

**The University of Michigan  
College of Engineering  
Curriculum Committee**

**Agenda**

**November 4, 2003**

**1:30-3:00 p.m.**

**BAER ROOM 2906 COOLEY  
Fourth Floor Lurie Engineering Center**

1. Approval of Minutes from October 21, 2003 Meeting
2. Course Approval Forms
3. Possible Additions

**University of Michigan  
College of Engineering  
Curriculum Committee Meeting  
Tuesday October 21, 2003  
1:30-3:00 p.m.  
Lurie Engineering Center GM Room  
Minutes**

Greg Hulbert called the meeting to order at 1:40 p.m.

Members Present: G.Hulbert, C. Cesnik E. Chan, W. Hansen, J. Holloway, Y.Liu, S, Montgomery, M. Parsons, J. Patel, H. Peng, R. Robertson

Members Absent: V. Chung, J.Fessler, S. Pang, P. Samson. S. Takayama L. Thompson

Guests: Susan Bitzer sitting in for S.Takayama, Bob Dennis, Bill Schultz, Jasprit Singh

**Motion to approve the minutes of the last meeting**

**The minutes of the last meeting were approved**

**ENGR 450 Presentation – Bob Dennis**

Bob Dennis talked about a potential course – ENGR 450 – Multidisciplinary Design. The vision is to establish a multidisciplinary major design experiment focusing on a systems level of integration that would cross departments. In addition to crossing departments they would ultimately like to cross more than one term and have projects with very significant sponsor involvement over the course of at least 2 to three years. They would like to maintain giving students a solid hands-on prototyping experience so they can see how their designs are realized. They would like to include students from many levels. They are asking to offer a pilot course titled ENGIN 450 this winter and the following winter (WN 04 and WN 05) term and transform that into a permanent course and expand it on the basis of student demand. Ultimately they would like to offer this course year round so there will be continuity of projects. If this becomes a permanent course they would like to identify additional project sponsors. They have one already and they would like to track students from these projects into potential jobs with the sponsors. The faculty who expressed an interest and willingness to be involved in the pilot course are: Bob Dennis, Nilton Renno, Sridhar Kota and Thomas Zurbuchen. They would like to have a greater diversity of departments if this turns into a permanent course.

Greg Hulbert called for a motion to approve ENGR 450 Moved and seconded.  
**Motion Carried (approved)**

## Course Approvals

**Tabled at 10-21-03 Meeting** *EECS* 420 Modification Approved

CEE 500 (X-Listed with ChE 500 and ENSCEN 500 New Course  
Course description changed Approved

**Tabled Course:** IOE 333 Modification – Changing Pre-requisites from: IOE 265 to: *Preceded or Accompanied by IOE 265*. Approved **Pending Outcomes to be consistent with current outcomes.**

Greg Hulbert called for a motion to approve the following courses. This was moved and seconded.

**Motion Carried (approved)**

CEE 230 New Course

CEE 490 Modification – Changed Max Credit Hours from: 3 to: 4.

ENGR 450 New Course (1 abstention)

ENGR 490 New Course (Prototype)

IOE 836 Modification – Changed Level of Credit from: Rackham Grad to: *Rackham Grad and Non-Rackham Grad*; Changed Max Credit Hours from: 2 to: 1

This was moved and seconded.

## ENGR 490 Presentation – Bill Schultz

Bill Schultz presented a proposal for ENGR 490 a prototype course. The course approval form was distributed at the meeting. Bill noted that this course is very experimental and experiential and multi-disciplinary. The primary instructors come from 4 different departments. The primary mode of instruction will be a 2 hour lecture followed by a one hour team meeting that will include the instructor and the rest will be all laboratory hard experience.

They hope to recruit non-engineers into the course.

Prototype Approved

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

## **Next Meeting**

Tuesday, November 4, 2003

1:30-3:00 p.m.

**BAER ROOM 2906 COOLEY**

## COURSE APPROVAL FORMS

### For November 4, 2003 CoE CC Meeting

AOSS 431 (X-listed with EECS 430) New Course

CHEME 698 Modification – Changing Title; Changing Description; Changing Contact  
Hours Week From: Arr *to: Contact Hrs/Wk 1 Number of  
Wks 16*

EECS 430 (X-Listed with AOSS 431 Modification – Adding AOSS 431 as cross-listing

IOE 516 New Course

IOE 523 Deletion

IOE 524 New Course

MSE 330 Modification – Changing Course Number from: MSE 430 *to: MSE 330.*  
Changing Pre-requisites from: Chem 210, Phys 140/141, Math 215 or  
Math 285, MSE 350 *to: Chem 210, Phys 140/141, Math 215 or  
Math 285, and preceded or accompanied by MSE 350,* Changing  
Level of Credit from: Ugrad or Rackham Grad *to: Undergrad Only.*

MSE 435 Modification – Changing Course Number from: MSE 435 *to: MSE 335,* Changing Level  
of credit from: Ugrad or Rackham Grad *to: Undergrad Only*

ENGIN SA Deletion of ENGIN STUDY ABROAD COURSES



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 10/23/2003

Effective Winter 2004

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department Atmospheric, Oceanic, & Space Sciences		Div # 241	Course Number 431	Home Department Atmospheric, Oceanic, & Space Sciences		Div # 241	Course Number 431
Cross Listed Course Information				Cross Listed Course Information EECS 430			
Course Title				Course Title Radiowave Propagation and Link Design			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces			TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	Radiowave Prop	
	Transcript Max = 20 Spaces				Transcript Max = 20 Spaces	Radiowave Prop	
Course Description				Course Description for Official Publication (Max = 50 words) Fundamentals of electromagnetic wave propagation in the ionosphere, the troposphere, and near the Earth. Student teams will develop practical radio link designs and demonstrate critical technologies. Simple antennas, noise, diffraction, refraction, absorption, multi-path interference, and scattering are studied.			
PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k				PROGRAM OUTCOMES: <input checked="" type="checkbox"/> a <input checked="" type="checkbox"/> b <input checked="" type="checkbox"/> c <input type="checkbox"/> d <input checked="" type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input checked="" type="checkbox"/> k			
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Core Course <input type="radio"/> Free Elective				Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Core Course <input type="radio"/> Free Elective			
Prerequisites <input type="radio"/> Enforced <input type="radio"/> Advised				Prerequisites Phys 405 or EECS 330 <input type="radio"/> Enforced <input type="radio"/> Advised			
Credit Restrictions				Credit Restrictions			
Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad <input type="checkbox"/> Ugrad or Non-Rackham Grad		<input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/add'l Work		Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad <input type="checkbox"/> Ugrad or Non-Rackham Grad		<input checked="" type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/add'l Work	
Credit Hours Min Max		Contact Hrs/Wk		Credit Hours Min Max		Contact Hrs/Wk	
		Number of Wks		4 4		4 14	
C. Repeatability (Indi Research, Dir. Study, Dissertation: Is this course repeatable? <input type="radio"/> Yes <input type="radio"/> No Maximum Hours? Maximum Times? Can it be repeated in the same term? <input type="radio"/> Yes <input type="radio"/> No				Printing Information (Optional) <input checked="" type="checkbox"/> Print the course in the Bulletin <input checked="" type="checkbox"/> Print the course in the Time Schedule			
Class Type(s) <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input type="checkbox"/> Other		Graded Section <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input type="checkbox"/> Other		Grading <input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y		Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension	
Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input checked="" type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years				Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd			
Cognizant Faculty Member: Christopher Ruf				Title Assoc Professor AOSS			
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. AOSS Perry Samson

Cross-listed Dept(s). EECS

**SUPPORTING STATEMENT**

New course in Atmospheric, Oceanic and Space Sciences Dept. requested with similar material as EECS 430 in order to more easily accommodate a shared teaching load between EECS and AOSS faculty members.

Are any special resources or facilities required for this course?

☐ Yes ☐ No

Detail the Special requirements

<b>COURSE #:</b> AOSS 431	<b>COURSE TITLE:</b> RADIOWAVE PROPAGATION AND LINK DESIGN
<b>TERMS OFFERED:</b> Winter	<b>PREREQUISITES:</b> Phys 405 or EECS 330
<b>TEXTBOOK/REQUIRED MATERIAL:</b> <i>Radiowave Propagation</i> , L. Boithias	<b>COGNIZANT FACULTY:</b> C. Ruf
<b>INSTRUCTOR(S):</b> C. Ruf	<b>DATE OF PREPARATION:</b> 10/23/2003
<b>CATALOG DESCRIPTION:</b> Fundamentals of electromagnetic wave propagation in the ionosphere, the troposphere, and the Earth. Student teams will develop practical radio link designs and demonstrate critical technologies. Simple antennas, noise, diffraction, absorption, multipath interference, and scattering are studied.	<b>SCIENCE/DESIGN:</b> 2/2
	<b>COURSE TOPICS:</b> 1. Radiation, Infinitesimal Dipole, Plane Waves, Poynting Theorem 2. Basic Antenna Characteristics, Friis Transmission Formula 3. Noise, Noise in receivers and from antennas 4. Signal-to-Noise Ratio (SNR), Free-Space Link 5. SNR to $E_b/N_o$ , Modulation Techniques 6. Receiving Systems 7. Radar Links, Global Positioning System 8. Detained Antenna characteristics 9. External Noise Sources 10. Propagation in Complex, Dispersive Media 11. Satellite Links, Propagation in the ionosphere 12. Propagation in the troposphere 13. Propagation in Urban areas, over land, and water

<b>COURSE OBJECTIVES*</b>	1. To develop both a practical understanding and hands-on experience in radiowave propagation, antennas, system noise, and hardware realization as used in such applications as (wireless) telecommunication, radar, and radio navigation. 2. To acquire practical experience in wireless radiowave link design using (a) conceptual wireless radio link system design project, and (b) hands-on proof-of-concept demonstration projects(s) or tests of critical aspects in link design. 3. To further develop and practice professional skills with team organization, team dynamics, project management, and product development using capstone design projects.
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<b>COURSE OUTCOMES*</b>	1. Given link requirements, be able to design and specify complete radiowave link at the system level. 2. Be able to understand fundamental performance parameters for different antennas and conduct design trade-offs in system-level link designs. 3. Be able to understand sources and effects of electromagnetic noise to the performance of radiowave links and account for the noise in link designs. 4. Be able to account for basic radio propagation effects on the ground, in the atmosphere and ionosphere. 5. Be able to configure and measure simple antenna system performance. 6. Be able to configure and operate a simple operational radio link. 7. Be able to operate effectively and positively in a design team environment. 8. Understand important characteristics associated with successful design teams.
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<b>ASSESSMENT TOOLS</b>	1. In-class closed book exams test objective #1 for individual students. 2. Weekly (and bi-weekly) problem sets test objective #1 under less time pressure. 3. Lab performance and write-ups test objective #2 explicitly. 4. Semester long design project with associated presentations, final report, and proof-of-concept demonstration test objectives #2-3.
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**COURSE OUTLINE**

wk   lec   material

**The Radio Link**

- |   |   |  |
|---|---|--|
| 1 | 1 | Introduction to course, radio spectrum and its management, propagation modes, free-space radio link, and Friis equation. Course-Pack – read CoursePack Chap 5-1 (p 423-425), and scan Larson and Wertz Chap 13.  |
|   | 2 | Radiation safety, permittivity and Maxwell's equations in frequency domain, and available lab times. Course-Pack – read CoursePack Chap 1-1 through 1-7 (p 379-385), scan Pritchard Chap 6, scan Siwiak Chap 1 and 4, and review, if necessary, RWD Chap 3. <b>HW 1 assigned</b> |
| 2 |   | <b>Lab 1</b>   |
|   | 3 | Wave equation, plane wave solution as approximation to spherical wave, constitutive relations, frequency dispersion, Debye model of relative permittivity, and the Project Definition Document (PDD).  |

**The Antenna**

- |   |   |  |
|---|---|--|
| 3 | 4 | 3 Complete Debye model, and introduction to antennas. Course-Pack – read CoursePack Chap 1-8 and 2-1 (pp. 385-397), and scan Kraus Chap 1. <b>HW 1 due, HW 2 assigned</b>                        |
|   | 5 | Field patterns, radiation pattern, normalized radiation pattern, pattern solid angle, Directivity, Gain, Hertzian dipole, and half wave dipole. Course-Pack – Scan Kraus Chap 2. <b>PDDs due</b> |
|   | 6 | Long antennas, antennas over a ground plane, and simple arrays. Course-Pack – read CoursePack Chap 2-2 through 2-2.3 (pp. 397-401). <b>HW 2 due, HW 3 assigned</b>                               |
| 4 |   | <b>Lab 2</b>   |
|   | 7 | Complete arrays, and introduce aperture antennas. Course-Pack – read CoursePack 2-2.4 (pp. 401-404)  |

**System Noise**

- |   |   |   |
|---|---|---|
| 8 |   | Uniformly illuminated aperture, tapered illumination, noise from a distributed source, radiance, Planck radiance, Rayleigh-Jeans law, brightness, and the radio sky.  |
| 5 | 9 | Brightness temperature, $T_{\text{Sun}}$ , $T_{\text{Moon}}$ , $T_{\text{sky}}$ , antenna temperature, $T_A$ & $T_A'$ , power received, $kT_A'B$ , relationship between $A_{\text{eff}}$ and Directivity, and |



introduction to PDR. Course-Pack – read CoursePack Chap 4 (pp. 415-422). **Revised PDDs due. HW 3 due**

- 10 Review  $T_A'$ ,  $T_{rec}$ , and noise from a 2-port. Course-Pack – read CoursePack Chap 3 (pp. 412-414). **HW 4 assigned**
- 6 **Lab 3**
- 11 Noise from cascaded devices,  $T_{sys}$ , S/N, link margin, and system noise as noise floor. Course-Pack – read CoursePack Chap 5-2 (pp. 425-427) and scan RWB Chap 1, 2, &3. **End of material that will be covered in Quiz 1. PDR draft due.**

### Propagation over the Earth

- 12 First Fresnel zone, Rayleigh roughness criterion, Snell's law, Fresnel reflection coefficients for grazing incidence . **HW 4 due, HW 5 assigned.**
- 7 13 Review. **HW 5 due.**
- 14 **Quiz 1**

### WINTER BREAK

- 8 **Lab 4**
- 15 Line-of-sight propagation with multipath gain or loss, spatial fading pattern, and diversity reception. Read Boithias Chap 3. **Revised PDR due.**
- 16 The groundwave. Read Boithias Chap 7, 176-185... **HW 6 assigned**

### Propagation in the Atmosphere

- 9 17 Refractivity,  $N$ , Standard Atmosphere,  $N_{dry}$ , and  $N_{wet}$ ,  $(dN/dh)$  for Standard Atmosphere, spherical Snell's law, and ray theory. Read Boithias, Chap 4. **CDR due.**
- 18  $(dN/dh)$  for non-Standard Atmosphere,  $K_a$ , and ducting. Read Hall, Chap 2 & 3. **HW 6 due, HW 7 assigned.**
- 10 **Lab 5**
19. Scattering and absorption by hydrometeors. Read Hall, Chap 5.
20. Review of propagation modes. **HW 7 due, HW 8 assigned.**
- 11 **Lab Notebooks due, Proof-of-concept demonstrations**

21. Oral presentations of revised CDR. **Revised CDR due.**

22. Oral presentations of revised CDR. **HW 8 due**

**12 Proof-of-concept demonstrations**

**Propagation via Skywave**

23. Solar processes, Earth's magnetic field, auroral zones, generation of Chapman Layer. Read Davies, Chap 1. **HW 9 assigned**

24. EM waves in isotropic and anisotropic plasmas, and Faraday rotation. Read Davies, Chap 2.

**13 Proof-of-concept demonstrations**

25. Skywave path, minimum skip distance,  $d_m$ , Maximum Usable Frequency, and MUF. Read Boithias, Chap 9. Review. **HW 9 due.**

26. **Quiz 2**

**14 27. Project Final Oral Reports (30 minutes each). Final written reports due.**

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 9/29/2003

Effective WN 04

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department Chemical Engineering		Div # 698	Home Department Chemical Engineering		Div # 245	Course Number 698
Cross Listed Course Information			Cross Listed Course Information			
Course Title Pharmaceutical Engineering Project			Course Title Directed Study in Chemical Engineering			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces	PHARMA ENG PROJECT Pharma Eng Project	TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces	DIRECTED STUDY Directed Study	
Course Description This project course is intended to provide students with industrial relevant project experience in Pharmaceutical Engineering.			Course Description for Official Publication (Max = 50 words) This project course is intended to provide students with relevant industrial project experience. The program of work is arranged at the beginning of each term by mutual agreement between the student and a member of the faculty. Any problem in the field of chemical engineering may be selected. The student writes a final report on his project.			
PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k			PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k			
Degree Requirements <input checked="" type="radio"/> Degree Requirement <input type="radio"/> Core Course <input type="radio"/> Free Elective <input type="radio"/> Tech Elective <input type="radio"/> Other			Degree Requirements <input checked="" type="radio"/> Degree Requirement <input type="radio"/> Core Course <input type="radio"/> Free Elective <input type="radio"/> Tech Elective <input type="radio"/> Other			
Prerequisites <input type="radio"/> Enforced <input type="radio"/> Advised			Prerequisites <input type="radio"/> Enforced <input type="radio"/> Advised			
Credit Restrictions			Credit Restrictions			
Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input checked="" type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad <input type="checkbox"/> Ugrad or Non-Rackham Grad		Credit Hours Min Max 1 16	Level of Credit <input type="checkbox"/> Undergrad only <input checked="" type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad <input type="checkbox"/> Ugrad or Non-Rackham Grad		Credit Hours Min Max 1 16	
All Credit types Rackham Grad w/add'l Work		Contact Hrs/Wk Arr Number of Wks Arr	All Credit types Rackham Grad w/add'l Work		Contact Hrs/Wk Arr Number of Wks Arr	
Repeatability (Indl Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? 6 Maximum Times? 2 Can it be repeated in the same term? <input type="radio"/> Yes <input type="radio"/> No			Printing Information (Optional) <input checked="" type="checkbox"/> Print the course in the Bulletin <input checked="" type="checkbox"/> Print the course in the Time Schedule			
Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input checked="" type="checkbox"/> Ind <input type="checkbox"/> Other			Graded Section <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input type="checkbox"/> Other			
Grading <input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input checked="" type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y			Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension			
Terms & Freq. of Offering <input checked="" type="checkbox"/> I <input checked="" type="checkbox"/> II <input checked="" type="checkbox"/> IIIa <input checked="" type="checkbox"/> IIIb <input checked="" type="checkbox"/> III <input type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years			Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd			
Cognizant Faculty Member: Robert M. Ziff			Title Professor			
Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty						

Approval

☐ Curriculum Comm.

☐ Faculty

☐ Rackham

☐ Cross listed Unit 1

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

Name, Signature & Department

Home Dept. Ronald G. Larson, Chemical Engineering

Cross-listed Dept(s).

Form Number

1159

### SUPPORTING STATEMENT

The Pharmaceutical Engineering Program no longer needs to use this course number for their project course so we would like to use...  
ChE 698 once again as a directed study course in Chemical Engineering

Are any special resources or facilities required for this course?

☐ Yes ☒ No

Detail the Special requirements

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 9/23/2003

Effective Winter 2004

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department <input checked="" type="checkbox"/> X		Div #	Course Number	Home Department Electrical Engineering and Computer Science		Div #	Course Number
Cross Listed Course Information  (not currently cross listed)				Cross Listed Course Information Cross listed as new course AOSS 431		241	431
Course Title				Course Title Radiowave Propagation and Link Design			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces			TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces	Radiowave Prop	
Course Description				Course Description for Official Publication (Max = 50 words) Fundamentals of electromagnetic wave propagation in the ionosphere, the troposphere, and near the Earth. Student teams will develop practical radio link designs and demonstrate critical technologies. Simple antennas, noise, diffraction, refraction, absorption, multi-path interference, and scattering are studied.			
PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k				PROGRAM OUTCOMES: <input checked="" type="checkbox"/> a <input checked="" type="checkbox"/> b <input checked="" type="checkbox"/> c <input type="checkbox"/> d <input checked="" type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input checked="" type="checkbox"/> k			
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Core Course <input type="radio"/> Free Elective		<input type="radio"/> Tech Elective <input type="radio"/> Other		Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Core Course <input type="radio"/> Free Elective		<input type="radio"/> Tech Elective <input type="radio"/> Other	
Prerequisites <input type="radio"/> Enforced <input type="radio"/> Advised				Prerequisites EECS 330 and Senior Standing <input type="radio"/> Enforced <input type="radio"/> Advised			
Credit Restrictions				Credit Restrictions			
Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad <input type="checkbox"/> Ugrad or Non-Rackham Grad		All Credit types <input type="checkbox"/> Rackham Grad w/add'l Work		Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad <input type="checkbox"/> Ugrad or Non-Rackham Grad		All Credit types <input checked="" type="checkbox"/> Rackham Grad w/add'l Work	
Credit Hours Min Max				Credit Hours Min Max		4 4	
Contact Hrs/Wk				Contact Hrs/Wk		4	
Number of Wks				Number of Wks		14	
C. Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input type="radio"/> Yes <input type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input type="radio"/> No				Printing Information (Optional) <input type="checkbox"/> Print the course in the Bulletin <input type="checkbox"/> Print the course in the Time Schedule			
Class Type(s) <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input type="checkbox"/> Other		Graded Section <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input type="checkbox"/> Other		Grading <input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y		Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension	
Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input checked="" type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years		Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd		Cognizant Faculty Member: Anthony England		Title Professor of EECS and AOSS	
Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty							

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

Name, Signature & Department

Home Dept. EECS

Cross-listed Dept(s). AOSS

Approval

☐ Curriculum Comm.

☐ Faculty

☐ Rackham

☐ Cross listed Unit 1

Form Number

1154

**SUPPORTING STATEMENT**

Cross listing of EECS 430 with the Atmospheric, Oceanic & Space Sciences Dept. as the new course, AOSS 431, is requested in order to accommodate a shared teaching load between EECS and AOSS faculty members.

Approved by EECS Curr Comm by email vote Oct-3, 2003

Are any special resources or facilities required for this course?

☐ Yes ☐ No

Detail the Special requirements



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 10/7/2003

Effective Winter 2004

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Div #	Course Number
Industrial and Operations Engineering		272	516
Cross Listed Course Information			
Course Title			
Stochastic Processes II			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces		
	Transcript Max = 20 Spaces		
Stochastic Proc II			
Stochastic Proc II			
Course Description			
Course Description for Official Publication (Max = 50 words) This course emphasizes the use of Markov Chains in theory and practice. General knowledge of probability theory and stochastic processes is assumed. Applications may include equipment replacement, queueing systems, and production systems. Methodologies covered include invariant measures and stationary distributions for both the discrete and continuous cases.			
<b>PROGRAM OUTCOMES:</b>			
<input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k			
<b>Degree Requirements</b> <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prerequisites			
<input type="radio"/> Enforced <input type="radio"/> Advised			
Credit Restrictions			
<b>Level of Credit</b>		Credit Hours	Contact Hrs/Wk
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rckhm Grad		Min	Max
<input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types			
<input type="checkbox"/> Non-Rckhm Grad <input type="checkbox"/> Rckhm Grad w/add'l Work			
<input type="checkbox"/> Ugrad or Rckhm Grad			
		Number of Wks	
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input type="radio"/> Yes <input checked="" type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input type="radio"/> No			
<b>Printing Information (Optional)</b> <input checked="" type="checkbox"/> Print the course in the Bulletin <input checked="" type="checkbox"/> Print the course in the Time Schedule			
<b>Class Type(s)</b> <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input type="checkbox"/> Other _____		<b>Graded Section</b> <input checked="" type="radio"/> Lec <input type="radio"/> Rec <input type="radio"/> Sem <input type="radio"/> Lab <input type="radio"/> Dis <input type="radio"/> Ind <input type="radio"/> Other _____	<b>Grading</b> <input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y
<b>Location</b> <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension		<b>Terms &amp; Freq. of Offering</b> <input type="checkbox"/> I <input checked="" type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input checked="" type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years	
Cognizant Faculty Member: _____		Title Asst. 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.

Cross-listed Dept(s).

**SUPPORTING STATEMENT**

This course has been taught three times and was well received by both IOE and Business School Ph.D. students. It also fills a need in that our Ph.D.s were missing some crucial material on continuous and discrete-time Markov Chains. The Q1 scores were 3.86, 3.50 and 4.21 for WT01, Q2, Q3, respectively. The Q2 scores were 4.14, 3.75, 4.25 for the same period.

Are any special resources or facilities required for this course?

☐ Yes ☒ No

Detail the Special requirements



**IOE 591 Stochastic Processes**  
**Winter 2003**  
**[www-personal.engin.umich.edu/~melewis/ioe\\_591.htm](http://www-personal.engin.umich.edu/~melewis/ioe_591.htm)**  
*Basic Course Information*

### **Instructor**

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Instructor: Mark E. Lewis  
Assistant Professor  
Industrial and Operations Engineering  
Office: 2855 IOE Building  
Phone: (734) 763-0519 (office)  
E-mail: [melewis@umich.edu](mailto:melewis@umich.edu)  
Office Hours: Tuesdays 1:30-3:30pm

You are welcome to ask questions in the classroom and directly after class. Appointments may be arranged by phone or email.

### **GSI**

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None for this course.

### **Course Content**

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This is the second course on stochastic processes. We will emphasize the use of Markov Chains in theory and practice. General knowledge of basic probability theory and stochastic processes is assumed. More advanced ideas will be developed as necessary. Applications considered include equipment replacement, queuing systems, and production and inventory systems. However, the topics discussed also have wide applications to financial and economic systems. Topics to be covered include:

- Generating functions and the continuity theorem
- Discrete-time Markov chains construction and decomposition
- Invariant measures and Stationary distributions
- Continuous-time Markov chains construction
- The forward and backward equations
- Uniformization
- Brownian Motion construction and properties

### **Course Objectives**

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- Develop a deeper understanding of probability
- Be able to apply probability concepts to situations involving uncertainty
- Understand the basic theory of discrete and continuous-time Markov chains

- Be able to compute performance measures for Markov chains
- Be able to state and prove theorems about stochastic processes (primarily for those students intending to do research in areas involving stochastic models).
- Be able to compare Markov chains via their sample paths
- Understand the basic construction and properties of Brownian motion

## Text

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Resnick, *Adventures in Stochastic Processes*, latest edition.

Other references that may be of interest:

Author(s)	Title
Ross, S.	Stochastic Processes, Academic Press, latest
Ross, S.	Introduction to Probability Models, Academic Press, latest (lower level).
Cinlar, E.	Introduction to stochastic processes, Prentice-Hall, Englewood Cliffs, New Jersey, 1975 (same level).
Karlin and Taylor	A First Course in Stochastic Processes, 2nd Edition, Academic Press, 1975 (higher level).
Feller, W.	Introduction to Probability Theory and Its Applications, Vols. 1 and 2, Wiley and Sons, 1970 (higher level).
Heyman D., and Sobel, M.	Stochastic Models in Operations Research, (Vol. 1), McGraw-Hill, 1982 (same level).
Parzen, E.	Stochastic Processes, Holden Day, 1962 (same to slightly higher level).
Wolff, R.	Stochastic Modeling and the Theory of Queues, Englewood Cliffs, NJ, 1989 (same level).
Billingsley, P.	Probability and Measure, 2 <sup>nd</sup> ed. Wiley 1986. (higher level)

## Course Grades

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Course grades are determined from performance on homework assignments and 2 midterm exams. The first midterm exam will be held in class on February 17<sup>th</sup>, 2003. The second exam will be a take home exam that will be due by the end of the last day of class April 16<sup>th</sup>, 2003. The midterm exams are open notes, open textbook. However, you are only allowed to use **your notes and the class textbook**; no other books are allowed nor are notes from previous years' classes and none borrowed or copied from other students.

Component	Weight (%)
Homework Assignments (receive equal weight)	30
Midterm 1	35
Midterm 2	35

## **Homeworks**

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Homework will be due on Wednesdays at the beginning of class. You are allowed 1 late homework per term, but it will not be accepted after the solutions have been posted.

Homework assignments develop your ability to use the course material effectively when solving problems. You are encouraged to work together in groups when analyzing homework. However, you are expected to hand in (for grading) your *own* write-up of the solutions. Copying, or rephrasing, of someone else's written work is unacceptable.

Past experience clearly shows that students who discuss the material with other students are better able to express their understanding of the course materials during exams. However, there is a vast gap between being able to read and understand a solution, to being able to write one. This is why each student is required to compose his or her own solution.

## **Regrades**

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If you believe there was an error in the grading of an exam or homework question, then you can submit the entire exam/homework to the GSI requesting a regrade. This must be done within one week from the date the exam was returned. The *entire* exam/homework will be regraded, so that you may gain, or lose, points by resubmitting.

## **Honor Code**

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All students are expected to be familiar with the Engineering Honor Code, and to be bound by its requirements on all homework and examinations. The use of model solutions handed out in previous offerings of the course is considered a violation of the honor code and will be treated very seriously.

## **Homework 0**

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Go to the course web site and download Homework 1.



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 10/15/2003

Effective Winter 2004

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department <b>Industrial and Operations Engineering</b>		Div # <b>272</b>	Course Number <b>523</b>	Home Department		Div #	Course Number
Cross Listed Course Information				Cross Listed Course Information			
Course Title <b>COMPARATIVE TECHNOLOGY MANAGEMENT SEMINAR</b>				Course Title			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	<b>COMP TECH MANAGEMENT</b>		TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces		
	Transcript Max = 20 Spaces	<b>COMP TECH MGT SEM</b>			Transcript Max = 20 Spaces		
Course Description U.S. Technology management systems are compared to those of other countries. Early offerings of the course focus on Japan, though this may shift to other countries or regions. Covers the technology life cycle from basic research to product development to manufacturing systems and the implications for technology management in the U.S.				Course Description for Official Publication (Max = 50 words)			
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k				<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k			
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Core Course <input type="radio"/> Free Elective <input type="radio"/> Tech Elective <input type="radio"/> Other				Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Core Course <input type="radio"/> Free Elective <input type="radio"/> Tech Elective <input type="radio"/> Other			
Prerequisites IOE 421 <input type="radio"/> Enforced <input type="radio"/> Advised				Prerequisites <input type="radio"/> Enforced <input checked="" type="radio"/> Advised			
Credit Restrictions				Credit Restrictions			
Level of Credit <input type="checkbox"/> Undergrad only <input checked="" type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Credit Hours Min Max 3 3		Contact Hrs/Wk 14		Contact Hrs/Wk 14	
Ugrad or Non-Rackham Grad All Credit types Rackham Grad w/add'l Work							
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input type="radio"/> Yes <input checked="" type="radio"/> No Maximum Hours? Maximum Times? Can it be repeated in the same term? <input type="radio"/> Yes <input type="radio"/> No				Printing Information (Optional) <input type="checkbox"/> Print the course in the Bulletin <input type="checkbox"/> Print the course in the Time Schedule			
Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input checked="" type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input type="checkbox"/> Other		Graded Section <input type="radio"/> Lec <input type="radio"/> Rec <input checked="" type="radio"/> Sem <input type="radio"/> Lab <input type="radio"/> Dis <input type="radio"/> Ind <input type="radio"/> Other		Grading <input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y		Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension	
Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input checked="" type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years		Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd		Cognizant Faculty Member: Jeffrey Liker		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.

Cross-listed Dept(s).

**SUPPORTING STATEMENT**

This course as described was offered last in Winter 1998. There are no plans to offer it in the future.

Are any special resources or facilities required for this course?

☐ Yes ☐ No

Detail the Special requirements



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 10/7/2003

Effective Winter 2004

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Div #	Course Number
Industrial and Operations Engineering		272	524
Cross Listed Course Information			
Course Title			
INTEGRATIVE TECHNOLOGY MANAGEMENT			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces		
	Transcript Max = 20 Spaces		
Course Description			
Course Description for Official Publication (Max = 50 words) A technology's path from invention to market success is shaped by a variety of factors. Covering the technology cycle from basic research to product development to manufacturing systems, this course provides an introduction into the analysis of these factors on industry, firm, and functional unit level. Integrates multiple perspectives from engineering, economics, management, and organizational behavior.			
<b>PROGRAM OUTCOMES:</b>			
<input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k			
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prerequisites <input type="radio"/> Enforced <input type="radio"/> Advised			
Credit Restrictions			
Level of Credit		Credit Hours	Contact
<input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rckhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rckhm Grad <input type="checkbox"/> Rckhm Grad w/add'l Work <input type="checkbox"/> Ugrad or Rckhm Grad		Min Max	Hrs/Wk Number of Wks
			3 14
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input type="radio"/> Yes <input checked="" type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input type="radio"/> No			
Printing Information (Optional) <input checked="" type="checkbox"/> Print the course in the Bulletin <input checked="" type="checkbox"/> Print the course in the Time Schedule			
Class Type(s)		Graded Section	Grading
<input checked="" type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input type="checkbox"/> Other		<input type="radio"/> Lec <input type="radio"/> Rec <input type="radio"/> Sem <input type="radio"/> Lab <input type="radio"/> Dis <input type="radio"/> Ind <input type="radio"/> Other	<input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y
Location		Ann Arbor <input checked="" type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension <input type="checkbox"/>	
Terms & Freq. of Offering <input type="checkbox"/> I <input checked="" type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input checked="" type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years			
Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd			
Cognizant Faculty Member: Sebastian Fixon Title Assistant 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.

Cross-listed Dept(s).

This course was offered with the IOE 523 number in Winter 2003, but the title and content were different enough to require making it a separate course. Q1 ranking: 4.69; Q2 ranking: 4.63 (26 of 28 students responded). This is not a seminar course.

☐ Yes ☐ No[illegible]

# IOE 523, Winter 2003

## Comparative Technology Management Seminar

Sebastian Fixson  
Assistant Professor  
IOE 2793  
fixson@umich.edu

### Syllabus and Course Policies

#### General

This course is designed to give an understanding of a number of aspects associated with technology management, discussing a variety of tools and applying multiple perspectives.

The course consists of four sections. The first three can be interpreted as approaching the topic “Technology Management” from the outside in. Section 1 covers technology developments over long periods of time, and the interactions between technology development and society. Section 2 focuses on the interactions between technologies and markets, in other words, companies’ decisions and behavior with respect to technology development efforts. Section 3 examines the role and actions of technology management on the business-unit level. Examples are research and product development and manufacturing activities. Finally, in section 4 student teams present the results of their semester projects.

In addition, there are two themes that cut across all sections and will be discussed throughout the course. The two themes are *tools/techniques* and *cultural issues*. The discussion of them will reoccur in changing contexts. Also, the learning experience will be enhanced by using some in-depth case studies for some of the classes during the term.

#### Class

Day/Time            Tuesday and Thursday, 1:30 – 3pm  
Location            IOE 1680

#### People

Instructor            Sebastian Fixson, fixson@umich.edu  
Office hours:        Tuesday, 3:30 – 5pm, IOE 2793  
GSI                    Phil Gouel, pgouel@umich.edu



Please prepare a name tag that you can place in front of you on the table during class. In addition, please prepare a one-page info sheet about yourself (including a photograph). The info-sheet is due on the second class, i.e. January 9. (A template for this sheet can be found at the resource section of the course web page.)

### Course requirements

The course grade is determined by assessing students' performance in the following tasks:

1. Class participation (individual assignment) (20%)  
Every student is expected to come to class prepared. You are expected to have read the assigned readings and to participate in and contribute to class discussions. The things that determine effective class participation are the following: Is the participant a good listener? Is the participant willing to interact with other class members? Are the points that are made relevant to the discussion? Are they linked to the comments of others? Do the comments add to the understanding of the situation? Does the participant distinguish among different kinds of data (i.e., facts, opinions, beliefs, concepts, etc.)?  
In addition, each student will be asked to present one of the readings at the beginning of the class. The presentation should be 10 to 15 minutes long, and cover the critical issues of the article, paper, or book chapter. What are the major points? What are the limitations? What is your opinion? (Also, please prepare a 1-page handout for the class.)
2. Two reaction papers (individual assignment) (20%)  
You can select the reading/case/discussion for your reaction paper yourself as long as you do not write two papers in the same section of the course. The two reaction papers together with the reading presentation should cover course sections 1, 2, and 3! The reaction papers are due 1 week after the reading/case discussion in class.  
Format requirements: 2 pages **max.** (you may add a third page with graphs, if necessary), letter sized paper, 1 inch margins, 12 points, 1 ½ spaced.
3. Mid-term exam (individual assignment) (30%)  
Closed-booked exam before spring break; one sheet of notes is allowed.
4. Final paper and presentation (group assignment in groups of 4) (30%)  
Examples for the papers/presentations are an analysis of an industry with a significant technological content at a turning point caused by technology management decisions, an analysis of an emerging technology and its surrounding socio-economic conditions, or the investigation of the origin of a technical innovation.  
Report format: 20 pages **max.** (you may add an appendix for data, extra graphs, etc.), letter sized paper, 1 inch margins, 12 points, 1 ½ spaced; quality of writing will influence grade!  
The presentations will be given during the last 3 classes at the end of the term. Presentation format: 15 minutes plus 5 minutes discussion time.  
The written report is due on Friday, April 18, 5 pm.  
On February 4, a one-page project proposal is due in class.  
By January 21, please sign-up for a group on the web-page.

## Section I - National and Industry Level Technology Analysis

### 1. Long-term technical change

Topic: How technologies change over the long term; how societies and technology interact with, and change, each other

Reading: (1) Barley, S. R. (1998). "What can we learn from the history of technology?" *Journal of Engineering and Technology Management* 15(4): 237-255. (University Library Electronic Journals and Newspapers)

### 2. Technology Trajectories

Topic: The concept of technology development as trajectories; technology paradigms

Readings: (2) Dosi, G. (1982). "Technological Paradigms and technological trajectories - a suggested interpretation of the determinants and directions of technical change." *Research Policy* 11: 147-162. (U-M Lib EJN)  
(3) Gardiner, J. P. (1984). Design trajectories for airplanes and automobiles during the past fifty years. *Design, Innovation and Long Cycles in Economic Development*. C. Freeman. London, Frances Pinter: 121-142.  
(4) Gardiner, J. P. (1984). Robust and lean designs with state-of-the-art automotive and aircraft examples. *Design, Innovation and Long Cycles in Economic Development*. C. Freeman. London, Frances Pinter: 143-168.

### 3. Development Paths of Technologies

Topic: Discussion of the concept of viewing trajectories as development paths

Readings: (5) Arthur, W. B. (1989). "Competing Technologies, Increasing Returns, and Lock-In by Historical Events." *The Economic Journal* 99: 116-131. (U-M Lib EJN)  
(6) David, P. A. (1985). "Clio and the Economics of QWERTY." *American Economic Review* 75(2): 332-337. (U-M Lib EJN)  
(7) Rao, H. and J. V. Singh (2001). *The Construction of New Paths: Institution-Building Activity in the Early Automobile and Biotechnology Industries*. Path Dependence and Creation. R. Garud and P. Karnoe. Mahwah, New Jersey, Lawrence Erlbaum Associates: 243-267.

### 4. Diffusion of Technologies

Topic: Discuss tools use to describe the diffusion process

Reading: (8) Pistorius, C. W. I. and J. M. Utterback (1997). "Multi-mode interaction among technologies." *Research Policy* 26(1): 67-84. (U-M Lib EJN)  
(9) Tilton, J. E. (1991). *Material Substitution: The Role of New Technology*. Diffusion of Technologies and Social Behavior. N. Nakicenovic and A. Gruebler. Berlin, Springer-Verlag: 383-406.

## 5. Predicting Technology Development

Topic: Tools used to predict the uncertain future of technology

Readings: (10) Kostoff, R. N. and R. R. Schaller (2001). "Science and Technology Roadmaps." IEEE Transactions on Engineering Management 48(2): 132-143. (U-M Lib EJN)  
(11) Wack, P. (1985). "Scenarios: uncharted waters ahead." Harvard Business Review 63 (September-October): 73-89.

Group lists due!

## Section II - Interactions between Technologies and Markets

### 6. Evolution of Industries and Dominant Designs

Topic: Tools used to describe the nature of dominant designs and their evolution

Readings: (12) Utterback, J. M. (1994). Mastering the Dynamics of Innovation. Boston, Massachusetts, Harvard Business School Press. Chapter 2, pp. 23-55  
(13) Utterback, J. M. (1994). Mastering the Dynamics of Innovation. Boston, Massachusetts, Harvard Business School Press. Chapter 4, pp. 79-102  
(14) Rosa, J. A., J. F. Porac, et al. (1999). "Sociocognitive Dynamics in a Product Market." Journal of Marketing 63(Special Issue 1999): 64-77. (U-M Lib EJN)

### 7. Predicting Future Technology Performance

Topic: Conceptual frameworks like the S-curve; influence of users' perspectives

Readings: (15) Foster, R. N. (1986). Timing Technological Transitions. Technology in the Modern Corporation: A Strategic Perspective. M. Horwitch. New York, Pergamon Press: 35-49.  
(16) Christensen, C. M. (1992a). "Exploring the limits of the technology S-curve. Part I: Component Technologies." Production and Operations Management 1(4): 334-357.  
(17) Henderson, R. M. (1995). "Of life cycles and imaginary: The unexpected long old age of optical lithography." Research Policy 24: 631-643. (U-M Lib EJN)

### 8. Radical / Incremental / Architectural Innovation

Topic: Relevance and significance of the impact of the innovation / technical change

Readings: (18) Abernathy, W. J. and J. M. Utterback (1978). "Patterns of Industrial Innovation." Technology Review, MIT: 59-64.  
(19) Abernathy, W. J. and K. B. Clark (1985). "Innovation: Mapping the winds of creative destruction." Research Policy 14: 3-22. (U-M Lib EJN)  
(20) Henderson, R. M. and K. B. Clark (1990). "Architectural Innovation: The Reconfiguration of Existing Product Technologies and the Failure of Established Firms." Administrative Science Quarterly 35: 9-30. (U-M Lib EJN)

## **9. Technology Characteristics' Impact on Innovation: Assembled vs. Non Assembled Products**

Topic: Relevant technology characteristics of the innovation

Readings: (21) Utterback, J. M. (1994). *Mastering the Dynamics of Innovation*. Boston, Massachusetts, Harvard Business School Press. Chapter 5, pp. 103-122  
(22) Utterback, J. M. (1994). *Mastering the Dynamics of Innovation*. Boston, Massachusetts, Harvard Business School Press. Chapter 6, pp. 123-144

Group project proposals due!

## **10. Systems Effects on Technology Development: The Role of Standards**

Topic: Mechanisms of standards and their effects on competition

Reading: (23) Shapiro, C. and H. R. Varian (1999). "The Art of Standard Wars." *California Management Review* 41(2): 8-32. (U-M Lib EJN)  
(24) Gruber, H. (2000). "The evolution of market structure in semiconductors: the role of product standards." *Research Policy* 29: 725-740. (U-M LIB EJN)

## **11. Demand Effects on Firms' Technology Development Decisions**

Topic: Influence of factors such as focus on current customers, or market heterogeneity, on technology development

Readings: (25) Bower, J. L. and C. M. Christensen (1995). "Disrupting Technologies: Catching the Wave." *Harvard Business Review* 73(January-February): 43-53.  
(26) Adner and Levinthal 2001 "Demand Heterogeneity and Technology Evolution: Implications for Product and Process Innovation" *Management Science*, Vol. 47, No. 5, May 2001 (U-M Lib EJN)

## **12. Legal Effects on Technology Developments: The Role of Patents**

Topic: Who captures the value of the innovation?

Reading: Harmon, A. (2001). In the 'Idea Wars,' a Fight to Control a New World Currency. *The New York Times*. New York City, NY: Section 3-1.  
(26 ½) Kortum, Samuel and Josh Lerner (1999). "What is behind the recent surge in patenting?" *Research Policy* 28(1): 1-22. (U-M Lib EJN)

Guest

Speaker: Dr. Tim Faley, Director, Office for Technology Transfer & Commercialization, College of Engineering, University of Michigan

## **13. Mid-term Exam**

Topic: All materials up to this point; closed book exam in class

### **Section III - Company Level Technology Management**

#### **14. Building Technical Knowledge: Creativity and Learning**

- Topic: Origins of innovations; learning on multiple levels
- Readings: (27) Bohn, R. E. (1994). "Measuring and Managing Technological Knowledge." *Sloan Management Review* 36(1): 61-73.
- (28) Karnoe, P. (1996). "The social process of competence building." *International Journal of Technology Management* 11(7/8, Special Issue on Unlearning and Learning for Technological Innovations): 770-789.

#### **SPRING BREAK**

#### **15. Managing R&D: Prototyping and Experimentation**

- Topic: Experimentation strategies
- Readings: (29) Thomke, S. H. (1998). "Managing Experimentation in the Design of New Products." *Management Science* 44(6): 743-762. (U-M Lib EJN)
- Case: HBS Case Team New Zealand

#### **16. Managing R&D: Project Evaluation and Selection**

- Topic: Project evaluation / selection techniques
- Readings: (30) Morgan and Daniels 2001, "Integrating product mix and technology adoption decisions: a portfolio approach for evaluating advanced technologies in the automobile industry" *Journal of Operations Management*, Vol. 19, pp. 219-238. (U-M Lib EJN)
- (31) Nichols 1994. "Scientific Management: An Interview with CFO Judy Lewent." *Harvard Business Review*.
- Guest
- Speaker: Robert Santer, (SRL, Ford Motor Company)

#### **17. Planning Product Development: Project Plans**

- Topic: Interactions/relations between product families and platforms
- Readings: (32) Wheelwright and Clark (1992). "Creating Project Plans to Focus Product Development." *Harvard Business Review*
- (33) Tatikonda, Mohan V. (1999). "An Empirical Study of Platform and Derivative Product Development Projects." *Journal of Product Innovation Management* 16: 3-26. (U-M Lib EJN)

## 18. Executing Product Development

- Topic: Impact of organizational competence and timing of resource allocation on product development performance
- Readings: (34) - Thomke, S. H. and T. Fujimoto (2000). "The Effect of "Front-Loading" Problem-Solving on Product Development Performance." *Journal of Product Innovation Management* 17: 128-142. (U-M Lib EJN)
- Case: Thomke, S. H. and A. Nimgade (1999). BMW AG: The Digital Auto Project (A). Boston, Harvard Business School: 24.

## 19. Comparing Product Development in different Contexts: Japan vs. US.

- Topic: Japanese and American Product Development Practices
- Readings: TBD
- Guest
- Speaker: Dr. James Morgan, Troy Design and Manufacturing,

## 20. Practice Report from Product Development

- Topic: Practice of Japanese Product Development in the United States
- Readings: TBD
- Guest
- Speaker: Toyota Tech Center (to be confirmed)

## 21. Supplier-dominated innovations

- Topic: Innovations in the Textile Industry
- Readings: (35) Abernathy, Frederick H., Janice H. Hammond, John T. Dunlop and D. Weil (1999). *A Stitch in Time: Lean Retailing and the Transformation of Manufacturing*, Oxford University Press. Chapter 1, pp. 1-20.
- (36) Abernathy, Frederick H., Janice H. Hammond, John T. Dunlop and D. Weil (1999). *A Stitch in Time: Lean Retailing and the Transformation of Manufacturing*, Oxford University Press. Chapter 2, pp. 21-38.
- (37) Abernathy, Frederick H., Janice H. Hammond, John T. Dunlop and D. Weil (1999). *A Stitch in Time: Lean Retailing and the Transformation of Manufacturing*, Oxford University Press. Chapter 3, pp. 39-54
- (\*)
- Guest
- Speaker: Francisco Veloso (Prof., Carnegie Mellon University)

## 22. Concurrent Engineering I:

- Topic: Linking Product Development and Manufacturing
- Readings: (38) Rusinko, Cathy A. (1999). "Exploring the Use of Design-Manufacturing Integration (DMI) to Facilitate Product Development: A Test of Some Practices." IEEE Transactions on Engineering Management 46(1): 56-71. (U-M Lib EJN)
- (39) Terwiesch, Christian, Christoph H. Loch and Arnoud De Meyer (2001). "Exchanging Preliminary Information in Concurrent Engineering: Alternative Coordination Strategies." Organization Science 13(4): 402-419. (U-M Lib EJN)

## 23. Concurrent Engineering II:

- Topic: Role of Product Architecture on PD and Downstream Activities
- Readings: (40) Ulrich, Karl T. (1995). "The role of product architecture in the manufacturing firm." Research Policy 24: 419-440. (U-M Lib EJN)
- (41) Fixson, Sebastian K. (2002). The Multiple Faces of Modularity - An Analysis of a Product Concept for Assembled Hardware Products. Cambridge MA, Massachusetts Institute of Technology: 55.

## 24. Concurrent Engineering III

- Topic: Linking Product Design, Operations, and Supply Chain
- Readings: (42) Liker, Jeffrey K., Durward K. Sobek II, Allen C. Ward and John J. Christiano (1996). "Involving Suppliers in Product Development in the United States and Japan: Evidence for Set-Based Concurrent Engineering." IEEE Transactions on Engineering Management 43(2): 165-178. (U-M Lib EJN)
- (43) Fine, C. H. (2000). "Clockspeed-based strategies for supply chain design." Production and Operations Management 9(3): 213-221. (U-M Lib EJN)
- Case: Rungtusanatham, Manus and Fabrizio Salvador (2001). Early Supplier Integration in the Design of the Skid-Steer Loader, Arizona State University.

## **Section IV - Synthesis and Application: Student Project Presentations**

### **25. Student Presentations (1)**

Topic: Each team presents its work in a 15 minutes presentation (plus 5 minutes for discussion)

### **26. Student Presentations (2)**

Topic: Each team presents its work in a 15 minutes presentation (plus 5 minutes for discussion)

### **27. Student Presentations (3)**

Topic: Each team presents its work in a 15 minutes presentation (plus 5 minutes for discussion)





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 10/3/2003

Effective Fall 2004

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department	Div #	Course Number	Home Department	Div #	Course Number
<input checked="" type="checkbox"/> Materials Science & Engineering - MATSCIE	281	430	Materials Science & Engineering - MATSCIE	281	330
Cross Listed Course Information			Cross Listed Course Information		
Course Title Thermodynamics of Materials			Course Title Thermodynamics of Materials		
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	Thermo of Matls	TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	Thermo of Matls
	Transcript Max = 20 Spaces	Thermo of Matls		Transcript Max = 20 Spaces	Thermo of Matls
Course Description The laws of thermodynamics and their consequences. Applications to solid and liquid materials. Mass and energy balances. Gas reactions. Phase diagrams. Ellingham, Pourbaix and stability diagrams. Defects in solids. Interfaces. Statistical thermodynamics.			Course Description for Official Publication (Max = 50 words) The laws of thermodynamics and their consequences. Applications to solid and liquid materials. Mass and energy balances. Gas reactions. Phase diagrams. Ellingham, Pourbaix and stability diagrams. Defects in solids. Interfaces. Statistical thermodynamics.		
<b>PROGRAM OUTCOMES:</b> <input checked="" type="checkbox"/> a <input checked="" type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input checked="" type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input checked="" type="checkbox"/> i <input checked="" type="checkbox"/> j <input checked="" type="checkbox"/> k			<b>PROGRAM OUTCOMES:</b> <input checked="" type="checkbox"/> a <input checked="" type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input checked="" type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input checked="" type="checkbox"/> i <input checked="" type="checkbox"/> j <input checked="" type="checkbox"/> k		
Degree Requirements <input checked="" type="radio"/> Degree Requirement <input type="radio"/> Core Course <input type="radio"/> Free Elective			Degree Requirements <input checked="" type="radio"/> Degree Requirement <input type="radio"/> Core Course <input type="radio"/> Free Elective		
Prerequisites Chem 210, Phys 140/141, Math 215 or Math 285, MSE 350 <input type="radio"/> Enforced <input checked="" type="radio"/> Advised			Prerequisites Chem 210, Phys 140/141, Math 215 or Math 285, and preceded or accompanied by MSE 350 <input type="radio"/> Enforced <input checked="" type="radio"/> Advised		
Credit Restrictions			Credit Restrictions		
Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input checked="" type="checkbox"/> Ugrad or Rackham Grad <input type="checkbox"/> Ugrad or Non-Rackham Grad			Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad <input type="checkbox"/> Ugrad or Non-Rackham Grad		
Credit Hours Min Max 4 4			Credit Hours Min Max 4 4		
Contact Hrs/Wk 4 Number of Wks 14			Contact Hrs/Wk 4 Number of Wks 14		
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input type="radio"/> Yes <input type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input type="radio"/> No			Printing Information (Optional) <input checked="" type="checkbox"/> Print the course in the Bulletin <input checked="" type="checkbox"/> Print the course in the Time Schedule		
Class Type(s) <input checked="" type="checkbox"/> Lec <input checked="" type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input type="checkbox"/> Other			Terms & Freq. of Offering <input checked="" type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input checked="" type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years		
Graded Section <input type="radio"/> Lec <input type="radio"/> Rec <input type="radio"/> Sem <input type="radio"/> Lab <input type="radio"/> Dis <input type="radio"/> Ind <input type="radio"/> Other			Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd		
Grading <input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y			Cognizant Faculty Member: R. Gibala D. Martin J. Millunchick		
Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension			Title Professor Assoc. Professor Asst. Professor		
Approval			Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty		

☐ Curriculum Comm.

- ☐ Faculty  
☐ Rackham  
☐ Cross listed Unit 1  
☐ Cross listed Unit 2

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

Name, Signature & Department

Home Dept. John W. Halloran

Cross-listed Dept(s):

**SUPPORTING STATEMENT**

MSE has been fine tuning its undergraduate course offering schedule to encourage students to elect courses in a more rational sequence that builds from one course to the next. We have recognized that our students actually take our Thermodynamics (MSE 430) and Kinetics and Transport (MSE 435) courses in their junior year. The material in these courses is junior material, and we use the courses as fundamental bases for our senior selective and the required design courses. Therefore, we wish to change the course numbers for MSE 430 and MSE 435 to MSE 330 and MSE 335, respectively. Correspondingly, we will change MSE 350 from a pre-requisite for MSE 430 to a co-requisite for MSE 330. Course content and ABET outcomes and objectives will remain unchanged. This will be a great help in advising students to take these courses in their junior year.

Are any special resources or facilities required for this course?

☐ Yes ☒ No

Detail the Special requirements

STEP II: Develop Course Objectives and Outcomes

<b>COURSE #:</b> MSE 330	<b>COURSE TITLE:</b> Thermodynamics of Materials
<b>TERMS OFFERED:</b> Fall	<b>PREREQUISITES:</b> Chem 210, Phys 140/141, Math 215 or Math 285, and preceded or accompanied by MSE 350
<b>INSTRUCTOR(S):</b> DC Martin, RE Robertson, R Gibala	<b>SCIENCE/DESIGN:</b>
<b>CATALOG DESCRIPTION:</b> The laws of thermodynamics and their consequences. Applications to solid and liquid materials. Mass and energy balances. Gas reactions. Phase diagrams. Ellingham, Pourbaix and stability diagrams. Defects in solids. Interfaces. Statistical thermodynamics.	<b>COURSE TOPICS:</b> 1. The First Law of Thermodynamics 2. The Second Law of Thermodynamics 3. Statistical interpretation of entropy 4. Enthalpy and the Helmholtz and Gibbs energies 5. Heat capacity, enthalpy, entropy, and the Third Law of Thermodynamics 6. Phase equilibrium in a one-component system 7. The behavior of gases 8. The behavior of solutions 9. Gibbs energy vs. composition and phase diagrams of binary systems 10. Reactions involving gases 11. Reactions involving pure condensed phases and a gaseous phase 12. Reaction equilibria in systems containing components in condensed solution

<b>COURSE OBJECTIVES*</b>	<ol style="list-style-type: none"> <li>1. To teach students the nature and basis of the laws of thermodynamics.</li> <li>2. To teach students when and how to apply the laws of thermodynamics to materials, how to calculate the changes in the thermodynamic variables when a material changes state (from gas to liquid to solid) or when the temperature of a material and/or the pressure acting on the material is changed without a change in state.</li> <li>3. To teach students the thermodynamics of mixtures and phases, the coexistence criteria for distinct phases, and how to use phase diagrams to succinctly summarize mixing behavior.</li> <li>4. To teach students the thermodynamics of the reactions of solids with gases and the reactions of several materials all in condensed phases.</li> </ol>
<b>COURSE OUTCOMES*</b>	<ol style="list-style-type: none"> <li>1. Given heat capacity data for reactants and products and the heat of reaction at one temperature, compute the heat of reaction at any other temperature [1,2].</li> <li>2. Given that a gas can be assumed to be approximately ideal, be able to determine work and heat in and out of the gas as it is cycled over a range of temperatures and pressures [1,2].</li> <li>3. Given component activities in a solution at one temperature and concentration, compute the activities at another temperature and concentration assuming the solution is regular [3].</li> <li>4. Given ideal solution behavior, be able to compute changes in enthalpy and Gibbs energy when a pure material is added to the solution [1,3].</li> <li>5. Given vapor pressure data of a component, be able to compute boiling points and latent heat of boiling [2].</li> <li>6. Given the activity coefficient of one component in a binary mixture over the range of composition, be able to determine the activity of the second component at any composition [3].</li> <li>7. Given appropriate thermodynamic data, be able to determine composition in a gas mixture at any specified temperature, and be able to compute equilibrium compositions when in contact with solids with similar components [4].</li> </ol>
<b>ASSESSMENT TOOLS</b>	<ol style="list-style-type: none"> <li>1. In-class closed-book quizzes and open-book exams test objectives for individual students.</li> <li>2. Weekly problem sets test objectives with less time pressure and with the possibility of student collaboration for conceptualization of solution.</li> </ol>

\*The ABET99 Group suggests up to 6 objectives and 1-3 outcomes per objective.

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 10/3/2003

Effective Winter 2004

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department	Div #	Course Number	Home Department	Div #	Course Number
<input checked="" type="checkbox"/> Materials Science & Engineering - MATSCIE	281	435	Materials Science & Engineering - MATSCIE	281	335
Cross Listed Course Information			Cross Listed Course Information		
Course Title Kinetics and Transport in Materials Engineering			Course Title Kinetics and Transport in Materials Engineering		
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces	Kin. and Transport Kin & Transp.	TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces Transcript Max = 20 Spaces	Kin. and Transport Kin & Transp.
Course Description Application of basic principles of molecular transport and mass, energy, and momentum balance to the solution of heat, diffusion, and fluid flow problems relevant to materials processing. Introduction to radiative heat transfer. Empirical approaches to and dimensional analysis of complex transport problems including convection, turbulence, and non-Newtonian flow.			Course Description for Official Publication (Max = 50 words) Application of basic principles of molecular transport and mass, energy, and momentum balance to the solution of heat, diffusion, and fluid flow problems relevant to materials processing. Introduction to radiative heat transfer. Empirical approaches to and dimensional analysis of complex transport problems including convection, turbulence, and non-Newtonian flow.		
<b>PROGRAM OUTCOMES:</b> <input checked="" type="checkbox"/> a <input checked="" type="checkbox"/> b <input type="checkbox"/> c <input checked="" type="checkbox"/> d <input type="checkbox"/> e <input checked="" type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input checked="" type="checkbox"/> k			<b>PROGRAM OUTCOMES:</b> <input checked="" type="checkbox"/> a <input checked="" type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input checked="" type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input checked="" type="checkbox"/> i <input checked="" type="checkbox"/> j <input checked="" type="checkbox"/> k		
Degree Requirements <input checked="" type="radio"/> Degree Requirement <input type="radio"/> Core Course <input type="radio"/> Free Elective <input type="radio"/> Tech Elective <input type="radio"/> Other			Degree Requirements <input checked="" type="radio"/> Degree Requirement <input type="radio"/> Core Course <input type="radio"/> Free Elective <input type="radio"/> Tech Elective <input type="radio"/> Other		
Prerequisites Math 216 and MSE 220 or 250 <input type="radio"/> Enforced <input checked="" type="radio"/> Advised			Prerequisites Math 216 and MSE 220 or 250 <input type="radio"/> Enforced <input checked="" type="radio"/> Advised		
Credit Restrictions			Credit Restrictions		
Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input checked="" type="checkbox"/> Ugrad or Rackham Grad <input type="checkbox"/> Ugrad or Non-Rackham Grad		Credit Hours Min Max 4 4	Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad <input type="checkbox"/> Ugrad or Non-Rackham Grad		Credit Hours Min Max 4 4
Contact Hrs/Wk 4 Number of Wks 14			Contact Hrs/Wk 4 Number of Wks 14		
Repeatability (Indl Research, Dir. Study, Dissertation): Is this course repeatable? <input type="radio"/> Yes <input type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input type="radio"/> No			Printing Information (Optional) <input checked="" type="checkbox"/> Print the course in the Bulletin <input checked="" type="checkbox"/> Print the course in the Time Schedule		
Class Type(s) <input checked="" type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input type="checkbox"/> Other _____			Terms & Freq. of Offering <input type="checkbox"/> I <input checked="" type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input checked="" type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years		
Graded Section <input type="radio"/> Lec <input type="radio"/> Rec <input type="radio"/> Sem <input type="radio"/> Lab <input type="radio"/> Dis <input type="radio"/> Ind <input type="radio"/> Other _____			Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd		
Grading <input checked="" type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y			Cognizant Faculty Member: M. Falk F. Filisko and T. Pollock J. Kieffer Title Asst. Professor Professors Assoc. Professor		
Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension			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. John W. Halloran

Cross-listed Dept(s): \_\_\_\_\_

**SUPPORTING STATEMENT**

MSE has been fine tuning its undergraduate course offering schedule to encourage students to elect courses in a more rational sequence that builds from one course to the next. We have recognized that our students actually take our Thermodynamics (MSE 430) and Kinetics and Transport (MSE 435) courses in their junior year. The material in these courses is junior material, and we use the courses as fundamental bases for our senior selective and the required design courses. Therefore, we wish to change the course numbers for MSE 430 and MSE 435 to MSE 330 and MSE 335, respectively. Correspondingly, we will change MSE 350 from a pre-requisite for MSE 430 to a co-requisite for MSE 330. Course content and ABET outcomes and objectives will remain unchanged. This will be a great help in advising students to take these courses in their junior year.

Are any special resources or facilities required for this course?

☐ Yes ☒ No

Detail the Special requirements

STEP II: Develop Course Objectives and Outcomes

<b>COURSE #:</b> MSE 335		<b>COURSE TITLE:</b> Kinetics and Transport in Materials Engineering	
<b>TERMS OFFERED:</b> Winter		<b>PREREQUISITES:</b> Math 216 and MSE 220 or 250	
<b>INSTRUCTOR(S):</b> M. Falk		<b>SCIENCE/DESIGN:</b> 4/0	
<b>CATALOG DESCRIPTION:</b> Application of basic principles of molecular transport and mass, energy and momentum balance to the solution of heat, diffusion and fluid flow problems relevant to materials processing. Introduction to radiative heat transfer. Empirical approaches to and dimensional analysis of complex transport problems including convection, turbulence and non-Newtonian flow.		<b>COURSE TOPICS:</b> <ol style="list-style-type: none"> <li>1. Systems of units.</li> <li>2. Balance laws: mass, species, momentum, thermal energy, mechanical energy.</li> <li>3. Application of balance laws to flow in pipes and tanks.</li> <li>4. Differential forms of balance laws.</li> <li>5. Constitutive laws for molecular transport: Fick's law, Fourier's law, Newton's law.</li> <li>6. Boundary conditions for transport problems.</li> <li>7. Combining balance, molecular transport and convection.</li> <li>8. Solving one-dimensional transport problems using differential equations.</li> <li>9. Solving higher dimensional transport problems using numerical methods.</li> <li>10. Deriving engineering (net) transport equations from microscopic equations.</li> <li>11. Radiation: Stephan-Boltzmann Law, black bodies, gray bodies, view factors.</li> <li>12. Turbulent flow.</li> <li>13. Dimensional analysis and dimensionless parameters.</li> <li>14. Phenomenological transfer coefficients (heat, momentum, mass).</li> <li>15. Nonlinear constitutive laws for transport; phenomenological non-Newtonian flow laws.</li> <li>16. Kinetic theories of transport: Chapman-Enskog Theory, Eyring Free Volume Theory, Debye Theory, theory of electronic thermal conduction.</li> </ol>	
<b>COURSE OBJECTIVES*</b>	<ol style="list-style-type: none"> <li>1. To understand and be able to apply the basic equations of molecular transport (Fourier, Fick and Newton's Laws).</li> <li>2. To utilize the equations of mass, energy and momentum balance to analyze transport problems.</li> <li>3. To combine (1) and (2) above in solving problems in the presence and absence of convection.</li> <li>4. To become familiar with the issues associated with turbulent flow and be able to utilize phenomenological approaches for analyzing turbulent flows.</li> <li>5. To learn representative kinetic theories for calculating transport coefficients in solids, liquids and gases.</li> <li>6. To understand the importance of dimensional analysis and the role of dimensionless quantities in determining transitions in physical behavior and quantifying empirically determined boundary conditions.</li> </ol>		
<b>COURSE OUTCOMES*</b>	<ol style="list-style-type: none"> <li>1. Students will be able to convert a transport problem into a set of differential equations for further analysis.</li> <li>2. Students will be able to calculate the power requirements for a piping network given data for friction factors and loss coefficients.</li> <li>3. Students will be able to use ordinary differential equations to determine how temperature and chemical composition vary with time in a simple reactor.</li> <li>4. Students will be able to apply linear constitutive laws to calculate effective transfer coefficients through composite structures.</li> <li>5. Students will be able to compute heat transfer between radiating bodies.</li> <li>6. Students will be able to use kinetic theories of transport to compute the temperature dependence of transport coefficients.</li> <li>7. Students will be able to express spatially dependent transport problems in terms of partial differential equations and solve these equations analytically in cases that can be reduced to one spatial dimension.</li> <li>8. Students will be able to analyze one-dimensional solidification using partial differential equations in order to predict cooling rates and solidification times.</li> <li>9. Students will be able to apply dimensional analysis to physical problems.</li> <li>10. Students will be able to calculate dimensionless parameters associated with transport and use these to compute transfer coefficients</li> <li>11. Students will be able to describe non-Newtonian behavior using phenomenological constitutive laws.</li> </ol>		
<b>ASSESSMENT TOOLS</b>	<ol style="list-style-type: none"> <li>1. Weekly homework.</li> <li>2. Three exams.</li> </ol>		

\*The ABET99 Group suggests up to 6 objectives and 1-3 outcomes per objective.

# Memorandum

**To:** College of Engineering Curriculum Committee

**From:** Associate Dean Stella Pang



**Date:** October 17, 2003

**Re:** Deletion of Inactive Study Abroad Course Numbers

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Enclosed please find course approval forms requesting the deletion of former study abroad course numbers that were previously listed under a separate ENGINSa home department. When seeking the approval of a new system of course numeration for student abroad numbers in April 2003, it was agreed that only two course numbers would represent study abroad on engineering international programs overseas: ENGR 301 for undergraduate study abroad and ENGR 591 for graduate study abroad. The diverse study abroad destinations are now captured in separate class sections under each course number.

Please contact Melissa Eljamal (7-7026) if you have further questions.

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 8/7/2003

Effective Fall 2003

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department <b>ENGNSA</b>		Div # <b>290</b>	Course Number <b>200</b>	Home Department		Div #	Course Number
Cross Listed Course Information				Cross Listed Course Information			
Course Title <b>Engineering Study Abroad Other</b>				Course Title			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	St Abr Other		TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces		
	Transcript Max = 20 Spaces	St Abr Other			Transcript Max = 20 Spaces		
Course Description <b>Engineering study abroad for non-UM programs</b>				Course Description for Official Publication (Max = 50 words)			
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k				<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k			
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input checked="" type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective				Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prerequisites <input type="radio"/> 4-5 semesters foreign language if immersion program <input type="radio"/> Enforced <input checked="" type="radio"/> Advised				Prerequisites <input type="radio"/> Enforced <input type="radio"/> Advised			
Credit Restrictions				Credit Restrictions			
Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Credit Hours Min Max 1 16		Contact Hrs/Wk varies Number of Wks varies		Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	
		Ugrad or Non-Rackham Grad All Credit types Rackham Grad w/add'l Work				Ugrad or Non-Rackham Grad All Credit types Rackham Grad w/add'l Work	
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No				Printing Information (Optional) <input type="checkbox"/> Print the course in the Bulletin <input type="checkbox"/> Print the course in the Time Schedule			
Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="checkbox"/> Other _____		Graded Section <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="radio"/> Other _____		Grading <input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y		Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension	
Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years		Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd		Cognizant Faculty Member: _____ Title _____		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. Engineering, Gary Herrin

Cross-listed Dept(s): \_\_\_\_\_



**SUPPORTING STATEMENT**

Due to recent approval of one study abroad number for undergraduates and one study abroad number for graduates, we are requesting that the old inactive numbers are deleted from the course listings.

Are any special resources or facilities required for this course?

☐ Yes ☐ No

Detail the Special requirements

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 9/22/2003

Effective Fall 2003

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department <b>ENGNSA</b>		Div # <b>290</b>	Course Number <b>301</b>	Home Department		Div #	Course Number
Cross Listed Course Information				Cross Listed Course Information			
Course Title <b>Engineering Study Abroad Imperial College</b>				Course Title			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	St Imp Coll		TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces		
	Transcript Max = 20 Spaces	St Imp Coll			Transcript Max = 20 Spaces		
Course Description <b>Engineering study abroad to Imperial College, England</b>				Course Description for Official Publication (Max = 50 words)			
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k				<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k			
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input checked="" type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective				Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prerequisites 4-5 semesters foreign language if immersion program <input type="radio"/> Enforced <input checked="" type="radio"/> Advised				Prerequisites <input type="radio"/> Enforced <input type="radio"/> Advised			
Credit Restrictions				Credit Restrictions			
Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackhm Grad <input type="checkbox"/> Ugrad or Rackhm Grad		Credit Hours Min Max 1 16		Contact Hrs/Wk varies Number of Wks varies		Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackhm Grad <input type="checkbox"/> Ugrad or Rackhm Grad	
						Credit Hours Min Max	
						Contact Hrs/Wk	
						Number of Wks	
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No				Printing Information (Optional) <input type="checkbox"/> Print the course in the Bulletin <input type="checkbox"/> Print the course in the Time Schedule			
Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="checkbox"/> Other _____		Graded Section <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="radio"/> Other _____		Grading <input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y		Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension	
Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years		Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd		Cognizant Faculty Member: _____ Title _____		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. Engineering, Gary Herrin

Cross-listed Dept(s): \_\_\_\_\_

~~Due to recent approval of one study abroad number for undergraduates and one study abroad number for graduates, we are requesting that the old, inactive numbers be deleted from the course listings.~~

This image shows a full page of primary-ruled notebook paper. It features horizontal dashed lines for writing and two vertical solid lines on each side to form margins. The paper is white and contains no text or other markings.

☐ Yes ☐ No

.....

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 9/22/2003

Effective Fall 2003

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Div #	Course Number	Home Department		Div #	Course Number
ENG/NSA		290	302				
Cross Listed Course Information				Cross Listed Course Information			
Course Title Engineering Study Abroad University of Hertfordshire				Course Title			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	Hertfordshir		TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces		
	Transcript Max = 20 Spaces	Hertfordshir			Transcript Max = 20 Spaces		
Course Description Engineering study abroad to University of Hertfordshire, England				Course Description for Official Publication (Max = 50 words)			
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k				<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k			
<b>Degree Requirements</b> <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input checked="" type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective				<b>Degree Requirements</b> <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prerequisites 4-5 semesters foreign language if immersion program <input type="radio"/> Enforced <input checked="" type="radio"/> Advised				Prerequisites <input type="radio"/> Enforced <input type="radio"/> Advised			
Credit Restrictions				Credit Restrictions			
<b>Level of Credit</b> <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackhm Grad <input type="checkbox"/> Ugrad or Rackhm Grad		Credit Hours Min Max 1 16		<b>Level of Credit</b> <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackhm Grad <input type="checkbox"/> Ugrad or Rackhm Grad		Credit Hours Min Max Number of Wks varies	
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? Maximum Times? Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No				Printing Information (Optional) <input type="checkbox"/> Print the course in the Bulletin <input type="checkbox"/> Print the course in the Time Schedule			
Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="checkbox"/> Other		Graded Section <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="radio"/> Other		Grading <input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y		Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension	
Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years		Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd		Cognizant Faculty Member: Title:			
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. Engineering, Gary Herrin

Cross-listed Dept(s).

Due to recent approval of one study abroad number for undergraduates and one study abroad number for graduates, we are requesting that the old, inactive numbers are deleted from the course listings.....

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1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 104
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[illegible]

☐ Yes ☐ No

[illegible]

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 9/22/2003

Effective Fall 2003

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Div #	Course Number
ENGNSA		290	303
Cross Listed Course Information			
Course Title Engineering Study Abroad University of New South Wales			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	Univ Nsw	
	Transcript Max = 20 Spaces	Univ Nsw	
Course Description Engineering study abroad to University of New South Wales, Australia			
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input checked="" type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prerequisites 4-5 semesters foreign language if immersion program <input type="radio"/> Enforced <input checked="" type="radio"/> Advised			
Credit Restrictions			
Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Credit Hours Min Max 1 16	Contact Hrs/Wk varies Number of Wks varies
Repeatability (Indic Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No			
Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="checkbox"/> Other		Graded Section <input type="radio"/> Lec <input type="radio"/> Rec <input type="radio"/> Sem <input type="radio"/> Lab <input type="radio"/> Dis <input type="radio"/> Ind <input checked="" type="radio"/> Other	Grading <input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension
Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years		Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd	
Cognizant Faculty Member: _____ Title: _____			
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. Engineering, Gary Herrin

Cross-listed Dept(s): \_\_\_\_\_

**SUPPORTING STATEMENT**

Due to recent approval of one study abroad number for undergraduates and one study abroad number for graduates, we are requesting that the old inactive numbers are deleted from the course listings.

Are any special resources or facilities required for this course?

☐ Yes ☐ No

Detail the Special requirements

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 9/22/2003

Effective Fall 2003

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Div #	Course Number
ENGNSA		290	304
Cross Listed Course Information			
Course Title Engineering Study Abroad University of Wollongong			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	Wollongong	
	Transcript Max = 20 Spaces	Wollongong	
Course Description			
Course Description for Official Publication (Max = 50 words)			
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k			
<b>Degree Requirements</b> <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input checked="" type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prerequisites <input type="radio"/> Enforced <input checked="" type="radio"/> Advised			
Credit Restrictions			
<b>Level of Credit</b> <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		<b>Credit Hours</b> Min Max 1 16	<b>Contact</b> Hrs/Wk varies Number of Wks varies
<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/add'l Work			
<b>Repeatability (Indic Research, Dir. Study, Dissertation):</b> Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input type="radio"/> No			
<b>Printing Information (Optional)</b> <input type="checkbox"/> Print the course in the Bulletin <input type="checkbox"/> Print the course in the Time Schedule			
<b>Class Type(s)</b> <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="checkbox"/> Other _____	<b>Graded Section</b> <input type="radio"/> Lec <input type="radio"/> Rec <input type="radio"/> Sem <input type="radio"/> Lab <input type="radio"/> Dis <input type="radio"/> Ind <input type="radio"/> Other _____	<b>Grading</b> <input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y	<b>Location</b> <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension
<b>Terms &amp; Freq. of Offering</b> <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd <input type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years			
<b>Cognizant Faculty Member:</b> _____ <b>Title</b> _____			
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. Engineering, Gary Herrin

Cross-listed Dept(s): \_\_\_\_\_



**SUPPORTING STATEMENT**

Due to recent approval of one study abroad number for undergraduates and one study abroad number for graduates, we are requesting that the old inactive numbers are deleted from the course listings.

Are any special resources or facilities required for this course?

☐ Yes ☐ No

Detail the Special requirements

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 9/22/2003

Effective Fall 2003

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Div #	Course Number
ENGINSA		290	305
Cross Listed Course Information			
Course Title Engineering Study Abroad University of Adelaide			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	St Adelaide	
	Transcript Max = 20 Spaces	St Adelaide	
Course Description			
Course Description for Official Publication (Max = 50 words)			
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k			
<b>Degree Requirements</b> <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input checked="" type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prerequisites <input type="radio"/> Enforced <input checked="" type="radio"/> Advised			
Credit Restrictions			
<b>Level of Credit</b> <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		<b>Credit Hours</b> Min Max 1 16	<b>Contact</b> Hrs/Wk varies Number of Wks varies
<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/add'l Work			
<b>Repeatability (Indic Research, Dir. Study, Dissertation):</b> Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input type="radio"/> No			
<b>Printing Information (Optional)</b> <input type="checkbox"/> Print the course in the Bulletin <input type="checkbox"/> Print the course in the Time Schedule			
<b>Class Type(s)</b> <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="checkbox"/> Other _____	<b>Graded Section</b> <input type="radio"/> Lec <input type="radio"/> Rec <input type="radio"/> Sem <input type="radio"/> Lab <input type="radio"/> Dis <input type="radio"/> Ind <input type="radio"/> Other _____	<b>Grading</b> <input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y	<b>Location</b> <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension
<b>Terms &amp; Freq. of Offering</b> <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd			
Cognizant Faculty Member: _____ Title: _____			
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. Engineering, Gary Herrin

Cross-listed Dept(s): \_\_\_\_\_

**SUPPORTING STATEMENT**

Due to recent approval of one study abroad number for undergraduates and one study abroad number for graduates, we are requesting that the old inactive numbers are deleted from the course listings.

Are any special resources or facilities required for this course?

☐ Yes ☐ No

Detail the Special requirements

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 9/22/2003

Effective Fall 2003

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department <b>ENGNSA</b>		Div # <b>290</b>	Course Number <b>306</b>	Home Department		Div #	Course Number
Cross Listed Course Information				Cross Listed Course Information			
Course Title <b>Engineering Study Abroad University of Melbourne</b>				Course Title			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	<b>St Melbourne</b>		TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces		
	Transcript Max = 20 Spaces	<b>St Melbourne</b>			Transcript Max = 20 Spaces		
Course Description <b>Engineering study abroad to University of Melbourne, Australia</b>				Course Description for Official Publication (Max = 50 words)			
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k				<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k			
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input checked="" type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective				Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prerequisites 4-5 semesters foreign language if immersion program <input type="radio"/> Enforced <input checked="" type="radio"/> Advised				Prerequisites <input type="radio"/> Enforced <input type="radio"/> Advised			
Credit Restrictions				Credit Restrictions			
Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Credit Hours Min Max <b>1 16</b>		Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Credit Hours Min Max _____	
<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/add'l Work		Contact Hrs/Wk <b>varies</b> Number of Wks <b>varies</b>		<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/add'l Work		Contact Hrs/Wk _____ Number of Wks _____	
Repeatability (Indic Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No				Printing Information (Optional) <input type="checkbox"/> Print the course in the Bulletin <input type="checkbox"/> Print the course in the Time Schedule			
Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="checkbox"/> Other _____		Graded Section <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="radio"/> Other _____		Grading <input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y		Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension	
Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years		Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd		Cognizant Faculty Member: _____ Title _____		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. Engineering, Gary Herrin

Cross-listed Dept(s): \_\_\_\_\_

**SUPPORTING STATEMENT**

Due to recent approval of one study abroad number for undergraduates and one study abroad number for graduates, we are requesting that the old inactive numbers are deleted from the course listings.

Are any special resources or facilities required for this course?

☐ Yes ☐ No

Detail the Special requirements

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 9/22/2003

Effective Fall 2003

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Div #	Course Number	Home Department		Div #	Course Number
ENGINSA		290	307				
Cross Listed Course Information				Cross Listed Course Information			
Course Title Engineering Study Abroad Monash University				Course Title			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	St Monash		TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces		
	Transcript Max = 20 Spaces	St Monash			Transcript Max = 20 Spaces		
Course Description Engineering study abroad to Monash University, Australia				Course Description for Official Publication (Max = 50 words)			
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k				<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k			
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input checked="" type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective				Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prerequisites 4-5 semesters foreign language if immersion program <input type="radio"/> Enforced <input checked="" type="radio"/> Advised				Prerequisites <input type="radio"/> Enforced <input type="radio"/> Advised			
Credit Restrictions				Credit Restrictions			
Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Credit Hours Min Max 1 16	Contact Hrs/Wk varies Number of Wks varies	Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Credit Hours Min Max	Contact Hrs/Wk Number of Wks
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No				Printing Information (Optional) <input type="checkbox"/> Print the course in the Bulletin <input type="checkbox"/> Print the course in the Time Schedule			
Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="checkbox"/> Other _____		Graded Section <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="radio"/> Other _____	Grading <input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y	Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension		Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd	
Cognizant Faculty Member: _____		Title _____		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. Engineering, Gary Herrin

Cross-listed Dept(s): \_\_\_\_\_

**SUPPORTING STATEMENT**

Due to recent approval of one study abroad number for undergraduates and one study abroad number for graduates, we are requesting that the old inactive numbers are deleted from the course listings.

Are any special resources or facilities required for this course?

☐ Yes ☐ No

Detail the Special requirements

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 9/22/2003

Effective Fall 2003

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department <b>ENGINSA</b>		Div # <b>290</b>	Course Number <b>308</b>	Home Department		Div #	Course Number
Cross Listed Course Information				Cross Listed Course Information			
Course Title <b>Engineering Study Abroad University of Queensland</b>				Course Title			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	<b>St QueensInd</b>		TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces		
	Transcript Max = 20 Spaces	<b>St QueensInd</b>			Transcript Max = 20 Spaces		
Course Description <b>Engineering study abroad to University of Queensland, Australia</b>				Course Description for Official Publication (Max = 50 words)			
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k				<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k			
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input checked="" type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective				Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prerequisites <b>4-5 semesters foreign language if immersion program</b> <input type="radio"/> Enforced <input checked="" type="radio"/> Advised				Prerequisites <input type="radio"/> Enforced <input type="radio"/> Advised			
Credit Restrictions				Credit Restrictions			
Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Credit Hours Min Max <b>1 16</b>		Contact Hrs/Wk <b>varies</b> Number of Wks <b>varies</b>		Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad	
<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/add'l Work						<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/add'l Work	
Repeatability (Indic Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No				Printing Information (Optional) <input type="checkbox"/> Print the course in the Bulletin <input type="checkbox"/> Print the course in the Time Schedule			
Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="checkbox"/> Other _____		Graded Section <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="radio"/> Other _____		Grading <input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y		Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension	
Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years		Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd		Cognizant Faculty Member: _____ Title _____		Grad Course: Attach nomination if Cognizant Faculty is not a regular graduate faculty	

☐ Curriculum Comm.

- ☐ Faculty  
☐ Rackham  
☐ Cross listed Unit 1  
☐ Cross listed Unit 2

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

Name, Signature & Department

Home Dept. Engineering, Gary Herrin

Cross-listed Dept(s): \_\_\_\_\_



**SUPPORTING STATEMENT**

Due to recent approval of one study abroad number for undergraduates and one study abroad number for graduates, we are requesting that the old inactive numbers are deleted from the course listings.

Are any special resources or facilities required for this course?

☐ Yes ☐ No

Detail the Special requirements

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 9/22/2003

Effective Fall 2003

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Div #	Course Number
ENGINSA		290	309
Cross Listed Course Information			
Course Title Engineering Study Abroad Bristol University			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	St Bristol	
	Transcript Max = 20 Spaces	St Bristol	
Course Description Engineering study abroad to Bristol University, England			
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input checked="" type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prerequisites 4-5 semesters foreign language if immersion program <input type="radio"/> Enforced <input checked="" type="radio"/> Advised			
Credit Restrictions			
Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackhm Grad <input type="checkbox"/> Ugrad or Rackhm Grad		Credit Hours Min Max 1 16	Contact Hrs/Wk varies Number of Wks varies
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No			
Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="checkbox"/> Other _____		Graded Section <input type="radio"/> Lec <input type="radio"/> Rec <input type="radio"/> Sem <input type="radio"/> Lab <input type="radio"/> Dis <input type="radio"/> Ind <input checked="" type="radio"/> Other _____	Grading <input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y
Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension		Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd	
Cognizant Faculty Member: _____ Title _____ 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. Engineering, Gary Herrin

Cross-listed Dept(s): \_\_\_\_\_

**SUPPORTING STATEMENT**

Due to recent approval of one study abroad number for undergraduates and one study abroad number for graduates, we are requesting that the old inactive numbers are deleted from the course listings.

Are any special resources or facilities required for this course?

☐ Yes ☐ No

Detail the Special requirements

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 9/22/2003

Effective Fall 2003

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Div #	Course Number
ENGINSA		290	310
Cross Listed Course Information			
Course Title Engineering Study Abroad Manchester University			
TITLE ABBREVIATION	Time Sched Max = 19 Spaces	St Manchestr	
	Transcript Max = 20 Spaces	St Manchestr	
Course Description Engineering study abroad to Manchester University, England			
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input checked="" type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prerequisites 4-5 semesters foreign language if immersion program <input type="radio"/> Enforced <input checked="" type="radio"/> Advised			
Credit Restrictions			
Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Credit Hours Min Max 1 16	Contact Hrs/Wk varies Number of Wks varies
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No			
Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="checkbox"/> Other _____		Graded Section <input type="radio"/> Lec <input type="radio"/> Rec <input type="radio"/> Sem <input type="radio"/> Lab <input type="radio"/> Dis <input type="radio"/> Ind <input checked="" type="radio"/> Other _____	Grading <input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y
Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension		Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd	
Cognizant Faculty Member: _____ Title _____			
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. Engineering, Gary Herrin

Cross-listed Dept(s). \_\_\_\_\_

Due to recent approval of one study abroad number for undergraduates and one study abroad number for graduates, we are requesting that the old, inactive numbers are deleted from the course listings.....

[illegible]

☐ Yes ☐ No

[illegible]

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 9/22/2003

Effective Fall 2003

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department	Div #	Course Number	Home Department	Div #	Course Number
ENGINSA	290	311			
Cross Listed Course Information			Cross Listed Course Information		
Course Title Engineering Study Abroad Middlesex University			Course Title		
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	St Middlesex	TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	
	Transcript Max = 20 Spaces	St Middlesex		Transcript Max = 20 Spaces	
Course Description Engineering study abroad to Middlesex University, England			Course Description for Official Publication (Max = 50 words)		
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input checked="" type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective		
Prerequisites 4-5 semesters foreign language if immersion program <input type="radio"/> Enforced <input checked="" type="radio"/> Advised			Prerequisites <input type="radio"/> Enforced <input type="radio"/> Advised		
Credit Restrictions			Credit Restrictions		
Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rckhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rckhm Grad <input type="checkbox"/> Rckhm Grad w/add'l Work <input type="checkbox"/> Ugrad or Rckhm Grad		Credit Hours Min Max 1 16	Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rckhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rckhm Grad <input type="checkbox"/> Rckhm Grad w/add'l Work <input type="checkbox"/> Ugrad or Rckhm Grad		Credit Hours Min Max
		Contact Hrs/Wk varies Number of Wks varies			Contact Hrs/Wk Number of Wks
Repeatability (Indic Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No			Printing Information (Optional) <input type="checkbox"/> Print the course in the Bulletin <input type="checkbox"/> Print the course in the Time Schedule		
Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="checkbox"/> Other	Graded Section <input type="radio"/> Lec <input type="radio"/> Rec <input type="radio"/> Sem <input type="radio"/> Lab <input type="radio"/> Dis <input type="radio"/> Ind <input checked="" type="radio"/> Other	Grading <input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y	Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd		
Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension			Cognizant Faculty Member: _____ Title: _____ 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. Engineering, Gary Herrin

Cross-listed Dept(s).

**SUPPORTING STATEMENT**

Due to recent approval of one study abroad number for undergraduates and one study abroad number for graduates, we are requesting that the old inactive numbers are deleted from the course listings.

Are any special resources or facilities required for this course?

☐ Yes ☐ No

Detail the Special requirements

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 9/22/2003

Effective Fall 2003

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Div #	Course Number
ENGINSA		290	312
Cross Listed Course Information			
Course Title Engineering Study Abroad Denmark Technical University			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	St Denmark	
	Transcript Max = 20 Spaces	St Denmark	
Course Description Engineering study abroad to Denmark Technical University, Denmark			
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input checked="" type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective Prerequisites 4-5 semesters foreign language if immersion program <input type="radio"/> Enforced <input checked="" type="radio"/> Advised Credit Restrictions Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rckhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rckhm Grad <input type="checkbox"/> Rackhm Grad w/add'l Work <input type="checkbox"/> Ugrad or Rckhm Grad Credit Hours Min Max 1 16 Contact Hrs/Wk varies Number of Wks varies			
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective Prerequisites <input type="radio"/> Enforced <input type="radio"/> Advised Credit Restrictions Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rckhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rckhm Grad <input type="checkbox"/> Rackhm Grad w/add'l Work <input type="checkbox"/> Ugrad or Rckhm Grad Credit Hours Min Max Contact Hrs/Wk Number of Wks			
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? Maximum Times? Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No			
Printing Information (Optional) <input type="checkbox"/> Print the course in the Bulletin <input type="checkbox"/> Print the course in the Time Schedule			
Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd <input type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years			
Cognizant Faculty Member: Title:			
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. Engineering, Gary Herrin

Cross-listed Dept(s):



**SUPPORTING STATEMENT**

Due to recent approval of one study abroad number for undergraduates and one study abroad number for graduates, we are requesting that the old inactive numbers are deleted from the course listings.

Are any special resources or facilities required for this course?

☐ Yes ☐ No

Detail the Special requirements

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 9/22/2003

Effective Fall 2003

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Div #	Course Number
ENGNSA		290	313
Cross Listed Course Information			
Course Title Engineering Study Abroad Rheinisch-Westfalische Technische			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	St Aachen	
	Transcript Max = 20 Spaces	St Aachen	
Course Description Engineering study abroad to Rheinisch-Westfalische Technische Hochschule Aachen , Germany			
PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k Degree Requirements <input checked="" type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input checked="" type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prerequisites 4-5 semesters foreign language if immersion program <input type="radio"/> Enforced <input checked="" type="radio"/> Advised			
Credit Restrictions			
Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Credit Hours Min Max 1 16	Contact Hrs/Wk varies Number of Wks varies
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No			
Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="checkbox"/> Other _____		Graded Section <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="radio"/> Other _____	Grading <input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension
Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years		Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd	
Cognizant Faculty Member: _____ Title: _____			
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. Engineering, Gary Herrin

Cross-listed Dept(s): \_\_\_\_\_

Due to recent approval of one study abroad number for undergraduates and one study abroad number for graduates, we are requesting that the old, inactive numbers are deleted from the course listings.....

[illegible]☐ Yes ☐ No

.....

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 9/22/2003

Effective Fall 2003

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Div #	Course Number
ENGINSA		290	314
Cross Listed Course Information			
Course Title Engineering Study Abroad Nagoya University			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	St Nagoya	
	Transcript Max = 20 Spaces	St Nagoya	
Course Description Engineering study abroad to Nagoya University , Japan			
PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k			
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input checked="" type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prerequisites 4-5 semesters foreign language if immersion program <input type="radio"/> Enforced <input checked="" type="radio"/> Advised			
Credit Restrictions			
Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Credit Hours Min Max 1 16	Contact Hrs/Wk varies Number of Wks varies
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No			
Printing Information (Optional) <input type="checkbox"/> Print the course in the Bulletin <input type="checkbox"/> Print the course in the Time Schedule			
Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="checkbox"/> Other		Graded Section <input type="radio"/> Lec <input type="radio"/> Rec <input type="radio"/> Sem <input type="radio"/> Lab <input type="radio"/> Dis <input type="radio"/> Ind <input checked="" type="radio"/> Other	Grading <input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y
Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension		Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd	
Cognizant Faculty Member: _____ Title: _____			
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. Engineering, Gary Herrin

Cross-listed Dept(s). \_\_\_\_\_

Due to recent approval of one study abroad number for undergraduates and one study abroad number for graduates, we are requesting that the old, inactive numbers are deleted from the course listings.

[illegible]☐ Yes ☐ No[illegible]

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 9/22/2003

Effective Fall 2003

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department <b>ENGNSA</b>		Div # <b>290</b>	Course Number <b>315</b>	Home Department		Div #	Course Number
Cross Listed Course Information				Cross Listed Course Information			
Course Title <b>Engineering Study Abroad ENSTA</b>				Course Title			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	<b>St Ensta</b>		TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces		
	Transcript Max = 20 Spaces	<b>St Ensta</b>			Transcript Max = 20 Spaces		
Course Description <b>Engineering study abroad to ENSTA , France</b>				Course Description for Official Publication (Max = 50 words)			
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k				<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k			
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input checked="" type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective				Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prerequisites 4-5 semesters foreign language if immersion program <input type="radio"/> Enforced <input checked="" type="radio"/> Advised				Prerequisites <input type="radio"/> Enforced <input type="radio"/> Advised			
Credit Restrictions				Credit Restrictions			
Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Credit Hours Min Max <b>1 16</b>	Contact Hrs/Wk <b>varies</b> Number of Wks <b>varies</b>	Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Credit Hours Min Max	Contact Hrs/Wk Number of Wks
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No				Printing Information (Optional) <input type="checkbox"/> Print the course in the Bulletin <input type="checkbox"/> Print the course in the Time Schedule			
Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="checkbox"/> Other _____	Graded Section <input type="radio"/> Lec <input type="radio"/> Rec <input type="radio"/> Sem <input type="radio"/> Lab <input type="radio"/> Dis <input type="radio"/> Ind <input checked="" type="radio"/> Other _____	Grading <input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y	Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension	Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIib <input type="checkbox"/> III <input checked="" type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years		Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd	
Cognizant Faculty Member: _____ Title _____				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. Engineering, Gary Herrin

Cross-listed Dept(s): \_\_\_\_\_

Due to recent approval of one study abroad number for undergraduates and one study abroad number for graduates, we are requesting that the old, inactive numbers are deleted from the course listings.

☐ Yes ☐ No

### Detail the Special requirements

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 9/22/2003

Effective Fall 2003

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Div #	Course Number
ENGINSA		290	316
Cross Listed Course Information			
Course Title Engineering Study Abroad Los Andes			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	St Los Andes	
	Transcript Max = 20 Spaces	St Los Andes	
Course Description Engineering study abroad to Los Andes , Colombia			
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input checked="" type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prerequisites 4-5 semesters foreign language if immersion program <input type="radio"/> Enforced <input checked="" type="radio"/> Advised			
Credit Restrictions			
Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Credit Hours Min Max 1 16	Contact Hrs/Wk varies Number of Wks varies
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No			
Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="checkbox"/> Other _____		Graded Section <input type="radio"/> Lec <input type="radio"/> Rec <input type="radio"/> Sem <input type="radio"/> Lab <input type="radio"/> Dis <input type="radio"/> Ind <input checked="" type="radio"/> Other _____	Grading <input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y
Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension		Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd	
Cognizant Faculty Member: _____ Title: _____ 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. Engineering, Gary Herrin

Cross-listed Dept(s). \_\_\_\_\_



**SUPPORTING STATEMENT**

Due to recent approval of one study abroad number for undergraduates and one study abroad number for graduates, we are requesting that the old inactive numbers are deleted from the course listings.....

Are any special resources or facilities required for this course?

☐ Yes ☐ No

Detail the Special requirements

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 9/22/2003

Effective Fall 2003

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Div #	Course Number
ENGNSA		290	317
Cross Listed Course Information			
Course Title			
Engineering Study Abroad TU Delft			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	St Tu Delft	
	Transcript Max = 20 Spaces	St Tu Delft	
Course Description			
Engineering study abroad to Technical University of Delft , Netherlands			
<b>PROGRAM OUTCOMES:</b>			
<input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k			
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input checked="" type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prerequisites 4-5 semesters foreign language if immersion program <input type="radio"/> Enforced <input checked="" type="radio"/> Advised			
Credit Restrictions			
Level of Credit		Credit Hours	Contact
<input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rckhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rckhm Grad <input type="checkbox"/> Rckhm Grad w/add'l Work <input type="checkbox"/> Ugrad or Rckhm Grad		Min Max 1 16	Hrs/Wk varies Number of Wks varies
Repeatability (Indi Research, Dir. Study, Dissertation):			
Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No			
Printing Information (Optional) <input type="checkbox"/> Print the course in the Bulletin <input type="checkbox"/> Print the course in the Time Schedule			
Class Type(s)		Graded Section	Location
<input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="checkbox"/> Other _____		<input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="radio"/> Other _____	<input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension
Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd			
Cognizant Faculty Member: _____ Title: _____ 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. Engineering, Gary Herrin

Cross-listed Dept(s). \_\_\_\_\_

**SUPPORTING STATEMENT**

Due to recent approval of one study abroad number for undergraduates and one study abroad number for graduates, we are requesting that the old, inactive numbers are deleted from the course listings.

Are any special resources or facilities required for this course?

☐ Yes ☐ No

Detail the Special requirements

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 9/22/2003

Effective Fall 2003

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department <b>ENGNSA</b>		Div # <b>290</b>	Course Number <b>318</b>	Home Department		Div #	Course Number
Cross Listed Course Information				Cross Listed Course Information			
Course Title <b>Engineering Study Abroad Hong Kong University of Technology</b>				Course Title			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	St Hkust		TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces		
	Transcript Max = 20 Spaces	St Hkust			Transcript Max = 20 Spaces		
Course Description <b>Engineering study abroad to Hong Kong University of Technology, Hong Kong</b>				Course Description for Official Publication (Max = 50 words)			
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k				<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k			
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input checked="" type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective				Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prerequisites <b>4-5 semesters foreign language if immersion program</b> <input type="radio"/> Enforced <input checked="" type="radio"/> Advised				Prerequisites <input type="radio"/> Enforced <input type="radio"/> Advised			
Credit Restrictions				Credit Restrictions			
Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Credit Hours Min Max <b>1 16</b>	Contact Hrs/Wk <b>varies</b> Number of Wks <b>varies</b>	Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Credit Hours Min Max	Contact Hrs/Wk Number of Wks
Repeatability (Indic Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No				Printing Information <input type="checkbox"/> Print the course in the Bulletin (Optional) <input type="checkbox"/> Print the course in the Time Schedule			
Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="checkbox"/> Other _____		Graded Section <input type="radio"/> Lec <input type="radio"/> Rec <input type="radio"/> Sem <input type="radio"/> Lab <input type="radio"/> Dis <input type="radio"/> Ind <input checked="" type="radio"/> Other _____	Grading <input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y	Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension		Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd	
Cognizant Faculty Member: _____		Title _____		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. Engineering, Gary Herrin

Cross-listed Dept(s). \_\_\_\_\_

**SUPPORTING STATEMENT**

Due to recent approval of one study abroad number for undergraduates and one study abroad number for graduates, we are requesting that the old, inactive numbers are deleted from the course listings.

Are any special resources or facilities required for this course?

☐ Yes ☐ No

Detail the Special requirements

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 9/22/2003

Effective Fall 2003

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Div #	Course Number
ENGNSA		290	319
Cross Listed Course Information			
Course Title Engineering Study Abroad Eindhoven University of Technology			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	St Eindh Un Tec	
	Transcript Max = 20 Spaces	St Eindh Un Tec	
Course Description Engineering study abroad to Eindhoven University of Technology, Netherlands			
PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k			
Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input checked="" type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prerequisites 4-5 semesters foreign language if immersion program <input type="radio"/> Enforced <input checked="" type="radio"/> Advised			
Credit Restrictions			
Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Ugrad or Non-Rckhm Grad <input type="checkbox"/> Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Non-Rckhm Grad <input type="checkbox"/> Rackhm Grad w/add'l Work <input type="checkbox"/> Ugrad or Rackhm Grad		Credit Hours Min Max 1 16	Contact Hrs/Wk varies Number of Wks varies
Repeatability (Indl Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? _____ Maximum Times? _____ Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No			
Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="checkbox"/> Other _____		Graded Section <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="radio"/> Other _____	Grading <input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y
Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension		Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd	
Cognizant Faculty Member: _____ Title: _____ 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. Engineering, Gary Herrin

Cross-listed Dept(s). \_\_\_\_\_

**SUPPORTING STATEMENT**

Due to recent approval of one study abroad number for undergraduates and one study abroad number for graduates, we are requesting that the old, inactive numbers are deleted from the course listings.

Are any special resources or facilities required for this course?

☐ Yes ☐ No

Detail the Special requirements

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 9/22/2003

Effective Fall 2003

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department	Div #	Course Number	Home Department	Div #	Course Number
ENGINSA	290	320			
Cross Listed Course Information			Cross Listed Course Information		
Course Title Engineering Study Abroad Tec U Berlin			Course Title		
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	Tec U Berlin	TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	
	Transcript Max = 20 Spaces	Tec U Berlin		Transcript Max = 20 Spaces	
Course Description Engineering study abroad to Technical University of Berlin, Germany			Course Description for Official Publication (Max = 50 words)		
<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input checked="" type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			<b>PROGRAM OUTCOMES:</b> <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input type="checkbox"/> g <input type="checkbox"/> h <input type="checkbox"/> i <input type="checkbox"/> j <input type="checkbox"/> k Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective		
Prerequisites 4-5 semesters foreign language if immersion program <input type="radio"/> Enforced <input checked="" type="radio"/> Advised			Prerequisites <input type="radio"/> Enforced <input type="radio"/> Advised		
Credit Restrictions			Credit Restrictions		
Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Credit Hours Min Max 1 16	Level of Credit <input type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Credit Hours Min Max
<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/add'l Work		Contact Hrs/Wk varies Number of Wks varies	<input type="checkbox"/> Ugrad or Non-Rackham Grad <input type="checkbox"/> All Credit types <input type="checkbox"/> Rackham Grad w/add'l Work		Contact Hrs/Wk Number of Wks
Repeatability (Indl Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? Maximum Times? Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No			Printing Information <input type="checkbox"/> Print the course in the Bulletin (Optional) <input type="checkbox"/> Print the course in the Time Schedule		
Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="checkbox"/> Other	Graded Section <input type="radio"/> Lec <input type="radio"/> Rec <input type="radio"/> Sem <input type="radio"/> Lab <input type="radio"/> Dis <input type="radio"/> Ind <input checked="" type="radio"/> Other	Grading <input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y	Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension	Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years	Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd
Cognizant Faculty Member:			Title		
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. Engineering, Gary Herrin

Cross-listed Dept(s).



**SUPPORTING STATEMENT**

Due to recent approval of one study abroad number for undergraduates and one study abroad number for graduates, we are requesting that the old inactive numbers are deleted from the course listings.

Are any special resources or facilities required for this course?

☐ Yes ☐ No

Detail the Special requirements

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 9/22/2003

Effective Fall 2003

A. CURRENT LISTING

B. REQUESTED LISTING

Home Department		Div #	Course Number
ENGINSA		290	321
Cross Listed Course Information			
Course Title Engineering Study Abroad GE3 Consortium			
TITLE ABBRE- VIATION	Time Sched Max = 19 Spaces	Consortiums	
	Transcript Max = 20 Spaces	Consortiums	
Course Description Engineering study abroad through GE3 Consortium			
PROGRAM OUTCOMES: <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e <input type="checkbox"/> f <input checked="" type="checkbox"/> g <input checked="" type="checkbox"/> h <input type="checkbox"/> i <input checked="" type="checkbox"/> j <input type="checkbox"/> k Degree Requirements <input type="radio"/> Degree Requirement <input type="radio"/> Free Elective <input checked="" type="radio"/> Other <input type="radio"/> Core Course <input type="radio"/> Tech Elective			
Prerequisites 4-5 semesters foreign language if immersion program <input type="radio"/> Enforced <input checked="" type="radio"/> Advised			
Credit Restrictions			
Level of Credit <input checked="" type="checkbox"/> Undergrad only <input type="checkbox"/> Rackham Grad <input type="checkbox"/> Non-Rackham Grad <input type="checkbox"/> Ugrad or Rackham Grad		Credit Hours Min Max 1 16	Contact Hrs/Wk varies Number of Wks varies
Repeatability (Indi Research, Dir. Study, Dissertation): Is this course repeatable? <input checked="" type="radio"/> Yes <input type="radio"/> No Maximum Hours? Maximum Times? Can it be repeated in the same term? <input type="radio"/> Yes <input checked="" type="radio"/> No			
Class Type(s) <input type="checkbox"/> Lec <input type="checkbox"/> Rec <input type="checkbox"/> Sem <input type="checkbox"/> Lab <input type="checkbox"/> Dis <input type="checkbox"/> Ind <input checked="" type="checkbox"/> Other		Graded Section <input type="radio"/> Lec <input type="radio"/> Rec <input type="radio"/> Sem <input type="radio"/> Lab <input type="radio"/> Dis <input type="radio"/> Ind <input checked="" type="radio"/> Other	Grading <input type="checkbox"/> A-E <input type="checkbox"/> CR/NC <input type="checkbox"/> S/U <input type="checkbox"/> P/F <input type="checkbox"/> Y
Location <input checked="" type="checkbox"/> Ann Arbor <input type="checkbox"/> Biological Station <input type="checkbox"/> Camp Davis <input type="checkbox"/> Extension		Terms & Freq. of Offering <input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> IIIa <input type="checkbox"/> IIIb <input type="checkbox"/> III <input type="checkbox"/> Yearly <input type="checkbox"/> Alter Years <input type="checkbox"/> Even Years <input type="checkbox"/> Odd Years Half term <input type="checkbox"/> 1st <input type="checkbox"/> 2nd	
Cognizant Faculty Member: Title			
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. Engineering, Gary Herrin

Cross-listed Dept(s).

**SUPPORTING STATEMENT**

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Detail the Special requirements