College of Engineering
Proposed Catalog Changes
Effective Term (unless otherwise noted) = Summer 2016

BIOLOGICAL AND AGRICULTURAL ENGINEERING

1. Add the following courses

**BE 411 (s) Industrial Energy Efficiency (1 cr, 6 cr max)**
This course will provide students an understanding of major industrial energy consuming equipment, diagnostics of energy inefficiencies, and instrumentation for baselining energy efficiency. Students will learn energy auditing and report writing with improvement recommendations including cost analysis. Each semester will cover a specific topic such as "process heating and refrigeration" or "motors and air compressors". As topics change by semester, prerequisites may be only a subset of those listed. Contact instructor for details.

**Prereq:** ((ENGR 320 or ME 322) or permission)

**Assessment:** Homework(s), Midterm Exams and Final Exam.

**Rationale:** Industry accounts for 33% of all energy used in the US. This course is geared towards educating future energy engineers about the working principles of energy intensive industrial equipments, diagnosis for energy inefficiencies, corrective measures and cost analysis. This course is being offered as BAE 404 course twice. We are requesting to create a permanent course number for this course. Note about prerequisites: as topics change, semester by semester, prerequisites may be only a subset of those listed. Course description instructs students to contact instructor for details about prerequisites for a particular semester.

2. Change the following courses

**BAE J494/J594 Thermochemical Technologies for Biomass Conversion (3 cr)**
Introduce the fundamentals of biomass conversion technologies for biofuels and bioenergy. Specific topics include biomass preparation / pretreatment, pyrolysis, gasification, direct liquefaction, and economic factors in thermochemical conversion of biomass. Advances of the technologies will be brought to current through literature reviews. A semester long course project is required if taken as a graduate level course. Recommended Preparation: Organic Chemistry, Chemical Reaction Engineering, Engineering Thermodynamics. *(Fall, odd numbered/years)*

**Prereq:** Chem 277 and Chem 278

**Coreq:** Engr 320 or Permission

**Available via distance:** No

**Geographical Area Availability:** Moscow

**Rationale:** This is a course typically for senior undergraduate students as a technical elective. Removing the wording of "Fall, odd numbered/years" will allow the flexibility to offer to students as it is needed either in Fall or Spring semesters, and in odd or even years. However, we do not anticipate teaching it more frequently than every other year, but are just planning allowing flexibility for which years/semesters it is taught.
1. Make the following curricular changes to the Materials Science and Engineering Minor:

(Note: If completing both the Materials Science and Engineering major or minor and the Metallurgical Engineering minor, students must have 6 unique credits towards each minor)

MSE 201   Elements of Materials Science (3 cr)

And 17 cr from the following courses:

Engr 350   Engineering Mechanics of Materials (3 cr)
MSE 313   Physical Metallurgy I (4 cr)
MSE 340   Transport and Rate Processes I (4 cr)
or ChE 340

MSE 341   Particulate Materials Processing (4 cr)

MSE 412   Mechanical Behavior of Materials (3 cr)
MSE 423   Corrosion (3 cr)
MSE 427   Ceramic Materials (3 cr)
MSE 432   Fundamentals of Thin Film Fabrication (3 cr)
MSE 434   Fundamentals of Polymeric Materials (3 cr)
MSE 438   Fundamentals of Nuclear Materials (3 cr)
MSE 456   Metallic Materials (3 cr)
MSE 464   Materials Physics and Engineering (3 cr)
or Phys 464

Phys 212   Engineering Physics II (3 cr)

Phys 212L   Engineering Physics II lab (1 cr)

Courses to total 20 credits for this minor

Distance Education: Less than 50% of requirements can be completed via distance
Geographical Area Availability: Moscow
Rationale: Remove the MSE 341 course which is no longer offered on a regular basis.

Add Phys 212L lab which is required by the major and makes summing to 17 credits practical without an extra 3 credit course.
Clarify that the cross-listed Phys 464 course is acceptable since MSE 464 has always been on the list.

**COMPUTER SCIENCE**

1. Change the following courses

   **CS 112 Computational Thinking and Problem Solving**
   Introduction to computational thinking and problem solving, including elementary computing concepts such as variables, loops, functions, lists, conditionals, concurrency, data types, simple object oriented concepts, I/O, events, syntax, structured programming, basic concepts of computer organization, editing and the influence of computers in modern society.  **CS112 carries no credit after CS120.**
   **Prereq:** Math 108 with grade of C or better or sufficiently high ACT, SAT, or Math Placement Test score to qualify for Math 143

   **Rationale:** The purpose of CS112 is to provide a safe learning environment for students starting out in computer science. Part of generating the feeling of safety is having a class of peers. Exit interviews have indicated that having students in the class that are far more advanced programmers is intimidating and discourages new comers. By refusing credit to those having already taken the more advanced CS120 we remove the “Easy A” incentive for CS112. This way we hope to maintain a more “safe” learning environment and increase retention.

   **CS 120 Computer Science I (4 cr)**
   Fundamental programming constructs, algorithms and problem-solving, fundamental data structures, overview of programming languages, virtual machines, introduction to language translation, declarations and types, abstraction mechanisms, object-oriented programming. This course includes a lab.
   **Prereq:** Math 143 with a grade of ‘C’ or higher or CS 112 with a grade of ‘CB’ or higher; or sufficiently high ACT, SAT, or Math Placement Test score to qualify for Math 170

   **Rationale:** There was concern in the department that if a student got a C in the prereqs that, by university rules, be unable to convert that grade to a B or better later.

**ELECTRICAL AND COMPUTER ENGINEERING**

1. Change the following course

   **ECE 427 Power Electronics (3 cr)**
   Characteristics, limitations, and application of solid state power devices; practical aspects of power electronic converters, including rectifiers and inverters; choppers, AC phase control, and device gating techniques. Cooperative: open to WSU degree-seeking students.
   **Prereq:** Corereq: ECE 420

   **Available via distance:** Yes
   **Geographical Area Availability:** Moscow
   **Rationale:** Change ECE 420 from Pre-req to Co-req. Course material in ECE-420 will be sequenced appropriately to support this change. No change in workload.

**MECHANICAL ENGINEERING**

1. Change the following course
ME 541 Mechanical Engineering Analysis (3 cr)
Mathematical modeling and solutions to mechanical engineering problems; analytical solutions to linear heat and mass diffusion, waves and vibrations; introduction to approximate techniques.
Prereq: ME 345, Engr 350, Math 330 & Math 310 or Equivalent

Available via distance: Yes
Geographical Area Availability: Moscow
Rationale: ME 541 is a course on advanced engineering mathematics. There is no need to list ME 345 (Heat Transfer) and ENGR 350 (Engineering Mechanics of Materials) as prerequisites. ME 541 does require knowledge of linear algebra (Math 330) and ordinary differential equations (Math 310). The change will also remove arbitrary restrictions on students outside mechanical Engineering Department to take ME 541, which will likely increase the number of enrollment.

1. Make the following courses cooperative and update their descriptions (EFFECTIVE SPRING ‘16)

ME J414/J514 HVAC Systems (3 cr)
Application of thermodynamics, heat transfer, and fluid flow to understanding the psychrometric performance of systems and equipment; evaluating the performance characteristics, advantages, and disadvantages of the various types of HVAC systems including large tonnage refrigeration/chiller equipment, cooling coils, cooling towers, ducts, fans, and heat pump systems; economics of system and equipment selection. Cooperative: open to WSU degree seeking students.
Prereq: ME 345

Available via distance: Yes
Geographical Area Availability: Boise
Rationale: The UI ME department and the WSU ME department are combining forces to minimize duplication in course offerings and maximize the variety of options available to MS and especially PhD students. The coop program also assures critical enrollment mass for specialized courses. This application covers courses on the UI side; WSU is doing something similar on their side for a set of courses that complements ours. There is no time like the present to begin this collaboration, starting with Spring 2016. We will be doing some follow-on requests for a larger set of courses, starting in Fall 2016.

ME J450/J550 Computational Fluid Dynamics (3 cr)
Governing equations of fluid flow; fundamentals of turbulence modeling; accuracy and stability of discretization schemes; verification and validation; boundary and initial conditions; grid generation; CFD post-processing. Application of CFD software (ANSYS FLUENT) through five hands-on CFD Labs including internal viscous pipe flows, external flows over a 2D airfoil and a circular cylinder, and flows in a 2D driven cavity. Additional projects/assignments required for graduate credits. Cooperative: open to WSU degree seeking students.
Prereq: Engr 335 and Math 330

Available via distance: Yes
Geographical Area Availability: Moscow
Rationale: The UI ME department and the WSU ME department are combining forces to minimize duplication in course offerings and maximize the variety of options available to MS and especially PhD students. The coop program also assures critical enrollment mass for specialized courses. This application covers courses on the UI side; WSU is doing something similar on their side for a set of courses that complements ours. There is no time like the present to begin this collaboration, starting with Spring 2016. We will be doing some follow-on requests for a larger set of courses, starting in Fall 2016.
ME 540 Continuum Mechanics (3 cr)
Stress and deformation of continua using tensor analysis; relationship between stress, strain, and strain rates in fluids and solids; applications. Cooperative: open to WSU degree seeking students.
Prereq: Permission

Available via distance: Yes
Geographical Area Availability: Moscow
Rationale: The UI ME department and the WSU ME department are combining forces to minimize duplication in course offerings and maximize the variety of options available to MS and especially PhD students. The coop program also assures critical enrollment mass for specialized courses. This application covers courses on the UI side; WSU is doing something similar on their side for a set of courses that complements ours. There is no time like the present to begin this collaboration, starting with Spring 2016. We will be doing some follow-on requests for a larger set of courses, starting in Fall 2016.

ME 549 Finite Element Analysis (3 cr)
Same as CE 546. Formulation of theory from basic consideration of mechanics; applications to structural engineering, solid mechanics, soil and rock mechanics; fluid flow. Cooperative: open to WSU degree seeking students.
Prereq: ME 341 or CE 342

Rationale: The UI ME department and the WSU ME department are combining forces to minimize duplication in course offerings and maximize the variety of options available to MS and especially PhD students. The coop program also assures critical enrollment mass for specialized courses. This application covers courses on the UI side; WSU is doing something similar on their side for a set of courses that complements ours. There is no time like the present to begin this collaboration, starting with Spring 2016. We will be doing some follow-on requests for a larger set of courses, starting in Fall 2016.