

New Course Request

Indiana University

IUPUI

Campus

Check Appropriate Boxes:

Undergraduate credit

Graduate credit

Professional credit

1. School/Division School of Engineering and Technology 2. Academic Subject Code ECE/EE

3. Course Number 32700 (must be cleared with University Enrollment Services) 4. Instructor _____

5. Course Title Engineering Economics

Recommended Abbreviation (Optional) Engineering Economics

(Limited to 32 Characters including spaces)

6. First time this course is to be offered (Semester/Year): Spring 2010

7. Credit Hours: Fixed at 3 or Variable from _____ to _____

8. Is this course to be graded S-F (only)? Yes _____ No

9. Is variable title approval being requested? Yes No

10. Course description (not to exceed 50 words) for Bulletin publication: _____

Credit 3. Class 3. P: Sophomore Standing. Engineering Economics is designed as an overview of economics with a focus on how it relates to the practice of engineering.

Topics include Interest formulas, rate of return, life cost analysis, depreciation, taxes, and cash flow.

11. Lecture Contact Hours: Fixed at 3 or Variable from _____ to _____

12. Non-Lecture Contact Hours: Fixed at 0 or Variable from _____ to _____

13. Estimated enrollment: 25 of which 0 percent are expected to be graduate students.

14. Frequency of scheduling: Spring/Fall Will this course be required for majors? Yes

15. Justification for new course: Industry feedback suggests economics is a necessary tool for engineers to comprehend.

16. Are the necessary reading materials currently available in the appropriate library? _____

17. Please append a complete outline of the proposed course, and indicate instructor (if known), textbooks, and other materials.

18. If this course overlaps with existing courses, please explain with which courses it overlaps and whether this overlap is necessary, desirable, or unimportant.

19. A copy of every new course proposal must be submitted to departments, schools, or divisions in which there may be overlap of the new course with existing courses or areas of strong concern, with instructions that they send comments directly to the originating Curriculum Committee. Please append a list of departments, schools, or divisions thus consulted.

Submitted by:

[Signature] Date 4/16/09
Department Chairman/Division Director

Approved by:

H.U. Akay Date 7/15/09
Dean

Date _____
Dean of Graduate School (when required)

Date _____
Chancellor/Vice-President

Date _____
University Enrollment Services

After School/Division approval, forward the last copy (without attachments) to University Enrollment Services for initial processing, and the remaining four copies and attachments to the Campus Chancellor or Vice-President.

PURDUE UNIVERSITY
REQUEST FOR ADDITION, EXPIRATION,
OR REVISION OF AN UNDERGRADUATE COURSE
(100-400 LEVEL)

DEPARTMENT Electrical and Computer Engineering EFFECTIVE SESSION Spring 2010

INSTRUCTIONS: Please check the items below which describe the purpose of this request.

<input checked="" type="checkbox"/> 1. New course with supporting documents	<input type="checkbox"/> 7. Change in course attributes (department head signature only)
<input type="checkbox"/> 2. Add existing course offered at another campus	<input type="checkbox"/> 8. Change in instructional hours
<input type="checkbox"/> 3. Expiration of a course	<input type="checkbox"/> 9. Change in course description
<input type="checkbox"/> 4. Change in course number	<input type="checkbox"/> 10. Change in course requisites
<input type="checkbox"/> 5. Change in course title	<input type="checkbox"/> 11. Change in semesters offered (department head signature only)
<input type="checkbox"/> 6. Change in course credit/type	<input type="checkbox"/> 12. Transfer from one department to another

PROPOSED: Subject Abbreviation <u>ECE/ME</u> Course Number <u>32700</u> Long Title <u>Engineering Economics</u> Short Title <u>Engineering Economics</u> <small>Abbreviated title will be entered by the Office of the Registrar if omitted. (22 CHARACTERS ONLY)</small>	EXISTING: Subject Abbreviation _____ Course Number _____	TERMS OFFERED Check All That Apply: <input checked="" type="checkbox"/> Summer <input checked="" type="checkbox"/> Fall <input checked="" type="checkbox"/> Spring CAMPUS(ES) INVOLVED <input type="checkbox"/> Calumet <input type="checkbox"/> N. Central <input type="checkbox"/> Cont Ed <input type="checkbox"/> Tech Statewide <input type="checkbox"/> Ft. Wayne <input type="checkbox"/> W. Lafayette <input checked="" type="checkbox"/> Indianapolis
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CREDIT TYPE 1. Fixed Credit: Cr. Hrs. <u>3</u> 2. Variable Credit Range: _____ Minimum Cr. Hrs _____ (Check One) To <input type="checkbox"/> Or <input type="checkbox"/> Maximum Cr. Hrs _____ 3. Equivalent Credit: Yes <input type="checkbox"/> No <input type="checkbox"/> 4. Thesis Credit: Yes <input type="checkbox"/> No <input type="checkbox"/>	COURSE ATTRIBUTES: Check All That Apply 1. Pass/Not Pass Only <input type="checkbox"/> 2. Satisfactory/Unsatisfactory Only <input type="checkbox"/> 3. Repeatable <input type="checkbox"/> Maximum Repeatable Credit: <u>1</u> 4. Credit by Examination <input type="checkbox"/> 5. Designator Required <input type="checkbox"/> 6. Special Fees <input type="checkbox"/> 7. Registration Approval Type Department <input type="checkbox"/> Instructor <input type="checkbox"/> 8. Variable Title <input type="checkbox"/> 9. Remedial <input type="checkbox"/> 10. Honors <input type="checkbox"/> 11. Full Time Privilege <input type="checkbox"/> 12. Off Campus Experience <input type="checkbox"/>
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Instructional Type	Minutes Per Mtg	Meetings Per Week	Weeks Offered	% of Credit Allocated	Delivery Method (Asyn. Or Syn.)	Delivery Medium (Audio, Internet, Live, Text-Based, Video)	Cross-Listed Courses
Lecture	75	2	16	100	Syn	Live	
Recitation							
Presentation							
Laboratory							
Lab Prep							
Studio							
Distance							
Clinic							
Experiential							
Research							
Ind. Study							
Pract/Observ							

COURSE DESCRIPTION (INCLUDE REQUISITES):
Credit 3. Class 3. P: Sophomore Standing. Engineering Economics is designed as an overview of economics with a focus on how it relates to the practice of engineering. Topics include Interest formulas, rate of return, life cost analysis, depreciation, taxes, and cash flow.

Calumet Department Head _____ Date _____	Calumet School Dean _____ Date _____
Fort Wayne Department Head _____ Date _____	Fort Wayne School Dean _____ Date _____
<i>[Signature]</i> _____ Date <u>4/16/09</u>	<i>[Signature]</i> _____ Date <u>7/15/09</u>
Indianapolis Department Head _____ Date _____	Indianapolis School Dean _____ Date _____
North Central Department Head _____ Date _____	North Central Chancellor _____ Date _____
West Lafayette Department Head _____ Date _____	West Lafayette College/School Dean _____ Date _____
	West Lafayette Registrar _____ Date _____

Elective Course:	ECE 32700 – Engineering Economics
Credit and contact hours:	(3 cr.) Class 3, Lab 0
IUPUI Campus Bulletin description:	ECE 32700: Engineering Economics. Credit 3. Class 3. Engineering economics is designed as an overview of economics with a focus on how it relates to the practice of engineering. Topics include Interest formulas, rate of return, life cost analysis, depreciation, taxes, and cash flow.
Additional description:	Engineering economics is the application of economic techniques to the evaluation of design and engineering alternatives. The role of engineering economics is to assess the appropriateness of a given project, estimate its value, and justify it from an engineering standpoint. This course covers the time value of money and other cash-flow concepts, reviews economic practices and techniques used to evaluate and optimize engineering decisions, and discusses the principles of benefit-cost analysis.
Prerequisite or corequisite:	P: Sophomore standing
Prerequisites by topic:	None
Textbook:	C. Park, <i>Contemporary Engineering Economics</i> , Prentice-Hall, 2007, ISBN: 0131876287
Coordinator:	Yaobin Chen, Professor of Electrical and Computer Engineering
Goals:	To develop an awareness of cash flow approach, time value of money, product and project costing, and rate of return. To provide an introduction to the process of integrating engineering proposals with economic analysis in order to select among several viable alternative projects. To understand and appreciate the models and measures used in decision making in the area of engineering economics.
Outcomes:	Upon successful completion of the course, students should be able to <ol style="list-style-type: none"> 1. Understand the terminology used in engineering economic analysis. [k] 2. Understand time-value-of-money concepts such as net present worth analysis, equivalent uniform annual worth analysis, benefit/cost analysis, internal rate of return analysis, loans, leveraging, and fixed-income investment analysis. [k] 3. Understand the criteria for making economic-based decisions. [k] 4. Analyze before-tax and after-tax cash flows. [a,k] 5. Understand economic risk analysis techniques. [k] 6. Conduct minimum life cycle cost tradeoffs between initial and repair costs. [a,k] 7. Formulate economic solutions to real-world case study problems. [k] 8. Demonstrate capability to use Excel spreadsheet analysis in solving economic problems. [k] 9. Experience working in a project team to solve an economic problem and make a presentation of the solution using Powerpoint. [d,g] 10. Write a project report, adhering to the specified format for business reports using appropriate writing style, grammar, and spelling. [g] 11. Learn how to estimate costs and perform an economic analysis in support of capstone design and other term projects. [a,k] 12. Develop cash flow analysis problem solving techniques for passing

	exams including the Engineering Economics portion of the EIT exam. [a,k]
Topics:	Based on two classes per week, fifteen weeks plus final exam 1. Engineering economic decisions (1 class) 2. Understanding financial statements (1 class) 3. Interest rate and economic equivalence (2 classes) 4. Understanding money and its management (1 classes) 5. Present worth analysis (1 class) 6. Annual worth analysis (2 classes) 7. Rate of return analysis (1 classes) 8. Estimating project cost elements (2 classes) 9. Depreciation and corporate taxes (2 classes) 10. Developing project cash flows (2 classes) 11. Inflation and its impact on project cash flows (1 class) 12. Sensitivity and risk analysis (4 classes) 13. Replacement analysis (2 classes) 14. Capital budgeting decisions (3 classes) 15. Economic analysis in the service sector (1 class) 16. Project presentations (2 classes) 17. Exams (2 classes)
Computer usage:	Homework and projects require the use of Microsoft Excel or other spreadsheet software
Laboratory projects:	None
ABET category:	Engineering science 100%
Prepared by:	Michael J. Lowry
Date:	March 23, 2009

Topics:

Lecture	Topic	HW Assignment
1	Introduction Engineering Economic Decisions	Read Chapter 1
2	Understanding Financial Statements Financial Ratio Analysis	Read Chapter 2 Due : Homework 1
3	Time Value of Money Economic Equivalence	Read Chapter 3 Due : Homework 2
4	Interest Formulas Unconventional Equivalence	Read Chapter 3 Due : Homework 3
5	Interest Rates Equivalence Analysis	Read Chapter 4 Due : Homework 4
6	Debt Management Investing in Financial Assets	Read Chapter 4 Due : Homework 5
7	Payback Period Present Worth Analysis	Read Chapter 5 Due : Homework 6
8	Annual Equivalent Worth Capital Costs versus Operating Costs	Read Chapter 6 Due : Homework 7
9	Life-Cycle Cost Analysis Design Economics	Read Chapter 6 Due : Homework 8
10	Rate of Return Analysis Incremental Analysis	Read Chapter 7 Due : Homework 9
11	Exam 1	Chapters 1-7
12	Cost-Volume-Profit Analysis Estimating Profit from Production	Read Chapter 8 Due : Homework 10
13	Depreciation Corporate Income Taxes	Read Chapter 9 Due : Homework 11
14	Tax Treatment of Gains or Losses Income Tax Rate	Read Chapter 9 Due : Homework 12
15	Project Cash Flows	Read Chapter 10 Due : Homework 13
16	Project Cash Flows Lease versus Buy	Read Chapter 10 Due : Homework 14

Lecture	Topic	Assignment
17	Inflation	Read Chapter 11 Due : Homework 15
18	Project Risk Probabilistic Cash Flow Analysis	Read Chapter 12 Due : Homework 16
19	Risk Estimation Risk Simulation	Read Chapter 12 Due : Homework 17
20	Financial Options Option Pricing and Analysis	Read Chapter 13 Due : Homework 18
21	Estimating Volatility Compound Options	Read Chapter 13 Due : Homework 19
22	Exam 2	Chapters 8-13
23	Replacement Analysis Economic Service Life	Read Chapter 14 Due : Draft Reports
24	Replacement Decisions Replacement Analysis with Tax Consideration	Read Chapter 14
25	Methods of Financing Cost of Capital	Read Chapter 15 Due : Homework 20
26	Choice of MARR Capital Budgeting	Read Chapter 15 Due : Homework 21
27	Project Presentations	Due : Project Written Reports
28	Cost-Benefit Analysis Benefit-Cost Ratio	Read Chapter 16 Due : Homework 22
29	Economic Analysis in the Service Sector Cost Effectiveness Analysis in the Public Sector	Read Chapter 16 Due : Homework 23
30	Review	
	Final Exam	

Computer usage: Variable based on the group project topic, but student should expect to conduct internet research, word processing, spreadsheet creation and manipulation, and the use of project management software.

Laboratory projects: None.

ABET category: General Education

Prepared by: Yaobin Chen **Date:** April 16, 2009