period during the summer. Cadets are assessed on their ability to lead units ranging from 11-135 persons, to master a variety of physical and mental challenges, and to exhibit composure and leadership skills in stressful situations.
Prereq: MS 301, MS 302 and Permission

Recommended Equivalent Course: None

2. Change the following courses:

MS 101 Introduction to Military ScienceIntro to the Army & Critical Thinking (1 cr)
Introduces Cadets to the personal challenges and competencies that are critical for effective leadership. Cadets learn how the personal development of life skills such as critical thinking, goal setting, time management, stress management, and comprehensive fitness relate to leadership, officership, and the Army profession. Labs include leader’s reaction/ropes course, basic survival skills, drill and ceremony, and emergency preparedness. One lecture hour and one leadership lab hour; lab is optional – but highly encouraged – for noncontracted cadets. Introduction to mission and organization of the U.S. Army; provides background in role of an Army officer as a career choice in either the Active Army or the National Guard/Reserves; lecture, conference, and activities dealing with military subjects; texts provided by dept; no mandatory uniform wear; students also learn about available two- and three-year scholarships and other financial programs for which they may be eligible. Participation entails no military obligation.

Recommended Short Course Title: None provided. Editor suggests: Intro to Army & Crit Thinking

MS 102 Fundamentals of Leadership and ManagementIntro to the Profession of Arms (1 cr)
Overviews basic leadership fundamentals such as setting direction, problem-solving, listening, presenting briefs, providing feedback, and using effective writing skills. Cadets explore dimensions of leadership attributes and core leader competencies in the context of practical, hands-on, and interactive exercises. Labs include orienteering, a teambuilding exercise, first aid, cultural protection, and ethics problem solving. One lecture hour and one leadership lab hour; lab is optional – but highly encouraged – for noncontracted cadets. Continuation of MS 101. Development of greater understanding of roles and responsibilities of Army officers; lecture, conference, and activities dealing with military subjects; texts provided by dept; more focus on leadership development and the development of personal confidence. Participation entails no military obligation.

Recommended Short Course Title: None provided. Editor suggests: Intro to Profession of Arms

MS 201 Applied Leadership and ManagementFoundations of Leadership I (2 cr)
Develops leadership skills and introduces different leadership theories. Further personal development such as time management and effective communication and briefing skills. Cadets explore tactics and techniques such as troop leading procedures, tactical movement, problem solving, and land navigation. Labs deepen understanding of the leader’s reaction/ropes course, basic survival skills, drill and ceremony, and emergency preparedness. Two lecture hours and one leadership lab hour; lab is optional – but highly encouraged – for noncontracted cadets. Application of leadership and management skills to various case studies; organization and structure of Army units; basic first aid; texts provided by department; Participation entails no military obligation.

Prereq: MS 102 or Permission

MS 202 Applied Leadership and ManagementFoundations of Leadership II (2 cr)
Examines the challenges of leading teams in the complex operational environment. The course highlights dimensions of terrain analysis, patrolling, and operation orders. Further study of the theoretical basis of the Army Leadership Requirements Model exploits the dynamics of adaptive leadership in the context of military operations. Prepares Cadets for third year MS classes. Cadets develop greater self awareness as they assess their own leadership styles and practice communication and team building skills. Case studies give insight into the importance and practice of teamwork and tactics in real-world scenarios. Labs deepen understanding of orienteering, teambuilding exercise, first aid, cultural protection, and ethics problem solving. Two lecture hours and one leadership lab hour; lab is optional – but highly encouraged – for noncontracted cadets. Troop leading procedures and application of procedures to planning and conducting small unit operations; individual soldier skills, such as military communication, basic map reading, and survival skills; texts provided by department; Participation entails no military obligation.

Prereq: MS 201 or Permission
3. Change the curricular requirements of **Military Science** (Minor):

- **MS 301 Adaptive Team Leadership**
- **Advanced Leadership and Management (3 cr)**
- **MS 302 Advanced Leadership and Management**
- **Applied Team Leadership (3 cr)**
- **MS 311 Leadership Lab (1 cr)**
- **MS 312 Leadership Lab (1 cr)**
- **MS 401 Seminar in Leadership and Management**
- **Mission Command and the Army Profession (3 cr)**
- **MS 402 Seminar in Leadership and Management**
- **Mission Command and the Company Grade Officer (3 cr)**
- **MS 411 Leadership Lab (1 cr)**
- **MS 412 Leadership Lab (1 cr)**

Recommended Short Course Title: None provided. Editor suggests: Mission Command and Army Prof

- **MS 401 Seminar in Leadership and Management**
  - **Mission Command and the Army Profession (3 cr)**
  - **MS 402 Seminar in Leadership and Management**
  - **Mission Command and the Company Grade Officer (3 cr)**

Prereq: MS 301-302 Coreq: MS 412

Recommended Short Course Title: None provided. Editor suggests: Mission Cmd & Comp Grd Officer
Three credits of Military Science courses (3 cr)
Military History Course (3 cr) (Selected in consultation with the Professor of Military Science, this course should develop the student’s awareness of the relationship of the military establishment to society, particularly in the United States, and develop their interest in the evolution of war and the progression of military professionalism.)
Courses to total 18 credits for this minor

The next UCC meeting will be November 17th, 2014. This meeting was adjourned at 4:34pm.

Charles Tibbals, UCC Secretary