The University of Michigan
College of Engineering
Curriculum Committee

Agenda
October 23, 2007
1:30-3:00 p.m.
GM ROOM 4th Floor
Lurie Engineering Center

1. Approval of Minutes from10-02-07 Meeting
2. Course Approvals
3. Multidisciplinary Design Minor – Discussion James Holloway
4. Change in Credit Hours for Financial Engineering Program
5. Creating Subject Area for the Energy Systems Engineering Degree Program
6. Proposed ME/AOSS SGUS Program

University of Michigan
College of Engineering
Curriculum Committee Meeting
Tuesday October 02, 2007
1:30-3:00 p.m.
Lurie Engineering Center GM Room
Minutes

Toby Teorey called the meeting to order at 1:40 p.m.

Members Present: T. Teorey, L. Bernal, J. Boyd, J. Holloway, E. Jankowski, C. Lastoskie, M. Moghaddam, S. Montgomery, J. Pan, T. Perakis, R. Robertson, G. Wakefield

Members Absent: M. Epelman, J. Hu, A. Hunt, M. Krug, E. Larsen, J. Shi R. Sulewski

Guests: Susan Bitzer (for Alan Hunt), Amy Conger, Stacie Edington, Volker Sick, Kathleen Vargo (Academic Rules Working Group), Pete Washabaugh, Henry Wong

The minutes of the last meeting (Sept. 18) were approved

Course approval Forms

Toby Teorey called for a motion to approve the following courses. This was moved and seconded.

These Courses Were Approved

ENGR 405(X-Listed with ChE 405 New Course
MSE 890 Modification—Changed Title from: Seminar in Materials and Metallurgy ***to: Colloquium in Materials Science and Engineering***; Changed Description

International Minor (Revised) for Discussion and Vote

A revised proposal was included in the meeting packet. Stacie Edington (from the International Programs Office) presented this revised proposal, since Amy Conger and Volker Sick were in Germany attending a conference. It was noted that students are very enthusiastic about this program. James Holloway said that Volker Sick will oversee this Program.

There was some discussion regarding this Program.
Toby Teorey called for a vote on approving this Minor as amended by the prerequisites, with the understanding that the Oversight Committee will be evaluating each requirement with the suggestions from the Curriculum Committee.
Moved and Seconded. This Proposal was approved.

Several small changes were made at this meeting and this proposal will be revised with those changes before being presented at the next College of Engineering Faculty Meeting on October 30.

Multidisciplinary Design Minor—Discussion and Clarifications

It was decided to hold this discussion until the next meeting (October 23).There will be a vote on this at the November 6 meeting. It was decided to wait until this Minor is approved to develop a template so there should be two minors to work with (this Minor and the International Minor)

Adjournment: Motion to adjourn was made and seconded
Motion carried (approved)

Next Meeting: October 23, 2007 GM Room (4th Floor Lurie Engineering Center)

COURSE APPROVAL FORMS

For October 23, 2007 CoE CC Meeting

EECS 578 Modification—Changing prerequisites from: EECS 478 ***to: EECS 478 or graduate standing***. Changing credit hours from: 3 ***to: 4***.

FINENG 500 New Course

FINENG 590 New Course

ME 360 Modification – Changing prerequisites from: ME 240 ***to: ME 240 and P/A EECS 314***.

ME 401(X-Listed with MFG 402) Modification—Changing title from: Statistical Methods for Manufacturing Systems ***to: Statistical Quality Control and Design***

ME 420 Modification—Changing description; adding lab section

ME 450 Modification—Changing Credit restrictions from: Recommend ME 495 not be elected concurrently. Not open to graduate students. ***to: May not be taken concurrently with ME 455 or ME 495. Not open to graduate students.***

ME 455 Modification—Adding credit restriction: May not be elected concurrently with ME 450 or ME 495

ME 483 New Course

ME 552(X-Listed with MFG 552) Modification—Changing Title from: Electromechanical System Design ***to: Mechantronic Systems Design***; Changing description; Changing Prerequisites from: EECS 210 or equivalent ***to: ME 350, ME 360, EEC S 314, or equivalent***; adding a lab section

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING
Course Approval Request
College Curriculum Committee, 1420 Lurie Engineering Center Building

Print

Form Number 1734

Action Requested

- ○ New Course
- ◉ Modification of Existing Course
- ○ Deletion of Course

Complete the following sections:
New Courses - B & C completely
Modifications - A modified information, B & C completely
Deletions - A & C completely

Date 9/22/2007
Effective Winter 2008

A. CURRENT LISTING

Home Department	Div #	Course Number

Cross Listed Course Information

Course Title

TITLE ABBREVIATION	Time Sched Max = 19 Spaces	
	Transcript Max = 20 Spaces	

Course Description

PROGRAM OUTCOMES:
☐ a ☐ b ☐ c ☐ d ☐ e ☐ f ☐ g ☐ h ☐ i ☐ j ☐ l

Degree Requirements ○ Degree Requirement ○ Tech Elective ○ Core Course ○ Other ○ Free Elective

X Prerequisites EECS 478 ○ Enforced ⊙ Advised

Credit Restrictions

Level of Credit
☐ Undergrad only ☐ All Credit types
X ☒ Rackham Grad ☐ Rckhm Grad w/add'l Work
☐ Non-Rckhm Grad
☐ Ugrad or Rckhm Grad
☐ Ugrad or Non-Rckhm Grad

Credit Hours: Min 3 Max 3
Contact Hrs/Wk 3
Number of Wks 14

C. Repeatability (Indi Research, Dir. Study, Dissertation:
Is this course repeatable? ○ Yes ⊙ No
Maximum Hours? ____ Maximum Times? ____
Can it be repeated in the same term? ○ Yes ○ No

Class Type(s) ☒ Lec ☐ Rec ☐ Sem ☐ Lab ☒ Dis ☐ Ind ☐ Other ____
Graded Section ⊙ Lec ○ Rec ○ Sem ○ Lab ○ Dis ○ Ind ○ Other
Grading ☒ A-E ☐ CR/NC ☐ S/U ☐ P/F ☐ Y
Location ☒ Ann Arbor ☐ Biological Station ☐ Camp Davis ☐ Extension

B. REQUESTED LISTING

Home Department	Div #	Course Number
EECS	252	578

Cross Listed Course Information

Course Title
Computer-Aided Design Verification of Digital Syste

TITLE ABBREVIATION	Time Sched Max = 19 Spaces	CAD Verif Dig Systems
	Transcript Max = 20 Spaces	CAD Verif

Course Description for Official Publication (Max = 50 words)
Design specification vs. implementation. Design errors. Functional and temporal modeling of digital systems. Simulation vs. symbolic verification techniques. Functional verification of combinational and sequential circuits. Topological and functional path delays; path sensitization. Timing verification of combinational and sequential circuits. Clock schedule optimization.

PROGRAM OUTCOMES:
☐ a ☐ b ☐ c ☐ d ☐ e ☐ f ☐ g ☐ h ☐ i ☐ j ☐ k

Degree Requirements ◉ Degree Requirement ○ Tech Elective ○ Core Course ○ Other ○ Free Elective

Prerequisites EECS 478 or Graduate Standing ○ Enforced ⊙ Advised

Credit Restrictions

Level of Credit
☐ Undergrad only ☐ All Credit types
☒ Rackham Grad ☐ Rckhm Grad w/add'l Work
☐ Non-Rckhm Grad
☐ Ugrad or Rckhm Grad
☐ Ugrad or Non-Rckhm Grad

Credit Hours: Min 4 Max 4
Contact Hrs/Wk 4
Number of Wks 14

Printing Information (Optional) ☐ Print the course in the Bulletin ☐ Print the course in the Time Schedule

Terms & Freq. of Offering ☐ I ☒ II ☐ IIIa ☐ IIIb ☐ III ☒ Yearly ☐ Alter Years ☐ Even Years ☐ Odd Years
Half term ☐ 1st ☐ 2nd

Cognizant Faculty Member: K. Sakallah, J. Hayes, V. Bertaco
Title: Prof., Prof., Asst. Prof.

Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

Approval
☐ Curriculum Comm. ____
☐ Faculty ____
☐ Rackham ____
☐ Cross listed Unit 1 ____
☐ Cross listed Unit 2 ____

Submitted By: ■ Home Dept. ☐ Cross-listed Dept.
Name, Signature & Department
Home Dept. EECS Greg Wakefield 9/22/07
Cross-listed Dept(s). ____

Form Number

1734

SUPPORTING STATEMENT

The change of prerequisite requirements is requested to reflect more accurately what preparation is needed for the course. EECS578 does not rely on any specific topic or algorithm covered in EECS478. However, it does require knowledge and ability to understand, transform and manipulate digital designs and graph algorithms. Usually students have acquired these skills by the end of their undregraduate studies. For those students who are still not at the graduate level, we perceive EECS478 as a proper course to acquire CAD-related skills.

The change in number of credit hours is requested to align this course with the majority of 500 graduate level courses in the hardware and software areas.

EECS578 includes a major project development as part of the course objectives, involving individual meetings with the instructor on a weekly basis (beside the lecture meetings) to discuss the project's progress and milestones.

Most hw/sw courses including a heavy project efffort are already set at 4-credit hours.

Are any special resources or facilities required for this course? ☐ Yes ☐ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING
Course Approval Request
College Curriculum Committee, 1420 Lurie Engineering Center Building

Print

Form Number 1836

Action Requested

○ New Course
◉ Modification of Existing Course
○ Deletion of Course

Complete the following sections:
New Courses - B & C completely
Modifications - A modified information, B & C completely
Deletions - A & C completely

Date 5/30/2007
Effective Winter 2008

A. CURRENT LISTING	B. REQUESTED LISTING
Home Department / Div # / Course Number	Home Department: Mechanical Engineering / Div #: / Course Number: 360
Cross Listed Course Information	Cross Listed Course Information
Course Title	Course Title: Modeling, Analysis and Control of Dynamic Systems
TITLE ABBREVIATION — Time Sched Max = 19 Spaces / Transcript Max = 20 Spaces	TITLE ABBREVIATION — Time Sched Max = 19 Spaces / Transcript Max = 20 Spaces
Course Description	Course Description for Official Publication (Max = 50 words): Developing mathematical models of dynamic systems, including mechanical, electrical, electromechanical, and fluid/thermal systems, and representing these models in transfer function and state space form. Analysis of dynamic system models, including time and frequency responses. Introduction to linear feedback control techniques. Synthesis and analysis by analytical and computer methods. Four hours of lecture per week.
PROGRAM OUTCOMES: ☐a ☐b ☐c ☐d ☐e ☐f ☐g ☐h ☐i ☐j ☐k	**PROGRAM OUTCOMES:** ☒a ☐b ☐c ☐d ☒e ☐f ☐g ☐h ☐i ☐j ☒k
Degree Requirements: ○ Degree Requirement ○ Free Elective ○ Other ○ Core Course ○ Tech Elective	Degree Requirements: ◉ Degree Requirement ○ Free Elective ○ Other ○ Core Course ○ Tech Elective
X Prerequisites: ME240 — Enforced ○ Advised	Prerequisites: ME240 and P/A EECS314 — ○ Enforced ◉ Advised
Credit Restrictions	Credit Restrictions
Level of Credit: ☐ Undergrad only ☐ Rackham Grad ☐ Non-Rckhm Grad ☐ Ugrad or Rckhm Grad; ☐ Ugrad or Non-Rckhm Grad ☐ All Credit types ☐ Rckhm Grad w/add'l Work — Credit Hours Min / Max — Contact Hrs/Wk / Number of Wks	Level of Credit: ☒ Undergrad only ☐ Rackham Grad ☐ Non-Rckhm Grad ☐ Ugrad or Rckhm Grad; ☐ Ugrad or Non-Rckhm Grad ☐ All Credit types ☐ Rckhm Grad w/add'l Work — Credit Hours Min 4 / Max 4 — Contact Hrs/Wk 4 / Number of Wks 14
C. Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? ○ Yes ◉ No; Maximum Hours? ; Maximum Times? ; Can it be repeated in the same term? ○ Yes ○ No	Printing Information (Optional): ☒ Print the course in the Bulletin ☐ Print the course in the Time Schedule
Class Type(s): ☒ Lec ☐ Rec ☐ Sem ☐ Lab ☐ Dis ☐ Ind ☐ Other — Graded Section: ○ Lec ○ Rec ○ Sem ○ Lab ○ Dis ○ Ind ○ Other — Grading: ☒ A-E ☐ CR/NC ☐ S/U ☐ P/F ☐ Y — Location: ☒ Ann Arbor ☐ Biological Station ☐ Camp Davis ☐ Extension	Terms & Freq. of Offering: ◙ I ◙ II ☐ IIIa ☐ IIIb ☐ III ◙ Yearly ☐ Alter Years ☐ Even Years ☐ Odd Years — Half term ☐ 1st ☐ 2nd
	Cognizant Faculty Member: D.Tilbury — Title: Assoc Prof
	Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

Approval

☐ Curriculum Comm.
☐ Faculty
☐ Rackham
☐ Cross listed Unit 1
☐ Cross listed Unit 2

Submitted By: ◙ Home Dept. ☐ Cross-listed Dept.
Name, Signature & Department:
Home Dept. Mechanical Engineering
Cross-listed Dept(s).

Form Number

1836

SUPPORTING STATEMENT

Both ME360 and EECS314 involve fundamental topics related to linear systems: component modeling, time and frequency response characteristics, transfer functions, and elements of feedback control. The ME faculty feel that students would benefit by having EECS314 taken prior to ME360 or by taking these courses concurrently.

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING
Course Approval Request
College Curriculum Committee, 1420 Lurie Engineering Center Building

Print

Form Number 1846

Action Requested

○ New Course
◉ Modification of Existing Course
○ Deletion of Course

Complete the following sections:
New Courses - B & C completely
Modifications - A modified information, B & C completely
Deletions - A & C completely

Date 9/10/2007
Effective Winter 2008

A. CURRENT LISTING	B. REQUESTED LISTING
Home Department / Div # / Course Number	Home Department: Mechanical Engineering / 280 / 401
Cross Listed Course Information	Cross Listed Course Information: Manufacturing / 275 / 402
X Course Title: Statisical Methods for Manufacturing Systems	Course Title: Statistical Quality Control and Design
TITLE ABBREVIATION — Time Sched Max = 19 Spaces: Stat Meth Mfg; Transcript Max = 20 Spaces: Stat Meth Mfg	TITLE ABBREVIATION — Time Sched Max = 19 Spaces: Stat Quality Control; Transcript Max = 20 Spaces: Stat Quality Control
Course Description	Course Description for Official Publication (Max = 50 words): Evolution of quality methods. Fundamentals of statistics. Process behavior over time. Concept of statistical process control (SPC). Design and interpretation of control charts. Process capability study. Tolerance. Measurement system analysis. Correlation. Regression analysis. Independent t-test and paired t-test. Design and analysis of two-level factorial experiments. Fractional factorial experiments. Response model building. Taguchi methods. Case studies.
PROGRAM OUTCOMES: ☐a ☐b ☐c ☐d ☐e ☐f ☐g ☐h ☐i ☐j ☐k	**PROGRAM OUTCOMES:** ☐a ☒b ☐c ☐d ☒e ☐f ☐g ☐h ☐i ☐j ☐k
Degree Requirements: ○ Degree Requirement ○ Free Elective ○ Other ○ Core Course ○ Tech Elective	Degree Requirements: ○ Degree Requirement ○ Free Elective ○ Other ○ Core Course ○ Tech Elective
Prerequisites: ○ Enforced ○ Advised	Prerequisites: Senior or Graduate Standing ○ Enforced ◉ Advised
Credit Restrictions	Credit Restrictions
Level of Credit: ☐ Undergrad only ☐ Rackham Grad ☐ Non-Rckhm Grad ☐ Ugrad or Rckhm Grad; ☐ Ugrad or Non-Rckhm Grad ☐ All Credit types ☐ Rckhm Grad w/add'l Work; Credit Hours Min / Max; Contact Hrs/Wk; Number of Wks	Level of Credit: ☐ Undergrad only ☐ Rackham Grad ☐ Non-Rckhm Grad ☐ Ugrad or Rckhm Grad; ☒ Ugrad or Non-Rckhm Grad ☒ All Credit types ☐ Rckhm Grad w/add'l Work; Credit Hours Min 3 / Max 3; Contact Hrs/Wk 3; Number of Wks 14
C. Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? ○ Yes ◉ No; Maximum Hours?; Maximum Times?; Can it be repeated in the same term? ○ Yes ○ No	Printing Information (Optional): ☒ Print the course in the Bulletin ☒ Print the course in the Time Schedule
Class Type(s): ☒ Lec ☐ Rec ☐ Sem ☐ Lab ☐ Dis ☐ Ind ☐ Other; Graded Section: ◉ Lec ○ Rec ○ Sem ○ Lab ○ Dis ○ Ind ○ Other; Grading: ☒ A-E ☐ CR/NC ☐ S/U ☐ P/F ☐ Y; Location: ☒ Ann Arbor ☐ Biological Station ☐ Camp Davis ☐ Extension	Terms & Freq. of Offering: ☐ I ☒ II ☐ IIIa ☐ IIIb ☐ III ☒ Yearly ☐ Alter Years ☐ Even Years ☐ Odd Years; Half term ☐ 1st ☐ 2nd; Cognizant Faculty Member: J. Hu; Title: Professor; Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

Approval

☐ Curriculum Comm.
☐ Faculty
☐ Rackham
☐ Cross listed Unit 1
☐ Cross listed Unit 2

Submitted By: ☒ Home Dept. ☐ Cross-listed Dept.
Name, Signature & Department
Home Dept. Mechanical Engineering
Cross-listed Dept(s). Manufacturing

Form Number

1846

SUPPORTING STATEMENT

This new title provides a better description of the course as it is currently taught.

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING
Course Approval Request
College Curriculum Committee, 1420 Lurie Engineering Center Building

Print

Form Number 1832

Action Requested

○ New Course
◉ Modification of Existing Course
○ Deletion of Course

Complete the following sections:
New Courses - B & C completely
Modifications - A modified information, B & C completely
Deletions - A & C completely

Date 5/30/2007
Effective Winter 2008

A. CURRENT LISTING	B. REQUESTED LISTING
Home Department / Div # / Course Number	Home Department: Mechanical Engineering / Div #: / Course Number: 420
Cross Listed Course Information	Cross Listed Course Information
Course Title	Course Title: Fluid Mechanics II
TITLE ABBREVIATION — Time Sched Max = 19 Spaces	Fluids II
TITLE ABBREVIATION — Transcript Max = 20 Spaces	Fluids II
Course Description: Control volume and streamline analysis for steady and unsteady flows. Incompressible and compressible flow. Hydraulic systems. Design of components. Losses and efficiency. Applications to centrifugal and axial flow machinery, e.g, fans, pumps, and torque converters.	Course Description for Official Publication (Max = 50 words): Use of commercial CFD packages for solving realistic fluid mechanics and heat transfer problems of practical interest. Introduction to mesh generation, numerical discretization, stability, convergence, and accuracy of numerical methods. Applications to separated, turbulent, and two-phase flows, flow control, and flows involving heat transfer. Open-ended design project.
PROGRAM OUTCOMES: ☐a ☐b ☐c ☐d ☐e ☐f ☐g ☐h ☐i ☐j ☐k	PROGRAM OUTCOMES: ☒a ☐b ☒c ☐d ☒e ☐f ☐g ☐h ☐i ☐j ☒k
Degree Requirements: ○ Degree Requirement ○ Free Elective ○ Other ○ Core Course ○ Tech Elective	Degree Requirements: ○ Degree Requirement ○ Free Elective ○ Other ○ Core Course ◉ Tech Elective
Prerequisites: ○ Enforced ○ Advised	Prerequisites: ME320 ○ Enforced ○ Advised
Credit Restrictions	Credit Restrictions
Level of Credit: ☐ Undergrad only ☐ Rackham Grad ☐ Non-Rckhm Grad ☐ Ugrad or Rckhm Grad; ☐ Ugrad or Non-Rckhm Grad ☐ All Credit types ☐ Rckhm Grad w/add'l Work; Credit Hours Min Max; Contact Hrs/Wk; Number of Wks	Level of Credit: ☐ Undergrad only ☐ Rackham Grad ☐ Non-Rckhm Grad ☐ Ugrad or Rckhm Grad; ☐ Ugrad or Non-Rckhm Grad ☒ All Credit types ☐ Rckhm Grad w/add'l Work; Credit Hours Min 3 Max 3; Contact Hrs/Wk 3; Number of Wks 14
C. Repeatability (Indi Research, Dir. Study, Dissertation. Is this course repeatable? ○ Yes ○ No; Maximum Hours? Maximum Times? Can it be repeated in the same term? ○ Yes ○ No	Printing Information (Optional): ☒ Print the course in the Bulletin ☒ Print the course in the Time Schedule
Class Type(s): ☒ Lec ☐ Rec ☐ Sem ☒ Lab ☐ Dis ☐ Ind ☐ Other; Graded Section: ○ Lec ○ Rec ○ Sem ○ Lab ○ Dis ○ Ind ○ Other; Grading: ☒ A-E ☐ CR/NC ☐ S/U ☐ P/F ☐ Y; Location: ☒ Ann Arbor ☐ Biological Station ☐ Camp Davis ☐ Extension	Terms & Freq. of Offering: ☐ I ☒ II ☐ IIIa ☐ IIIb ☐ III; ☒ Yearly ☐ Alter Years ☐ Even Years ☐ Odd Years; Half term ☐ 1st ☐ 2nd; Cognizant Faculty Member: R. Akhavan; Title: Assoc. Professor; Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

Approval

☐ Curriculum Comm.
☐ Faculty
☐ Rackham
☐ Cross listed Unit 1
☐ Cross listed Unit 2

Submitted By: ☒ Home Dept. ☐ Cross-listed Dept.
Name, Signature & Department
Home Dept. Mechanical Engineering
Cross-listed Dept(s).

Form Number

1832

SUPPORTING STATEMENT

This course aims to familiarize students with the use of commercial Computational Fluid Dynamics (CFD) and geometry and mesh-generation packages for solving realistic fluids and heat transfer problems of engineering interest. As such, the course requires extensive hands-on computer lab training sessions. Class time is divided between fourteen lectures and ten computer lab sessions of 80 minutes each.

Are any special resources or facilities required for this course? ☒ Yes ☐ No

Detail the Special requirements

The computer labs are held in the Window Training Rooms located in 3358 Duderstadt Center. Students are trained in the use of GAMBIT mesh generation and FLUENT CFD packages.

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING
Course Approval Request
College Curriculum Committee, 1420 Lurie Engineering Center Building

Print

Form Number 1833

Action Requested

○ New Course
◉ Modification of Existing Course
○ Deletion of Course

Complete the following sections:
New Courses - B & C completely
Modifications - A modified information, B & C completely
Deletions - A & C completely

Date 5/30/2007
Effective Winter 2008

A. CURRENT LISTING

Home Department | Div # | Course Number

Cross Listed Course Information

Course Title

TITLE ABBREVIATION — Time Sched Max = 19 Spaces | Transcript Max = 20 Spaces

Course Description

PROGRAM OUTCOMES:
☐a ☐b ☐c ☐d ☐e ☐f ☐g ☐h ☐i ☐j ☐k

Degree Requirements: ◉ Degree Requirement ○ Free Elective ○ Other ○ Core Course ○ Tech Elective

Prerequisites: ○ Enforced ◉ Advised

Credit Restrictions: Recommend ME495 not be elected concurrently. Not open to graduate studentss.

Level of Credit: ☒ Undergrad only ☐ Ugrad or Non-Rckhm Grad ☐ Rackham Grad ☐ All Credit types ☐ Non-Rckhm Grad ☐ Rckhm Grad w/add'l Work ☐ Ugrad or Rckhm Grad

Credit Hours: Min | Max

Contact Hrs/Wk | Number of Wks

C. Repeatability (Indi Research, Dir. Study, Dissertation)
Is this course repeatable? ○ Yes ◉ No
Maximum Hours? Maximum Times?
Can it be repeated in the same term? ○ Yes ○ No

Class Type(s): ☒ Lec ☐ Rec ☐ Sem ☒ Lab ☐ Dis ☐ Ind ☐ Other
Graded Section: ◉ Lec ○ Rec ○ Sem ○ Lab ○ Dis ○ Ind ○ Other
Grading: ☒ A-E ☐ CR/NC ☐ S/U ☐ P/F ☐ Y
Location: ☒ Ann Arbor ☐ Biological Station ☐ Camp Davis ☐ Extension

B. REQUESTED LISTING

Home Department: Mechanical Engineering | Div # | Course Number: 450

Cross Listed Course Information

Course Title: Design and Manufacturing III

TITLE ABBREVIATION — Time Sched Max = 19 Spaces: Des & Mfg III | Transcript Max = 20 Spaces: Des/Mfg III

Course Description for Official Publication (Max = 50 words)
A mechanical engineering design project by which the student is exposed to the design process from concept through analysis to layout and report. Projects are proposed from the different areas of study within mechanical engineering and reflect the expertise of instructional faculty and industrial representatives. Three hours of lecture and two labs.

PROGRAM OUTCOMES:
☒a ☐b ☒c ☒d ☒e ☒f ☒g ☒h ☒i ☐j ☒k

Degree Requirements: ◉ Degree Requirement ○ Free Elective ○ Other ○ Core Course ○ Tech Elective

Prerequisites: ME350, ME360, and ME395
◉ Enforced ○ Advised

Credit Restrictions: May not be taken concurrently with ME455 or ME495. Not open to graduate students.

Level of Credit: ☒ Undergrad only ☐ Ugrad or Non-Rckhm Grad ☐ Rackham Grad ☐ All Credit types ☐ Non-Rckhm Grad ☐ Rckhm Grad w/add'l Work ☐ Ugrad or Rckhm Grad

Credit Hours: Min 4 | Max 4

Contact Hrs/Wk 8 | Number of Wks 14

Printing Information (Optional) ☒ Print the course in the Bulletin ☒ Print the course in the Time Schedule

Terms & Freq. of Offering: ☒ I ☒ II ☐ IIIa ☐ IIIb ☐ III ☒ Yearly ☐ Alter Years ☐ Even Years ☐ Odd Years
Half term ☐ 1st ☐ 2nd

Cognizant Faculty Member: S. Skerlos **Title** Assoc. Professor

Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

Approval

☐ Curriculum Comm.
☐ Faculty
☐ Rackham
☐ Cross listed Unit 1
☐ Cross listed Unit 2

Submitted By: ☒ Home Dept. ☐ Cross-listed Dept.
Name, Signature & Department
Home Dept. Mechanical Engineering
Cross-listed Dept(s).

Form Number

1833

SUPPORTING STATEMENT

ME450, ME455, and ME495 involve intense teamwork for students. Fairness dictates that students must not have split team allegiances when taking these courses so that teammates in one class are not forced to cover for a student whose primary team focus is in another class.

Are any special resources or facilities required for this course? ☑ Yes ☐ No

Detail the Special requirements

Unchanged since 1997-98

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING
Course Approval Request
College Curriculum Committee, 1420 Lurie Engineering Center Building

Print

Form Number 1834

Action Requested

○ New Course
◉ Modification of Existing Course
○ Deletion of Course

Complete the following sections:
New Courses - B & C completely
Modifications - A modified information, B & C completely
Deletions - A & C completely

Date 5/30/2007
Effective Fall 2008

A. CURRENT LISTING

Home Department | Div # | Course Number

Cross Listed Course Information

Course Title

TITLE ABBREVIATION
Time Sched Max = 19 Spaces
Transcript Max = 20 Spaces

Course Description

PROGRAM OUTCOMES:
☐a ☐b ☐c ☐d ☐e ☐f ☐g ☐h ☐i ☐j ☐k

Degree Requirements ○ Degree Requirement ○ Free Elective ○ Other ○ Core Course ○ Tech Elective

Prerequisites ○ Enforced ○ Advised

X Credit Restrictions

Level of Credit
☐ Undergrad only ☐ Ugrad or Non-Rckhm Grad
☐ Rackham Grad ☐ All Credit types
☐ Non-Rckhm Grad ☐ Rckhm Grad w/add'l Work
☐ Ugrad or Rckhm Grad

Credit Hours Min Max
Contact Hrs/Wk
Number of Wks

C. Repeatability (Indi Research, Dir. Study, Dissertation:
Is this course repeatable? ○ Yes ◉ No
Maximum Hours? Maximum Times?
Can it be repeated in the same term? ○ Yes ○ No

Class Type(s) ☒ Lec ☐ Rec ☐ Sem ☒ Lab ☐ Dis ☐ Ind ☐ Other
Graded Section ◉ Lec ○ Rec ○ Sem ○ Lab ○ Dis ○ Ind ○ Other
Grading ☒ A-E ☐ CR/NC ☐ S/U ☐ P/F ☐ Y
Location ☒ Ann Arbor ☐ Biological Station ☐ Camp Davis ☐ Extension

B. REQUESTED LISTING

Home Department: Mechanical Engineering | Div # | Course Number: 455

Cross Listed Course Information

Course Title: Analytical Product Design

TITLE ABBREVIATION
Time Sched Max = 19 Spaces: Analyt Product Des
Transcript Max = 20 Spaces: Analyt Product Des

Course Description for Official Publication (Max = 50 words)
Design of artifacts is addressed from a multidisciplinary perspective that includes engineering, art, psychology, marketing, and economics. Using a decision-making framework, emphasis is placed on quantitative methods. Building mathematical models and accounting for interdisciplinary interactions. Students work in team design projects from concept generation to prototyping and design verification. Four credit-hour election requires prototyping of project.

PROGRAM OUTCOMES:
☒a ☐b ☒c ☒d ☒e ☒f ☒g ☒h ☒i ☐j ☒k

Degree Requirements ○ Degree Requirement ○ Free Elective ◉ Other ○ Core Course ○ Tech Elective

Prerequisites ME350, ME360, ME395 for ME majors. PI for all others.
○ Enforced ⊙ Advised

Credit Restrictions: May not be elected concurrently with ME450 or ME495

Level of Credit
☐ Undergrad only ☐ Ugrad or Non-Rckhm Grad
☐ Rackham Grad ☒ All Credit types
☐ Non-Rckhm Grad ☐ Rckhm Grad w/add'l Work
☐ Ugrad or Rckhm Grad

Credit Hours Min 3 Max 4
Contact Hrs/Wk 4
Number of Wks 14

Printing Information (Optional) ☒ Print the course in the Bulletin ☒ Print the course in the Time Schedule

Terms & Freq. of Offering ☒ I ☐ II ☐ IIIa ☐ IIIb ☐ III ☒ Yearly ☐ Alter Years ☐ Even Years ☐ Odd Years
Half term ☐ 1st ☐ 2nd

Cognizant Faculty Member: P. Papalambros **Title** Professor

Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

Approval
☐ Curriculum Comm.
☐ Faculty
☐ Rackham
☐ Cross listed Unit 1
☐ Cross listed Unit 2

Submitted By: ☒ Home Dept. ☐ Cross-listed Dept.
Name, Signature & Department
Home Dept. Mechanical Engineering
Cross-listed Dept(s).

Form Number

1834

SUPPORTING STATEMENT

ME 455: "ME 450, ME 455, and ME 495 involve intense teamwork for students. Fairness dictates that students must not have split team allegiances when taking these courses so that teammates in one class are not forced to cover for a student whose primary team focus is in another class."

Are any special resources or facilities required for this course? ☐ Yes ☐ No

Detail the Special requirements

student machine shop - same as ME450

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING
Course Approval Request
College Curriculum Committee, 1420 Lurie Engineering Center Building

Print

Form Number 1634

Action Requested

(•) New Course
( ) Modification of Existing Course
( ) Deletion of Course

Complete the following sections:
New Courses - B & C completely
Modifications - A modified information, B & C completely
Deletions - A & C completely

Date 2/28/2007
Effective Winter 2008

A. CURRENT LISTING	B. REQUESTED LISTING
Home Department / Div # / Course Number	Home Department: Mechanical Engineering / Course Number: 483
Cross Listed Course Information	Cross Listed Course Information
Course Title	Course Title: MANUFACTURING SYSTEM DESIGN
TITLE ABBREVIATION — Time Sched Max = 19 Spaces	Mfg Sys Design
TITLE ABBREVIATION — Transcript Max = 20 Spaces	Mfg Sys Des
Course Description	Course Description for Official Publication (Max = 50 words): Manufacturing system design methodologies and procedures. Topics: paradigms of manufacturing; building blocks of manufacturing systems; numerical control and robotics; task allocation and line balancing; system configurations; performance of manufacturing systems including quality, productivity, and responsiveness; economic models and optimization of manufacturing systems; launch and reconfiguration of manufacturing systems; Lean manufacturing.
PROGRAM OUTCOMES: ☐a ☐b ☐c ☐d ☐e ☐f ☐g ☐h ☐i ☐j ☐k	PROGRAM OUTCOMES: ☐a ☒b ☐c ☐d ☒e ☒f ☐g ☐h ☐i ☐j ☒k
Degree Requirements: ○ Degree Requirement ○ Free Elective ○ Other ○ Core Course ○ Tech Elective	Degree Requirements: ○ Degree Requirement ○ Free Elective ○ Other ○ Core Course ● Tech Elective
Prerequisites: Enforced / Advised	Prerequisites: ME250 — Enforced / Advised
Credit Restrictions	Credit Restrictions
Level of Credit: ☐ Undergrad only ☐ Rackham Grad ☐ Non-Rckhm Grad ☐ Ugrad or Rckhm Grad ☐ Ugrad or Non-Rckhm Grad ☐ All Credit types ☐ Rckhm Grad w/add'l Work; Credit Hours Min/Max; Contact Hrs/Wk; Number of Wks	Level of Credit: ☐ Undergrad only ☐ Rackham Grad ☐ Non-Rckhm Grad ☐ Ugrad or Rckhm Grad ☒ Ugrad or Non-Rckhm Grad ☒ All Credit types ☐ Rckhm Grad w/add'l Work; Credit Hours Min 3 / Max 3; Contact Hrs/Wk 14; Number of Wks 14

C.

Repeatability (Indi Research, Dir. Study, Dissertation):
Is this course repeatable? ○ Yes ● No
Maximum Hours? 3 Maximum Times? 1
Can it be repeated in the same term? ○ Yes ● No

Printing Information (Optional) ☒ Print the course in the Bulletin ☒ Print the course in the Time Schedule

Class Type(s) ☒ Lec ☐ Rec ☐ Sem ☐ Lab ☐ Dis ☐ Ind ☐ Other
Graded Section ○ Lec ○ Rec ○ Sem ○ Lab ○ Dis ○ Ind ○ Other
Grading ☒ A-E ☐ CR/NC ☐ S/U ☐ P/F ☐ Y
Location ☒ Ann Arbor ☐ Biological Station ☐ Camp Davis ☐ Extension

Terms & Freq. of Offering: ☐ I ☒ II ☐ IIIa ☐ IIIb ☐ III — ☒ Yearly ☐ Alter Years ☐ Even Years ☐ Odd Years
Half term ☐ 1st ☐ 2nd

Cognizant Faculty Member: S. Jack Hu **Title** Professor

Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

Approval

☐ Curriculum Comm.
☐ Faculty
☐ Rackham
☐ Cross listed Unit 1
☐ Cross listed Unit 2

Submitted By: ☒ Home Dept. ☐ Cross-listed Dept.
Name, Signature & Department
Home Dept. Mechanical Engineering
Cross-listed Dept(s).

Form Number

1634

SUPPORTING STATEMENT

This course will count as a technical elective in the Undergraduate Mechanical Engineering program as well as an elective in the Graduate program and is a required course for the Concentration in Manufacturing Systems.

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

ME499 (ME483) Manufacturing System Design

S. Jack Hu
The University of Michigan

Mondays and Wednesdays, 3:30-5:00pm

An introduction to the procedures and methodologies for designing manufacturing systems. Topics covered include: paradigms of manufacturing; building blocks of manufacturing systems; numerical control and robotics; task allocation and line balancing; system configurations; performance of manufacturing systems including quality, productivity and responsiveness; economic models and optimization of manufacturing systems; launch and reconfiguration of manufacturing systems; Lean manufacturing.

1. **Introduction (3 hours)**
    a. Importance of manufacturing
    b. Types of industry
    c. Manufacturing System performance
        i. Cost (fixed cost, variable cost)
        ii. Productivity (system efficiency, system availability)
        iii. Quality
        iv. Responsiveness
        v. Safety
    d. Paradigms of manufacturing
        i. Craft
        ii. Mass production
        iii. Lean
        iv. Flexible
        v. Mass customization
        vi. Reconfigurable Manufacturing
    e. Exercises

2. **Building Blocks of Manufacturing Systems (3 hours)**
    a. Types of manufacturing processes.
        i. Machining
        ii. Assembly
        iii. Welding and Joining
        iv. Forming
        v. Special processes: EDM, ECM, etc.
    b. Components of Manufacturing Systems
        i. Processing Machines (workstations)
        ii. Material Handling
        iii. Fixtures
        iv. Pallets

v. Buffers
vi. controls
vii. Measurement and inspection

c. Examples manufacturing systems
i. Engine block machining
ii. Automobile body assembly
iii. Stamping
iv. Aircraft final assembly
v. Computer assembly
vi. Painting processes

3. **Computer Numerical Control (1.5 hours)**
a. CNC system architecture
b. G-Code
c. Controllers
d. Interpolators
e. Exercises

4. **Robotics (1.5 hours)**
a. Types of robotics
b. Robot motion
c. Robot applications
i. Welding
ii. Painting
iii. Material handling
iv. Fixturing
d. Exercises

5. **Procedure in manufacturing system design (4.5 hours)**
a. From machines to systems
i. Station level design issues: fixturing
ii. Layout vs. volume and variety
iii. Configurations: Serial, Parallel, and Hybrid
b. Product to process planning
c. Exercises
d. Task allocation and sequencing
e. Line balancing
f. Exercises

6. **System Productivity (3 hours)**
a. Machine level performance
i. Component failures
ii. Failure Mode Effect Analysis
iii. Reliability Analysis

b. Reliability vs productivity
c. Productivity analysis
    i. Productivity of serial and parallel configurations
    ii. Productivity of general mfg systems
    iii. Role of buffers
    iv. Bottleneck analysis and theory of constraints
d. Impact of Material Handling systems on productivity
e. Exercises

7. Quality of manufacturing systems (3 hours)

a. Sources of variability
b. Propagation of quality variation in Mfg Systems
    i. Descriptive statistics
    ii. Addition of Variance
c. Impact of Configuration on Quality
d. Process stability
e. Tolerance and Process Capability
    i. Cp, Cpk, Cpm
f. Exercises

8. Responsiveness (1.5 hours)

a. Just in-time
b. Convertibility
    i. Quick die change
c. Scalability

9. Cost of manufacturing system (3 hours)

a. Cost of manufacturing systems
    i. Investment cost
    ii. Operations cost
b. Life cycle economics
c. Exercises

10. System Selection (1.5 hours)

a. Criteria
b. Trade-off analysis
c. Analytic Hierarchy Process

11. Manufacturing System Launch (3 hours)

a. Ramp-up issues
b. Variation Reduction
    i. Assembly example

ii. Machining example

12. Reconfiguration of Manufacturing System (3 hours)

a. Needs for system reconfiguration
b. Principles of Reconfiguration
c. Examples of Reconfiguration
    i. Machines
    ii. Cells
    iii. Systems

13. Lean Manufacturing (6 hours)

a. Toyota production system
    i. JIT, Pull, Flow
b. Lean cell design as example of manufacturing system design

Pre-requisites:

An introductory course in manufacturing processes.

History

This course was developed as a required elective for the Manufacturing Concentration. Initially taught as a 2 credit hour module, it was changed to 3 hours with additional contents in Winter 2006. Enrollment and evaluations are listed below:

Semester	Enrollment	Q1	Q2
Winter 06	25	4.13	4.5
Winter 07	26		

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING
Course Approval Request
College Curriculum Committee, 1420 Lurie Engineering Center Building

Print

Form Number 1831

Action Requested

○ New Course
◉ Modification of Existing Course
○ Deletion of Course

Complete the following sections:
New Courses - B & C completely
Modifications - A modified information, B & C completely
Deletions - A & C completely

Date 5/14/2007
Effective Fall 2007

	A. CURRENT LISTING	B. REQUESTED LISTING
☐	Home Department / Div # / Course Number	Home Department: MECHANICAL ENGINEERING / Div #: / Course Number: 552
	Cross Listed Course Information	Cross Listed Course Information: MANUFACTURING 552
X	Course Title: ELECTROMECHANICAL SYSTEM DESIGN	Course Title: MECHATRONIC SYSTEMS DESIGN
	TITLE ABBREVIATION — Time Sched Max = 19 Spaces:	TITLE ABBREVIATION — Time Sched Max = 19 Spaces: MECHATRONIC SYS DES
	TITLE ABBREVIATION — Transcript Max = 20 Spaces:	TITLE ABBREVIATION — Transcript Max = 20 Spaces: MECHATRONIC SYS DES
X	Course Description: Design of electromechanical systems with emphasis placed on the integration of mechanical and electrical principles. Topics include: electromechanical device design: generators/alternators, electrical motors, measurement/sensing devices; digital control: microprocessors, AD/DA converters, data transmission and acquisition; electromechanical system design: mixed domain modeling, real time control and mechatronic systems.	Course Description for Official Publication (Max = 50 words): Mechatronics is the synergistic integration of mechanical disciplines, controls, electronics and computers in the design of high-performance systems. Case studies, hands-on lab exercises and hardware design projects cover the practical aspects of machine design, multi-domain systems modeling, sensors, actuators, drives, circuits, simulation tools, DAQ, and controls implementation using microprocessors.
	PROGRAM OUTCOMES: ☐a ☐b ☐c ☐d ☐e ☐f ☐g ☐h ☐i ☐j ☐k	**PROGRAM OUTCOMES:** ☐a ☐b ☐c ☐d ☐e ☐f ☐g ☐h ☐i ☐j ☐k
	Degree Requirements: ○ Degree Requirement ○ Free Elective ○ Other ○ Core Course ○ Tech Elective	Degree Requirements: ○ Degree Requirement ○ Free Elective ○ Other ○ Core Course ○ Tech Elective
X	Prerequisites: EECS210 or equivalent — Enforced ○ Advised	Prerequisites: ME350, ME360, EECS314, or equivalent — ○ Enforced ○ Advised
☐	Credit Restrictions:	Credit Restrictions:
☐	Level of Credit: ☐ Undergrad only ☐ Ugrad or Non-Rckhm Grad ☐ Rackham Grad ☐ All Credit types ☐ Non-Rckhm Grad ☐ Rckhm Grad w/add'l Work ☐ Ugrad or Rckhm Grad; Credit Hours Min Max; Contact Hrs/Wk; Number of Wks	Level of Credit: ☐ Undergrad only ☐ Ugrad or Non-Rckhm Grad ☐ Rackham Grad ☒ All Credit types ☐ Non-Rckhm Grad ☐ Rckhm Grad w/add'l Work ☐ Ugrad or Rckhm Grad; Credit Hours Min 3 Max 3; Contact Hrs/Wk 3; Number of Wks 14
C.	Repeatability (Indi Research, Dir Study, Dissertation): Is this course repeatable? ○ Yes ○ No; Maximum Hours? Maximum Times? Can it be repeated in the same term? ○ Yes ○ No	**Printing Information (Optional)** ☒ Print the course in the Bulletin ☒ Print the course in the Time Schedule
X	**Class Type(s)** ☒ Lec ☐ Rec ☐ Sem ☒ Lab ☐ Dis ☐ Ind ☐ Other; **Graded Section** ⊙ Lec ○ Rec ○ Sem ○ Lab ○ Dis ○ Ind ○ Other; **Grading** ☒ A-E ☐ CR/NC ☐ S/U ☐ P/F ☐ Y; **Location** ☒ Ann Arbor ☐ Biological Station ☐ Camp Davis ☐ Extension	Terms & Freq. of Offering: ☒ I ☐ II ☐ IIIa ☐ IIIb ☐ III — ☒ Yearly ☐ Alter Years ☐ Even Years ☐ Odd Years; Half term ☐ 1st ☐ 2nd
		Cognizant Faculty Member: S. AWTAR; Title: ASST. PROF.
		Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

Approval

☐ Curriculum Comm.
☐ Faculty
☐ Rackham
☐ Cross listed Unit 1
☐ Cross listed Unit 2

Submitted By: ☒ Home Dept. ☐ Cross-listed Dept.
Name, Signature & Department
Home Dept. MECHANICAL ENGINEERING
Cross-listed Dept(s). MANUFACTURING

Form Number

1831

SUPPORTING STATEMENT

See attached

Are any special resources or facilities required for this course? ☒ Yes ☐ No

Detail the Special requirements

A mechatronics lab area which exists (X50 Lab). See attached for further details.

Petition for the following changes in ME552

1. **Course title: from 'Electromechanical Systems Design' to 'Mechatronic Systems Design'**
2. **Course description**
3. **Course structure: from a regular to a lab-based class**
4. **Prerequisites**

1. Course title

The distinction between 'mechatronics' and 'electromechanics' is well-recognized in the academic and industrial communities. While the two terms are similar in composition, their associated connotations are different.

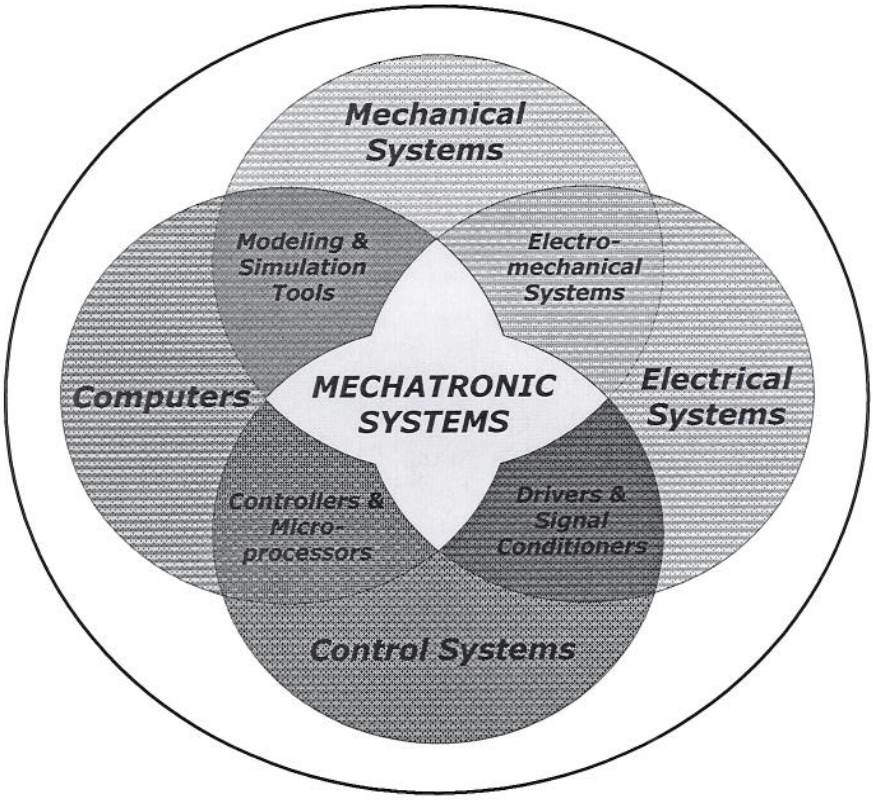
'Electromechanics' traditionally refers to the study of prime movers and transducers spanning the electrical and mechanical domains, such as motors, generators, alternators, solenoids, voice-coils, tachometers etc. However, 'Mechatronics' has come to mean much more than the words it is derived from. It refers to multidisciplinary systems engineering that involves not only mechanical, electrical and electromechanical elements, but also intelligent controls using computers.

According to the IEEE/ASME Transactions on Mechatronics, "*Mechatronics is the synergetic integration of mechanical engineering with electronic and intelligent computer control in the design and manufacture of industrial products and processes.*"

According to the International Federation of Automatic Controls Mechatronics Journal, "*Mechatronics is the synergistic combination of precision mechanical engineering, electronic control and systems thinking in the design of products and manufacturing processes. It relates to the design of systems, devices and products aimed at achieving an optimal balance between basic mechanical structure and its overall control.*"

Thus, while 'electromechanical systems' comprise a broad range of sensors and actuators, 'mechatronic systems' comprise mechanical elements, sensors and actuators, data acquisition, drive and signal processing electronics, and microprocessors. Furthermore, Mechatronics, represents a model-based design approach that incorporates and integrates mechanical design, controls, electronics and computers from very the onset of the design process. Since, we teach this multi-disciplinary design process in ME552, 'Mechatronic Systems Design' is a more appropriate course title.

The following figure shows the commonly recognized domains of Mechatronic Systems [1-3], of which Electromechanical Systems are a sub-set. Further articles that differentiate the two terms are listed below.



Web-links and/or pdf copies are available.

[1] "Getting a hold on Mechatronics", Steven Ashley, Associate Editor, ASME Mechanical Engineering magazine, 1997.

[2] "Mechatronic Systems: A challenge for control engineering", Rolf Isermann, Proceedings of the American Controls Conference, 1997

[3] "Mechatronic Systems: Concepts and Application", Rolf Isermann, Transactions of the Institute of Measurement and Controls, 2000

[4] "Mechatronics: More than just a name", Jim Hewit, Industrial Robot, 1993

[5] "Mechatronics: From 20th to 21st century", Masayoshi Tomizuka, Control Engineering Practice, 2002

[6] "Mechatronic Design", Job van Amerongen, Mechatronics Journal, 2003

[7] "Mechatronic System Design Methodology", M. Valasek, Proceedings of IEE/IMechE Mechatronics, 1998

[8] "Top 10 technologies that will change the world: Mechatronics", MIT Technology Review, January 2003

[9] "Top 10 technologies that will change the world: Bio-Mechatronics", MIT Technology Review, May 2005

[10] "Wanted: Broader Knowledge, New Skills", State of Engineering Series, SAE Automotive Engineering International, March 2007

2. Proposed Course Description

Mechatronic system design is the synergistic integration of mechanical disciplines, controls, electronics and computers in the design of high-performance systems. Case studies, hands-on lab exercises and design projects provide a practical exposure to precision machine design, multi-domain dynamic systems modeling, controls theory, sensors and actuators, electrical drives and circuits, simulation tools, DAQ hardware/software, and real-time controls implementation using microprocessors.

3. Change in course format to 'Lab-based' course

Mechatronics is essentially an application-oriented discipline, and therefore requires hands-on training. It is not uncommon for students at the senior undergraduate and early graduate levels to be lacking the link between 'engineering knowledge' and 'engineering implementation'. The former often represents solving textbook problems while the latter is limited to tinkering aided by trial-and-error. While students learn individual topics in other dedicated courses, ME552 brings together this engineering knowledge and teaches them how to deterministically implement it in the design of real-life engineering systems. Given this objective, the course would be ineffective without a strong lab and hardware component.

The methodology for teaching this design process is to first prime the students by means of pre-designed lab modules and case-studies. Each lab module is a basic mechatronic system consisting of a mechanical system, sensor(s), actuator(s), drive(s), and electronics, and the student tasks involve mechanical assembly, modeling, parameter identification, and controls. These structured and pre-designed modules should provide the necessary exposure and preparation to the students as they subsequently take on the more challenging task of designing, building and testing a mechatronic system from scratch, which is their course project.

Lab exercises in the first part of the course can include

- Introduction to DAQ hardware and software
- Introduction to electronic components and circuits
- Closed-loop DC motor – load system
- Open-loop Stepper motor – load system
- Magnetic levitation system
- Inverted Pendulum Balancing System

Resources required for a 'lab-based' class include

1. A mechatronics lab area, which is already exists (X50 Lab)

2. A course budget to support the hardware involved in the lab exercises and projects. This may come from one or more of several sources including the ME department, Design Division, CRLT, and industrial sponsors.
3. A GSI to help run and grade the labs, and guide the students on their hardware projects

4. Course Pre-requisites

It is assumed that students coming into the class have pre-existing knowledge of design, dynamic systems, controls, and circuits. The objective of this course is to foster the application of this theoretical knowledge in the design, fabrication and testing of hardware systems.

ME350 (or equivalent undergraduate mechanical design course)
ME360 (or equivalent undergraduate dynamic systems & controls course)
EECS314 (or equivalent undergraduate electronics course)

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING
Course Approval Request
College Curriculum Committee, 1420 Lurie Engineering Center Building

[redacted]

Form Number **1789**

Action Requested

- (•) New Course
- ( ) Modification of Existing Course
- ( ) Deletion of Course

Complete the following sections:
New Courses - B & C completely
Modifications - A modified information, B & C completely
Deletions - A & C completely

Date 10/17/2007
Effective Winter 2008

A. CURRENT LISTING	B. REQUESTED LISTING
Home Department / Div # / Course Number	Home Department: FINENG / Div # / Course Number: 500
Cross Listed Course Information	Cross Listed Course Information
Course Title	Course Title: Financial Engineering: An Overview
TITLE ABBREVIATION — Time Sched Max = 19 Spaces	FESEMINAR
TITLE ABBREVIATION — Transcript Max = 20 Spaces	FESUMMERPR
Course Description	Course Description for Official Publication (Max = 50 words): The objective of this course is to introduce financial engineering (FE) students to fundamental skills required to keep up with the rigorous FE curriculum. The program includes various prerequisite involving finance, international finance, financial accounting, economics, statistics, calculus, stochastic calculus, computer programming, as well as team building, ethics in the financial world, and interpersonal skills techniques.
[redacted] ☐a ☐b ☐c ☐d ☐e ☐f ☐g ☐h ☐i ☐j ☐k	[redacted] ☐a ☐b ☐c ☐d ☐e ☐f ☐g ☐h ☐i ☐j ☐k
Degree Requirements: O Degree Requirement O Core Course O Free Elective O Tech Elective O Other	Degree Requirements: (•) Degree Requirement O Core Course O Free Elective O Tech Elective O Other
Prerequisites: O Enforced O Advised	Prerequisites: FE student only (•) Enforced O Advised
Credit Restrictions	Credit Restrictions
Level of Credit: ☐ Undergrad only ☐ Rackham Grad ☐ Non-Rckhm Grad ☐ Ugrad or Rckhm Grad ☐ Ugrad or Non-Rckhm Grad ☐ All Credit types ☐ Rckhm Grad w/add'l Work	Level of Credit: ☐ Undergrad only ☒ Rackham Grad ☐ Non-Rckhm Grad ☐ Ugrad or Rckhm Grad ☐ Ugrad or Non-Rckhm Grad ☐ All Credit types ☐ Rckhm Grad w/add'l Work
Credit Hours Min Max: — — Contact Hrs/Wk: — Number of Wks: —	Credit Hours Min 3 Max 3 Contact Hrs/Wk 7 Number of Wks 7
C. Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? O Yes (•) No; Maximum Hours? ___ Maximum Times? ___; Can it be repeated in the same term? O Yes (•) No	Printing Information (Optional): ☒ Print the course in the Bulletin ☒ Print the course in the Time Schedule
Class Type(s): ☐ Lec ☐ Rec ☒ Sem ☐ Lab ☐ Dis ☐ Ind ☐ Other ___ Graded Section: O Lec O Rec (•) Sem O Lab O Dis O Ind O Other. Grading: ☐ A-E ☐ CR/NC ☒ S/U ☐ P/F ☐ Y Location: ☒ Ann Arbor ☐ Biological Station ☐ Camp Davis ☐ Extension	Terms & Freq. of Offering: ☐ I ☐ II ☐ IIIa ☒ IIIb ☐ III; ☒ Yearly ☐ Alter Years ☐ Even Years ☐ Odd Years; Half term ☐ 1st ☐ 2nd
	Cognizant Faculty Member: Nejat Seyhun; Title: Professor
	Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

Approval

- ☐ Curriculum Comm. _____
- ☐ Faculty _____
- ☐ Rackham _____
- ☐ Cross listed Unit 1 _____
- ☐ Cross listed Unit 2 _____

Submitted By: ☒ Home Dept. ☐ Cross-listed Dept.

Name, Signature & Department

Home Dept. Nejat Seyhun Nejat Seyhun (w/card on behalf)

Cross-listed Dept(s). _____

Form Number

1789

SUPPORTING STATEMENT

The following course is being established to meet the Financial Engineering program prerequisite requirements for all its students and will allow the students to complete their degrees within three terms and one half terms. The establishment of this course, will assure that the interdisciplinary financial engineering program has provided all of its entering students the necessary skill set needed to keep up with the curriculum as most students enter the program with various deficiencies (e.g., engineering, mathematics, economics, business, computer programming etc.)

Starting in Summer 2006, the financial engineering program required all its new entering students attend the summer program. (See attached schedule). The feedback from the students was positive and it has helped them to phase into the program-required courses. Based on the outcome and positive feedback (see attached survey), the establishment of the course was part of the FE program curriculum will greatly assure the students' readiness for the FE courses in their first term.

The program was offered as an experimental contingency for its first offering, with a requirement to establish it as part of the curriculum. Stella Pang, CoE ADGE has approved the request to establish the course.

Attached please find the Summer Program 2006 and 2007 schedule and student evaluation.

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

APPENDIX C

TO: FE Executive Committee

FROM: Nejat Seyhun
Henia Kamil

DATE: 9/15/06

RE: Financial Engineering Summer Program 2006

The first test run of the FE summer institute is now complete. The summer institute was in session July 31 – September 1, 2006.

This year we instituted the non-refundable enrollment deposit fee in the amount of $500.00. All students were informed of the new procedure as well as the need to arrive by July 31. In fact we received the non-refundable deposit prior to students submitting their certification of funds material. A class of 73 new incoming students including dual degree student enrolled was expected to attend. Three did not come, two were excused thus only 69 enrolled and participated in the Summer Program. Average attendance per session was 62.5 students.

The following faculty and staff were instrumental in the success of this program.

Name		Affiliation	Session title
Valerie	Saslow	RBSchool	Applied Economics
Kevin	O'Malley	EECS	C++
Tim	Maul	ENGR	Statistics
Tim	Maul	ENGR	Calculus
David	Hess	Rbschool	Ethics
Nejat	Seyhun	RBSchool	Finance
Joe	Walls	Rbschool	Excel/Visual Basic
Nejat	Seyhun	RBSchool	Financial statement Analysis
Nejat	Seyhun	RBSchool	Valuation
Nejat	Seyhun	RBSchool	International Finance
Kathleen	Welch	Public Health	SAS
Amadi	Nwankapa	ENGR	MATLAB
Amy	Hoag	Career Center	Business Commuications and Etiquette
Robin/Cynthia	Dall/Hill/	ECRC	ECRC introducation; Presentation/Resume Workshop
Cynthia	Redwine	ECRC	Mock Interviews
Barbar	Dobson	ELI	AEE testing for identified students*
Linda Huff-Brinkman	International Center Staff	International Center	International Center Mandatory* Check-in Program
Raffi	Indejikian	RBSchool	Accounting
Leslie	Olsen	CoE-TechCom	Presentation Skills

Note: * AY07-08 Summer program will be held prior to start of the program.
Summer Program schedule is listed below.

Financial Engineering Summer Program Schedule – July 31 – September 1, 2006

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
July 31 Orientation ECRC presentation Resume Writing Teambuilding	**August 1-2** Statistics		**August 3-5** Finance			**August 6**
August 7-8 Business Economics		**August 9-11** C++			**August 12** Accounting	**August 13**
August 14-15 Accounting		**August 16-17** Calculus		**August 18** Presentation Skills & Resume Workshop Matlab	**August 19** Excel/Visual Basic	**August 20**
August 21-23 SAS			**August 24** Financial Statement Analysis	**August 25** Valuation	**August 26** International Finance	**August 27**
August 28 Ethics	**August 29** Business Etiquette International	**August 30** 8:00-10:00 Resume Critique 10:00 CoE	**August 31** AEE Test for selected students Mock Interviews	**September 1** **8:00-10:00** **Conclusion**	**September2**	**September 3**

	Center Mandatory Check-in Program	Graduate Welcome Day				
September 4 **LABOR Day (University Closed)**	**September 5** **Classes start**	**September 6**	**September 7**	**September 8** **Office of Career Development, Ross Business School Presentation**		

The following class demographic was provided to the faculty included below of those who are attending as of Fall 2006.

FALL 2006 (August 2006)		
GENDER		
FEMALE	24	33%
MALE	49	67%
GEOGRAPHIC LOCATION		
US	9	12%
INT'L	64	88%
UG DISCIPLINES		
Engineering	20	27%
Business/Commerce	34	47%
LSA**	19	26%
Median GPA	UG: 3.39/4	
Median GRE	V: 520; Q: 800;A/W 4.0/6	
Median GMAT	710	
Median TOEFL	637	

Note:
** Countries represented in Fall 2006; Argentina, Canada, China, Hong Kong, India, Indonesia, Korea, Russia, Singapore, Taiwan, Thailand, United Arab Emirates*
*** LSA: Mathematics, Physics, Economics, Actuarial Sciences.*

Length of program:

The program run six (6) days a week for four consecutive weeks daily from 8:30 -5:00 pm.

At the beginning students arrived by the start of 8:30 am, but as the month went on students arrived by 9:00 am or later.

Recommendation:

Students should arrive one week prior to the start of the summer program to take care of all personal matters.

Extend the period of the summer program from July 16 – August 28, 2007. Remove Saturday classes. Teach from 9:00 – 4:00 pm. Provide students with time to take care of their personal issues.

Orientation will be held on Friday prior to the start of the program (July 13, 2007). Schedule AEE , International Student Check-in program and TB testing with Students health services prior to start of the program. Work with University housing on providing students with accommodation and rental options starting July 1.

Program to end prior to University wide events.

Content:

For next year, add a week session on English and technical writing which will also include small exercises.

Course material. As this is the first year, we have collected the course material. Next year we will only need to update the material for two session Calculus and statistics.

Included in the summer program was SAS programming that is used extensively in the financial industry. The workshop went well. For Summer 07, the program should run for four days to allow student for some proficiency. C++ training of three days was not sufficient.

Leadership modules were developed to meet the student needs. If possible and time permitting, increase to include four days for technical writing, team building as well as developing better communication skills.

Physical location:

The program was held on North Campus. The lectures were held in 1504 GG Brown. Six break out rooms were reserved. One computer lab, CSE 1620, was also reserved. CSE 1620 (A/B) is the biggest lab seating 42 students. Students were paired up in teams.

Difficulties:
Reservation of the classroom was challenging. Rooms were not open on Saturday for two consecutive weeks. Issues resolved. Lab teaching will need to be revamped.

Program Cost

AY06-07, the expenditures were recorded to gage the cost of the summer program. The tuition revenue model will include the new program to be covered by the tuition students will pay for the FINENG 500 new course. To be able to directly receive the tuition we will need to establish a Dept. ID as well as Program CODE: FINENG for courses that are directly related to the Financial engineering program. Courses developed for these purposes will be under special topics and FE will need to secure faculty to teach the course. This year the expenses were within available funds reserved from previous years.

Current Expenditures as of 10/6/06 by category:

Teaching/Staff			
Faculty Compensation		38,500.003	
Staff Support		5,531.76	
FB		3,000.00	
Sub-Total			$47,031.76
Curriculum			
Challenge Program		2,142.50	
CSCAR		9,000.00	
Business Communication		2,690.26	
Course Materials Copyrights		2,621.16	
Sub-Total			$16,453.42
Miscellaneous			
Food		$18,164.14	
Supplies		$5,916.40	
Sub-total			$24,080.54
Grand Total			**$87,566.22**

Cost per student $1,269.00

Recommendation:

Make the FE Summer program will become a required class. Credit hours to be determined based on FY06-07 projected expenditures based on 45 new incoming students. Scheduling of venue will be automatic and adequate facilities for computer labs can be scheduled as well.

AY 07-08 Summer program budget:

A survey was conducted after each session to evaluate student satisfaction from each session. Below you will find the average summary:

Question	1	2	3	4	5	6	# Responses
Orientation	3.44	4.14	3.98	4.16	4.17	4.44	59
Statistics	3.26	3.42	3.18	3.10	3.24	3.47	62
Finance	3.34	4.48	4.32	4.66	4.72	4.75	65
Business Economics	3.40	4.45	4.28	4.29	4.53	4.67	44
C++	2.46	3.46	3.31	3.35	3.35	3.96	54
Accounting	2.76	3.82	3.44	3.91	3.68	4.18	34
Calculus	3.72	3.59	3.14	3.14	3.28	3.21	29
Resume Workshop	3.43	4.00	3.90	3.83	4.07	4.20	30
MATLAB	2.59	3.21	3.00	3.11	3.24	3.52	29
Excel/Visual Basic	2.96	4.32	4.40	4.44	4.40	4.52	25
SAS	2.11	4.47	4.47	4.39	4.47	4.56	36
Financial Statement Valuation International Finance	3.15	4.42	4.27	4.42	4.58	4.67	33
Ethics	3.13	4.25	4.19	4.06	4.25	4.50	16
Multicultural Comm.	3.62	4.46	4.46	4.64	4.69	4.67	39

Questions
1) I had a good background on this material
2) Overall, the teaching materials were excellent
3) I learned a great deal in this session
4) The instructor was aware of the learning difficulties of the participants
5) Overall, this was an excellent session
6) Overall, the instructor was an excellent teacher

LOGISTICS:

The program provided water, refreshments and lunch for the duration of the program. This allowed efficiency in retaining students within the program location and area.

Lunch was ordered from various vendors to provide variety of choice on a daily basis. Refreshments such as water, soda, snacks, coffee, sugar , tea and minor supplies were purchases.

Vendors who provided service during the month of August were: Cosi, Zanzibar, Pizza House, Zingermann, Afternoon Delight, Jimmy Jones, Mr. Pita, China Gate and Evergreen

Refreshments were purchased at Kroger, GFS, Sam's Club to reduce cost.

Problems encountered were more of the quantity needed or used by the students.

Recommendations:

Contract with one supplier for delivery of all supplies at the beginning of the program. GFS would be contracted for the delivery and cost efficiencies.

(e.g, For example: a university supplier requested $11.00 per case of 24 bottles including vs. purchase of a case of 24 bottles of water purchased within range of $3.33-4.59 per case.)

Food vendors: negotiate cost of meals and contract with vendors prior to start of program.

SUMMER 2007 – Student Survey

	Number of responds	Average
Q1: I had a good back ground on this material		
Ethics	42	3.6
Math Review	43	3.6
Business Economics	42	3.7
Resume Writing	43	3.2
Statistics	43	3.5
Interview skill / Presentation Skill	44	3.1
Negotiation skill	43	3.1
Financial Accounting	44	3.1
Finance	44	3.5
SAS	44	2.3
International Finance	43	3.0
Honor Code review	44	2.9
Multicultural Business Communication	44	3.0
Matlab	44	2.8
C ++	44	3.3
Excel	44	3.4
Mock Interview	28	2.5
Q2: Overall, the teaching material were excellent		
Ethics	42	4.1
Math Review	44	2.8
Business Economics	44	4.3
Resume Writing	44	3.5
Statistics	44	3.3
Interview skill / Presentation Skill	43	3.3
Negotiation skill	42	4.1
Financial Accounting	43	3.7
Finance	44	4.3
SAS	44	3.7
International Finance	44	4.0
Honor Code review	44	3.2
Multicultural Business Communication	44	3.5
Matlab	44	2.5
C ++	43	3.2
Excel	44	3.7
Mock Interview	24	2.9
Q3: I learned a great deal in this session		
Ethics	42	3.5
Math Review	43	2.5
Business Economics	44	3.9
Resume Writing	44	3.4
Statistics	44	3.1
Interview skill / Presentation Skill	44	3.3

Negotiation skill	43	3.9
Financial Accounting	44	3.6
Finance	44	4.4
SAS	44	3.9
International Finance	44	4.0
Honor Code review	44	3.2
Multicultural Business Communication	44	3.3
Matlab	43	2.4
C ++	43	3.1
Excel	43	3.9
Mock Interview	22	3.1
Q4: The instructor was aware of the learning difficulties of the participants		
Ethics	41	3.7
Math Review	42	2.8
Business Economics	41	4.1
Resume Writing	41	3.6
Statistics	41	3.4
Interview skill / Presentation Skill	42	3.4
Negotiation skill	40	4.1
Financial Accounting	42	3.7
Finance	42	4.3
SAS	42	3.6
International Finance	42	4.2
Honor Code review	42	3.6
Multicultural Business Communication	42	3.7
Matlab	42	2.9
C ++	42	2.9
Excel	42	3.9
Mock Interview	21	3.2
Q5: Overall this was an excellent session		
Ethics	42	3.9
Math Review	43	2.6
Business Economics	43	4.3
Resume Writing	43	3.6
Statistics	44	3.3
Interview skill / Presentation Skill	43	3.4
Negotiation skill	42	4.1
Financial Accounting	43	4.0
Finance	43	4.5
SAS	43	3.7
International Finance	43	4.2
Honor Code review	43	3.2
Multicultural Business Communication	43	3.5
Matlab	43	2.5
C ++	42	3.1

Excel	43	3.9
Mock Interview	22	3.3
Q6: Overall, the instructor was an excellent teacher		
Ethics	42	4.2
Math Review	43	2.7
Business Economics	43	4.5
Resume Writing	42	3.5
Statistics	43	3.5
Interview skill / Presentation Skill	43	3.5
Negotiation skill	42	4.3
Financial Accounting	43	4.0
Finance	43	4.5
SAS	43	3.8
International Finance	43	4.3
Honor Code review	42	3.4
Multicultural Business Communication	43	3.6
Matlab	43	2.6
C ++	43	3.4
Mock Interview	22	3.3

FINANCIAL ENGINEERING PROGRAM (FINENG591)
July 13, 2007 – August 28, 2007
LOCATION CSE 1670

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
July 9 TB Testing University Health Services Building	July 10 International Center Check-In 9:00 -12:00 PM		July 12 TB Testing University Health Services Building	July 13 FE Orientation *Nejat Seyhun/Henia Kamil* ECRC Presentation *Kerri Boivin* Teambuilding Workshop	July 14 Ethics (Morning) David Hess
July 16 Math Review *George Michailidis*	July 17 Math Review *George Michailidis*	July 18 Business Economics (morning) *Valerie Suslow*	July 19 Business Economics *Valerie Suslow*	July 20 Business Economics (morning) *Valerie Suslow* The Principle of Resume Writing *Leslie Olsen*	July 21 Math Review (Morning) *George Michailidis*
July 23 Math Review *George Michailidis*	July 24 Math Review *George Michailidis*	July 25 Statistics (morning) *Ji Zhu*	July 26 Statistics *Ji Zhu*	July 27 Interviewing Skills Presentation Skills Resume Critique *Amy Hoag*	July 28 Salary Negotiating Skills (morning) *Georges Potworowski*
July 30 Financial / Managerial Accounting *Raffi Indjejikian*	July 31 Managerial Accounting *Raffi Indjejikian*	August 1 Finance (morning) *Nejat Seyhun* Resume Critique (Afternoon) *ECRC*	August 2 Finance *Nejat Seyhun*	August 3 Finance *Nejat Seyhun*	August 4 Finance *Nejat Seyhun* (morning)
August 6 Finance *Nejat Seyhun*	August 7 SAS	August 8 SAS (morning)	August 9 SAS	August 10 SAS	August 11 International Finance *Nejat Seyhun* (morning)

FINANCIAL ENGINEERING PROGRAM (FINENG591)
July 13, 2007 – August 28, 2007
LOCATION CSE 1670

August 13 International Finance *Nejat Seyhun*	August 14 International Finance *Nejat Seyhun* (morning) ********* CoE HONOR CODE REVIEW ***Resume Writing Workshop***	August 15 Multicultural Business Communication and Cross Cultural Communication Business Etiquette *Amy Hoag*	August 16 MathLab *Amadi Nwankpa* ****** ***RESUME Writing Workshop and Review***	August 17 C++ *Kevin O'Malley* **LAB CSE 1620** **1:00 – 4:30 PM**	August 18 C++ *Kevin O'Malley* **LAB CSE 1620** **10:15-12:00 PM**
August 20 C++ *Kevin O'Malley* **LAB CSE 1620** **1:00 – 4:30 PM**	August 21 C++ *Kevin O'Malley* **LAB CSE 1620** **1:00 – 4:30 PM**	August 22 C++(morning) *Kevin O'Malley* **LAB CSE 1620** **10:15-12:00 PM**	August 23 C++ *Kevin O'Malley* **LAB CSE 1620**	August 24 Excel *Joe Walls*	August 25 Excel (morning) *Joe Walls*
August 27 Resume Review Mock Interviews	August 28 FE Club officers vote Choosing career path as Financial Engineer Conclusion	August 29 College of Engineering Graduate Orientation	August 30 InterPro (non-FE) Orientations	August 31 Rackham Orientation for all FE students	

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING
Course Approval Request
College Curriculum Committee, 1420 Lurie Engineering Center Building

[redacted]

Form Number **1851**

Action Requested

(•) New Course
( ) Modification of Existing Course
( ) Deletion of Course

Complete the following sections:
New Courses - B & C completely
Modifications - A modified information, B & C completely
Deletions - A & C completely

Date 10/17/2007
Effective winter 2008

A. CURRENT LISTING

Home Department | Div # | Course Number

Cross Listed Course Information

Course Title

TITLE ABBREVIATION — Time Sched Max = 19 Spaces | Transcript Max = 20 Spaces

Course Description

[redacted] ☐a ☐b ☐c ☐d ☐e ☐f ☐g ☐h ☐i ☐j ☐k

Degree Requirements ○ Degree Requirement ○ Tech Elective ○ Core Course ○ Other ○ Free Elective

Prerequisites ○ Enforced ○ Advised

Credit Restrictions

Level of Credit
☐ Undergrad only ☐ All Credit types
☐ Rackham Grad ☐ Rckhm Grad w/add'l Work
☐ Non-Rckhm Grad
☐ Ugrad or Rckhm Grad
☐ Ugrad or Non-Rckhm Grad

Credit Hours Min ___ Max ___
Contact Hrs/Wk ___
Number of Wks ___

C. Repeatability (Indi Research, Dir. Study, Dissertation:
Is this course repeatable? ⊙ Yes ○ No
Maximum Hours? 3 Maximum Times? 2
Can it be repeated in the same term? ○ Yes ⊙ No

Class Type(s) ☐ Lec ☐ Rec ☐ Sem ☐ Lab ☐ Dis ☒ Ind ☐ Other ___
Graded Section ○ Lec ○ Rec ○ Sem ○ Lab ○ Dis ⊙ Ind ○ Other
Grading ☐ A-E ☐ CR/NC ☒ S/U ☐ P/F ☐ Y
Location ☒ Ann Arbor ☐ Biological Station ☐ Camp Davis ☐ Extension

B. REQUESTED LISTING

Home Department: FINENG | Div # | Course Number: 590

Cross Listed Course Information

Course Title: Ind Study or Research in selected Financial Engineering Topics

TITLE ABBREVIATION — Time Sched Max = 19 Spaces: INDRESFINENGTOPICS | Transcript Max = 20 Spaces: INDRESINFINENGTOPICS

Course Description for Official Publication (Max = 50 words)
Individual study of specialized topics of Financial Engineering

[redacted] ☐a ☐b ☐c ☐d ☐e ☐f ☐g ☐h ☐i ☐j ☐k

Degree Requirements ○ Degree Requirement ○ Tech Elective ○ Core Course ◉ Other ○ Free Elective

Prerequisites permission of instructor
○ Enforced ◉ Advised

Credit Restrictions

Level of Credit
☐ Undergrad only ☐ All Credit types
☒ Rackham Grad ☐ Rckhm Grad w/add'l Work
☐ Non-Rckhm Grad
☐ Ugrad or Rckhm Grad
☐ Ugrad or Non-Rckhm Grad

Credit Hours Min 1 Max 3
Contact Hrs/Wk 14
Number of Wks 14

Printing Information (Optional) ☒ Print the course in the Bulletin ☒ Print the course in the Time Schedule

Terms & Freq. of Offering ☒ I ☒ II ☒ IIIa ☒ IIIb ☒ III — ☒ Yearly ☐ Alter Years ☐ Even Years ☐ Odd Years
Half term ☐ 1st ☐ 2nd

Cognizant Faculty Member: Nejat Seyhun **Title** Professor

Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

Approval
☐ Curriculum Comm. ___
☐ Faculty ___
☐ Rackham ___
☐ Cross listed Unit 1 ___
☐ Cross listed Unit 2 ___

Submitted By: ☒ Home Dept. ☐ Cross-listed Dept.
Name, Signature & Department
Home Dept. Nejat Seyhun Nejat Seyhun
Cross-listed Dept(s). ___

Form Number

1851

SUPPORTING STATEMENT

The following course will allow students interested in doing an individual study of a specialized topic in the area of Financial Engineering

Are any special resources or facilities required for this course? ☐ Yes ☐ No

Detail the Special requirements

UNIVERSITY OF MICHIGAN
COLLEGE OF ENGINEERING

273B CHRYSLER CENTER
2121 BONISTEEL BLVD
ANN ARBOR, MI 48109-2092 U.S.A.
PHONE 734 763 0480 FAX 734 763-2523
HTTP://INTERPRO.ENGIN.UMICH.EDU/

MEMORANDUM

TO: Toby Teory
Curriculum Committee

FROM: Professor Nejat Seyhun
Director, Financial Engineering Program

DATE: October 12, 2007

RE: Increase number of credit hours for the Financial Engineering program from 36 to 39 credits starting January 2008.

As a result of its interdisciplinary nature, the College of Engineering Financial Engineering (FE) program (Appendix A) is actively engaged in expanding its curricular activities. One of these efforts is the establishment of the summer program into a new course (FINENG500 Financial Engineering: An Overview). The FE Executive Committee and the FE Curriculum Committee approved the three credit Summer program as well as the request to increase the number of credits hours from 36 to 39.

Students in the financial engineering program come from different and various backgrounds (see appendix B). Consequently, many lack prerequisites in finance, international finance, accounting, economics, statistics, calculus, or in various computer programming languages such as SAS, MATLAB, and C++. Summer Program also prepares students by strengthening their soft skills such as presentation skills, ethics, and leadership. In the summer of 2006 (see Appendix C) the Financial Engineering instituted the Financial Engineering summer program with the approval of Stella Pang to provide all students identified with deficiencies an opportunity to complete the required modules during the August 2006 so they can start the program in Fall without a need to enroll in non-required additional courses and thus would not defer the completion of the degree program by one or two term (see Appendix D). While the 2006 summer program did not bear any credit hour; the feedback from the students was excellent (see Appendix C). As a result of attending the summer program, students who entered in Fall of 2006, will be able to complete the degree by December 2007.

The FE program also adjusted the admission to summer in lieu of fall term for the AY07-08 entering class. This change allowed students to be prepared for the academic rigor as well as recruiting schedule that is needed for in the field. Recruiting for Financial Engineering students is similar to the students pursuing the Master of Business Administration and starts early in the Fall.

A decision to move up the enrollment to Summer 2007 was instituted with approval from previous Associate Dean Stella Pang, FE executive Committee (see Appendix E) and FE curriculum committee (see Appendix E) and also require that students enroll for three (3) credits hours as part of the degree program with the stipulation to request approval to increase the number of credit hours from 36 to 39 for the start of Summer 2008. To meet this new requirement, the program would like to request that you approve the three (3) credit hour increase. The program will be identified as FINENG500: Financial Engineering Program: An Overview (see request for course approval).

Please consider this memo as a formal request to initiate the necessary action, and advise if any further information is required.

Appendix A: FE Program is

- *Interdisciplinary program across*:
  - College of Engineering
    - » Industrial and Operations Engineering
    - » Computer Science
  - College of Literature Science and the Arts
    - » Economics
    - » Mathematics
    - » Statistics
  - School of Business Administration
    - » Finance
    - » Accounting

Master of Science in Financial Engineering

http://interpro.engin.umich.edu

The Financial Engineering Program consists of 36 credit hours leading to the Master of Science in Financial Engineering degree. Graduates are uniquely qualified for a wide range of career opportunities in financial services, banking, insurance, government agencies, energy companies in areas such as financial modeling, derivatives analytics, hedging, risk management and information technology.

Curriculum Requirements

Prerequisites

Entering students should have a strong mathematical background similar to that of University of Michigan undergraduates majoring in IOE, Mathematics and Statistics (with applied concentrations), EECS (with economic interests), Economics or Business (with technical interests). In particular, students should have previously completed:

- Two years of college mathematics including multivariable calculus, differential equations and linear algebra (Math 115, 116, 215, {216 or 316}, {214 or 217 or 417 or 419})
- Two terms of calculus-based probability and statistics (Math/Stat 425 and Stat 426 or IOE 265 and 316/366 or EECS 401 and Stat 426)
- Basic microeconomic theory/time value of money/interest: (Econ 401 or Math 424)
- An introductory finance course (FIN 503 or FIN 551)
- Accounting principles (ACC 471 or ACC 501)
- Computer programming experience (EECS 183, C or C++ and spreadsheets)

Courses shown in parentheses indicate University of Michigan courses that typically cover the prerequisite material. Students not presenting transcripts showing these prerequisites courses may occasionally be admitted with course "deficiencies". All identified deficiencies are focused on during the mandatory FE Summer Program that begins in July prior to the start of the first Fall term.

Required core:

All students must complete a required core of courses covering financial concepts in capital budgeting, investments, financial markets, and derivative instruments and securities, analytical tools in optimization, stochastic processes, and statistics.

Finance		
*Financial Engineering I	IOE 552/MATH 542	Winter only
*Financial Engineering II	IOE 553/MATH 543	Fall only
*Computational Finance	MATH 623	Fall only
Portfolio Analysis and Investments	FIN 608	Fall/Winter
Fixed Income Securities and Markets	FIN 609	Fall/Winter
International Finance	FIN 612	Fall only
Managing International Portfolios	FIN 614	Fall only
Analysis/Design Tools		
*Mathematics of Finance	MATH 423	Fall only
Continuous Optimization Methods	IOE 511/MATH 562	Fall only
Applied Statistics	STAT 500	Winter only
Stochastic Processes or Discrete State Stochastic Processes	IOE 515 MATH/STAT 526	Fall only Winter only

**These courses must be taken in this sequence: MATH 423, IOE 552, IOE 553, MATH 623.*

Electives/Concentration Areas:

In addition to the core courses student must take at least 12 credit hours of elective courses chosen in consultation with an advisor to form a concentration area. Example concentration areas and related courses are:

(a) Capital markets (for students expected to seek employment in financial institutions in the areas of quantitative research, trading and arbitrage, derivatives and product structuring, risk management, investment banking and brokerages, asset/liability management, and in financial departments of non-financial firms and public institutions):

Finance		
Options and Futures in Corporate Decision Making	FIN 580	Fall and Winter
Risk Management and Financial Engineering	FIN 618	Winter only
Valuations	FIN 615	Fall and Winter
Corporate Financial Policy	FIN 621	Fall and Winter
Corporate Financial Engineering	FIN 622	Fall and Winter
Banking and Financial Institutions	FIN 631	Winter only
Off-Balance Sheet Banking	FIN 632	Winter only
Financial Trading	FIN 640	Winter only
Optimization and Analysis		
Linear Programming	IOE 510/MATH 561	Fall and Winter
Dynamic Programming	IOE 512	Winter only
Nonlinear Programming	IOE 611/MATH 663	
Stochastic Control	EECS 558	Fall only
Numerical partial differential equations		
Numerical Methods for Scientific Computing II	MATH 572	
Empirical analysis of complex systems	CSCS 520/PHY 580	
Applied probability, stochastic processes and stochastic analysis in finance		
*Seek advising regarding this concentration	*	*

(b) Insurance/risk management systems, forecasting (for work in risk management groups, pension management, insurance companies, industrial economic forecasting groups)

Insurance/risk management systems		
Life Contingencies I	MATH 520	Fall only
Life Contingencies II	MATH 521	Winter only
Risk Theory	MATH 523	Winter only
Time series analysis and forecasting		
Empirical Analysis of complex systems	CSCS 520/PHY 580	
Forecasting and Time Series Analysis	IOE 565	Fall only
Bayesian Decision Analysis	IOE 560/STAT 550	Winter only
Analysis of Time Series	STAT 531	Fall only
Advanced Quantitative Methods: Forecasting and Modeling	ECON 574/PPS 574	

(c) Operations and information systems (for work in "middle office" and operational areas of financial institutions-for corporate users and information systems specialty firms)

Information systems/software engineering		
Software Engineering	EECS 481	Fall and Winter
Database Management Systems	EECS 484	Fall and Winter
Artificial intelligence/pattern recognition		
Introduction to Artificial Intelligence	EECS 492	Fall and Winter
Machine Learning	EECS 545	Fall only
Simulation		
Computer Modeling of Complex Systems	CMPLXSYS 530	Winter only
Simulation	IOE 474	Fall and Winter
Electronic Commerce	EECS 547/IS 652	Winter only

Program Length

Students with sufficient background and experience (for example, those who are already studying towards a graduate technical degree at U of M) may be able to complete the FE program in *three* terms of course work. Students with limited experience and less developed backgrounds are encouraged to participate in an internship as part of a *three to four* term experience.

AS OF SUMMER 2007

Master of Science in Financial Engineering

http://interpro.engin.umich.edu

The Financial Engineering Program consists of 36 credit hours leading to the Master of Science in Financial Engineering degree. Graduates are uniquely qualified for a wide range of career opportunities in financial services, banking, insurance, government agencies, energy companies in areas such as financial modeling, derivatives analytics, hedging, risk management and information technology.

Curriculum Requirements

Prerequisites

Entering students should have a strong mathematical background similar to that of University of Michigan undergraduates majoring in IOE, Mathematics and Statistics (with applied concentrations), EECS (with economic interests), Economics or Business (with technical interests). In particular, students should have previously completed:

- Two years of college mathematics including multivariable calculus, differential equations and linear algebra (Math 115, 116, 215, {216 or 316}, {214 or 217 or 417 or 419})
- Two terms of calculus-based probability and statistics (Math/Stat 425 and Stat 426 or IOE 265 and 316/366 or EECS 401 and Stat 426)
- Basic microeconomic theory/time value of money/interest: (Econ 401 or Math 424)
- An introductory finance course (FIN 551)
- Accounting principles (ACC 471 or ACC 501)
- Computer programming experience (EECS 183, C or C++ and spreadsheets)

Courses shown in parentheses indicate University of Michigan courses that typically cover the prerequisite material. Students not presenting transcripts showing these prerequisites courses may occasionally be admitted with course "deficiencies". All identified deficiencies are focused on during the mandatory FE Summer Program that begins in July prior to the start of the first Fall term.

Required core:

All students must complete a required core of courses covering financial concepts in capital budgeting, investments, financial markets, and derivative instruments and securities, analytical tools in optimization, stochastic processes, and statistics.

Financial Engineering: An Overview (FE Summer Program)	FINENG 591(3)	Summer only

Finance		
*Financial Engineering I	IOE 552/MATH 542 (3)	Winter only
*Financial Engineering II	IOE 553/MATH 543 (3)	Fall only
*Computational Finance	MATH 623 (3)	Fall only
Capital Markets & Investment Strategy	FIN 608 (2.25)	Fall/Winter
Fixed Income Securities and Markets	FIN 609 (1.5)	Fall/Winter
Options & Futures Corp. Decision Making	FIN 580 (2.25)	Fall/Winter
Analysis/Design Tools		
*Stochastic Analysis for Finance	MATH 506 (3)	Fall only
Continuous Optimization Methods	IOE 511/MATH 562 (3)	Fall only
Statistical Analysis of Financial Data	STAT 508 (3)	Fall only
Stochastic Processes or Discrete State Stochastic Processes	IOE 515 (3) MATH/STAT 526 (3)	Fall only Winter only

**These courses must be taken in this sequence: MATH 506, IOE 552, IOE 553, MATH 623.*

Electives/Concentration Areas:

In addition to the core courses student must take at least 9 credit hours of elective courses chosen in consultation with an advisor to form a concentration area. Example concentration areas and related courses are:

(a) Capital markets (for students expected to seek employment in financial institutions in the areas of quantitative research, trading and arbitrage, derivatives and product structuring, risk management, investment banking and brokerages, asset/liability management, and in financial departments of non-financial firms and public institutions):

Finance		
Finance: Risk Management	FINENG 591	Winter only
Risk Management and Financial Engineering	FIN 618	Winter only
Valuations	FIN 615	Fall and Winter
Corporate Financial Policy	FIN 621	Fall and Winter
Corporate Financial Engineering	FIN 622	Fall and Winter
Banking and Financial Institutions	FIN 631	Winter only
Off-Balance Sheet Banking	FIN 632	Winter only
Financial Trading	FIN 640	Winter only
Optimization and Analysis		
Linear Programming	IOE 510/MATH 561	Fall and Winter
Dynamic Programming	IOE 512	Winter only
Nonlinear Programming	IOE 611/MATH 663	
Stochastic Control	EECS 558	Fall only
Numerical partial differential equations		
Numerical Methods for Scientific Computing II	MATH 572	
Applied probability, stochastic processes and stochastic analysis in finance		
*Seek advising regarding this concentration	*	*

(b) Insurance/risk management systems, forecasting (for work in risk management groups, pension management, insurance companies, industrial economic forecasting groups)

Insurance/risk management systems		
Life Contingencies I	MATH 520	Fall only
Life Contingencies II	MATH 521	Winter only
Risk Theory	MATH 523	Winter only
Time series analysis and forecasting		
Forecasting and Time Series Analysis	IOE 565	Fall only
Bayesian Decision Analysis	IOE 560/STAT 550	Winter only
Analysis of Time Series	STAT 531	Fall only
Advanced Quantitative Methods: Forecasting and Modeling	ECON 574/PPS 574	

(c) Operations and information systems (for work in "middle office" and operational areas of financial institutions-for corporate users and information systems specialty firms)

Information systems/software engineering		
Software Engineering	EECS 481	Fall and Winter
Database Management Systems	EECS 484	Fall and Winter
Artificial intelligence/pattern recognition		
Introduction to Artificial Intelligence	EECS 492	Fall and Winter
Machine Learning	EECS 545	Fall only
Simulation		
Computer Modeling of Complex Systems	CMPLXSYS 530	Winter only
Simulation	IOE 474	Fall and Winter
Electronic Commerce	EECS 547/SI 652	Winter only

Program Length

Students with sufficient background and experience (for example, those who are already studying towards a graduate technical degree at U of M) may be able to complete the FE program in *three* terms of course work. Students with limited experience and less developed backgrounds are encouraged to participate in an internship as part of a *three to four* term experience.

About Financial Engineering:

- Established in 1997
- Number of Alumni: 298
- Number of Students in the Program: 126
- Number of Fall 2006 incoming: 48
- Median GPA of Entering Class: 3.69
- Median GRE of Fall entering class: 1317

  (Verbal 526; Quantitative 791; A/W 4/6)
- Median TOEFL for Fall entering class: 637

Appendix B: Demographics

FALL 2005			FALL 2006			FALL 2007S		
GENDER			*GENDER*			*GENDER*		
FEMALE	19	41%	FEMALE	24	33%	FEMALE	12	26.5%
MALE	27	59%	MALE	49	67%	MALE	36	73.5%
GEOGRAPHIC LOCATION			*GEOGRAPHIC LOCATION*			*GEOGRAPHIC LOCATION*		
US	11	24%	US	9	12%	US	5	10%
INT"L*	35	76%	INT'L	64	88%	INT'L	43	90%
UG DISCIPLINES			*UG DISCIPLINES*			*UG DISCIPLINES*		
Engineering	24	52%	Engineering	20	27%	Engineering	28	59%
Business/Commerce	9	20%	Business/Commerce	34	47%	Business/Management	5	10%
LSA**	13	28%	LSA**	19	26%	LSA**	15	31%

Note:
** Countries represented in Fall 2007: Canada, China, France , India, Indonesia, Korea, Mexico, Pakistan, Taiwan*
*** LSA: Mathematics, Physics, Economics, Actuarial Sciences*

APPENDIX C

TO: FE Executive Committee

FROM: Nejat Seyhun
Henia Kamil

DATE: 9/15/06

RE: Financial Engineering Summer Program 2006

The first test run of the FE summer institute is now complete. The summer institute was in session July 31 – September 1, 2006.

This year we instituted the non-refundable enrollment deposit fee in the amount of $500.00. All students were informed of the new procedure as well as the need to arrive by July 31. In fact we received the non-refundable deposit prior to students submitting their certification of funds material. A class of 73 new incoming students including dual degree student enrolled was expected to attend. Three did not come, two were excused thus only 69 enrolled and participated in the Summer Program. Average attendance per session was 62.5 students.

The following faculty and staff were instrumental in the success of this program.

Name		Affiliation	Session title
Valerie	Saslow	RBSchool	Applied Economics
Kevin	O'Malley	EECS	C++
Tim	Maul	ENGR	Statistics
Tim	Maul	ENGR	Calculus
David	Hess	Rbschool	Ethics
Nejat	Seyhun	RBSchool	Finance
Joe	Walls	Rbschool	Excel/Visual Basic
Nejat	Seyhun	RBSchool	Financial statement Analysis
Nejat	Seyhun	RBSchool	Valuation
Nejat	Seyhun	RBSchool	International Finance
Kathleen	Welch	Public Health	SAS
Amadi	Nwankapa	ENGR	MATLAB
Amy	Hoag	Career Center	Business Commuications and Etiquette
Robin/Cynthia	Dall/Hill/	ECRC	ECRC introducation; Presentation/Resume Workshop
Cynthia	Redwine	ECRC	Mock Interviews
Barbar	Dobson	ELI	AEE testing for identified students*
Linda Huff-Brinkman	International Center Staff	International Center	International Center Mandatory* Check-in Program
Raffi	Indejikian	RBSchool	Accounting
Leslie	Olsen	CoE-TechCom	Presentation Skills

Note: * AY07-08 Summer program will be held prior to start of the program.
Summer Program schedule is listed below.

Financial Engineering Summer Program Schedule – July 31 – September 1, 2006

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
July 31 Orientation ECRC presentation Resume Writing Teambuilding	**August 1-2** Statistics		**August 3-5** Finance			**August 6**
August 7-8 Business Economics		**August 9-11** C++			**August 12** Accounting	**August 13**
August 14-15 Accounting		**August 16-17** Calculus		**August 18** Presentation Skills & Resume Workshop Matlab	**August 19** Excel/Visual Basic	**August 20**
August 21-23 SAS			**August 24** Financial Statement Analysis	**August 25** Valuation	**August 26** International Finance	**August 27**
August 28 Ethics	**August 29** Business Etiquette Internatio nal	**August 30** 8:00-10:00 Resume Critique 10:00 CoE	**August 31** AEE Test for selected students Mock Interviews	**September 1** **8:00-10:00** **Conclusion**	**September2**	**September 3**

	Center Mandatory Check-in Program	Graduate Welcome Day				
September 4 **LABOR Day (University Closed)**	**September 5** **Classes start**	**September 6**	**September 7**	**September 8** **Office of Career Development, Ross Business School Presentation**		

The following class demographic was provided to the faculty included below of those who are attending as of Fall 2006.

FALL 2006 (August 2006)		
GENDER		
FEMALE	24	33%
MALE	49	67%
GEOGRAPHIC LOCATION		
US	9	12%
INT'L	64	88%
UG DISCIPLINES		
Engineering	20	27%
Business/Commerce	34	47%
LSA**	19	26%
Median GPA	UG: 3.39/4	
Median GRE	V: 520; Q: 800;A/W 4.0/6	
Median GMAT	710	
Median TOEFL	637	

Note:
** Countries represented in Fall 2006; Argentina, Canada, China, Hong Kong, India, Indonesia, Korea, Russia, Singapore, Taiwan, Thailand, United Arab Emirates*
*** LSA: Mathematics, Physics, Economics, Actuarial Sciences.*

Length of program:

The program run six (6) days a week for four consecutive weeks daily from 8:30 -5:00 pm.

At the beginning students arrived by the start of 8:30 am, but as the month went on students arrived by 9:00 am or later.

Recommendation:

Students should arrive one week prior to the start of the summer program to take care of all personal matters.

Extend the period of the summer program from July 16 – August 28, 2007. Remove Saturday classes. Teach from 9:00 – 4:00 pm. Provide students with time to take care of their personal issues.

Orientation will be held on Friday prior to the start of the program (July 13, 2007). Schedule AEE , International Student Check-in program and TB testing with Students health services prior to start of the program. Work with University housing on providing students with accommodation and rental options starting July 1.

Program to end prior to University wide events.

Content:

For next year, add a week session on English and technical writing which will also include small exercises.

Course material. As this is the first year, we have collected the course material. Next year we will only need to update the material for two session Calculus and statistics.

Included in the summer program was SAS programming that is used extensively in the financial industry. The workshop went well. For Summer 07, the program should run for four days to allow student for some proficiency. C++ training of three days was not sufficient.

Leadership modules were developed to meet the student needs. If possible and time permitting, increase to include four days for technical writing, team building as well as developing better communication skills.

Physical location:

The program was held on North Campus. The lectures were held in 1504 GG Brown. Six break out rooms were reserved. One computer lab, CSE 1620, was also reserved. CSE 1620 (A/B) is the biggest lab seating 42 students. Students were paired up in teams.

Difficulties:
Reservation of the classroom was challenging. Rooms were not open on Saturday for two consecutive weeks. Issues resolved. Lab teaching will need to be revamped.

Program Cost

AY06-07, the expenditures were recorded to gage the cost of the summer program. The tuition revenue model will include the new program to be covered by the tuition students will pay for the FINENG 500 new course. To be able to directly receive the tuition we will need to establish a Dept. ID as well as Program CODE: FINENG for courses that are directly related to the Financial engineering program. Courses developed for these purposes will be under special topics and FE will need to secure faculty to teach the course. This year the expenses were within available funds reserved from previous years.

Current Expenditures as of 10/6/06 by category:

Teaching/Staff			
Faculty Compensation		38,500.003	
Staff Support		5,531.76	
FB		3,000.00	
Sub-Total			$47,031.76
Curriculum			
Challenge Program		2,142.50	
CSCAR		9,000.00	
Business Communication		2,690.26	
Course Materials Copyrights		2,621.16	
Sub-Total			$16,453.42
Miscellaneous			
Food		$18,164.14	
Supplies		$5,916.40	
Sub-total			$24,080.54
Grand Total			**$87,566.22**

Cost per student $1,269.00

Recommendation:

Make the FE Summer program will become a required class. Credit hours to be determined based on FY06-07 projected expenditures based on 45 new incoming students. Scheduling of venue will be automatic and adequate facilities for computer labs can be scheduled as well.

AY 07-08 Summer program budget:

A survey was conducted after each session to evaluate student satisfaction from each session. Below you will find the average summary:

Question	1	2	3	4	5	6	# Responses
Orientation	3.44	4.14	3.98	4.16	4.17	4.44	59
Statistics	3.26	3.42	3.18	3.10	3.24	3.47	62
Finance	3.34	4.48	4.32	4.66	4.72	4.75	65
Business Economics	3.40	4.45	4.28	4.29	4.53	4.67	44
C++	2.46	3.46	3.31	3.35	3.35	3.96	54
Accounting	2.76	3.82	3.44	3.91	3.68	4.18	34
Calculus	3.72	3.59	3.14	3.14	3.28	3.21	29
Resume Workshop	3.43	4.00	3.90	3.83	4.07	4.20	30
MATLAB	2.59	3.21	3.00	3.11	3.24	3.52	29
Excel/Visual Basic	2.96	4.32	4.40	4.44	4.40	4.52	25
SAS	2.11	4.47	4.47	4.39	4.47	4.56	36
Financial Statement Valuation International Finance	3.15	4.42	4.27	4.42	4.58	4.67	33
Ethics	3.13	4.25	4.19	4.06	4.25	4.50	16
Multicultural Comm.	3.62	4.46	4.46	4.64	4.69	4.67	39

Questions
1) I had a good background on this material
2) Overall, the teaching materials were excellent
3) I learned a great deal in this session
4) The instructor was aware of the learning difficulties of the participants
5) Overall, this was an excellent session
6) Overall, the instructor was an excellent teacher

LOGISTICS:

The program provided water, refreshments and lunch for the duration of the program. This allowed efficiency in retaining students within the program location and area.

Lunch was ordered from various vendors to provide variety of choice on a daily basis. Refreshments such as water, soda, snacks, coffee, sugar , tea and minor supplies were purchases.

Vendors who provided service during the month of August were: Cosi, Zanzibar, Pizza House, Zingermann, Afternoon Delight, Jimmy Jones, Mr. Pita, China Gate and Evergreen

Refreshments were purchased at Kroger, GFS, Sam's Club to reduce cost.

Problems encountered were more of the quantity needed or used by the students.

Recommendations:

Contract with one supplier for delivery of all supplies at the beginning of the program. GFS would be contracted for the delivery and cost efficiencies.

(e.g, For example: a university supplier requested $11.00 per case of 24 bottles including vs. purchase of a case of 24 bottles of water purchased within range of $3.33-4.59 per case.)

Food vendors: negotiate cost of meals and contract with vendors prior to start of program.

SUMMER 2007 – Student Survey

	Number of responds	Average
Q1: I had a good back ground on this material		
Ethics	42	3.6
Math Review	43	3.6
Business Economics	42	3.7
Resume Writing	43	3.2
Statistics	43	3.5
Interview skill / Presentation Skill	44	3.1
Negotiation skill	43	3.1
Financial Accounting	44	3.1
Finance	44	3.5
SAS	44	2.3
International Finance	43	3.0
Honor Code review	44	2.9
Multicultural Business Communication	44	3.0
Matlab	44	2.8
C ++	44	3.3
Excel	44	3.4
Mock Interview	28	2.5
Q2: Overall, the teaching material were excellent		
Ethics	42	4.1
Math Review	44	2.8
Business Economics	44	4.3
Resume Writing	44	3.5
Statistics	44	3.3
Interview skill / Presentation Skill	43	3.3
Negotiation skill	42	4.1
Financial Accounting	43	3.7
Finance	44	4.3
SAS	44	3.7
International Finance	44	4.0
Honor Code review	44	3.2
Multicultural Business Communication	44	3.5
Matlab	44	2.5
C ++	43	3.2
Excel	44	3.7
Mock Interview	24	2.9
Q3: I learned a great deal in this session		
Ethics	42	3.5
Math Review	43	2.5
Business Economics	44	3.9
Resume Writing	44	3.4
Statistics	44	3.1
Interview skill / Presentation Skill	44	3.3

Negotiation skill	43	3.9
Financial Accounting	44	3.6
Finance	44	4.4
SAS	44	3.9
International Finance	44	4.0
Honor Code review	44	3.2
Multicultural Business Communication	44	3.3
Matlab	43	2.4
C ++	43	3.1
Excel	43	3.9
Mock Interview	22	3.1
Q4: The instructor was aware of the learning difficulties of the participants		
Ethics	41	3.7
Math Review	42	2.8
Business Economics	41	4.1
Resume Writing	41	3.6
Statistics	41	3.4
Interview skill / Presentation Skill	42	3.4
Negotiation skill	40	4.1
Financial Accounting	42	3.7
Finance	42	4.3
SAS	42	3.6
International Finance	42	4.2
Honor Code review	42	3.6
Multicultural Business Communication	42	3.7
Matlab	42	2.9
C ++	42	2.9
Excel	42	3.9
Mock Interview	21	3.2
Q5: Overall this was an excellent session		
Ethics	42	3.9
Math Review	43	2.6
Business Economics	43	4.3
Resume Writing	43	3.6
Statistics	44	3.3
Interview skill / Presentation Skill	43	3.4
Negotiation skill	42	4.1
Financial Accounting	43	4.0
Finance	43	4.5
SAS	43	3.7
International Finance	43	4.2
Honor Code review	43	3.2
Multicultural Business Communication	43	3.5
Matlab	43	2.5
C ++	42	3.1

Excel	43	3.9
Mock Interview	22	3.3
Q6: Overall, the instructor was an excellent teacher		
Ethics	42	4.2
Math Review	43	2.7
Business Economics	43	4.5
Resume Writing	42	3.5
Statistics	43	3.5
Interview skill / Presentation Skill	43	3.5
Negotiation skill	42	4.3
Financial Accounting	43	4.0
Finance	43	4.5
SAS	43	3.8
International Finance	43	4.3
Honor Code review	42	3.4
Multicultural Business Communication	43	3.6
Matlab	43	2.6
C ++	43	3.4
Mock Interview	22	3.3

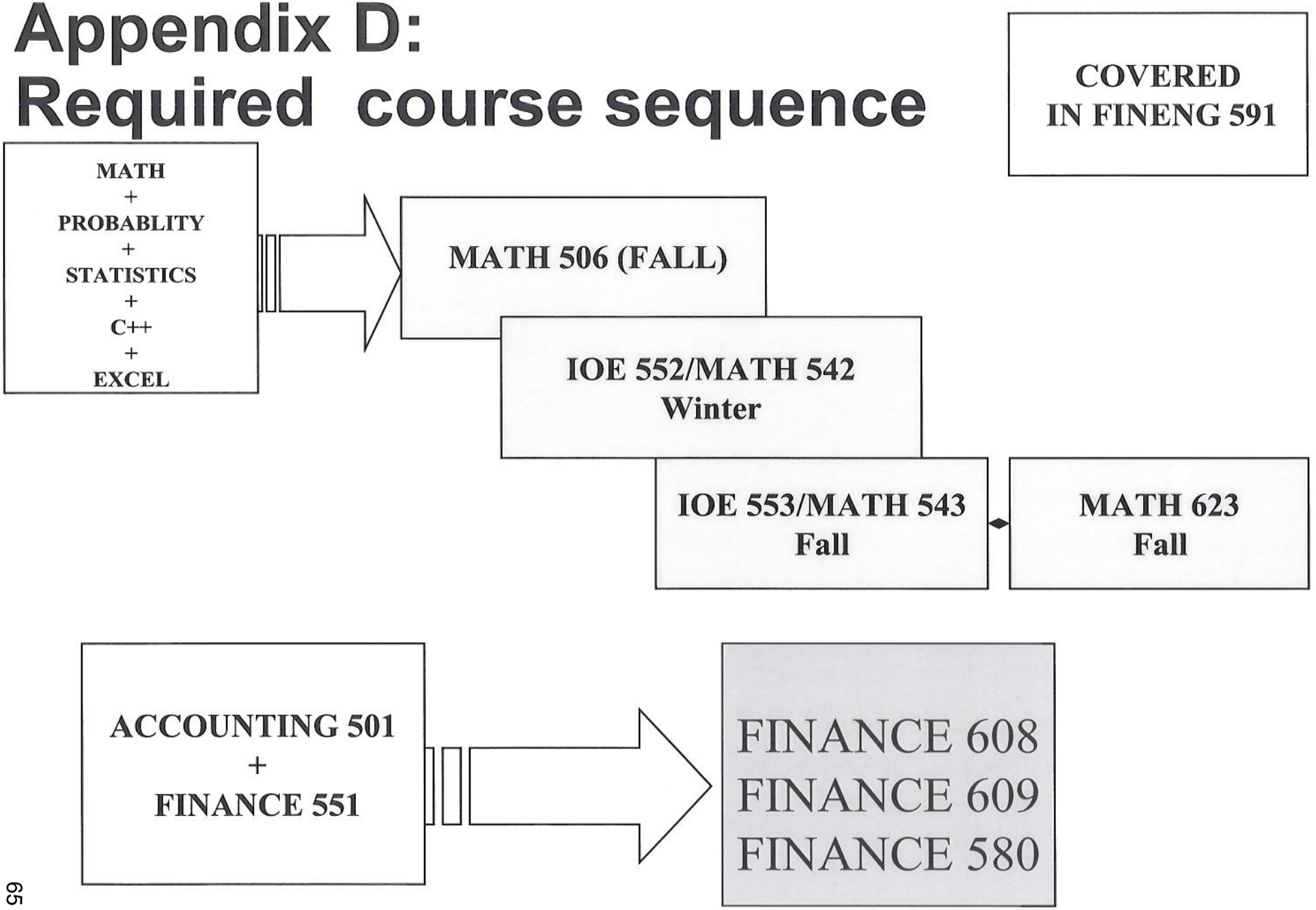
FINANCIAL ENGINEERING PROGRAM (FINENG591)
July 13, 2007 – August 28, 2007
LOCATION CSE 1670

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
July 9 TB Testing University Health Services Building	July 10 International Center Check-In 9:00 -12:00 PM		July 12 TB Testing University Health Services Building	July 13 FE Orientation *Nejat Seyhun/Henia Kamil* ECRC Presentation *Kerri Boivin* Teambuilding Workshop	July 14 Ethics (Morning) David Hess
July 16 Math Review *George Michailidis*	July 17 Math Review *George Michailidis*	July 18 Business Economics (morning) *Valerie Suslow*	July 19 Business Economics *Valerie Suslow*	July 20 Business Economics (morning) *Valerie Suslow* The Principle of Resume Writing *Leslie Olsen*	July 21 Math Review (Morning) *George Michailidis*
July 23 Math Review *George Michailidis*	July 24 Math Review *George Michailidis*	July 25 Statistics (morning) *Ji Zhu*	July 26 Statistics *Ji Zhu*	July 27 Interviewing Skills Presentation Skills Resume Critique *Amy Hoag*	July 28 Salary Negotiating Skills (morning) *Georges Potworowski*
July 30 Financial / Managerial Accounting *Raffi Indjejikian*	July 31 Managerial Accounting *Raffi Indjejikian*	August 1 Finance (morning) *Nejat Seyhun* Resume Critique (Afternoon) *ECRC*	August 2 Finance *Nejat Seyhun*	August 3 Finance *Nejat Seyhun*	August 4 Finance *Nejat Seyhun* (morning)
August 6 Finance *Nejat Seyhun*	August 7 SAS	August 8 SAS (morning)	August 9 SAS	August 10 SAS	August 11 International Finance *Nejat Seyhun* (morning)

FINANCIAL ENGINEERING PROGRAM (FINENG591)
July 13, 2007 – August 28, 2007
LOCATION CSE 1670

August 13	August 14	August 15	August 16	August 17	August 18
International Finance *Nejat Seyhun*	International Finance *Nejat Seyhun* (morning) ********* CoE HONOR CODE REVIEW ***Resume Writing Workshop***	Multicultural Business Communication and Cross Cultural Communication Business Etiquette *Amy Hoag*	MathLab *Amadi Nwankpa* ****** ***RESUME Writing Workshop and Review***	C++ *Kevin O'Malley* **LAB CSE 1620** **1:00 – 4:30 PM**	C++ *Kevin O'Malley* **LAB CSE 1620** **10:15-12:00 PM**
August 20	August 21	August 22	August 23	August 24	August 25
C++ *Kevin O'Malley* **LAB CSE 1620** **1:00 – 4:30 PM**	C++ *Kevin O'Malley* **LAB CSE 1620** **1:00 – 4:30 PM**	C++(morning) *Kevin O'Malley* **LAB CSE 1620** **10:15-12:00 PM**	C++ *Kevin O'Malley* **LAB CSE 1620**	Excel *Joe Walls*	Excel (morning) *Joe Walls*
August 27	August 28	August 29	August 30	August 31	
Resume Review Mock Interviews	FE Club officers vote Choosing career path as Financial Engineer Conclusion	College of Engineering Graduate Orientation	InterPro (non-FE) Orientations	Rackham Orientation for all FE students	

Appendix D:
Required course sequence



Appendix E

FINANCIAL ENGINEERING COMMITTEES
2007-2008

H. Nejat Seyhun, Director
6724 Sam Wyly Hall 1234
Phone: 763-5463
Email: nseyhun@ umich.edu

EXECUTIVE COMMITTEE

Email: FEExecutiveCommittee@umich.edu

Name	Department	Address	Phone	Email
Curtis Huntington	Mathematics	530 Church St, 1043	763-0293	chunt@umich.edu
Vijay Nair	Statistics	453 West Hall, 1092	763-5238	vnn@umich.edu
Stephen Salant	Economics	254 Lorch Hall, 1220	764-2370	ssalant@umich.edu
H. Nejat Seyhun	Ross Business School	6724 Sam Wyly Hall 1234	763-5463	nseyhun@bus.umich.edu
Larry Seiford	Industrial Operations	1877A IOE, 2117	764-3451	seiford@umich.edu
Stephen Pollock	Prof Emeritus, Mfg IOE		764-9403	pollock@umich.edu

CURRICULUM COMMITTEE

Email: FECurriculumCommittee@umich.edu

Name	Department	Address	Phone	Email
Volodymyr Babich	Industrial Operations	2783 IOE 2117	647-0872	babich@umich.edu
Joseph Conlon	Mathematics	5858 East Hall 1109	764-9427	conlon@umich.edu
Stephen Salant	Economics	254 Lorch Hall, 1220	764-2370	ssalant@umich.edu
H. Nejat Seyhun	Ross Business School	6724 Sam Wyly Hall 1234	763-5463	nseyhun@umich.edu
Mike Wellman	Elec Eng. & Comp. Sci.	126 ATL 2110	764-6894	wellman@engin.umich.edu
Ji Zhu	Statistics	445B West Hall, 1092	936-2577	jizhu@umich.edu

ADMISSIONS COMMITTEE

Email: FEAdmissionsCommittee@umich.edu

Name	Department	Address	Phone	Email
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Curtis Huntington	Mathematics	2864 East Hall, 1109	763-0293	chunt@umich.edu
*Jussi Keppo	Industrial Operations	2885 IOE 2117	764-6473	keppo@umich.edu
Moulinath Banerjee	Statistics	451 West Hall, 1107	764-2388	moulib@umich.edu

*Chair

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING
Course Approval Request
College Curriculum Committee, 1420 Lurie Engineering Center Building

[redacted]

Form Number **1789**

Action Requested

- (•) New Course
- ( ) Modification of Existing Course
- ( ) Deletion of Course

Complete the following sections:
New Courses - B & C completely
Modifications - A modified information, B & C completely
Deletions - A & C completely

Date 10/17/2007
Effective Winter 2008

A. CURRENT LISTING	B. REQUESTED LISTING
Home Department / Div # / Course Number	Home Department: FINENG / Div # / Course Number: 500
Cross Listed Course Information	Cross Listed Course Information
Course Title	Course Title: Financial Engineering: An Overview
TITLE ABBREVIATION — Time Sched Max = 19 Spaces	FESEMINAR
TITLE ABBREVIATION — Transcript Max = 20 Spaces	FESUMMERPR
Course Description	Course Description for Official Publication (Max = 50 words): The objective of this course is to introduce financial engineering (FE) students to fundamental skills required to keep up with the rigorous FE curriculum. The program includes various prerequisite involving finance, international finance, financial accounting, economics, statistics, calculus, stochastic calculus, computer programming, as well as team building, ethics in the financial world, and interpersonal skills techniques.
[redacted] ☐a ☐b ☐c ☐d ☐e ☐f ☐g ☐h ☐i ☐j ☐k	[redacted] ☐a ☐b ☐c ☐d ☐e ☐f ☐g ☐h ☐i ☐j ☐k
Degree Requirements: O Degree Requirement O Core Course O Free Elective O Tech Elective O Other	Degree Requirements: (•) Degree Requirement O Core Course O Free Elective O Tech Elective O Other
Prerequisites: O Enforced O Advised	Prerequisites: FE student only (•) Enforced O Advised
Credit Restrictions	Credit Restrictions
Level of Credit: ☐ Undergrad only ☒ Rackham Grad ☐ Non-Rckhm Grad ☐ Ugrad or Rckhm Grad ☐ Ugrad or Non-Rckhm Grad ☐ All Credit types ☐ Rckhm Grad w/add'l Work	Level of Credit: ☐ Undergrad only ☒ Rackham Grad ☐ Non-Rckhm Grad ☐ Ugrad or Rckhm Grad ☐ Ugrad or Non-Rckhm Grad ☐ All Credit types ☐ Rckhm Grad w/add'l Work
Credit Hours Min 3 Max 3	Credit Hours Min 3 Max 3
Contact Hrs/Wk 7	Contact Hrs/Wk 7
Number of Wks 7	Number of Wks 7

C.

Repeatability (Indi Research, Dir. Study, Dissertation:
Is this course repeatable? O Yes (•) No
Maximum Hours? ____ Maximum Times? ____
Can it be repeated in the same term? O Yes (•) No

Printing Information (Optional) ☒ Print the course in the Bulletin ☒ Print the course in the Time Schedule

Class Type(s): ☐ Lec ☐ Rec ☒ Sem ☐ Lab ☐ Dis ☐ Ind ☐ Other ____
Graded Section: O Lec O Rec (•) Sem O Lab O Dis O Ind O Other
Grading: ☐ A-E ☐ CR/NC ☒ S/U ☐ P/F ☐ Y
Location: ☒ Ann Arbor ☐ Biological Station ☐ Camp Davis ☐ Extension

Terms & Freq. of Offering: ☐ I ☐ II ☐ IIIa ☒ IIIb ☐ III — ☒ Yearly ☐ Alter Years ☐ Even Years ☐ Odd Years
Half term ☐ 1st ☐ 2nd

Cognizant Faculty Member: Nejat Seyhun **Title** Professor

Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

Approval

- ☐ Curriculum Comm. ____
- ☐ Faculty ____
- ☐ Rackham ____
- ☐ Cross listed Unit 1 ____
- ☐ Cross listed Unit 2 ____

Submitted By: ☒ Home Dept. ☐ Cross-listed Dept.

Name, Signature & Department
Home Dept. Nejat Seyhun [signature]
Cross-listed Dept(s). ____

Form Number

1789

SUPPORTING STATEMENT

The following course is being established to meet the Financial Engineering program prerequisite requirements for all its students and will allow the students to complete their degrees within three terms and one half terms. The establishment of this course, will assure that the interdisciplinary financial engineering program has provided all of its entering students the necessary skill set needed to keep up with the curriculum as most students enter the program with various deficiencies (e.g., engineering, mathematics, economics, business, computer programming etc.)

Starting in Summer 2006, the financial engineering program required all its new entering students attend the summer program. (See attached schedule). The feedback from the students was positive and it has helped them to phase into the program-required courses. Based on the outcome and positive feedback (see attached survey), the establishment of the course was part of the FE program curriculum will greatly assure the students' readiness for the FE courses in their first term.

The program was offered as an experimental contingency for its first offering, with a requirement to establish it as part of the curriculum. Stella Pang, CoE ADGE has approved the request to establish the course.

Attached please find the Summer Program 2006 and 2007 schedule and student evaluation.

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

UNIVERSITY OF MICHIGAN
COLLEGE OF ENGINEERING

273B CHRYSLER CENTER
2121 BONISTEEL BLVD
ANN ARBOR, MI 48109-2092 U.S.A.
PHONE 734 763 0480 FAX 734 763-2523
HTTP://INTERPRO.ENGIN.UMICH.EDU/

MEMORANDUM

TO: Toby Teory
Curriculum Committee

FROM: Professor Ann Marie Sastry
Director, Energy Systems Engineering

Ann Marie Sastry

DATE: October 17, 2007

RE: Creating the SUBJECT AREA for the Energy Systems Engineering Degree Program

The Energy Systems Engineering Program was officially launched this Fall 2007 semester. In order to develop the required course curriculum for the program, I would like to request the creation of a subject area.

The InterPro Council of Directors approved the creation of the SUBJECT AREA for the Energy Systems Engineering Program. The Energy Systems Engineering Program request is similar to the requests used to establish the AUTO, FINENG and PIM areas.

I therefore propose to establish the following subject area:

Preferred Subject Area:	ESENG
Preferred Campus Location:	273B Chrysler Center
Effective Term:	Winter 2008
Academic Organization:	210503

Please consider this memo as a formal request to initiate the necessary action, and please advise me if any further information is required.

Thank you in advance for your consideration.

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING
Course Approval Request
College Curriculum Committee, 1420 Lurie Engineering Center Building

Print

Form Number 1853

Action Requested

- (•) New Course
- ( ) Modification of Existing Course
- ( ) Deletion of Course

Complete the following sections:
New Courses - B & C completely
Modifications - A modified information, B & C completely
Deletions - A & C completely

Date 10/17/2007
Effective Fall 2008

A. CURRENT LISTING	B. REQUESTED LISTING
Home Department / Div # / Course Number	Home Department: ESENG / Course Number: 501
Cross Listed Course Information	Cross Listed Course Information
Course Title	Course Title: Seminars on Energy Systems, Technology and Policy
TITLE ABBREVIATION — Time Sched Max = 19 Spaces	SEMENERTECHPOLICY
TITLE ABBREVIATION — Transcript Max = 20 Spaces	SEMINARENERGYTECHPOL
Course Description	Course Description for Official Publication (Max = 50 words): This course is intended to provide students with an understanding the critical issues in energy technologies.

PROGRAM OUTCOMES:

A.	B.
☐ a ☐ b ☐ c ☐ d ☐ e ☐ f ☐ g ☐ h ☐ i ☐ j ☐ k	☐ a ☐ b ☐ c ☐ d ☐ e ☐ f ☐ g ☐ h ☐ i ☐ j ☐ k
Degree Requirements: ○ Degree Requirement ○ Tech Elective ○ Core Course ○ Other ○ Free Elective	**Degree Requirements**: (•) Degree Requirement ○ Tech Elective ○ Core Course ○ Other ○ Free Elective
Prerequisites: ○ Enforced ○ Advised	Prerequisites: Greaduate student or permission by instructor ○ Enforced ○ Advised
Credit Restrictions	Credit Restrictions
Level of Credit: ☐ Undergrad only ☐ Rackham Grad ☐ Non-Rckhm Grad ☐ Ugrad or Rckhm Grad ☐ Ugrad or Non-Rckhm Grad ☐ All Credit types ☐ Rckhm Grad w/add'l Work	**Level of Credit**: ☐ Undergrad only ☐ Rackham Grad ☐ Non-Rckhm Grad ☐ Ugrad or Rckhm Grad ☐ Ugrad or Non-Rckhm Grad ☒ All Credit types ☐ Rckhm Grad w/add'l Work
Credit Hours Min / Max: — / —	Credit Hours Min / Max: 3 / 3
Contact Hrs/Wk: — Number of Wks: —	Contact Hrs/Wk: 14 Number of Wks: 14

C.

A.	B.
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? ○ Yes (•) No; Maximum Hours? — Maximum Times? —; Can it be repeated in the same term? ○ Yes ○ No	**Printing Information (Optional)**: ☒ Print the course in the Bulletin ☒ Print the course in the Time Schedule
Class Type(s): ☐ Lec ☐ Rec ☒ Sem ☐ Lab ☐ Dis ☐ Ind ☐ Other ___	**Graded Section**: ○ Lec ○ Rec (•) Sem ○ Lab ○ Dis ○ Ind ○ Other
Grading: ☒ A-E ☐ CR/NC ☐ S/U ☐ P/F ☐ Y	**Location**: ☒ Ann Arbor ☐ Biological Station ☐ Camp Davis ☐ Extension
	Terms & Freq. of Offering: ■ I ☐ II ☐ IIIa ☐ IIIb ☐ III; ■ Yearly ☐ Alter Years ☐ Even Years ☐ Odd Years; Half term ☐ 1st ☐ 2nd
	Cognizant Faculty Member: Ann Marie Sastry **Title** Professor
	Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

Approval

- ☐ Curriculum Comm. ____
- ☐ Faculty ____
- ☐ Rackham ____
- ☐ Cross listed Unit 1 ____
- ☐ Cross listed Unit 2 ____

Submitted By: ■ Home Dept. ☐ Cross-listed Dept.

Name, Signature & Department

Home Dept. Ann Marie Sastry Ann Marie Sastry / MC on behalf

Cross-listed Dept(s). N/A

Form Number

1853

SUPPORTING STATEMENT

The following course is required for students in the Master of Engineering in Energy Systems Engineering. A copy of the offering in Fall 2007 is attached.

Are any special resources or facilities required for this course? ☐ Yes ☒ No

Detail the Special requirements

ME599-04/ME599-881
SEMINARS ON ENERGY SYSTEMS TECHNOLOGY AND POLICY

PROFESSOR ANN MARIE SASTRY
DEPARTMENT OF MECHANICAL ENGINEERING
FALL, 2007
TUESDAY, 6-9PM

COURSE SUMMARY

Leaders in policy and energy systems engineering discuss cutting-edge technologies, and critical barriers in their disciplines. Speakers range from research leaders, to business leaders, to policy makers. The aim of the seminar series is to provide a view at multiple scales, of challenges in developing and implementing new energy technologies. Industrial, governmental, and research perspectives will be given, on the most promising technologies and policies which will shape our energy portfolio and its environmental consequences, in the decades to come. The need to create sustainable energy systems is a common theme, and the speakers will offer their own perspectives on how policy and technology can be effective in doing so.

The course will be offered both in person, and via distance learning. A portion of each lecture will be devoted to discussion.

TOPICS

The topic areas are as follows, with approximate numbers of lectures devoted to each subject:

1) The energy landscape: policy, technology and economic drivers for sustainable, global energy systems. (3 lectures)

2) Key technologies: novel fuels, storage, generation and device technologies, from portables, to automobiles, to grid sources. (6 lectures)

3) Creating successful businesses in energy technologies: lessons learned, and future directions, in mature and new industries. (3 lectures)

4) Changing the way we think: sustainable systems, flexible grids, and the path ahead in energy systems. (3 lectures)

LIST OF LECTURES
Subject to Change

1. Tuesday, September 4
Prof. Ann Marie Sastry,
University of Michigan
Introduction: The Changing Energy Landscape

2. Tuesday, September 11
Prof. James J. Duderstadt,
University of Michigan
ASSIGNMENT: HW#1

3. Tuesday, September 18
Mr. James Croce,
CEO, NextEnergy
ASSIGNMENT: HW#1 DUE

4. Tuesday, September 25
Mr. Ted Miller,
Technical Specialist, Ford Motor Company

5. Tuesday, October 2
Dr. David Cole, Chairman,
Center for Automotive Research
~~ASSIGNMENT: HW#2~~

6. Thursday, October 4
Mr. Chris Brown,
Executive Vice President, DTE Energy
Resources
~~ASSIGNMENT: HW#2 DUE~~
ASSIGNMENT: HW#2

(no lecture)
Thursday, October 18
ASSIGNMENT: HW#2 DUE

7. Tuesday, October 23
Prof. Johannes Schwank,
University of Michigan

8. Thursday, October 25
Mr. John Denniston, Partner and Chief
Operating Officer at Kleiner Perkins Caufield & Byers
ASSIGNMENT: HW#2 DUE
ASSIGNMENT: HW#3

9. Tuesday, October 30
Prof. Rosina Bierbaum &
Prof. Christian Lastoskie,
University of Michigan
ASSIGNMENT: HW#3 DUE

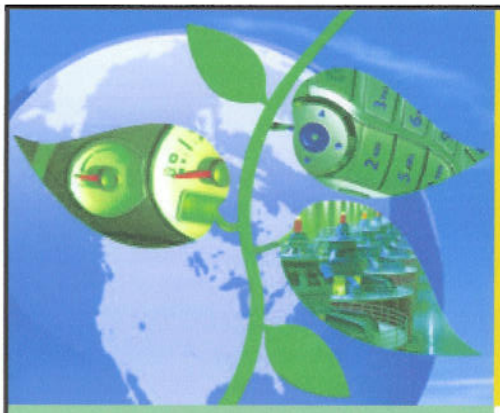
10. Tuesday, November 13
Prof. Stephen Forrest,
University of Michigan

11. Tuesday, November 20
Prof. Alec Gallimore,
University of Michigan
ASSIGNMENT #4

12. Tuesday, November 27
Mr. Eric Macris & Mr. Sunil Paul,
SpringVentures, LLC
ASSIGNMENT #4 DUE

13. Thursday, November 29
Ms. Elizabeth Lowery, Vice President for Environment and Energy,
General Motors

Tuesday, December 4
FINAL EXAM



NEW!

MASTER OF ENGINEERING IN
ENERGY SYSTEMS ENGINEERING

AN INTERDISCIPLIARY PROGRAM FROM THE UNIVERSITY OF MICHIGAN COLLEGE OF ENGINEERING

Download the 2007 Master of Energy Systems Engineering Program Brochure in PDF format

This course is open to qualified undergraduate and graduate students. It is the first required course in the Master of Engineering Energy Systems Engineering Program.

Others interested in attending this course in Fall 2007 without being admitted to the program may enroll by applying for non-candidate for degree status.

INTRODUCING THE FIRST REQUIRED COURSE IN THE NEW MASTER OF ENERGY SYSTEMS ENGINEERING DEGREE PROGRAM

ME599: Seminars in Energy Systems, Technology and Policy

Fourteen three-hour sessions in which speakers including researchers, industry leaders, entrepreneurs and policymakers discuss critical issues in energy technologies. Topics include:

- **The energy landscape:** policy, technology and economic drivers for sustainable global energy systems
- **Key technologies:** novel fuels, storage, generation and device technologies from portables to automobiles to grid sources
- **Creating successful businesses in energy technologies:** lessons learned and future directions in new and mature industries
- **Changing the way we think:** sustainable systems, flexible grids and the path ahead in energy systems

Speakers include:

- **Mr. David Cole**, Chairman of the Center for Automotive Research (CAR)
- **Mr. James Croce**, Chief Executive Officer, NextEnergy
- **Mr. John Denniston**, Senior Partner, Kleiner Perkins Caufield & Byers
- **Dr. James J. Duderstadt**, University of Michigan President Emeritus and University Professor of Science and Engineering
- **Dr. Stephen R. Forrest**, University of Michigan Vice President for Research; Professor of Electrical Engineering and Computer Science; Materials Science and Engineering; and Physics
- **Ms. Elizabeth Lowery**, General Motors Vice President, Environment and Energy, and Chief Environmental Officer
- **Mr. Ted Miller**, Technical Leader of Advanced Batteries, Ford Motor Company

Register Online Today: **InterPro.engin.umich.edu**

Presented by MichiganEngineering

THE UNIVERSITY OF MICHIGAN -- COLLEGE OF ENGINEERING
Course Approval Request
College Curriculum Committee, 1420 Lurie Engineering Center Building

Print

Form Number 1852

Action Requested

- (•) New Course
- ( ) Modification of Existing Course
- ( ) Deletion of Course

Complete the following sections:
New Courses - B & C completely
Modifications - A modified information, B & C completely
Deletions - A & C completely

Date 10/17/2007
Effective Winter 2008

A. CURRENT LISTING	B. REQUESTED LISTING
Home Department / Div # / Course Number	Home Department: ESENG / Div #: / Course Number: 599
Cross Listed Course Information	Cross Listed Course Information
Course Title	Course Title: Special Topics in Energy Systems Engineering
TITLE ABBREVIATION — Time Sched Max = 19 Spaces	ENERGYSYSENESPCTO
TITLE ABBREVIATION — Transcript Max = 20 Spaces	ENERGYSSPECIALTOPICS
Course Description	Course Description for Official Publication (Max = 50 words): Selected topics pertinent to the Energy Systems Engineering Program

PROGRAM OUTCOMES:

A. CURRENT LISTING	B. REQUESTED LISTING
☐ a ☐ b ☐ c ☐ d ☐ e ☐ f ☐ g ☐ h ☐ i ☐ j ☐ k	☐ a ☐ b ☐ c ☐ d ☐ e ☐ f ☐ g ☐ h ☐ i ☐ j ☐ k
Degree Requirements: O Degree Requirement O Tech Elective O Core Course O Other O Free Elective	Degree Requirements: O Degree Requirement O Tech Elective O Core Course (•) Other O Free Elective
Prerequisites: O Enforced O Advised	Prerequisites: permission of instructor; O Enforced O Advised
Credit Restrictions	Credit Restrictions
Level of Credit: ☐ Undergrad only ☐ Rackham Grad ☐ Non-Rckhm Grad ☐ Ugrad or Rckhm Grad ☐ Ugrad or Non-Rckhm Grad ☐ All Credit types ☐ Rckhm Grad w/add'l Work	Level of Credit: ☐ Undergrad only ☐ Rackham Grad ☐ Non-Rckhm Grad ☐ Ugrad or Rckhm Grad ☐ Ugrad or Non-Rckhm Grad ☒ All Credit types ☐ Rckhm Grad w/add'l Work
Credit Hours Min / Max:	Credit Hours Min: 3 Max: 3
Contact Hrs/Wk:	Contact Hrs/Wk: 14
Number of Wks:	Number of Wks: 14

C.

Repeatability (Indi Research, Dir. Study, Dissertation:
Is this course repeatable? (•) Yes O No
Maximum Hours? 3 Maximum Times? 4
Can it be repeated in the same term? (•) Yes O No

Printing Information (Optional)
☒ Print the course in the Bulletin
☒ Print the course in the Time Schedule

Class Type(s): ☒ Lec ☐ Rec ☐ Sem ☐ Lab ☐ Dis ☐ Ind ☐ Other
Graded Section: (•) Lec O Rec O Sem O Lab O Dis O Ind O Other
Grading: ☒ A-E ☐ CR/NC ☐ S/U ☐ P/F ☐ Y
Location: ☒ Ann Arbor ☐ Biological Station ☐ Camp Davis ☐ Extension

Terms & Freq. of Offering: ☒ I ☒ II ☒ IIIa ☒ IIIb ☒ III — ☒ Yearly ☐ Alter Years ☐ Even Years ☐ Odd Years
Half term: ☐ 1st ☐ 2nd

Cognizant Faculty Member: Ann Marie Sastry **Title** Professor

Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty

Approval

- ☐ Curriculum Comm.
- ☐ Faculty
- ☐ Rackham
- ☐ Cross listed Unit 1
- ☐ Cross listed Unit 2

Submitted By: ☒ Home Dept. ☐ Cross-listed Dept.
Name, Signature & Department
Home Dept. Ann Marie Sastry Ann Marie Sastry/on behalf Houston
Cross-listed Dept(s).

Form Number

1852

SUPPORTING STATEMENT

The following course will the new Master of Engineering in Energy Systems Engineering to offer courses pertinent to the area as the program develops.

Are any special resources or facilities required for this course? ☐ Yes ☐ No

Detail the Special requirements

The attached descriptive page provides specific information about the ME/AOSS SGUS program as approved by AOSS SGUS Advisor, the Mechanical Engineering (ME) Undergraduate Program Committee, and the Chair of ME. There are currently three students in the ME Department who would like to pursue this SGUS program. The ME Dept. seeks the approval of the CoE Curriculum Committee for this SGUS program.

Please contact us if there are any questions.
Prof. David R. Dowling (drd@umich.edu)
Prof. Thomas Zurbuchen (thomasz@umich.edu)

SEQUENTIAL GRADUATE/UNDERGRADUATE STUDY (SGUS)

B.S.E.[Mech. Engin.] and the M.S.E. [Atmos., Ocean., & Space Sci..]

Admission to SGUS ME/AOSS (Intent Form)

By the end of the junior year (80-85 hours) the student must meet with the ME UG student advisor to discuss the SGUS program. The Intent Form must be filed at this time with a copy given to the AOSS graduate program office. This form actually outlines what credits are to be double counted and what courses can be possibly transferred to the graduate degree.

- 3.2 cumulative GPA required at time of filing Intent Form and at time of admission to the AOSS graduate program.
- may double count a maximum of 9 approved graduate credits graded "B" or better from the advanced technical elective or unrestricted electives.
- may transfer a maximum of 3 acceptable graduate credits graded "B" or better not used for BSE in Mech. Eng.
- may take AOSS 581 (Space System Management) and AOSS 464 (Space and Spacecraft Environment) as general electives for the BSE in Mech. Eng.
- must enter the graduate program in the subsequent full term upon completing the BSE in ME ; no BSE in ME requirements are waived.
- must enroll in the AOSS graduate program for a minimum of two full terms at full time status subsequent to completing the BSE. (minimum of 9 hours each semester).
- may dual enroll in undergraduate/graduate program early if within 6 hours of completing the BSE. (Details to be worked out on a case-by-case basis).

Advanced Mathematics and Other Requirements

Any graduate Stat or Math course approved/accepted by Undergraduate Program will be honored.

Restrictions

May not pursue both EGL and SGUS, and may not switch from one of these programs to another at any time.

GRE

Students may enter this SGUS program without taking the GRE .

Approved by ME UG Program Committee on 9-19-07
Approved by AOSS SGUS Advisor, 09-15-07
Approved by the ME Chair, 10-9-07