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): PHL 361 RH

Course Title: Engineering & Economic Financial Management I

Abbreviated Course Title (≤ 30 chars): Engr & Econ Fin Mgmt I

First Semester to be Offered: Spring 2015

Submitted by: Durward K. Sobek II
dsobek@le.montana.edu

Submitter's Contact Info: Phone, Email:
x7140

Instructor: Joe Atwood

Department: Ag. Econ. & Econ.

College: COA & CLS

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 server 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
12/20/2013
Submitter

Ruhul Amin
1/16/2014
Department Head

Christine M. Foreman
1/15/2014
Chair, College Curriculum Comm.

Dean *
12/10/2013

Chair, Core Subcommittee (if app.)

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 301
Engineering & Economic Financial Management I
Engr & Econ Fin Mgmt I
3
Ag. Econ. & Econ.
COA & CLS

Students will:

• Summarize the importance, usefulness and limitations of financial engineering.

• Demonstrate how to construct, price, and hedge complex derivatives.

• Apply numerical analysis and numerical methods in stochastic financial modeling.
INFORMATION REQUIRED BY THE REGISTRAR

The data needed to enter the new course into the MSU Catalog and Schedule of Classes is collected on this page. Once the new course has been approved, this page is automatically forwarded to the Registrar for data entry.

Assigned Rubric, Course Number, Core Designation (if needed):

EFIN 301

Course Title (for Catalog):

Engineering & Economic Financial Management I

Course Title (for Schedule of Classes, 30 characters, max.):

Engr & Econ Fin Mgmt I

First Semester to be Offered:

Spring 2015

Restricted Entry/Consent of Instructor Required:

Yes No

Instructor’s GID (last 4 digits only):

9179

Department Offering Course:

Ag. Econ. & Econ.

College:

COA & CLS

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:

3

Seminar:

Independent Study:

Lab/Studio:

Recitation/Discussion:

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.

Assigned Day(s):

M Tu W Th F Sa Su

Assigned Time(s):

10:00 am - 10:50 am

Assigned Building:

LINH

Assigned Room:

113

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):

CSCI 111, ECNS 301, EIND 354 or equivalent

Co-Requisite(s):

EFIN 101

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

Introduction to financial engineering principles and tools used to manage risk, lower costs, and access new markets. Applications of arbitrage pricing are explored with emphasis on derivatives and applications. Numerous numerical financial applications using R and higher-level programming languages.
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, Engineering and Financial Economic Management I- EFIN 301, is part of the new program. Please see the Dean's statement from the College of Agriculture, November 14 2013- "I fully support approval of EFIN 101, EFIN 301 and EFIN 401 as new courses. These courses will be integral to the newly developed Financial Engineering program; an interdisciplinary program between the College of Agriculture (COA) and the College of Engineering. The College of Agriculture will financially support the initial development of these courses with either reallocated Agriculture Economics and Economics resources or possible new resources obtained through the normal college or university resource distribution process. Steady state cost of offering the courses will be justified through growth of the program." The College of Engineering also supports the development of these new courses in conjunction with the College of Agriculture.
New Undergraduate Course Narrative
Montana State University
Updated August 23, 2012

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 301
2. Course Title
   > Engineering & Economic Financial Management I
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 class introduces the student to financial engineering concepts with an emphasis upon derivative instruments. The class emphasizes the construction, pricing, and hedging of conventional and exotic derivatives using both theoretical and numerical procedures. Reading will illustrate both the usefulness and potential pitfalls of derivatives in today's financial markets. Students will integrate applied theory and numerical procedures in problems sets and a major class project. The students' major class projects will involve real world applications. The class structure will involve a combination of lecture and student led presentations. Student learning will be assessed through a combination of graded problem sets, periodic exams, and a graded major project.
4. Based on what types of student work (e.g., tests, homework assignments, papers, performances, etc.) will grades be determined?
   > Regular Homework, Exams and a Course Project. See attached syllabus.
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.
   > See attached syllabus.
6. List required texts or other required references.
   > See attached syllabus.
7. What are the estimated enrollment and student credit hour (SCH) production?
   [SCH = (enrollment * 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 tenured 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?

   > Yes. Fall 2012. Enrollment was 5. 2 audited the course.

13. Justify the level of course offering.

   > Complex mathematical and statistical material typically only offered at the junior or senior within economics, engineering, and statistics programs.

**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?

   > This course builds on the material from EIND354. It is not related to other courses.

15. Do the topics in the proposed course duplicate or reiterate those in other courses in this or any other department? If so, how do 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. The proposed course addresses the construction of new financial instruments, a topic not covered by existing business finance courses. Further, the analysis elements of the course require higher-level mathematics, including advanced statistics, as well as more advanced economics knowledge and actuarial methods versus 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 at the crossroads of economics and engineering. The principles of financial engineering analyzed 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.

> Predominantly majors and minors. Some students from other fields such as economics, ag. bus., business, and engineering disciplines will periodically enroll.

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.

> At this time, no additional resources are necessary.

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.
EFIN 301
Engineering & Economic Financial Management I
Spring 2015

Instructor: Joe Atwood
Office: 309E Linfield Hall
Phone: 406-994-5614
E-mail: jatwood@montana.edu; brwin338@aol.com

Texts: Hull, John C. Options, Futures, and Other Derivatives, Prentice Hall (HULL)

Learning Outcomes
Students will
- Summarize the importance, usefulness and limitations of financial engineering.
- Demonstrate how to construct, price, and hedge complex derivatives.
- Apply numerical analysis and methods in stochastic financial modeling.

Course Description
This class introduces the student to financial engineering concepts with an emphasis upon derivative instruments. The class emphasizes the construction, pricing, and hedging of conventional and exotic derivatives using both theoretical and numerical procedures. Reading will illustrate both the usefulness and potential pitfalls of derivatives in today’s financial markets. Students will integrate applied theory and numerical procedures in problems sets and a major class project. The students’ major class projects will involve real world applications. The class structure will involve a combination of lecture and student led presentations. Student learning will be assessed through a combination of graded problem sets, periodic exams, and a graded major project.

Prerequisites: CSCI 111, ECNS 301, EIND 354 or equivalent

Grading
The "course score" and course grade will be computed as the weighted average of your "short problem set score" (40% weight), your "exam percent score" (40% weight), and the major project score (20% weight). Each student will be expected to complete a major project assigned by the instructor or chosen by the student with instructor approval. Requirements for the major project will be presented and discussed in class.

A problem set will usually consist of 5-7 questions. Each problem set will be individually assigned a percentage score. Your overall “short problem set score” will be computed as the average of the individual problem set scores. Each exam will also be assigned a percentage score. The two highest regular exam percentage scores will be averaged to give your “exam percent score”. On a 100 point scale, grades will be allocated as follows:


Example: If you average 95% on your short problems, 80% on your exams, and 90% on your major project, the course "points" would be calculated as 0.95 x 40 + 0.80 x 40 + 0.90 x 20 = 88 \rightarrow B+ course grade.

The third exam for this course will be held during MSU’s scheduled final exam time for this class. ALL students are required to take the third exam.
# TENTATIVE COURSE OUTLINE

<table>
<thead>
<tr>
<th>Subject (Text Book Chapters)</th>
<th>Text Chapters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Markets, Prices, Arbitrage</td>
<td>HULL 1</td>
</tr>
<tr>
<td>Risk, Options</td>
<td>CZ 1</td>
</tr>
<tr>
<td>Interest Rates, Bonds</td>
<td>HULL 4</td>
</tr>
<tr>
<td>Risky Assets, Risk Neutral Probabilities and Introduction to the Binomial Pricing Model</td>
<td>HULL 2, CZ 2,3,4</td>
</tr>
<tr>
<td>Portfolios and Risk: EV and CAPM</td>
<td>HULL 5</td>
</tr>
<tr>
<td>Forward Contracts, Futures and Options</td>
<td>HULL 2.5, CZ 6,7</td>
</tr>
<tr>
<td>Option Pricing (Introduction)</td>
<td>HULL 8</td>
</tr>
<tr>
<td>Financial Engineering Overview</td>
<td>HULL 3</td>
</tr>
<tr>
<td>More In Depth Examination of Options and Derivatives</td>
<td>HULL 9</td>
</tr>
<tr>
<td>Interest Rate Swaps and Other Applications</td>
<td>HULL 6</td>
</tr>
<tr>
<td>Pricing Models</td>
<td>HULL 7,9,11,12</td>
</tr>
<tr>
<td>Binomial Asset Pricing Model</td>
<td>HULL 13</td>
</tr>
<tr>
<td>Weiner Process and Ito's Lemma</td>
<td>HULL 14</td>
</tr>
<tr>
<td>Black-Scholes-Merton Model</td>
<td></td>
</tr>
<tr>
<td>Applications</td>
<td></td>
</tr>
<tr>
<td>Stock Options</td>
<td>HULL 15</td>
</tr>
<tr>
<td>Stock Indices and Currencies</td>
<td>HULL 16</td>
</tr>
<tr>
<td>Futures Options and Volatility Smiles</td>
<td>HULL 17,19</td>
</tr>
<tr>
<td>Hedging Greeks</td>
<td>HULL 18</td>
</tr>
<tr>
<td>Numerical Applications</td>
<td>HULL 20-22</td>
</tr>
</tbody>
</table>