New Undergraduate Course Approval Cover Form
Montana State University

This four-page form collects basic information about the proposed new course, provides information on the approval process, and includes all required approvals. Additional information (see INFO sheet) is also required as part of the New Course Packet.

Proposed New Course Information

Requested Rubric, Course Number, Core Designation (if needed): EFIN 499
Example: PHL 361 RH

Course Title: FINANCIAL ENGINEERING DESIGN CAPSTONE
Abbreviated Course Title (≤ 30 chars): FIN ENG DESIGN CAPSTONE
First Semester to be Offered: Spring 2016
Submitted by: Durward K. Sobek
dx7140 dsobek@le.montana.edu
Instructor: William Schell
Department: Mechanical and Industrial Engineering
College: COE

New Course Review Process

Instructor completes the New Course Packet, with Core information if a Core designation is requested.
Instructor checks for "equivalent" course in the MUS system and recommends a common or unique course number.
Department Head’s signature indicates that course has been approved by the process used within the Department.
The Chair of the College Curriculum Committee signs to indicate college academic approval.
The College Dean signs to indicate that adequate resources are available to offer the course. Supporting information (Dean’s Statement) is typically required.
The New Course Packet (as PDF) is uploaded to the Provost’s Office for distribution to other committees.
Course requests are sent to Curriculum and Program Committee (CPC). Core reviews are sent to appropriate Core subcommittee. Committees work in parallel when possible to speed approval process. Special topics courses (291,491) skip the CPC review (limited to two years.)
Provost’s Office reviews the new course request. New courses are submitted to MUS for Common Course Number (CCN) review. Dean and Department informed upon approval.
Approved new course sent to Registrar for inclusion in the Catalog and Schedule of Classes.

APPROVALS

Durward K. Sobek II
Submitter
12/20/2013

Ruhul Amin
Department Head
1/16/2014

Christine M. Foreman
Chair, College Curriculum Comm.
12/10/2013

Dean

Chair, Core Subcommittee (If appl.)

Chair, CPC

Assoc. Provost

Note: This diagram illustrates the typical flow path, but at any review step there can be a request for additional information or modifications. Careful review in early steps is the best way to speed the overall process. * Special topics courses (x91) require fewer signatures, but cannot be offered more than two times without committee review.
INFORMATION NEEDED FOR COMMON COURSE NUMBERING

The process for identifying a common course number for a new course is as follows:

1. Course learning outcomes are prepared for the new course.
2. The person submitting the new course request looks at the CCN website to see if a course with similar outcomes already exists in the MUS system.

   www.mus.edu/Qtools/CCN/ccn_default.asp

   • If a course exists with at least 80% of the same outcomes, the course is considered “equivalent” to the proposed new course, and the new course should use the existing rubric and course number.
   • If no “equivalent” course is found, the person submitting the new course request should identify a unique course number that has not been used by any other course in the MUS system.

3. The requested rubric and course number are submitted as part of the new course packet.
4. The Provost’s Office submits the learning outcomes and the requested rubric and course number to the MUS to have a course number assigned to the course. (This will typically be the requested course number, but it could be changed.)
5. The assigned common course number is reported back to the person submitting the new course request.

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**Requested Rubric, Course Number, Core Designation (if needed):**

**Course Title:**

**Abbrev. Course Title (≤ 30 char):**

**Credits:**

**Department Offering Course:**

**College:**

Is this course “equivalent” to a course in the MUS System?:  

☐ Yes  ☐ No

**Learning Outcomes for the Course:**

EFIN 499

FINANCIAL ENGINEERING DESIGN CAPSTONE

FIN ENG DESIGN CAPSTONE

Mechanical and Industrial Engineering

COE

1. Engage in a substantial, open-ended problem and successfully create and deliver a well-engineered solution to meet a set of client needs.

2. Integrate tools and concepts from multiple Financial Engineering arenas in order to construct a solution to a real-world situation.

3. Demonstrate skills in interacting professionally with clients and others.

4. Demonstrate teamwork, interpersonal and formal communication skills.
**EFIN 499**  
**FINANCIAL ENGINEERING DESIGN CAPSTONE**  
Engr & Econ Fin Mgmt I  
Spring 2016  
☐ Yes ☐ No  
9179  
Mechanical and Industrial Engineering  
COE

Is the requested course number available? (x4155 to check): ☑ Yes ☐ No

Frequency of course offering: ☑ Annually ☐ Alternate Years, starting ______  
Semester(s) offered (check all that apply): ☑ Summer ☐ Fall ☑ Spring  
Summer Options (check all that apply): ☐ First 6 weeks ☐ Second 6 weeks ☐ 12 weeks

Credits by mode of instruction:  
| Lecture: | 1 |  
| Seminar: | 1 |  
| Independent Study: | 1 |  
| Lab/Studio: | 1 |  
| Recitation/Discussion: | 1 |  
**TOTAL CREDITS:** 3

Primary Mode(s) of Delivery:  
☑ Face-to-face ☐ Web-Enhanced (small on-line comp.)  
☐ On-Line Only ☐ Blended (significant on-line portion)

**Time and Location** – Call the Registrar’s Office at x4155 to find a time and location for the course.

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<th>Day(s)</th>
<th>M</th>
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Capacity (room capacity, or enrollment “cap”): 30

**Co- and Pre-Requisites** – Courses numbered 200 and above are normally expected to have prerequisites. When listing multiple prerequisites, please separate courses with “and” if both are required, or “or” if only one is required.

Prerequisite(s):  
Co-Requisite(s):  

**Course Description** – Provide a course description of 40 words or less for the MSU Catalog.

A comprehensive open-ended team design project emphasizing the engineering and evaluation of financial instruments and decision support models in order to manage risk, create strategic business opportunities, lower costs, and access new markets. Teamwork and communication skills emphasized.
DEAN'S STATEMENT

The reviewing committees are being asked to take a closer look at the resources required for each proposed new course. In many cases new courses will replace existing courses and the new course request is effectively resource neutral, however that is not always the case. For example, a new elective course that would result in distributing an existing student population across a larger number of courses would represent a significant increase in expenditures for the new course, and no increase in total student credit hours. A funding mechanism for such a course would need to be identified. The Dean's Statement is the place to document how the costs of the proposed new course will be covered.

The Financial Engineering program was recently (September 2013) approved by the Board of Regents. The new program will be managed jointly by departments in two colleges: the Department of Mechanical and Industrial Engineering in the College of Engineering and the Department of Agricultural Economics and Economics in the College of Agriculture. This course, Financial Engineering Design Capstone- EIND 499, is part of the new program. Please see the Dean’s statement from the College of Engineering, November 8, 2013- "As Acting Dean of the College Engineering, I fully support approval of EFIN 499 and EIND 468 as new courses. These courses are integral to the development and growth of the new Financial Engineering program. The College of Engineering will financially support the initial development of these courses. The steady state cost of offering will be justified through growth of the Financial Engineering program and accompanied resources. These resources will either be reallocated Industrial Engineering resources or possibly new resources obtained through the normal college or university resource distribution processes."
Please provide the following information in narrative format. Substantive responses to all criteria are required. Although not required, a draft syllabus can also be helpful to the committee in understanding the details of the proposed course.

**General Course Information**

1. Requested Rubric, Course Number, and Core Designation (if any)

   EFIN 499

2. Course Title

   **FINANCIAL ENGINEERING DESIGN CAPSTONE**

3. Provide a general description of the course explaining the need for the course, its goals, and its overall structure. *This is the most important part of the application and should offer a good sense of what students will experience by taking this class.*

   This is the third course in the financial engineering course sequence and represents the capstone of the recently approved undergraduate curriculum. Financial engineering develops and manages financial strategies and tools in financial management. In this course, students will apply the tools learned throughout the curriculum to engineer and evaluate financial instruments and decision support models in order to manage risk, create strategic business opportunities, lower costs, and access new markets for an external client. Teamwork and communication skills emphasized throughout this team experience.

4. Based on what types of student work (e.g., tests, homework assignments, papers, performances, etc.) will grades be determined?

   From the attached syllabus, Grades will be based primarily on overall team performance, and secondarily on individual contribution, as follows:
   - **15%** Individual journal, participation, and team evaluation
   - **10%** Weekly project management meetings
   - **10%** Interim deliverables (e.g. Statement of Work)
   - **15%** Interim presentation and written report
   - **10%** Design Fair poster and team interview
   - **40%** Final written report
Individual grades may differ from team grades depending on individual circumstances.
5. Provide a course content outline containing all major topics plus a brief description of the material to be covered under each major topic heading.

   This is a capstone project course with minimal material provided to students through lectures or discussion. The content of the class discussions varies based on the needs of the teams. Typically these discussions will include many of the following topics:
   - Creating a Project Definition and Scope
   - Effective Project Planning, Tracking and Control
   - Team Dynamics and Effective Meetings
   - Effective Use of Design Journaling
   - Data Collection Techniques
   - Client and Project Communications Expectations and Best Practices
   - Technical Writing and Oral Presentations Best Practices
   - Planning for Implementation, Hand-off and Control

6. List required texts or other required references.

   No required text.

7. What are the estimated enrollment and student credit hour (SCH) production?  
   \[ SCH = (enrollment \times credits) \]

   Enrollment = 15; SCH = 45

8. Will there be an enrollment cap that restricts enrollment below the level of student demand? If so, what is the enrollment cap and why is it necessary?

   No

9. Will course be a “restricted enrollment” course? If so, why is restricted enrollment necessary?

   No.

10. Describe how the success of the course will be evaluated? (“End-of-semester student evaluations” is not the answer to this question. How will the instructor determine if the learning outcomes are being met, and how will the department determine if the course is fulfilling its intended purpose?)

    Student enrollment, accreditation review, financial engineering internal and external advisory committees, student and industry feedback.

11. Is the instructor a member of the regular faculty (i.e., tenured or tenure-track)? If no, please describe the instructor’s qualifications, attach a Vita, and provide a separate letter of support, signed by the department head (or
appropriate unit director), addressing the instructor’s qualifications to teach this course.

Regular tenure-track faculty member.

Level of Offering
12. Has the course been offered previously under 280/291 or 480/491? If so, when? Under what number? What was the enrollment? What level of students took the course?

No

13. Justify the level of course offering.

This is an open-ended, team based, design course where students are expected to utilize all aspects of the Financial Engineering curriculum in their development of solutions for an external client.

Relationship to other Courses, Curricula, and Departments
14. Does this course build on or interrelate with other courses in your curriculum or related curricula? If so, which ones?

Yes; the course requires the application of material covered throughout the Financial Engineering curriculum with a particular focus on the EFIN 301/401 sequence.

15. Do the topics in the proposed course duplicate or reiterate those in other courses in this or any other department? If so, how does the coverage and educational experience differ and how is this duplication or reiteration justified? Also, what liaison (which is expected in cases of apparent overlap) has been conducted with other departments? Report reactions, both favorable and unfavorable.

No, the material is not covered in any other course offered by MSU. The proposed major and courses in financial engineering have been reviewed by the finance department in the College of Business at MSU and the business faculty at U of M at Missoula. They found that the material is sufficiently different to not overlap with existing finance courses.

16. What programs (departments, colleges) will be impacted by the SCH production of this course? That is, where do you think the SCH in the proposed course are likely to come from? If the expected SCH production of the proposed course is greater than 1000, and the SCH are expected to come from other colleges, what steps have been taken to make the other units aware of the potential loss of SCH? Report reactions, both favorable and unfavorable.

The financial engineering major is offered jointly by the Department of Agricultural Economics and Economics and the Department of Mechanical and Industrial Engineering; both departments will be sources of the SCH for this major, along with new students.
17. If this proposed course has a significant interdisciplinary component, please explain briefly. Otherwise, indicate n/a.

This course is the application of material found at the crossroads of economics and engineering. The principles of financial engineering applied in this course are constructed through the combination of engineer’s strong system modeling is used in combination with financial economic principles.

Students Served
18. Does the proposed course serve majors only? Non-majors only? Both majors and non-majors? What other majors might be interested in this course? State areas or disciplines to be served and indicate the specific efforts that will be made to make the course material relevant to all disciplines served.

Only majors in the new Financial Engineering program.

Resources
19. What additional resources (e.g., additional instructional FTE, required technologies), if any, will be required to offer this course? Are there any resource issues for the students who will take the course (e.g., required technologies, travel, on-line access requirements)? Will there be an additional fee charged to students taking this course? Please explain.

Incremental instructional resources are needed in Industrial Engineering. The Dean of the College of Engineering committed the needed non-tenure track support to cover other EIND courses as part of the approval of the new undergraduate degree in Financial Engineering.

20. What existing information resources - print (books, journals, documents), audiovisual (videos, DVDs, CDs or other), and/or electronic (e-books, databases, electronic journals and web sites) - provided by the MSU Libraries will be used by students in this course? Provide examples as well as descriptive information. If additional information resources are necessary, please discuss those acquisitions with the library (x6549 Collection Development) at least three months prior to the beginning of the semester in which this course will be taught.

No additional information resources are necessary.

Other Supporting Material
21. Include any additional information you feel is needed to support this request.

The course was part of the proposal for a new degree program which was discussed widely with the Colleges of L&S, Ag, Engineering and Business; and was vetted through Faculty Senate before reaching the Board of Regents. See the attached BOR application for the financial engineering major.
Spring 2016

EFIN 499 – FINANCIAL ENGINEERING DESIGN CAPSTONE

Instructor: William Schell, PhD, PE

Office Hours: Roberts Hall 403, MWF 9 – 10 and W 1 – 2
Contact: wschell@ie.montana.edu, 406.994.5938 (office), 406.224.0857 (cell / text)

General Course Information

Website: http://www.coe.montana.edu/ie/faculty/schell/teaching/efin499/

Meeting Location and Time: TBD

Description: A comprehensive open-ended team design project emphasizing the engineering and evaluation of financial instruments and decision support models in order to manage risk, create strategic business opportunities, lower costs, and access new markets. Teamwork and communication skills emphasized.

Prerequisites: EFIN 401

Etiquette and Attendance: All members of the class are expected to conduct themselves professionally at all times. Key components of professional behavior include arriving on time, engaging in discussions, and not adding distractions to class. Students are expected to attend class and class members are expected to be present when attending, failure to attend class or participate will be reflected in your final grade. MSU Student Conduct Guidelines can be found at www2.montana.edu/policy/studentconduct

Learning Outcomes: At the end of this course students who learn the material will be able to:
1. Engage in a substantial, open-ended problem and successfully create and deliver a well-engineered solution to meet a set of client needs.
2. Integrate tools and concepts from multiple Financial Engineering arenas in order to construct a solution to a real-world situation.
3. Demonstrate skills in interacting professionally with clients and others.
4. Demonstrate teamwork, interpersonal and formal communication skills.

Grading and Evaluation:

Grades will be based primarily on overall team performance, and secondarily on individual contribution, as follows:

15% Individual journal, participation, and team evaluation
10% Weekly project management meetings
10% Interim deliverables (e.g. Statement of Work)
15% Interim presentation and written report
10% Design Fair poster and team interview
40% Final written report

Individual grades may differ from team grades depending on individual circumstances.

Late Assignments: Assignments must be turned in at the beginning of the class period when it is due. Late assignments will not be accepted.
Course Communications

Assignments and other key information regarding this course will be published to the course website. The course listserv will be utilized for any reminders, and to draw student's attention to any new materials (e.g. corrections) published to the website. Please make sure the email address you regularly use is on the listserv, and check your email frequently. As noted above, the instructor is available outside of published office hours.

Laboratory

The laboratory associated with the course is the Billie O. Ragsdale Production Systems Design Laboratory located in Roberts 415. You have been issued a key to this lab, and will be able to use it for the academic year, subject to the posted laboratory policies.

Course Structure

EFIN 499 is taught as an integrated, project-based course. You have been assigned to work on a team to provide a client with an engineered solution to their business or operational problem. Your team will be responsible for all phases of the project, including: understanding client needs, project scoping and definition, data collection, idea generation, engineering analysis, solution development, documentation, client communication, and project management.

Class meetings (generally weekly, on Mondays) will be used to take care of logistics, review project assignments, conduct just-in-time education on pertinent topics, and conduct project management. Attendance is mandatory at all class sessions.

Teams will be required to hold a weekly project management meeting, facilitated by one of the team members on a rotating basis (evenly split between all team members). The team will review progress against plan since the previous meeting, assess the current state of the project, and plan future tasks. The faculty advisor will attend this meeting to judge participation and individual contribution, and offer guidance and suggestions as needed. Attendance of all team members is expected.

Journals

Purchase a blank, 9" x 12" journal with numbered pages from the bookstore (AMPAD #23-157 is recommended, since it lays flat. AMPAD #23-156 is also acceptable. No lab composition books!). In the journal, keep record of all class-related activities and information: class notes, team meeting notes, individual brainstorming, web or library research activity, sketches of design ideas, user interview notes, contact information, analyses, reflections, etc. Journals will be periodically assessed throughout the semester on journal check dates. See the course website for more details.

Key Dates

- Mid January – First Day of Class
- Second Week of Class – Statement of Work Due (Internal)
- Third Week of Class – Initial Project Plan Due
- Week before Spring Break – Interim Project Presentations and Report Due
- Week before Finals – Design Fair
- First Day of Finals – Final Report Due by 5:00

Additional details on the course schedule will be provided during the first class meeting.