College of Science
Proposed Catalog Changes
Effective Summer 2017

BIOLOGICAL SCIENCES
1. Add the following courses:

   **BIOL J426/J526 Systems Biology (3 cr)**
   Two lec per wk. (Fall only, alt/yrs). Systems Biology will use quantitative approaches including theory and computation to understand the complex function that emerges from physiological systems. Topics will include transcriptional networks and their common motifs, robustness in chemotaxis and development, noise and variability, evolution of modularity, and optimality in metabolism. Cooperative: open to WSU degree-seeking students.
   **Prereq:** BIOL 115 and MATH 170 or permission of instructor

   **BIOL 526 Systems Biology (3 cr)**
   See BIOL J426/J526.

   **Rationale:** This course is a new offering in the Bio Sci curriculum and fills a gap in terms of courses that span between biological systems within cells and quantitative approaches of theory and computation that can be used to understand them. In addition, it will add diversity to the pool of upper division elective courses available for majors in Biological Sciences.

2. Drop the following course:

   **BIOL 101 Perspectives in Biology (1 cr)**
   Open only to majors. Intro to the disciplines in the fields of biology; current research topics.

   **Available via distance:** No
   **Geographical Area:** Moscow
   **Rationale:** This course is being dropped because it is no longer serving a purpose in the department. This has a minor, but temporary decrease in workload for the department.

CHEMISTRY
1. Change the following course:

   **CHEM 111 Principles of Chemistry I (4 cr)**
   *Gen Ed: Natural and Applied Sciences*
   Full credit may be earned in only one of the following: CHEM 101, or 111. Note that grades in CHEM 111 will supersede any grades earned in CHEM 101. Intensive treatment of principles and applications of chemistry. Three lec and one 3-hr lab a week. Recommended Preparation: A grade of ‘B’ or better in a high school chemistry course.
**Prereq:** Chem 050 or min 560 SAT or 620 SAT 16 math or min 25 ACT math or min 49 COMPASS College Algebra, or a grade of ‘C’ or better in CHEM 101, MATH 143, MATH 160, or MATH 170; or Permission

**Available via distance:** No  
**Geographical Area:** Moscow  
**Rationale:** Since CHEM 050 is no longer offered it should be removed as a potential prerequisite of CHEM 111.

**GEOGRAPHY**

1. Changes the following courses:

   **GEOG J412/J512 Applied Meteorology and Climatology (3 cr)**
   Practice of meteorology and climatology to solve a wide range of real-world problems in water resources, wildfire, agriculture and societal hazards. Course will introduce scientific means of interpreting weather and climate information for weather forecasting and build analytical skills using models and tools that facilitate decision-making and adaptation for practical problems.  
   Additional projects/assignments required for graduate credit—Includes lecture and hands-on laboratory and field-based exercises. (Spring, alt/rys)  
   **Prereq:** Geog 301 or Geog 401; or Permission

   **GEOG 512 Applied Meteorology and Climatology (3 cr)**
   **Available via distance:** No  
   **Geographical Area:** Moscow  
   **Rationale:**

2. Make the following curricular changes to the **Major in Geography** (B.S.):

   - GEOG 100 Physical Geography 3 cr
   - GEOG 100L Physical Geography Lab 1 cr
   - GEOG 165 Human Geography 3 cr
   - GEOG 200 World Regional Geography 3 cr
   - GEOG 313 Global Climate Change 3 cr
   - GEOG 385 GIS Primer 3 cr
   - GEOG 390 Cartographic Design & Geovisualization 3 cr
   - **GEOG 489 Capstone Preparation** 1 cr
   - GEOG 493 Senior Capstone in Geography 3 cr
Rationale: This 1-credit course is designed to assist students taking GEOG 493, Capstone, in the following semester by preparing them to complete a capstone project. The main objectives of the Capstone Preparation course are for students to identify mentors, select projects, and write project proposals. We have found that students who take the Capstone Preparation course have a better senior capstone experience because they get to focus on completing their projects and write-ups instead of also having to identify mentors and select projects in the same semester. In semesters when the Capstone Preparation and Capstone courses are both offered (because of student need), the course is taught together with the Capstone course, so no additional course instructors are needed.

This course has been, and currently is, taught by the department. The change proposed here will require Geography majors to take the Capstone Preparation (which is currently not required).

MATHEMATICS

1. Add the following course:

MATH 529 Numerical Methods (3 cr)
Phys 428 same as Engr 428, Math 428 and Phys 528. Systems of equations, root finding, error analysis, numerical solution to differential equations, interpolation and data fitting, numerical integration, related topics and applications. Additional projects and/or assignments required for graduate credit in Math 529 and Phys 528.
Prereq: MATH 310

Available via distance: Yes
Geographical Area: Distance course
Rationale: The course number Math 529 was chosen because Math 528 is already reserved for Differential Manifolds.

The creation of Math 529 increases 500 level course options for the graduate students.

As was mentioned, Math 428 is currently offered every semester by the math department as an engineering outreach (EO) course. This EO Math 428 is also listed as Engr 428, but not as Phys J428/J528. Therefore, the students were not aware of the option to earn graduate credits prior to the enrollment. It was often the case that the students who wished to earn graduate credits in Phys 528 ended up with filing a petition. The creation of Math 529 is considered to avoid such extra petition process.

MTHE 409 Algebraic and Functional Reasoning (3 cr)
Examines the understandings that are foundational to advanced algebraic concepts, and how grade 5-10 students develop these ideas. Topics include strategies for solving equations and systems, covariational reasoning, properties of linear, quadratic, exponential, and trigonometric functions.
MTHE 410 Proof and Viable Argumentation (3 cr)
Develops viable argumentation as it can be found in grades 5-10 as a means of learning content, deepening understanding, and determining what is true and what is false mathematically. Topics include the language of argumentation, argument types, reasoning types, the distinction between proofs and viable arguments. Emphasizes how different argument types can contribute to student learning and increasing student discourse.

Available via distance: Yes
Geographical Area: Distance course

Rationale:
Purpose 1: The majority of Idaho math teachers of grades 6-8 have an elementary (K-8) teaching certificate or a certificate in a subject other than math. So most of these teachers have taken just 3-9 credits of math. This is alarmingly inadequate for the job, especially with the new rigorous Common Core Standards and assessments. We seek to address this problem by providing a UI Math Endorsement, which will prepare teachers to teach in the middle grades. The endorsement will require 21 credits of math, including:

- MTHE 410 — Proof & Viable Argumentation
- MTHE 409 — Algebraic & Functional Reasoning
- EDCI 411 — Geometry, Measurement, & Trigonometry
- EDCI 4** — Data Analysis & Probability
- EDCI 4** — Proportional & Algebraic Reasoning

For elementary education majors, the other 6 credits will usually be Math 235 & 236, which they must take anyway for their degree. Because the courses are online, they are available both for pre-service teachers and for in-service teachers seeking an endorsement or working toward an advanced degree in education. All five courses will be offered every 2 years. The material in these courses is specifically targeted to preparing teachers for the Common Core math content in the middle grades. One new part of the Common Core Standards is a focus on students making viable arguments and proofs, which is why this course is included.

Purpose 2: Idaho now requires all new elementary (K-8) teachers to get an endorsement in math, language arts, social science, or science. One reason for this requirement is that more elementary schools are hiring specialists to teach, say, only math classes for grades 4-6. This endorsement program will allow these students to get endorsed so they can specialize in mathematics.

Purpose 3: Students can be certified to teach all secondary math (6-12) in various ways. Through UI they must take between 23 credits and 47 credits, depending on the strength of their degree. None of them ever take a course that prepares them to teach Algebra I, Algebra II, or Pre-Calculus, which are the subjects that comprise the bulk of...
the secondary math they will teach. The new Algebraic & Functional Reasoning course will address this lack.

The phrase “grade 5-10” in the course description is necessary because of the course contents. The phrase also stresses that the course is mainly about the middle school mathematics.

2. Change the following course:

**MATH 395 Analysis of Algorithms (3 cr)**
Same as CS 395. Measures of efficiency; standard methods and examples in the design, implementation, and analysis of algorithms. (Spring only)
Prereq: Math 175 and CS 121

Available via distance: No
Geographical Area: Moscow
Rationale: Coordinating with the CS department so that the course will contain more implementation/programming than previously. This requires us to require CS121 as a prereq.

**STATISTICAL SCIENCE**

1. Add the following course:

**STAT 517 Statistical Learning and Predictive Modeling (3 cr)**
A comprehensive overview of statistical learning and predictive modeling techniques to analyze large data sets in science, social science, and other data-rich fields including, for example, biology, business, and engineering. Topics include regression, classification, resampling methods, model selection and regularization, tree-based methods, support vector machines, clustering, and text mining. The implementation of the methods will be in R, and Python as needed. Basic experience with computer programming is assumed.
Prereq: STAT 431

Available via distance: Yes
Geographical Area: Moscow, Engineering Outreach
Rationale: The dramatic increase in the availability of data and computing power has resulted in an increased demand solving problems in statistical prediction. This course addresses a need for a course in our curriculum for predictive modeling. It will cover both theoretical and applied aspects of predictive modeling.

The course has already been taught twice as Stat 504 by Dr. Stephen Lee. We do not anticipate difficulty continuing to offer this course.

2. Make the following curricular changes to the **Major in Statistical Science** (M.S.):

Students seeking admission to the MS program in Statistical Science should have completed at least two semesters in college calculus comparable to MATH 170 and MATH 175, and two classes in applied statistics including STAT 431 or a comparable course. Familiarity with programming is
expected, and familiarity with numerical or statistical computing environments is desirable.
Students are not required to have an undergraduate degree in statistics.

Candidates must fulfill the requirements of the College of Graduate Studies and of the Department of Statistical Science. See the College of Graduate Studies section for the applicable general requirements for M.S. degree.

An individual graduate program is tailored for the student, but all students must complete a basic core requirement of 24 credits and either i) a thesis (STAT 500), ii) an internship report (STAT 598), or iii) a consulting option or course (6 credits of STAT 597). Credits from Stat 431 will not count toward the degree.

Available via distance: 100% of curricular requirements can be completed via distance.
Geographical Area: Moscow, Engineering Outreach
Rationale: The department has always had this policy, but including it in the catalog will make it easier to enforce and more clear to students.