COLLEGE OF ENGINEERING
Proposed Catalog Changes

Biological and Agricultural Engineering

1. Change the curricular requirements of Biological and Agricultural Engineering (B.S.B.A.E.) [Effective: Summer 2014]

   E. Eco-Hydrological Engineering Option
   BAE 355 Fundamentals of Hydrologic Engineering (3 cr)
   BAE 450 Environmental Hydrology (3 cr)
   BAE 451 Engineering Hydrology (3 cr)
   BAE 452 Environmental Water Quality (3 cr)
   BAE 458 Open Channel Hydraulics (3 cr)
   CE 211 Engineering Surveying (3 cr)
   CE 322 Hydraulics (3 cr)
   Engr 220 Engineering Dynamics (3 cr)
   Soil 205 The Soil Ecosystem (3 cr)
   Technical Electives (3-11 cr)
   One of the following (3 cr):
   CS 112 Introduction to Problem Solving and Programming (3 cr)
   CS 130 Programming with Visual Basic (3 cr)

   Courses to total 128 credits for this degree

   Rationale: BAE 450 (Environmental Hydrology) has significant material that is redundant to BAE 355 (Fundamentals of Hydrologic Engineering) and BAE 451 (Engineering Hydrology), which are both required courses (see above). We propose to replace this course with an increase in the number of Technical Elective credits. The departmentally approved tech electives that show in the degree audit for this option are shown below. Note that these tech electives provide our students aspects of soil or hydrology (which build on BAE 355 and 450), or geographic or ecological aspects of watershed science (which are complementary to BAE 355 and 451). & 11 credits from: BAE 459 or Soils 438, or Geog 385, or Fish 430, FISH 415, or UpDiv BAE, or UpDiv Soils, or UpDiv FISH or UpDiv HYDR. Note re: accreditation: BAE 450 is not an “engineering” course, has never counted toward the ABET requirement of 48 credits in engineering topics, and therefore can be replaced with a non-engineering course.

Chemical and Material Engineering

1. Change the curricular requirements of Chemical Engineering (B.S.Ch.E.) [Effective: Summer 2014]

   Chemical engineering or Material Science and Engineering numbered 390 or greater technical electives (3 cr)
   Chemical/bioscience elective course (3 cr)
   Chemical/bioscience elective lab (1 cr)
   Computer science elective in a programming language (3 cr)
   Economics elective (3 cr)
   Humanities and Social Sciences electives (9 cr)
   Communication electives (2 cr)
   Mathematics electives numbered 300 or greater (3 cr)
   Technical electives in math, science, or engineering numbered 300 or greater (excluding any 398, 498, or 598 Internship) (6 cr)

   Courses to total 128 credits for this degree, not counting Engr 101, any 398 (Internship), any 498 (Internship), any 598 (Internship), mathematics courses numbered lower than Math 170-143, and other courses that might be required to remove deficiencies.

   Rationale: 398, 498, & 598 Internships are industrial off campus activities not under the supervision of a University faculty member. Hence, they should appear on the transcript, but not be counted as technical elective towards the minimum degree requirements. Other changes are only making the wording consistent between the ChE and MSE programs while not changing the requirements.

2. Change the curricular requirements of Materials Science and Engineering (B.S.M.S.E.) [Effective: Summer 2014]

   Computer Science elective in a programming language (3 cr)
   Economics Elective (3 cr)
   Humanities and Social Science electives (6 cr)
   MSE or ChE elective numbered 300 or greater (3 cr)
   Technical electives in math, science, or engineering numbered 300 or greater (excluding any 398, 498, or 598 Internship) (3 cr)
Courses to total 127 credits for this degree, not counting Engl 101, any 398 (Internship), any 498 (Internship), any 598 (Internship), and mathematics courses numbered lower than Math 170, and other courses that might be required to remove deficiencies.

Rationale: 398, 498, & 598 Internships are industrial off campus activities not under the supervision of a University faculty member. Hence, they should appear on the transcript, but not be counted as technical elective towards the minimum degree requirements. Other changes are only making the wording consistent between the ChE and MSE programs while not changing the requirements.

Civil Engineering

1. Add the following courses [Effective: Summer 2014]

   **CE 512** Advanced Topics in Waste Management and Treatment (3 cr)
   Modeling, analysis, and design of advanced and emerging engineering technologies and processes for waste management/treatment and resource recovery.
   **Prereq:** Instructor Permission
   Recommended Short Course Title: Adv Topic Waste Management

   Rationale: UI offers no fundamentals-focused, theoretical/empirical graduate-level course that specifically focuses on advanced, cutting edge resource recovery topics associated with management of organic-rich liquid and solids waste streams. However, the industry is moving rapidly to embrace advanced technologies and methods that maximize resource recovery from waste streams. CE431/532 teach the fundamentals that ultimately are built upon as our profession develops advanced waste recovery techniques; this course takes the students to the next level. Students have an opportunity to learn about and further investigate advanced and most current topics on waste management.

   **CE 516** River Restoration (3 cr)
   This course focuses on the principles, assumptions and practices used in river restoration. The use of channel form, channel classification, reference reaches, sediment transport equations, hydraulic structures, 1-D and 2-D flow models, aquatic habitat modeling to design restoration projects are discussed. The course also includes topics such as adaptive management, restoration evaluation and monitoring, basic ecological design goals, and a number of local case studies. The course has a mandatory field trip to a local restored site. Recommended classes to take prior to this include at least one of the following: CE 535, CE 322, CE 428, or CE 520.
   **Prereq:** Engr 335 or Instructor Permission

   Rationale: This course has been offered twice at UI Boise as CE 504 – River Restoration and will be offered again in Spring 2013. It does not change the workload of the faculty teaching this course. It serves a need in the university and the local Boise consulting firms/federal agencies on river restoration techniques from an engineering and geomorphic perspective. No other equivalent course is taught in Idaho.

2. Change the following course [Effective: Summer 2014]

   **CE 460** Geotechnical Engineering Design (3 cr)
   Applications of soil mechanics in design of shallow and deep foundations, earth retaining structures, shallow and deep foundations, embankments, slopes, excavations, and soil exploration programs.
   **Prereq:** CE 360; and CE 441 or CE 444; or Permission

   Rationale: Students need to have some background in the design of steel or reinforced concrete structures to gain maximum benefit from this class. To enhance the value of this class, the new course description adds structural design (CE 441 or CE444) as a prerequisite.

3. Change the following courses from Dormant Status to Active Status [Effective: Summer 2014]

   **CE 473** Highway Design (3 cr)
   Theory and practice in highway design, highway functional classification concepts, design controls and criteria, geometric design of highways and streets, cross section and roadside design, and highway safety manual applications. Planning, horizontal and vertical alignments, field data collection, location and design of highway systems. Demonstrated competence in the operation of electronic total stations and land development software required for permission. Two lec and one 3-hr lab a wk.
   **Prereq:** CE 211 and Permission
   **Coreq:** CE 372

   Rationale: CE 473 has not been offered for several years; as a result, the course was added to the university’s dormant course list. The civil engineering department is offering the course again starting spring 2013. The department is requesting that CE473 be removed from the dormant list and redisplayed in the General Catalog. Changes also have been made to the course description and the course prerequisite

   **CE 484** Engineering Law and Contracts (2-3 cr)
Project engineering techniques for planning, scheduling, and controlling typical engineering and construction projects. Contract law and application to engineering services agreements and construction contracts; preparing technical specifications, agency, torts, professional liability, and alternate dispute resolution.

**Prereq:** Senior standing in engineering

Rationale: The civil engineering curriculum requires students to complete seven technical electives to comprise 21 credit hours. All of the CE technical electives are 3 credit courses. We are increasing the credit hours for this course from 2 to 3 credits, such that it aligns with all other CE technical electives. Concurrently we are adding some project management elements to this course. Adding content on contracts and project management to the CE curriculum will help address ABET/ASCE accreditation requirements addressing professional practice.

### Computer Science

1. Add the following course **[Effective: Summer 2014]**

   **CS 328 Introduction to Computer Game Development (3 cr)**
   An introduction to data structures, algorithms, and programming techniques useful in the development of computer games. Topics including 2D graphics, sound programming, user interfaces, game genres, computerization of classic board games and simulation games.
   
   **Prereq:** CS 210 and CS 240

   Recommended Short Course Title: Game Development

   Rationale: This course is proposed as an upper-division technical elective, to be offered approximately every other year, subject to an available and interested faculty member and sufficient student demand. It is intended to complement and strengthen the department’s existing CS 428/528 course offered every other year, enabling CS 428/528 to emphasize more advanced topics involved in networked 3D games.

2. Change the following courses **[Effective: Summer 2014]**

   **CS J428/J528 Multi-User Games and Virtual Environments (3 cr)**
   Software design and programming issues involved in constructing multi-user computer games and multi-user virtual environments, incorporating networking and 3D graphics. Additional projects and assignments are required for graduate credit.
   
   **Prereq:** CS 210, and CS 324, and CE 328

   Recommended Short Course Title: Games and Virtual Environments

   Rationale: The addition of CS 328: Introduction to Computer Game Development will enable CS 428/528 to undertake more advanced topics in computer game development, justifying a slight change in title and description.

### Electrical and Computer Engineering

1. Change the following courses **[Effective: Summer 2014]**

   **ECE 310 Fundamentals of Electronics/Microelectronics I (3 cr)**
   Operational amplifier fundamentals and applications, introduction to electronic devices such as diodes, bipolar junction transistor (BJT) and metal oxide semiconductor field effect transistors (MOSFET), large and small-signal modeling of non-linear electronic devices, DC and small-signal analysis of circuits with non-linear electronic devices, biasing of electronic circuits using passive and active elements such as current mirrors, frequency response of electronic circuits, introduction to the analysis, design, and applications of electronic circuits such as rectifiers, power supplies, and low-frequency single-stage amplifiers. Practical limitations of amplifiers of electronic circuits.
   
   **Prereq:** ECE 212 and ECE 213
   
   **Coreq:** ECE 311

   Rationale: We are changing the “Integrated Circuit Design” emphasis courses to be more inclusive of “Semiconductors” and “Systems” level courses in the program as well as “IC packaging”. The new name of the emphasis will be “Microelectronics” and this course will be the first course in this sequence of courses.

   **ECE 311 Fundamentals of Electronics/Microelectronics I Lab (1 cr)**
   Lab to accompany ECE 310.

   **Coreq:** ECE 310

   Rationale: Since we are proposing to change the Co-requisite class name to “Microelectronics I”, we would like to change the name of this course also.
ECE 410 Advanced Electronics Microelectronics II (3 cr)
Introduction to analog integrated circuit (IC) implementation and design, differential and common-mode signal concepts, differential amplifiers, multistage amplifiers, operational amplifier design, frequency response of electronic circuits, feedback in electronic circuits, large-signal/power amplifiers, advanced current sources and mirrors, and fundamentals of analog filters. 
Prereq: ECE 310 and 311; or Permission

Rationale: We are changing the “Integrated Circuit Design” emphasis courses to be more inclusive of “Semiconductors” and “Systems” level courses in the program as well as “IC packaging”. The new name of the emphasis will be “Microelectronics”. This course will be the second course in this sequence of courses. Thus we would like to rename it reflecting the new name of the emphasis in ECE program. This course also prerequisite for most advanced “Microelectronics” track courses. Since such topics as MOSFETs are covered more in ECE310 (Microelectronics I) we have expanded the topic coverage in this class adding advanced current sources and mirrors (basic current mirrors/sources are covered in ECE310), and fundamentals of analog filters. We have some Engineering Outreach degree and/or non-degree students that took ECE310 or equivalent courses in another institution. Thus, we would like the instructor to evaluate the student’s background and let them in the class or discourage student to register. Thus added “or Permission” clause in the prerequisite section.

ECE 411 Advanced Electronics Laboratory Microelectronics II Lab (1 cr) 
Lab to accompany or follow ECE 410. 
Prereq or Coreq: ECE 410

Rationale: Since we are proposing to change the Co-requisite class name to “Microelectronics II”, we would like to change the name of this course also.

ECE J413/J513 Communication Circuits Radio-Frequency IC Design (3 cr) 
Radio frequency (RF) communications concepts, integrated circuit (IC) transceiver architectures, low-noise amplifier, mixers, passive devices and matching networks, oscillators, power amplifiers, phase-locked loops, and frequency synthesizers. Additional projects/assignments are required for graduate students. Impedance transforms and matching networks, small-signal high frequency amplifiers, distortion in amplifiers, noise calculations and considerations, sine wave oscillators, mixers and frequency translators, phase-locked loops, and power amplifiers. Additional projects/assignments reqd for grad cr. 
Prereq: ECE 410 or Permission

Rationale: 
1- The name change highlights the fact that this is an integrated circuit (IC) design course and the focus will be on frequencies exceeding 1 GHz and not an outdated VHF/UHF discrete course. 
2- This title-change makes this course more attractive for those students who choose IC design elective courses. The proposed name is used in many schools and clearly demonstrates what topics are covered in the course. This helps students in finding a job in IC design industry and also in pursuing higher education in other schools. 
3- The course description is modified to better match a widely accepted textbook that we have decided to use for this course.

ECE J415/J515 Analog Integrated Circuit Design (3 cr)
Analog integrated circuit (IC) analysis, design, simulation, and layout, advanced biasing techniques, voltage references and regulators, operational amplifiers, frequency compensation techniques, noise analysis in analog circuits, and comparators/continuous time integrated circuit filter design. Additional projects/assignments required for graduate credit.
Prereq: ECE 410 or Permission

Rationale: 
1. Topic list of the course is updated. Comparators topic will be covered in ECE J417/J517 course. Thus, covering additional topic is possible. New topics such as IC continuous time filters, and regulators are listed. 
2. Noise topic was always covered in ECE 415/515, but was not listed on catalog. Thus, noise is not a new topic, but listed as an update to the catalog entry.

ECE J417/J517 Pulse and Digital Circuits Mixed Signal IC Design (3 cr) 
Sample and hold (S/H) circuits, comparators, data-converter fundamentals, Nyquist-rate digital-to-analog converters (DAC) and analog-to-digital converters (ADC), over-sampling data converters, and phase-locked loops. Additional projects/assignments are required for graduate credit. Electronic switching, timing, and pulse shaping techniques, logic functions, realization with diodes, transistors, and FETs. Additional projects/assignments reqd for grad cr. 
Prereq: ECE 410 or Permission

Rationale: 
1- Some topics in the current catalog description are outdated. Examples are: realization of digital gates with bipolar transistors and diodes. 
2- The remaining topics are covered in details in ECE 445. (ECE 445 description: Principles of design of very large scale integrated circuits; CMOS logic design; transistor sizing and layout methodologies; intro to IC CAD tools). 
3- We are modernizing/updating topics list that are of great practical and theoretical interest in mixed-signal IC design. These topics include data converters and phase-locked-loops.
4. The name change highlights the fact that this is an integrated circuit (IC) design course, which makes it more attractive for those students who choose IC design elective courses. The proposed name is used in many schools and clearly demonstrates what topics are covered in the course. This helps students in finding a job in IC design industry and also in pursuing higher education in other schools.

5. As the proposed content is rather advanced, the prerequisite should be changed from ECE 310 to ECE 410. Both of these prerequisite classes are offered every semester.

**ECE J419/J516 Image Sensors and Systems (3 cr)**
This course introduces various concepts and fundamentals related to semiconductor image sensors. Topics cover light production and detection, video image formats, image sensor characteristics and performance metrics, basic and advanced operation principals and types of semiconductor image sensors (CCD and CMOS), noise in imagers, image and color processing, and issues related to camera system design, integration and signal processing. Additional projects/assignments are required for graduate credit. **Recommended preparation: ECE 410 or equivalent.**

**Prereq:** ECE 310

Rationale: Course description has contradicting statement to prerequisite of the class. We would like to remove the last sentence.

**ECE 480 EE Senior Design I (3 cr)**
The capstone design sequence for electrical engineering majors. Course topics include design, research, simulation, and experimental methods; specifications, prototyping, troubleshooting, and verification; report writing, documentation and oral presentations. Topics are considered in the context of a major design project involving a team of students. Projects incorporate realistic engineering constraints; i.e. environmental, sustainability, manufacturability, ethical, safety, social and political considerations.

**Prereq:** ECE 240, ECE 241, ECE 310, ECE 311, ECE 320, ECE 321, ECE 330, ECE 331, ECE 340, ECE 341, ECE 350, ECE 351 and Stat 301, or Permission

Rationale: Add ECE 330 and ECE 331 as a prerequisite. ECE 330 and ECE 331 are core junior-level courses that prepare students for their design experience in ECE 480.

**ECE 481 EE Senior Design II (3 cr)**
*May be used as general education credit in J-3-d.* The capstone design sequence for electrical engineering majors. Course topics include design, research, simulation, and experimental methods; specifications, prototyping, troubleshooting and verification; report writing, documentation and oral presentations. Topics are considered in the context of a major design project involving a team of students. Projects incorporate realistic engineering constraints; i.e. environmental, sustainability, manufacturability, ethical, safety, social and political considerations.

**Prereq:** ECE 330, 331 and 480, or Permission

Rationale: Drop ECE 330 and ECE 331 as prerequisites. ECE 330 and ECE 331 should be prerequisites for ECE 480, which is a prerequisite for ECE 481.

**ECE 513 Radio-Frequency IC Design**
*Communication Circuits (3 cr)*

See ECE J413/J513.

**ECE 517 Mixed Signal IC Design**
*Pulse and Digital Circuits (3 cr)*

See ECE J417/J517.

2. Change the curricular requirements of Electrical Engineering (B.S.E.E.) [Effective: Summer 2014]...
Within the constraints on choice of technical electives noted above, students may choose sets of electives to develop proficiencies in certain areas of emphasis. These areas are currently available, one in communications, one in integrated circuit design, and one in power. The course requirements for each of these areas are described below.

The Communications emphasis prepares students for a variety of careers in the communications industry. Students should take a total of 18 credits from the following: (a) core courses: 9 credits from ECE 410, ECE 430, ECE 450, and (b) technical electives: 9 credits from ECE 413, ECE 432, ECE 445, ECE 452, ECE 455.

The Microelectronics emphasis prepares students for variety careers in the semiconductor industry. It includes courses in analog/RF and mixed-signal integrated circuit (IC) design, semiconductors, and IC packaging. Students should take a total of 18 credits from the following: (a) 6 required credits: ECE 410, ECE 460, and (b) 3 core credits: ECE 413, ECE 415, ECE 418, and (c) 3 credits of ECE 440, ECE 430, ECE 450 and ECE 465, and (c) 6 additional credits of technical electives from ECE 413, ECE 415, ECE 417, ECE 418, ECE 419, ECE 445, ECE 462, ECE 465. The integrated Circuit Design emphasis prepares students for careers in the field of integrated circuit design. It includes courses in analog and digital integrated circuit at both the system and transistor level. Students should take a total of 18 credits from the following: (a) core courses: 13 credits from ECE 410, ECE 411, ECE 415, ECE 445, ECE 460 and (b) technical electives: 3 credits from ECE 412, ECE 413, ECE 416, ECE 417, ECE 440, ECE 452, ECE 470, ECE 476.

The Power emphasis prepares students for a variety of careers with electric utilities, consulting firms, and with manufacturing and design firms. Students should take a total of 18 credits from the following: (a) 12 credits: ECE 420, ECE 422, ECE 427 and ECE 450, and (b) 3 core credits from: ECE 410, ECE 430, ECE 440, and (c) 3 additional credits of technical electives.

Rationale:
1. We would like to replace ECE416 with ECE418 and add ECE 465 to the general EE technical electives list reflecting the strong area of research our department known for and to give wider flexibility for students to take classes to fulfill TE requirements in Microelectronics emphasis.
2. These editions will also allow newly designed Microelectronics track students to take more appropriate technical elective classes counted towards their degrees and help them acquire wider knowledge in semiconductor industry to improve their employment prospects.
3. All students in ECE program satisfy prerequisite of these two classes which is ECE310 to attain broader knowledge about the semiconductor technologies.
4. We would like to strike out ECE416 because we will not have resources to teach this course for some time. Also, content of the ECE 310 and ECE410 are redesigned to include big portion of the ECE416 topics.
5. We would like to rename and refocus the IC Design emphasis based on the requested improvement of the related courses in our department. We have a plan tied to staffing resources for next 5 years to successfully implement the proposed emphasis.
6. The new name of the emphasis (Microelectronics) will be more inclusive of other areas such as “Semiconductors”, “signal and systems” and “IC packaging”.
7. There was a loophole in existing emphasis course requirements that students has to take total 19 credit (instead of 18) to get this emphasis. Also because of low enrolment and staffing issues, we would not offer ECE411 every semester that makes meeting the emphasis requirement very difficult for students.
8. If students follow the listed courses in original IC design emphasis, there is a chance that they might not be fulfilling the general program requirement for technical electives (…at least nine credits from the follow courses: ECE 410 or ECE 416, ECE 420, ECE 430, ECE 440 or ECE 443, ECE 450 and ECE 460). We are making sure that following the listed courses will satisfy both general EE technical elective requirements and the Microelectronics emphasis requirements.

Engineering

1. Drop the following courses [Effective: Summer 2014]

**EM J484 / JS84 Writing Winning Proposals (3 cr)**
Practical course to define the process for developing and submitting proposals. Topics include RFP identification, budgeting, scheduling, proposal writing, proposal reviews, and other topics in the proposal writing process. Guest lecturers will discuss their successful experiences. Students will produce one submission-ready proposal for review of technical writing skills. Additional projects reqd for grad cr.

Rationale: This course has not been taught for more than 8 years and is no longer a requirement for the EM program.

**EM 511 Legal Process for Engineers (3 cr)**
Designed to acquaint engineering management students with the legal process in general and the role of the judiciary in issues encountered by engineering managers. The course is intended to prepare professionals and managers for legal problems and potential liabilities they may encounter in their work as managers. Course employs the Socratic process to explore business organizations, employment law, contract law and other related topics.

Rationale: We previously had a lawyer teach the course and we no longer have an instructor to offer it. The curriculum was updated some time ago such that this no longer became a required class. The students are allowed to choose their qualitative electives.
**TM 527  Occupational Health Hazards (3 cr)**
In-depth examination and implementation of the field of industrial hygiene practice; focus on recognition, evaluation, and control of occupational health hazards.

Recommended Equivalent Course: TM 533

Rationale: This is not a required class. We have not had sufficient student enrollments to have this class go for the last 7 years.

2. Add the following courses [Effective: Summer 2014]

**EM 515 (s) Advanced Topics in Engineering Management (2-9 cr, max 9)**
Same as TM 515. Advanced topics in Engineering Management and Technology Management.

**Prereq: Instructor Permission**

Recommended Short Course Title: Adv Topics in EM

Rationale: No increase in workload. Special topic classes are needed at times to test the feasibility of new courses or to satisfy the need for a class from students or an employer. This course will provide a vehicle to provide cross-listed advanced topics class in both Engineering and Technology Management.

**EM 560  Project Risk Management (3 cr)**
Application of project risk assessment tools and techniques that help increase the probability of project success. Discover different approaches used by commercial and federal agencies to identify, assess, and quantify risks and their impacts on projects.

**Prereq: EM 510 or TM 510; or Instructor Permission**

Rationale: No increase in workload. This course was taught as a special topics class in the summer of 2013 and it appears in the future there will be a demand for this course. Also, this course increases the offering of courses in Engineering Management.

**TM 515  (s) Advanced Topics in Engineering Management (2-9 cr, max 9)**
See EM 515.

Recommended Short Course Title: Adv Topics in EM

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**Mechanical Engineering**

1. Add the following courses [Effective: Summer 2014]

**ME J423/J523  Human Factors and Ergonomics in Product Design (3 cr)**
Introduction to and application of Human Factors & Ergonomics Engineering principles in product design. Engineers design systems (e.g., work environments or products) where the human is an integral component. Human Factors & Ergonomics Engineering puts emphasis on how products should be designed so that they are safe, comfortable, and efficient for the human user. This course will focus on how body characteristics, physical and cognitive abilities, and the environment affect how products should be designed to accommodate the intended user(s). Additional projects/assignments are required for graduate credit.

**Prereq: Senior standing in the College of Engineering; or Permission**

Recommended Short Course Title: Human Factors & Ergonomics

Rationale: This course has been taught several in the past 4 years and will be offered every Spring semester. This is not an increase in faculty loads as the course is already in the normal rotation and has been taught in the normal load.

**ME 490  Solid modeling, Simulation and Manufacturing Capstone (3 cr)**
Use of solid modeling software focused on preparation for certification examinations, introduction to multi-physics numerical simulation, and computer aided manufacturing (CAM). A major final project is required. (Fall only)

**Prereq: Permission**

Recommended Short Course Title: Solid Model, Sim & Manuf Caps

Rationale: There will be an emphasis on preparation for certifications exams in preparation for the engineering practice. This will be a capstone experience in numerical simulation and manufacturing. The increased workload is manageable in that two new clinical faculty have been hired.

2. Change the following courses [Effective: Summer 2014]

**ME J421/J521 (s) Advanced Computer Aided Design (3 cr)**
Use of solid modeling software for advanced component design, creation of complex multi-component assemblies, animation studies, and rendering. Course concludes with one month-long final project.
Prereq: ME 301 and ME 341
Coreq: ME 341

Rationale: This course was developed and taught over the last several years and it is apparent that a separate graduate level experience in solid-modeling is needed. ME 521 will become a stand-alone course to better serve the needs of the graduate students. There will be minimal impact on the teaching loads of the department faculty. Adding the subtitle to ME 421 for more flexibility in what is taught in the course.

ME 521 Advanced Computer-Aided Design Design Synthesis with Solid Modeling (3 cr)
Use of solid modeling in the design synthesis process that focuses on optimized designs, reverse engineering to understand design intent, and aesthetics. Course concludes with one month-long final project. See ME 421/521.
Prereq: Graduate Standing or ME 421

Recommended Short Course Title: Design Synth w/ Solid Model

Rationale: A separate graduate level experience in solid-modeling is needed to better serve the needs of the graduate students. Minimal impact on teaching loads.