

EDUCATIONAL POLICY COMMITTEE
COURSE AND CURRICULUM CHANGES
UNIVERSITY FACULTY MEETING
March 21, 2005

RCEAS MOTIONS

ECE Department Catalog Changes – October 19, 2004**Proposed Course Changes (Modify existing description)****1. Current course number and course description (from course catalog):****ECE 33 Introduction to Computer Engineering (4) fall**

Analysis, design and implementation of small digital circuits. Boolean algebra. Minimization techniques synchronous sequential circuit design, number systems and arithmetic. Microcomputer architecture and assembly level programming. Prerequisite: Engr 1 or CSE 17.

2. Proposed course number and course description (as it will appear in course catalog):**ECE 33 (CSE 33). Introduction to Computer Engineering (4) fall**

Analysis, design and implementation of small digital circuits. Boolean algebra. Minimization techniques, synchronous sequential circuit design, number systems and arithmetic. Microcomputer architecture and assembly level programming. Prerequisite: Engr 1 or CSE 17.

3. Description of proposed change(s):

Crosslist with CSE 33 (CSE department has added CSE 33 in anticipation)

4. Rationale for proposed change(s):

Rationale: To accommodate the CSE department, as per its request. Specifically, CSE majors must take this course and CSE faculty may also teach the course.

5. Impact Statement:

None. This course is offered now and will not be affected

Proposed Course Changes (Modify existing description)

1. Current course number and course description (from course catalog):

ECE 201 Computer Architecture (3) Spring

Structure and function of digital computers. Computer components and their operations. Computer interconnection structures. Memory system and cache memory. Interrupt driven input/output and direct memory access. Instruction sets and addressing modes. Instruction pipelining. Floating-point representation and arithmetic. Alternative architectures: RISC vs. CISC and introduction to parallel architectures. Prerequisite: ECE 33.

2. Proposed course number and course description (as it will appear in course catalog):

ECE 201 (CSE201). Computer Architecture (3) Spring

Structure and function of digital computers. Computer components and their operations. Computer interconnection structures. Memory system and cache memory. Interrupt driven input/output and direct memory access. Instruction sets and addressing modes. Instruction pipelining. Floating-point representation and arithmetic. Alternative architectures: RISC vs. CISC and introduction to parallel architectures. Prerequisite: ECE 33 (CSE33).

3. Description of proposed change(s):

Crosslist with CSE 201 (CSE department has added CSE 201 in anticipation)

4. Rationale for proposed change(s):

Rationale: To accommodate the CSE department, as per its request. Specifically, CSE majors must take this course and CSE faculty also teach the course.

5. Impact Statement:

None. This course is offered now and will not be affected

Proposed New ProgramMinor in Nanotechnology**1. Proposed new program mission statement:**

To focus and recognize the work of students who wish to establish a base of knowledge and experience in the area of nanotechnology.

2. Rationale for proposed new program:

Nanotechnology is a field of growing scientific interest and technological importance. Lehigh offers a number of courses related to nanotechnology. The creation of a minor in the field is therefore logical, will be attractive to students, and may even serve as a recruiting attraction.

3. Description of proposed new program:**a. Admission criteria: (required for Graduate programs only)**

Not applicable

b. Specific degree requirements:Bachelor's Degree

This is not a bachelor's degree but the form has no slot for minors

(1) course requirements, including a semester-by-semester roster

To obtain a Minor in Nanotechnology a student must complete a minimum of 15 credit hours of study as follows:

Foundation Courses**I Basics of Nanotechnology**

MAT 3XX. Materials for Nanotechnology (3)

II Crystallography and Band Theory

One of the following four courses:

MAT 302 Electronic Properties of Materials (3)

PHY 363 Physics of Solids (3)

ECE 308 Physics and Models of Electronic Devices (3)

CHM 341 Chemical Physics and Bonding (4)

Elective Courses

Elective courses are to be selected from the list below. New courses will be added to this list as they are created. There will be additional courses made available by remote learning from the MatPAC universities. MatPAC is the Materials Pennsylvania Consortium.

Course	Cross listing
CHE 391	Colloid and Surface Chemistry (3) CHM 391
MAT 334	Electron Microscopy and Microanalysis (4) EES 339 and CHE 334
MAT 3XX	Thin Films (3)

MAI 345	Powder Metallurgy (3)
MAI 3XX	Strategies for Nanocharacterization (3)
PHY 369	Quantum Mechanics I (3)
ECE 3XX	Micro and Nanotechnology (3)
ECE 3XX	Applied Quantum Mechanics (3)
ECE 351	Microelectronics Technology (3)

Courses of individual study (including laboratory projects) on relevant topics, in any appropriate department will also be accepted as electives for the minor, with the approval of the advisor

Additional requirement:

Since the aim of this minor is to provide an interdisciplinary program in nanotechnology students must take at least two courses outside their home department.

(2) new courses

No new courses are required for this minor, however, we expect that several new courses will be developed over time and that these courses will be added to the list of electives as they are created. These new courses will reflect the changing interests of Faculty and the results of new Faculty hires.

Several courses are listed here as 3XX. All of these courses have already been given (under experimental numbers) and will be made regular courses shortly.

4. Academic Impact Statement:

a. Is this proposed new program interdisciplinary?

Yes

b. Identify any known effects of the proposed new program on other programs at the University.

It will make programs in engineering, physics and chemistry more attractive by providing a cool option.

c. If there are known effects, individuals in charge of the affected programs must be consulted about the proposed new program and the following information provided:

(1) Who was consulted?

Chairs of all of the departments impacted by the program were consulted and kept informed of the work of the committee that prepared this proposal.

(2) Is the proposed new program acceptable to the affected programs?

Yes

(3) Will any changes be required in the affected programs? If so, describe.

No. However:

1 This program will work as proposed only if each professor giving a course available as an elective is sympathetic to allowing students to take the course when they are in a different department and do not have the normal prerequisites.

2 In some cases, to be suitable, courses would need to change their content somewhat to put more emphasis on nanotechnology aspects of the subject matter. For example, Professor Misiolek has indicated an interest in doing this in MAT 345

d. Identify any known effects of the proposed new program on the University's commitment to diversity.

None.

5. Resource Impact Statement:

As no new courses are involved there is expected to be no impact on resources.

a. Provide each of the following:

- (1) Library impact statement
- (2) Computer impact statement
- (3) Faculty impact statement
- (4) Facilities impact statement

b. Provide a statement indicating who will assume financial responsibility for any new resources required:

It is not anticipated that there will be new resources required to launch this minor - with the exception of some administration to run it. Although the program is highly interdisciplinary, it will need a "home department" from which to operate. This will be the Department of Materials Science and Engineering. The Department of Materials Science and Engineering in collaboration with the Center for Advanced Materials and Nanotechnology, will be responsible for the program including its administration

CSE DEPARTMENT: Proposed Program Change for APC**Name and summary of current program:**

Bachelor of Science in Computer Science and Business

Proposed program changes (as they will appear in the catalog):

Current catalog entry::

Senior year, first semester (16 credit hours)

CSE 303 Operating System Design (3)
 MGT 280 Management of People and Operations (4)
 CSB Professional Elective (3)*
 CSB 313 Design of Integrated Business Applications II (3)
 HSS electives Humanities/Social Sciences elective (3)

Proposed catalog entry:

Senior year, first semester (16 credit hours)

CSE 303 Operating System Design (3)
 MGT 280 Management of People and Operations (4)
 CSB Professional Elective (3)*
 CSB 313 Design of Integrated Business Applications II (3)
 CSE 252 Computers, the Internet, and Society (3)

Description of proposed change(s):

Replace the 3-credit HSS elective with the specific HSS course CSE 252.

Rationale for proposed change(s):

This ensures that CSB students have exposure to computer ethics, an accreditation requirement.

Academic Impact Statement:Is this proposed program change interdisciplinary? **NO****Identify any known effects of the proposed program change on other programs at the University.****NONE****If there are known effects, individuals in charge of the affected programs must be consulted about the proposed program change and the following information provided: NONE****Who was consulted?****Is the proposed program change acceptable to the affected programs?****Will any changes be required in the affected programs? If so, describe.****Identify any known effects of the proposed program change on the University's commitment to diversity.****NO KNOWN EFFECTS****Resource Impact Statement:**

Provide each of the following:

Library impact statement **NONE**Computer impact statement **NONE**Faculty impact statement **NONE**Facilities impact statement **NONE**Provide a statement indicating who will assume financial responsibility for any new resources required: **None required**

CSE DEPARTMENT: Proposed Program Change for APC

Name and summary of current program:

Bachelor of Science in Computer Science

Proposed program changes (as they will appear in the catalog):

Current catalog entry::

Junior year, first semester (18 credit hours)

CSE 261 Discrete Structures (3)

MATH 231 Probability and Statistics (3) or

MATH 309 Theory of Probability (3)

HSS electives ## (6)

Approved technical elective* (3)

Approved professional elective** (3)

Proposed catalog entry:

Junior year, first semester (18 credit hours)

CSE 261 Discrete Structures (3)

MATH 231 Probability and Statistics (3)

HSS electives ## (6)

Approved technical elective* (3)

Approved professional elective** (3)

Description of proposed change(s):

Remove Math 309 as an alternative to Math 231.

Rationale for proposed change(s):

ABET accreditation standards require that students have exposure to statistics. The very few students who elect Math 309 in place of Math 231 do not satisfy this requirement

Academic Impact Statement:

Is this proposed program change interdisciplinary? **NO**

Identify any known effects of the proposed program change on other programs at the University.
NONE

If there are known effects, individuals in charge of the affected programs must be consulted about the proposed program change and the following information provided: NONE

Who was consulted?

Is the proposed program change acceptable to the affected programs?

Will any changes be required in the affected programs? If so, describe

Identify any known effects of the proposed program change on the University's commitment to diversity.

NO KNOWN EFFECTS

Resource Impact Statement:

Provide each of the following:

Library impact statement **NONE**

Computer impact statement **NONE**

Faculty impact statement **NONE**

Facilities impact statement **NONE**

Provide a statement indicating who will assume financial responsibility for any new resources required: **None required**

Proposed New Course - CSE Department

1. Proposed new course number and course description (as is it will appear in course catalog):

CSE 1aa Technical Presentation (1)

Oral and written communication of information in computer science. Technical writing; structure, style, and delivery of oral presentations; use of visual aids. Prerequisite: CSE 17.

2. Instructional mode (i.e., lecture, recitation, laboratory, seminar, independent study, or other) and number of contact hours per week:

Lecture supplemented with laboratory exercises

3. Rationale for proposed new course:

Our B.S. students in the College of Arts get no exposure to oral and written communication in their required program. This course fills that gap.

4. Academic impact on programs affected by new course:

- a. Is this proposed new course cross-listed? No.
- b. Is the proposed new course acceptable to all affected programs? Yes
- c. If there are known effects, individuals in charge of the affected programs must be consulted about the changes and the following information provided:

1. Who was consulted?

No one else. We direct the B.S. in CS in CAS.

2. Is the proposed new course acceptable to the affected program?

Yes.

3. Will any changes be required in the affected programs? If so, describe.

An additional credit will be required, raising the required number of credits from 126 to 127

- d. Identify any known effects of the proposed new course on the University's commitment to diversity.

5. Resource Impact Statement:

a. Provide each of the following:

- (1) **Library impact statement:** None.
- (2) **Computer impact statement:** None.
- (3) **Faculty impact statement:** Slight. The enrollment will be low, and the course is only 1 credit
- (4) **Facilities impact statement:** None

b. Provide a statement indicating who will assume financial responsibility for any new resources required:

CSE will assume financial responsibility for the change.

Proposed New Course – CSE Department

1. Proposed new course number and course description (as is it will appear in course catalog):

CSE 2bb: System and Network Administration (3)

Overview of systems and network administration in a networked UNIX-like environment. System installation, configuration, administration, and maintenance; security principles; ethics; network, host, and user management; standard services such as electronic mail, DNS, and WWW; file systems; backups and disaster recovery planning; troubleshooting and support services; automation, scripting; infrastructure planning. Prerequisite: CSE17

2. Instructional mode (i.e., lecture, recitation, laboratory, seminar, independent study, or other) and number of contact hours per week:

Two hours lecture, one hour hands-on laboratory per week

3. Rationale for proposed new course:

This course was taught experimentally in Spring 2004 to two dozen students. Students appreciated the hands-on lab experience and found the material directly useful. Some students believe this should be a required course for all sophomore CS majors. This course fills a void in our curriculum.

4. Academic impact on programs affected by new course:

a. Is this proposed new course cross-listed?

No

b. Is the proposed new course acceptable to all affected programs?

Yes

c. If there are known effects, individuals in charge of the affected programs must be consulted about the changes and the following information provided:

1. Who was consulted?
2. Is the proposed new course acceptable to the affected program?
3. Will any changes be required in the affected programs? If so, describe.

d. Identify any known effects of the proposed new course on the University's commitment to diversity.

None

5. Resource Impact Statement:

a. Provide each of the following:

(1) Library impact statement:

None

(2) Computer impact statement:

This course depends heavily on the availability and functionality of a highly configurable and modern computer systems laboratory. One currently exists, supporting 12 workstations. If this course were to be popular, multiple lab sections would be required or additional workstations would be needed (as well as periodic replacement of failed or outdated equipment).

(3) Faculty impact statement:

No special impact.

(4) Facilities impact statement:

None.

b. Provide a statement indicating who will assume financial responsibility for any new resources required:

CSE will assume financial responsibility for the change.

Proposed New Course - CSE Department

5. Proposed new course number and course description (as is it will appear in course catalog):

CSE 3zz Introduction to Mobile Robotics (3)

Algorithms employed in mobile robotics for navigation, sensing, and estimation. Common sensor systems, motion planning, robust estimation, bayesian estimation techniques, Kalman and Particle filters, localization and mapping. Credit will not be given for both CSE 3zz and CSE 4zz. Prerequisites: Math 205 and CSE 109.

6. Instructional mode (i.e., lecture, recitation, laboratory, seminar, independent study, or other) and number of contact hours per week:

Lecture, three hours per week, supplemented with a few laboratory exercises

7. Rationale for proposed new course:

This course is consistent with engineering school goals of fostering education in Autonomous and Intelligent Systems (AIS). The course was offered in Fall '03 for the first time with an enrollment of 18 students. A follow-on course is being offered this semester. Enrollment as of 1 Sep is 23 students.

8. Academic impact on programs affected by new course:

- e. Is this proposed new course cross-listed? No.
- f. Is the proposed new course acceptable to all affected programs? N/A
- g. If there are known effects, individuals in charge of the affected programs must be consulted about the changes and the following information provided:
 - 4. Who was consulted?
 - 5. Is the proposed new course acceptable to the affected program?
 - 6. Will any changes be required in the affected programs? If so, describe.
- h. Identify any known effects of the proposed new course on the University's commitment to diversity.

9. Resource Impact Statement:

- c. Provide each of the following:
 - (5) **Library impact statement:** None.
 - (6) **Computer impact statement:** None. The course will make use of computers purchased under the AIS grant.
 - (7) **Faculty impact statement:** None. Prof. Spletzer (CSE) will teach the course.
 - (8) **Facilities impact statement:** None. It will use resources already in place in AIS West (PL322) and the VADER Laboratory (PL450)

- d. Provide a statement indicating who will assume financial responsibility for any new resources required:
CSE will assume financial responsibility for the change.

RCEAS: Computer Science and Engineering

Proposed Course Changes

1. Current course number title course description, and credits (from present course catalogue):

CSE 347. Data Mining (3)

Overview of modern data mining techniques: data cleaning; attribute and subset selection; model construction, evaluation and application. Fundamental mathematics and algorithms for decision trees, covering algorithms, association mining, statistical modeling, linear models, neural networks, instance-based learning and clustering covered. Practical design, implementation, application and evaluation of data mining techniques in class projects. Prerequisites: Either CSE 17 and MATH 231, or BIS 120 and ECO 145.

2. Proposed course number title, course description, and credits (as it will appear in course catalogue):

CSE 347. Data Mining (3)

Overview of modern data mining techniques: data cleaning; attribute and subset selection; model construction, evaluation and application. Fundamental mathematics and algorithms for decision trees, covering algorithms, association mining, statistical modeling, linear models, neural networks, instance-based learning and clustering covered. Practical design, implementation, application and evaluation of data mining techniques in class projects. Credit will not be given for both CSE 347 and CSE 447. Prerequisites: Either CSE 17 and MATH 231, or BIS 120 and ECO 145.

3. Nature of proposed change(s)

Do not allow students to get credit for CSE 347 and CSE 447, because the latter course is a graduate version of CSE 347, with the students in CSE 447 attending CSE 347 and doing extra work.

Other change(s)? If so, please describe below and provide rationale for each change.

4. Resource Impact

A. Provide impact statements in the four areas listed below:

(1) **Library impact statement** (attach statement if provided by LTS)

N/A

(2) **Computer impact statement** (attach statement, if provided by LTS)

N/A

(3) **Faculty impact statement** (how proposed program affects load on existing faculty or requires new faculty)

N/A

(4) **Facilities impact statement** (how proposed program affects load on existing facilities or requires new facilities)

N/A

B. Provide a statement indicating who will assume financial responsibility for any new resources required:

No new resources are required.

RCEAS: Computer Science and Engineering

Proposed Course Changes

1. Current course number, title, course description, and credits (from present course catalogue):

CSE 365. Natural Language Processing (3)

Computer analysis of human languages, such as English. Syntactic parsing and semantic interpretation of sentences; morphological recognition of words and idioms. Applications of natural language processing such as database queries. Prerequisite: CSE 262 or equivalent familiarity with Prolog, Lisp.

2. Proposed course number, title, course description, and credits (as it will appear in course catalogue):

3. Nature of proposed change(s)

Other change(s)? If so, please describe below and provide rationale for each change.
DROP.

Rationale: We have not offered the course in a number of years, nor do we intend to offer it again.

4. Resource Impact

A. Provide impact statements in the four areas listed below:

(1) Library impact statement (attach statement if provided by LTS)

N/A

(2) Computer impact statement (attach statement if provided by LTS)

N/A

(3) Faculty impact statement (how proposed program affects load on existing faculty or requires new faculty)

N/A

(4) Facilities impact statement (how proposed program affects load on existing facilities or requires new facilities)

N/A

B. Provide a statement indicating who will assume financial responsibility for any new resources required:

N/A

RCEAS: Computer Science and Engineering

Proposed New Course

1. Proposed new course number and course description (as it will appear in course catalogue):

CSE 33 (ECE 33). Introduction to Computer Engineering (4) fall
Analysis, design and implementation of small digital circuits. Boolean algebra. Minimization techniques, synchronous sequential circuit design, number systems and arithmetic. Microcomputer architecture and assembly level programming. Prerequisite: Engr 1 or CSE 17.

2. Instructional mode (lecture, recitation, laboratory, seminar independent study, or other) and number of contact hours per week:

Lecture and recitation. Four hours per week.

3. Rationale for proposed new course:

The course has been taught for many years as ECE 33. We seek to crosslist it because it is taken by all our Computer Science majors and all our Computer Engineering majors (and few others) and because we sometimes teach the course.

4. Academic impact on programs affected by new course:

None

A. Is the proposed course to be cross-listed?

Yes.

B. Identify any known effects of the proposed new course on other programs at the University.

None.

C. If there are known effects, individuals in charge of the affected programs must be consulted about the proposed new program and the following information provided:

(1) Who was consulted?

We consulted ECE.

(2) Is the proposed new course acceptable to all other programs affected?

Yes.

(3) Will any changes be required in the affected programs? If so, please describe below:

No.

D. Does the proposed new program affect the University's commitment to diversity in any way? If so, please describe below:

No.

5. Resource Impact

None.

RCEAS: Computer Science and Engineering

Proposed New Course

1. Proposed new course number and course description (as it will appear in course catalogue):

CSE 201 (ECE 201). Computer Architecture (3)

Structure and function of digital computers. Computer components and their operations. Computer interconnection structures. Memory system and cache memory. Interrupt driven input/output and direct memory access. Instruction sets and addressing modes. Instruction pipelining. Floating-point representation and arithmetic. Alternative architectures: RISC vs. CISC and introduction to parallel architectures. Prerequisite: ECE 33.

2. Instructional mode (lecture, recitation, laboratory, seminar, independent study or other) and number of contact hours per week:

Lecture. Three hours per week.

3. Rationale for proposed new course:

The course has been taught for many years as ECE 201. We seek to crosslist it because it is taken by all our Computer Science majors and all our Computer Engineering majors (and few others) and because we usually teach the course.

4. Academic impact on programs affected by new course:

None

A. Is the proposed course to be cross-listed?

Yes

B. Identify any known effects of the proposed new course on other programs at the University.

None.

C. If there are known effects, individuals in charge of the affected programs must be consulted about the proposed new program and the following information provided:

(1) Who was consulted?

We consulted ECE

(2) Is the proposed new course acceptable to all other programs affected?

Yes.

(3) Will any changes be required in the affected programs? If so please describe below:

No.

D. Does the proposed new program affect the University's commitment to diversity in any way? If so, please describe below:

No.

5. Resource Impact

None.

#4
F'04

Approved

**P.C. Rossin College of Engineering and Applied Science:
Department of Civil and Environmental Engineering**

Proposed Course Changes

1. Current course number, title, course description, and credits (from present course catalogue):

CEE 379 (EES 379). Environmental Case Studies (3 to 4 credits)
Supervised multidisciplinary team projects investigating site characterization and environmental remediation design and environmental policy and financial implications of environmental projects. OSHA approved Health and Safety training provided. Prerequisites: EES 21, EES 31 plus 5 EES courses or permission of the instructor (CEE prerequisites: CEE 274 and CEE 276 (CHE 276)). Staff

2. Proposed course number, title, course description and credits (as it will appear in course catalogue):

CEE 379 (EES 379) Environmental Case Studies (3 to 4 credits)
Case studies will be used to explore the impact of politics, economics, society, technology, and ethics on environmental projects and preferences. Environmental issues in both affluent and developing countries. Multidisciplinary student teams investigate site characterization; environmental remediation design; environmental policy; and political, financial, social, and ethical implications of environmental projects. Prerequisites: ES2 or EES 21 or CEE 276 (CHE 276) or permission of the instructor.

3. Nature of proposed change(s)

A. Course title change? If so, provide rationale below:

No

B. Course number change? If so, provide rationale below:

No

C. Change in course credits? If so, provide rationale below:

No

D. Change in course description? If so, provide rationale below:

Yes. I have added the first two sentences to more accurately describe that the majority of class time will be spent analyzing environmental case studies to elicit the role of politics, economics, society, technology, and ethics in real world environmental projects (both in the developed and developing world). I have expanded upon the description of the multidisciplinary team work to be more inclusive of the issues we will consider in remediation design. The statement about OSHA health and safety training has been omitted – it is highly unlikely that this type of training will be necessary for our work, but should it become necessary in the future, it will of course be provided.

I have also modified the prerequisites by eliminating the general requirement for 5 EES courses. One purpose of this course is to engage students from different departments and different backgrounds in analysis of environmental issues, and therefore the class is designed to be taken by a multidisciplinary group of students. Requiring so many EES courses might discourage students from non-

EES backgrounds from taking the course and is not required for successful completion of the course. I have also eliminated CEE 274 and EES 31 as prerequisites – the case studies we cover encompass a broad range of environmental issues, and thus a particular background in water chemistry or organismal biology is not required for successful completion of the course. Any technical background necessary to cover a particular case study will be provided in lecture or through handouts.

E. Other change(s)? If so please describe below and provide rationale for each change.

No

4. Resource Impact

A. Provide impact statements in the four areas listed below:

(1) Library impact statement (attach statement, if provided by LTS)

None

(2) Computer impact statement (attach statement, if provided by LTS)

None

(3) Faculty impact statement (how proposed program affects load on existing faculty or requires new faculty)

None

(4) Facilities impact statement (how proposed program affects load on existing facilities or requires new facilities)

None

B. Provide a statement indicating who will assume financial responsibility for any new resources required:

No new financial responsibility required.

CSE DEPARTMENT: Proposed Change in Minor for APC**Name and summary of current program:**

Minor in Computer Science

Proposed program changes (as they will appear in the catalog):

Current catalog entry::

CSE 15 Introduction to Computing (4)
 CSE 17 Structured Programming and Data Structures 4)
 ECE 33 Introduction to Computer Engineering (3)
 and two CSE electives from the following list:
 CSE 109 Systems Programming (3)
 CSE 216 Software Engineering (3)
 CSE 241 Data Base Systems
 CSE 261 Discrete Structures
 CSE 271 Programming in C and the Unix Environment (3)
 CSE 262 Programming Languages
 CSE 327 Artificial Intelligence Theory and Practice (3)
 CSE 340 Design and Analysis of Algorithms (3)

Proposed catalog entry:

CSE 15 Introduction to Computing (4)
 CSE 17 Structured Programming and Data Structures (4)
 plus any three CSE courses, except CSE 1aa (Technical Presentation)

Description of proposed change(s):

No longer require ECE 33 and allow any CSE course beyond the required courses.

Rationale for proposed change(s):

This makes the minor attractive to a broader audience .

Academic Impact Statement:Is this proposed program change interdisciplinary? **NO**

Identify any known effects of the proposed program change on other programs at the University.

NONE

If there are known effects, individuals in charge of the affected programs must be consulted
 about the proposed program change and the following information provided: NONE

Who was consulted?

Is the proposed program change acceptable to the affected programs?

Will any changes be required in the affected programs? If so, describe.

Identify any known effects of the proposed program change on the University's
 commitment to diversity.

NO KNOWN EFFECTS

Resource Impact Statement:

Provide each of the following:

Library impact statement **NONE**Computer impact statement **NONE**Faculty impact statement **NONE**

Facilities impact statement **NONE** Provide a statement indicating who will assume financial
 responsibility for any new resources required: **None required**

#6
F'04

Approved

**P.C. Rossin College of Engineering and Applied Science
Department of Materials Science and Engineering**

Proposed New Course

1. Proposed new course number and course description (as it will appear in course catalogue):

MAT 3ZZ Education Option. (1)
Techniques and methods for teaching, particularly at the high school level through seminars and practice. Lectures and hands-on laboratory demonstrations on topics from materials science and engineering will be delivered to students in participating high schools in the Lehigh Valley

2. Instructional mode (lecture, recitation, laboratory, seminar, independent study, or other) and number of contact hours per week:

Combination of seminar classes at Lehigh, and introductory classes in materials science given by the students in participating high schools in the Lehigh Valley. One contact hour per week.

3. Rationale for proposed new course:

The materials field is very often unknown to high school students. Introducing students earlier to this discipline is very important for broadening their understanding of engineering (and the world in general) and providing a better foundation for their choice of career.

Many materials students are interested in a career involving the teaching of students, or the training of professional staff. This course gives them a taste of what this type of career is all about.

The course has been given twice before under an experimental number (it was taken by 5 students in 2003 and by one in 2004). The students who have taken it have found it very valuable. It is expected that the numbers of students enrolled will increase when the course is in the catalog.

4. Academic impact on programs affected by new course:

A. Is the proposed course to be cross-listed?

The course is not cross-listed at this moment. However, the MS&E department will be very happy to share its experience with students from other departments.

B. Identify any known effects of the proposed new program on other programs at the University.

After running this course for two years no effects of this new course on other programs have been observed.

C. If there are known effects, individuals in charge of the affected programs must be consulted about the proposed new program and the following information provided:

(1) Who was consulted?

(2) Is the proposed new program acceptable to all other programs affected?

(3) Will any changes be required in the affected programs? If so, please describe below:

D. Does the proposed new program affect the University's commitment to diversity in any way? If so please describe below:

The proposed course is offered to all MS&E students without any preferences and in turn the lectures are offered to high school students. Assuming a high enrollment in the course, we will be able to offer materials lectures in public and private high schools, in the urban areas as well in the suburbs of the Lehigh Valley. Our ultimate goal is to reach every high school student who is interested in science and engineering.

5. Resource Impact

A. Provide impact statements in the four areas listed below:

(1) Library impact statement (attach statement if provided by LTS)

No impact on library

(2) Computer impact statement (attach statement if provided by LTS)

No need of any new computers

(3) Faculty impact statement (how proposed program affects load on existing faculty or requires new faculty)

Professor Misiolek who developed this course will coordinate it as he did in 2003 and 2004

(4) Facilities impact statement (how proposed program affects load on existing facilities or requires new facilities)

The proposed course does not require any new facilities.

B. Provide a statement indicating who will assume financial responsibility for any new resources required:

The course requires some physical materials, which are used in hands-on demonstrations. So far the course instructor covered these expenses from his research accounts. It is proposed that the MS&E department will cover the materials supplies expenses from now on.

**ROSSIN COLLEGE OF ENGINEERING AND APPLIED SCIENCE:
Department of Materials Science and Engineering**

Proposed New Course

1. Proposed new course number and course description (as it will appear in course catalogue):

MAT 3XX. Materials for Nanotechnology (3)

Viewing the nanoworld through transmission electron microscopy and scanning probe microscopies. Why nanoscale materials have different physical properties from their bulk counterparts. Classes of nanostructured materials. Fullerenes, carbon nanotubes, nanoparticles and wires of metals and semiconductors, inorganic nanoparticles, and nanoporous materials. "Top-down" and "bottom-up" nanofabrication. Current and potential future uses of nanomaterials. Credit will not be given for both MAT 3XX and MAT 4XX. Prerequisite: MAT 33 or permission of instructor. Kiely.

2. Instructional mode (lecture, recitation, laboratory, seminar, independent study, or other) and number of contact hours per week:

Lecture for 3 contact hours per week.

3. Rationale for proposed new course:

Nanotechnology is emerging as one of the most influential and exciting scientific endeavors of our generation. It is important that we educate our engineers and scientists to understand the materials science issues that relate to this rapidly developing and highly interdisciplinary field.

The course was developed and delivered by Professor Chris Kiely on an experimental basis in the Spring 03 and Spring 04 semesters. In Spring 03 it was offered as a MatPac course and was delivered by internet, broadcast to 7 Penn State graduate students in addition to 12 Lehigh students. In Spring 04 it was not offered as a MatPac course but still attracted 9 Lehigh students, two attendees from local industry (Agere and Minerals Technologies) and 2 other Lehigh staff members who audited the course. The student overall ratings were 4.5 and 4.8 in Spring 03 and Spring 04 respectively.

4. Academic impact on programs affected by new course:

A. Is the proposed course to be cross-listed?

It is not cross listed yet but may be in the future.

B. Identify any known effects of the proposed new program on other programs at the University.

This course should not affect other programs, although it will draw students from other science and engineering departments in the university. No equivalent Lehigh course exists at present. This course is slated to become one of two required core courses in the new Graduate Certificate Program in Nanomaterials proposed by the Department of Materials Science and Engineering. It will also play a key role in the minor in nanotechnology.

C. If there are known effects, individuals in charge of the affected programs must be consulted about the proposed new program and the following information provided:

(1) Who was consulted?

(2) Is the proposed new program acceptable to all other programs affected?

(3) Will any changes be required in the affected programs? If so, please describe below:

D. Does the proposed new program affect the University's commitment to diversity in any way? If so, please describe below:

This new course will not have any negative impact on the University's commitment to diversity.

5. Resource Impact

A. Provide impact statements in the four areas listed below:

(1) **Library impact statement** (attach statement if provided by LTS)

To complement the recent subscriptions to some Nanotechnology oriented journals (e.g. Advanced Materials, Advanced Functional Materials, Nanoletters, Journal of Nanoparticle Research) the library will also need to stock up on a small selection of Nanotechnology texts that have been appearing in print over the past year or two.

(2) **Computer impact statement** (attach statement if provided by LTS)

No impact expected.

(3) **Faculty impact statement** (how proposed program affects load on existing faculty or requires new faculty)

Prof Kiely will continue to deliver the course as part of his normal lecturing duties.

(4) **Facilities impact statement** (how proposed program affects load on existing facilities or requires new facilities)

The intention is to offer this course (via the internet) to other MatPac universities (e.g. Penn State) as well as to our own Lehigh students. This requires the use of the video conferencing classroom (#451) in Whitaker Laboratory.

B. Provide a statement indicating who will assume financial responsibility for any new resources required:

No new resources are required to run this course.

Engineering: Materials Science and Engineering

Proposed New Course

1. Proposed new course number and course description (as it will appear in course catalogue):

MAT 3YY. Strategies for Nanocharacterization (3)

Nanocharacterization techniques: their suitability for specific measurements. Special attention to spatial resolution, detection limits and accuracy for scanning electron microscopy, transmission electron microscopy, X-ray analysis, diffraction analysis, ion beam techniques, surface techniques, atomic force microscopy and other scanning probe microscopies, and light microscopies and spectroscopies. Credit will not be given for both MAT 3YY and MAT 4YY. Prerequisites: Senior standing.

2. Instructional mode (lecture, recitation, laboratory, seminar, independent study, or other) and number of contact hours per week:

Standard 3 hours of lectures per week.

3. Rationale for proposed new course:

Lehigh is nationally and internationally famous in scanning electron microscopy and transmission electron microscopy, and these subjects are well covered by existing courses. However, we should not allow our students to imagine that these are the only techniques available for nanocharacterization. This course provides information on a broad sweep of a myriad of techniques that contribute in different and complementary ways. The course will also serve as a significant contribution to the growing interest in nanotechnology on this campus.

The course was given successfully in the Spring of 2004, to five students (4 graduate and 1 undergraduate).

4. Academic impact on programs affected by new course:

A. Is the proposed course to be cross-listed?

Not at present - but we are open to offers.

B. Identify any known effects of the proposed new course on other programs at the University.

This course, as well as serving many students in the doctoral programs at Lehigh, will contribute specifically to both the Minor in Nanotechnology and to the Graduate Certificate Program in Nanomaterials

C. If there are known effects, individuals in charge of the affected programs must be consulted about the proposed new program and the following information provided:

(1) Who was consulted?

The committee that prepared the Minor in Nanotechnology and the committee that prepared the Graduate Certificate in Nanomaterials and the faculty of the department.

(2) Is the proposed new program acceptable to all other programs affected?

Yes.

(3) Will any changes be required in the affected programs? If so, please describe below:

The programs might be compromised without it.

D. Does the proposed new program affect the University's commitment to diversity in any way? If so please describe below:

There is no negative impact on the commitment to diversity.

5. Resource Impact

A. Provide impact statements in the four areas listed below:

(1) Library impact statement (attach statement if provided by LTS)

Additional books required for this course will be books that the library will acquire anyway, either for general research use or in connection with the course Materials for Nanotechnology.

(2) Computer impact statement (attach statement if provided by LTS)

None.

(3) Faculty impact statement (how proposed program affects load on existing faculty or requires new faculty)

This course will normally be given by Charles Lyman and Alwyn Eades and can be fitted into their schedules and that of the Department.

(4) Facilities impact statement (how proposed program affects load on existing facilities or requires new facilities)

None.

B. Provide a statement indicating who will assume financial responsibility for any new resources required:

This will be a standard elective in the Department of Materials Science and Engineering. That Department will assume responsibility for the course.

RCEAS: Computer Science and Engineering**Proposed Course Changes**

1. Current course number, title, course description, and credits (from present course catalogue):

CSE 331. User Interface Systems and Techniques (3)

Principles and practice of creating effective human-computer interfaces. Design and user evaluation of user interfaces; design and use of interface building tools. Programming projects using a variety of interface building tools to construct and evaluate interfaces. Prerequisite: CSE 109 or consent of the instructor.

2. Proposed course number, title, course description, and credits (as it will appear in course catalogue):

CSE 331. User Interface Systems and Techniques (3)

Principles and practice of creating effective human-computer interfaces. Design and user evaluation of user interfaces; design and use of interface building tools. Programming projects using a variety of interface building tools to construct and evaluate interfaces. Prerequisite: CSE 17 or consent of the instructor.

3. Nature of proposed change(s)

A. Course title change? If so, provide rationale below:

B. Course number change? If so, provide rationale below:

C. Change in course credits? If so provide rationale below:

D. Change in course description? If so provide rationale below:

E. Other change(s)? If so please describe below and provide rationale for each change.

Change in prerequisite from "CSE 109" to "CSE 17."

This change makes it easier for students to minor in Compute Science and include CSE 331 as part of the minor.

4. Resource Impact

A. Provide impact statements in the four areas listed below:

(1) Library impact statement (attach statement, if provided by LTS)

None.

(2) Computer impact statement (attach statement, if provided by LTS)

None.

(3) Faculty impact statement (how proposed program affects load on existing faculty or requires new faculty)

None.

(4) Facilities impact statement (how proposed program affects load on existing facilities or requires new facilities)

None.

B. Provide a statement indicating who will assume financial responsibility for any new resources required:

No new resources are required.

RCEAS: Computer Science and Engineering

Proposed Course Changes

1. Current course number, title, course description and credits (from present course catalogue):

CSE 332 Multimedia Design and Development (3)

Analysis, design and implementation of multimedia software primarily for computer based training (CBI). Projects emphasize user interface design, content design with storyboards or scripts, creation of graphics, animation, audio and video materials, and software development using high level authoring tools.

Prerequisite: CSE14 or CSE17. Blank.

2. Proposed course number, title, course description and credits (as it will appear in course catalogue):

CSE 332 Multimedia Design and Development (3)

Analysis, design and implementation of multimedia software, primarily for e-learning courses or training. Projects emphasize user interface design, content design with storyboards or scripts, creation of graphics, animation, audio and video materials, and software development using high level authoring tools, such as Flash. Prerequisite: CSE12 or CSE15 or Engr 1 or consent of instructor. Blank.

3. Nature of proposed change(s)

A. Course title change? If so provide rationale below:

B. Course number change? If so, provide rationale below:

C. Change in course credits? If so, provide rationale below:

D. Change in course description? If so, provide rationale below:

Reduce the archaic language.

E. Other change(s)? If so, please describe below and provide rationale for each change.

Change prerequisites so that the course is available to a wider audience.

4. Resource Impact

A. Provide impact statements in the four areas listed below:

(1) Library impact statement (attach statement if provided by LTS)

No impact.

(2) Computer impact statement (attach statement, if provided by

LTS)

No impact.

(3) Faculty impact statement (how proposed program affects load on existing faculty or requires new faculty)

No impact.

(4) Facilities impact statement (how proposed program affects load on existing facilities or requires new facilities)

No impact.

B. Provide a statement indicating who will assume financial responsibility for any new resources required:

No new resources are required.

RCEAS: Computer Science and Engineering

Proposed Course Changes

1. Current course number, title, course description, and credits (from present course catalogue):

CSE 352 Ecommerce applications, technology & strategy(3)

E-Commerce for business applications: enterprise resource planning, (ERP); customer relationship management (CRM) and supply chain management (SCM); information innovation strategies and their dependence on a common information integration technology architecture; strategic, technical, logistical and cultural implications of building and operating information integration systems applications

2. Proposed course number, title, course description, and credits (as it will appear in course catalogue):

CSE 352 Information Technology for Commerce(3)

Digitization & Information Integration for business applications: enterprise resource planning, (ERP); customer relationship management (CRM) and supply chain management (SCM); information innovation strategies and their dependence on a common information integration technology architecture; strategic, technical, logistical and cultural implications of building and operating information integration systems applications.

3. Nature of proposed change(s)

A. Course title change? If so, provide rationale below:

Makes the title more descriptive and removes the misleading buzz word "E-commerce"

B. Course number change? If so, provide rationale below:

C. Change in course credits? If so, provide rationale below:

D. Change in course description? If so, provide rationale below:

Replaces the misleading buzz word "E-commerce" with a more descriptive phrase.

E. Other change(s)? If so, please describe below and provide rationale for each change.

4. Resource Impact

A. Provide impact statements in the four areas listed below:

(1) Library impact statement (attach statement if provided by LTS)

None

(2) Computer impact statement (attach statement, if provided by LIS)

None

(3) Faculty impact statement (how proposed program affects load on existing faculty or requires new faculty)

None

(4) Facilities impact statement (how proposed program affects load on existing facilities or requires new facilities)

B. Provide a statement indicating who will assume financial responsibility for any new resources required:

No additional resources are needed.

RCEAS: Computer Science and Engineering

Proposed New Course

1. Proposed new course number and course description (as it will appear in course catalogue):

CSE 3vv: Network Security (3)

Overview of network security threats and vulnerabilities. Techniques and tools for detecting, responding to and recovering from security incidents. Fundamentals of cryptography. Hands-on experience with programming techniques for security protocols. Credit will not be given for both CSE 3vv and CSE 4vv. Prerequisite: CSE342 or CSE303 or CSE2bb.

2. Instructional mode (lecture, recitation, laboratory, seminar, independent study, or other) and number of contact hours per week:

Three hours of lecture per week.

3. Rationale for proposed new course:

The course reflects the background of the instructor and fills a previously unmet need to have network courses in the CSE curriculum. The course has been taught twice before, with good enrollments.

4. Academic impact on programs affected by new course:

A. Is the proposed course to be cross-listed?

No.

B. Identify any known effects of the proposed new program on other programs at the University.

None that we are aware of.

C. If there are known effects, individuals in charge of the affected programs must be consulted about the proposed new program and the following information provided:

(1) Who was consulted?

(2) Is the proposed new program acceptable to all other programs affected?

(3) Will any changes be required in the affected programs? If so please describe below:

D. Does the proposed new program affect the University's commitment to diversity in any way? If so, please describe below:

Yes. The person hired to teach the course is female and a member of an under-represented minority.

5. Resource Impact

A. Provide impact statements in the four areas listed below:

(1) Library impact statement (attach statement if provided by LTS)

No impact. All relevant material is available on line.

(2) Computer impact statement (attach statement if provided by LTS)

No impact. We have the resources for course.

(3) Faculty impact statement (how proposed program affects load on existing faculty or requires new faculty)

A new faculty member has already been hired to propose and teach network courses.

(4) Facilities impact statement (how proposed program affects load on existing facilities or requires new facilities)

No impact.

B. Provide a statement indicating who will assume financial responsibility for any new resources required.

The Computer Science and Engineering Department is assuming financial responsibility.

Engineering: Materials Science and Engineering**Proposed New Course**

1. Proposed new course number and course description (as it will appear in course catalogue):

3WW Thin Films and Nanostructured Materials (3)

Connections between processing techniques, structure, and mechanical behavior of materials with characteristic dimensions (e.g., thickness or grain size) at the micrometer or nanometer scale. Epitaxial thin films, polycrystalline films, patterned films, nanoparticles, and bulk materials with nanocrystalline structure. Credit will not be given for both MAT 3WW and MAT 4WW. Prerequisite: MAT 33 and MECH 2, or equivalents.

2. Instructional mode (lecture, recitation, laboratory, seminar, independent study, or other) and number of contact hours per week:

Standard three hours of lecture format.

3. Rationale for proposed new course:

Many areas of technology are based on thin film structures. Correspondingly it is a major area of research in materials science. There is significant activity in this field in the Department. Providing an elective in the field for our students is logical and desirable.

4. Academic impact on programs affected by new course:

A. Is the proposed course to be cross-listed?

The course will not be cross listed

B. Identify any known effects of the proposed new program on other programs at the University.

The course will serve as an elective for students in Materials Science and Engineering, and as an elective for the Minor in Nanotechnology.

C. If there are known effects, individuals in charge of the affected programs must be consulted about the proposed new program and the following information provided:

(1) Who was consulted?

The Department of Materials Science and Engineering.

(2) Is the proposed new program acceptable to all other programs affected?

They are delighted.

(3) Will any changes be required in the affected programs? If so, please describe below:

No.

D. Does the proposed new program affect the University's commitment to diversity in any way? If so, please describe below:

No

5. Resource Impact

A. Provide impact statements in the four areas listed below:

(1) Library impact statement (attach statement if provided by LTS)

This topic is already well covered by the library.

(2) Computer impact statement (attach statement if provided by LTS)

None.

(3) Faculty impact statement (how proposed program affects load on existing faculty or requires new faculty)

The course has been given before and fits well into the departmental course structure.

(4) Facilities impact statement (how proposed program affects load on existing facilities or requires new facilities)

There will be no such impact.

B. Provide a statement indicating who will assume financial responsibility for any new resources required:

Responsibility will be assumed by the Department of Materials Science and Engineering

Proposed Course Changes**1. Current course number, title, course description, and credits (from present course catalogue):****Mat 335. (ChE 335) Principles of Semiconductor Materials Processing (3)**

Description and analysis of the processing steps involved in microelectronic material fabrication. Emphasis will be placed on the chemistry of the fabrication steps, mathematical modeling of the transport and chemical reaction phenomena, and interpretation of experimental methods and data. Prerequisite: a course in thermodynamics and senior standing.

2. Proposed course number, title, course description, and credits (as it will appear in course catalogue):**3. Nature of proposed change(s)**

A. Course title change? If so, provide rationale below:

B. Course number change? If so provide rationale below:

C. Change in course credits? If so, provide rationale below:

D. Change in course description? If so provide rationale below:

E. Other change(s)? If so, please describe below and provide rationale for each change.

Delete course. It has not been given for a long time and it is anticipated that it will not be given again. We have confirmed with ChE that they have no interest in retaining the course.

4. Resource Impact

A. Provide impact statements in the four areas listed below:

(1) Library impact statement (attach statement if provided by LTS)

(2) Computer impact statement (attach statement if provided by LTS)

(3) Faculty impact statement (how proposed program affects load on existing faculty or requires new faculty)

(4) Facilities impact statement (how proposed program affects load on existing facilities or requires new facilities)

B. Provide a statement indicating who will assume financial responsibility for any new resources required:

Engineering: Materials Science and Engineering

Proposed Course Changes

1. Current course number, title, course description, and credits (from present course catalogue):

Mat 367. (ChE 367) Metal Films and Coatings: Processing, Structure, and Properties (3)

Focus will be on the processing, structure, and properties of metal films and coatings. Processing methods will include evaporation, sputtering, chemical vapor deposition (CVD), plasma-assisted CVD, ion implantation, electrodeposition, metal bath solidification, weld overlay, thermal spraying, and diffusion. Characterization of thin films and coatings will be done with the use of sophisticated analytical instrumentation, including spectroscopic methods, microscopy and diffraction techniques. Characterization methods are explored in conjunction with processing techniques and film/coating properties via class assignments that are designed to introduce students to the archival scientific literature. Prerequisite: Senior standing in Chemical Engineering or Materials Science and Engineering, or permission of the instructor(s).

2. Proposed course number, title, course description, and credits (as it will appear in course catalogue):

3. Nature of proposed change(s)

A. Course title change? If so provide rationale below:

B. Course number change? If so provide rationale below:

C. Change in course credits? If so provide rationale below:

D. Change in course description? If so provide rationale below:

E. Other change(s)? If so, please describe below and provide rationale for each change.

Delete course. It has not been given for a long time and it is anticipated that it will not be given again. We have confirmed with ChE that they have no interest in retaining the course.

4. Resource Impact

A. Provide impact statements in the four areas listed below:

- (1) **Library impact statement** (attach statement if provided by LTS)
- (2) **Computer impact statement** (attach statement if provided by LTS)
- (3) **Faculty impact statement** (how proposed program affects load on existing faculty or requires new faculty)
- (4) **Facilities impact statement** (how proposed program affects load on existing facilities or requires new facilities)

B. Provide a statement indicating who will assume financial responsibility for any new resources required:

Engineering: Materials Science and Engineering

Proposed Course Changes

1. Current course number, title, course description, and credits (from present course catalogue):

Mat 396. (Chem 396) Chemistry of Nonmetallic Solids (3)

Chemistry of ionic and electronic defects in nonmetallic solids and their influence on chemical and physical properties. Intrinsic and impurity-controlled defects, nonstoichiometric compounds, defect interactions. Properties to be discussed include: diffusion, sintering, ionic and electronic conductivity, solid-state reactions, and photoconductivity. Prerequisite: Chem 187 or Mat 205 or equivalent.

2. Proposed course number, title, course description, and credits (as it will appear in course catalogue):

3. Nature of proposed change(s)

A. Course title change? If so, provide rationale below:

B. Course number change? If so, provide rationale below:

C. Change in course credits? If so, provide rationale below:

D. Change in course description? If so, provide rationale below:

E. Other change(s)? If so, please describe below and provide rationale for each change.

Delete course. It has not been given for a long time and it is anticipated that it will not be given again. We have confirmed with Chemistry that they have no interest in retaining the course.

4. Resource Impact

A. Provide impact statements in the four areas listed below:

(1) Library impact statement (attach statement if provided by LTS)

(2) Computer impact statement (attach statement if provided by LTS)

(3) Faculty impact statement (how proposed program affects load on existing faculty or requires new faculty)

(4) Facilities impact statement (how proposed program affects load on existing facilities or requires new facilities)

B. Provide a statement indicating who will assume financial responsibility for any new resources required:

Program Curriculum

When	What	Credits	Notes
Year 1 - Fall	MLL 0xx Globalization & Cultures	3	(note a)
	GC 0xx GC Practicum (trip orientation)	1	
Year 1 – intersession	Trip	0	(note b)
Year 1 - Spring	Engl 0xx Global Literature	3	(note c)
Year 2 and 3	Eco 001	4	(note d)
	3 GC courses	9 to 12	(note e)
Year 4	GC 3xx GC Capstone	3 to 4	(note f)
Any time	Study Abroad	0	(note g)
Each semester	At least 2 co-curricular activities	0	(note h)
Total credits		varies	(note i)

Notes

- MLL 0xx fulfills the Engl 001 requirement. For students who have AP or other transfer credit for Engl 001, MLL 0xx counts as a separate course (no student loses credit).
- Although required, the first-year 10-day intersession trip does not carry academic credit.
- Engl 0xx fulfills the Engl 002 requirement, and is designed specifically for students in the GC program. The instructors are the English Department Teaching Fellows who went on the intersession trip and who will focus on country specific content. Students who have AP or other transfer credit for Engl 002 can take Engl 0xx without relinquishing their credit for Engl 002.
- Eco 001 may be taken in the first year by CBE students following their curriculum or by CAS students. CEAS students are typically unable to take Eco 001 before the second year. In any case, it should be taken as early as possible to provide a foundational perspective for other GC courses and co-curricular activities.
- Three additional GC courses chosen among the courses (re)designed by the faculty who participate in the annual GC faculty seminar. These courses will satisfy the HSS requirements for RCEAS students or count as free electives; they easily fit within the available distribution requirements and free electives for CAS and CBE students.
- A seminar/project course that integrates the students' GC experiences.
- The student may transfer credits back to Lehigh from the Study Abroad experience but credits are not required for the GC program. Acceptable Study Abroad experiences must be at least 5 weeks in length, take place in a non-English-speaking country, and include language instruction. Home-stay is encouraged. Students are encouraged to spend at least a semester abroad, but summer programs are acceptable.
- The co-curricular activities, GC-sponsored or -approved events like speakers or trips, do not carry academic credit but are critical to the program's goals.
- Only 1 credit is a GC-specific add-on course for all students in the program (GC Trip Practicum). The credits in all of the courses required for the GC curriculum total 23 to 27, but most of the credits are double-counted for other requirements. For example, all CBE and CEAS students are required to take Eco 001, and many CAS students choose it as a distribution course or a free elective. The GC courses taken in years 2 and 3 are designed to fulfill distribution requirements, although they may be electives, and for some students especially in CAS they may fulfill major requirements.

Bioengineering Program

Proposed Program Changes

1. Name and summary of current program: Bioengineering Program

The program is designed to meet the goals of students seeking educational opportunities at the interface of life science with engineering, humanities, business, social science, or other natural sciences. The Bioengineering Program provides a structured curriculum that combines engineering principles with a background in biology, and provides depth in one of three tracks.

2. Proposed program changes (as they will appear in the catalog):

Engineering (require four out of the following six categories)

1. ECE 81 - Principles of Electrical Engineering (4)
2. Mat 33 - Engineering Materials and Processes (3)
3. ChE 31 - Material and Energy Balances of Chemical Processes (3)
4. Mech 2 - Elementary Engineering Mechanics (3)
5. ChE 44 - Fluid Mechanics (4) or
ME 231 - Fluid Mechanics (3) or
CEE 121 - Mechanics of Fluids (3) or
ECE 123/Phys 190 - Electronic Circuits (3) / Electronics (3)
6. ChE 210 - Chemical Engineering Thermodynamics (4) or
Mat 205 - Thermodynamics and Phase Diagrams (3) or
ME 104 - Thermodynamics I (3) or
PHY 340 - Thermal Physics (3)

Suggested courses for each track to meet educational goals particular to that track:

Biopharmaceutical Engineering Track –

- Mat 33 - Engineering Materials and Processes (3)
- ChE 31 - Material and Energy Balance (3)
- ChE 210 - Chemical Engineering Thermodynamics (4)
- ChE 44 - Fluid Mechanics (4)

If ChE 210 is taken, then ChE 211 is recommended instead of CIIM 187 (and satisfies that Chemistry requirement).

Bioelectronic/Biophotonics Track –

- ECE 81 - Principles of Electrical Engineering (4)
- ECE 123/Phys 190 - Electronic Circuits (3) / Electronics (3)
- Mech 2 - Elementary Engineering Mechanics (3)
- Mat 33 - Engineering Materials and Processes (3)

Cell and Tissue Engineering Track -

- Mech 2 - Elementary Engineering Mechanics (3)
- Mat 33 - Engineering Materials and Processes (3)
- ME 104 - Thermodynamics (3)
- ME 231 - Fluid Mechanics (3)

General Requirements

Free electives (6 credits)

3. Description of proposed change(s):

The proposed changes reduce core engineering courses from 6 to 4 for each of the three tracks. As currently structured, the curriculum does not permit the students to take any free electives. The requirement of 6 engineering core courses is unnecessary given that the students specialize in one of three tracks. These changes will leave the overall credit requirements unchanged. They release 6 credits as required free electives. Additionally they allow us to strengthen the students' preparation in each track.

4. Rationale for proposed change(s):

The rationale for proposed changes from 6 to 4 core engineering courses is 1) it relaxes the requirements in line with the other engineering departments in the college 2) it frees up the curriculum to offer two free electives 3) it strengthens the preparation of students in each track.

5. Academic Impact Statement:

a. Is this proposed program change interdisciplinary? No

b. Identify any known effects of the proposed program change on other programs at the University. No known effects

c. If there are known effects, individuals in charge of the affected programs must be consulted about the proposed program change and the following information provided:

(1) **Who was consulted?** The Bioengineering Program Committee, consisting of 12 faculty members, considered this over several meetings this fall (2004). All affected departments are represented in the committee, including Chemical Engineering, Biological Sciences, Physics, Mechanical Engineering and Mechanics, Electrical and Computer Engineering, and Material Science and Engineering. All department chairs were further informed of this proposed change. We had additional input from the Bioengineering Juniors, our first cohort, on their perspective

(2) **Is the proposed program change acceptable to the affected programs?** N/A

(3) **Will any changes be required in the affected programs? If so, describe.** No

d. Identify any known effects of the proposed program change on the University's commitment to diversity. No known effects

6. Resource Impact Statement: No known effects

a. Provide each of the following:

(1) Library impact statement

The library has good base of journals, monographs, and related materials to support this proposed change in engineering core requirements. They will be able to absorb any additional introductory materials into the budget if additions appear gradually.

(2) Computer impact statement **None**

(3) Faculty impact statement **No known effects**

We anticipate no additional impact on faculty

(4) Facilities impact statement

No known effects

b. Provide a statement indicating who will assume financial responsibility for any new resources required: **Bioengineering Program**

Proposed New Course

1. Proposed new course number and course description (as it will appear in course catalog):

BioE 242 - Bioengineering Research 3 (2) fall

Continuation of research initiated in BioE 132 and 142. Topic chosen by student with a faculty advisor from the three bioengineering tracks (biopharmaceutical engineering, bioelectronic/biophotonics or biostructural mechanics). Written and oral reports approved by research advising professor will track progress. Prerequisite BioE 142 or permission of instructor

2. Instructional mode (i.e. lecture, recitation, laboratory, seminar, independent study, or other) And number of contact hours per week:

One 1 hour scheduled seminar and five hours of independent laboratory

3. Rationale for proposed new course:

Development of senior level courses as a part of the integrated experiential learning for
Bioengineering Program

4. Academic impact on programs affected by new course:

- a. Is this proposed new course cross-listed? No
- b. Is the proposed new course acceptable to all affected programs? Yes
- c. If there are known effects, individuals in charge of the affected programs must be consulted about the changes and the following information provided:

1. **Who was consulted?** The Bioengineering Program Committee, consisting of 12 faculty members, considered this over several meetings this fall (2004). All affected departments are represented in the committee, including Chemical Engineering, Biological Sciences, Physics Mechanical Engineering and Mechanics Electrical and Computer Engineering, and Material Science and Engineering.
2. **Is the proposed new course acceptable to the affected program?** Yes
3. **Will any changes be required in the affected programs? If so, describe.** No

- d. **Identify any known effects of the proposed new course on the University's commitment to diversity.** No known effects

5. Resource Impact Statement:

- a. Provide each of the following:

(1) Library impact statement:

The library has a good base of journals, monographs, and related materials to support this course. They will be able to absorb any additional introductory materials into the budget if additions appear gradually.

(2) Computer impact statement: None

- (3) Faculty impact statement:** This represents continuation of research work with faculty in previous courses BioE 132 and 142. Faculty members accept students for research in their laboratories so this course does not require any new lab development. Students will use existing experimental and computational resources in research laboratories. The main new resource requirements are faculty time and support for materials and supplies. The first cohort of Bioengineering students are currently taking BioE 132 (Fall 2004). For this academic year, the RCEAS dean has

provided \$500 per student for these undergraduate research projects. Such support will need to be continued. This level is our first estimate of the requirement; it may need to be adjusted.

(4) Facilities impact statement: None per Registrar

- b. **Provide a statement indicating who will assume financial responsibility for any new resources required:** Bioengineering Program

Proposed New Course

1. Proposed new course number and course description (as it will appear in course catalog):

BioE 290 – Bioengineering Thesis (1-3) spring

Thesis, guided by a faculty advisor, based on research conducted either in BioE 132, 142, 242, or in Engr 211,212. Includes written report and oral presentation. Prerequisite BioE 242 or Engr 212 or permission of instructor.

2. Instructional mode (i.e. lecture, recitation, laboratory, seminar, independent study, or other)

And number of contact hours per week:

Independent study. Presentations at semester-end.

3. Rationale for proposed new course:

Implementation of proposed and approved Bioengineering curriculum.

4. Academic impact on programs affected by new course:

- a. **Is this proposed new course cross-listed?** No
- b. **Is the proposed new course acceptable to all affected programs?** Yes
- c. **If there are known effects, individuals in charge of the affected programs must be consulted about the changes and the following information provided:**

1. **Who was consulted?** The Bioengineering Program Committee, consisting of 12 faculty members, considered this over several meetings this fall (2004). All affected departments are represented in the committee, including Chemical Engineering, Biological Sciences, Physics, Mechanical Engineering and Mechanics, Electrical and Computer Engineering, and Material Science and Engineering.
2. **Is the proposed new course acceptable to the affected program?** Yes
3. **Will any changes be required in the affected programs? If so, describe.** No

- d. **Identify any known effects of the proposed new course on the University's commitment to diversity.** No known effects

5. Resource Impact Statement:

a. Provide each of the following:

(1) Library impact statement:

BioE 290 is an independent study course within the Bioengineering curriculum. The Library already broadly supports bioengineering in several areas (physics, biology, engineering). Since independent study by its nature may delve into new fields, the faculty advisor should consider proposals in light of the collection. Areas that need a small amount of new or more in-depth material can be accommodated if given adequate lead time. Services such as interlibrary loan may suffice for most cases.

(2) Computer impact statement: None

(3) Faculty impact statement: This represents continuation of research work with faculty in previous courses BioE 132, 142 and 242. We anticipate no additional impact on faculty.

(4) Facilities impact statement: None per Registrar

- b. Provide a statement indicating who will assume financial responsibility for any new resources required:** Bioengineering Program

Proposed New Course

1. **Proposed new course number and course description (as it will appear in course catalog):**

BioE 350 – Special Topics (I-4) spring

Special topics of study in bioengineering. Permission of Instructor.

2. **Instructional mode (i.e. lecture, recitation, laboratory, seminar, independent study, or other) And number of contact hours per week:**

Lectures or independent study

3. **Rationale for proposed new course:**

To provide a mechanism for one-time offering of special courses.

4. **Academic impact on programs affected by new course:**

- a. **Is this proposed new course cross-listed?** No
- b. **Is the proposed new course acceptable to all affected programs?** Yes
- c. **If there are known effects, individuals in charge of the affected programs must be consulted about the changes and the following information provided:**
 - 1. **Who was consulted?** The Bioengineering Program Committee, consisting of 12 faculty members, considered this over several meetings this fall (2004). All affected departments are represented in the committee, including Chemical Engineering, Biological Sciences, Physics Mechanical Engineering and Mechanics, Electrical and Computer Engineering, and Material Science and Engineering.
 - 2. **Is the proposed new course acceptable to the affected program?** Yes
 - 3. **Will any changes be required in the affected programs? If so, describe.** No
- d. **Identify any known effects of the proposed new course on the University's commitment to diversity.** No known effects

5. **Resource Impact Statement:**

a. **Provide each of the following:**

(1) **Library impact statement:**

BioE 350 is an independent study course within the Bioengineering curriculum. The Library already broadly supports bioengineering in several areas (physics, biology, engineering). Since independent study by its nature may delve into new fields, the faculty advisor should consider proposals in light of the collection. Areas that need a small amount of new or more in-depth material can be accommodated if given adequate lead time. Services such as interlibrary loan may suffice for most cases.

(2) **Computer impact statement:** None

(3) **Faculty impact statement:** A special topics course will be offered only when faculty interest and availability match the need of a small group of students for a specific topic.

(4) **Facilities impact statement:** None per Registrar

b. **Provide a statement indicating who will assume financial responsibility for any new resources required:** Bioengineering Program

Proposed Course Changes

5. Current course number and course description (from course catalog):

BioE 231 Integrated Bioelectronic/Biophotonics Lab (2) (No description in catalog)

6. Proposed course number and course description (as it will appear in course catalog):

BioE 331. Integrated Bioelectronic/Biophotonics Laboratory (2) Junior spring

Experiments in microelectronics, micro fabrication of MEMS, instrumentation and computer interfaces, lasers, optics, optoelectronics, fiber optics and modern optical microscopy for use in biomedical applications Prerequisites BioE 110 and (ECE 123 or EHY 190) and permission of instructor

3. Description of proposed change(s):

Course number change from BioE 231 to BioE 331

4. Rationale for proposed change(s):

We would like to move BioE labs to a 3XX level as we plan for our students to take them later and are adding prerequisites so they are better prepared to benefit from them.

5. Impact Statement:

New prerequisites will have an effect on when students can take these courses. Students may take it as part of a Graduate Program.

Proposed Course Changes

1. Current course number and course description (from course catalog):

BioE 243. Integrated Biotechnology Lab (2) (No description in catalog)

2. Proposed course number and course description (as it will appear in course catalog):

BioE 343. Integrated Biotechnology Laboratory (2) Senior fall

Biosafety, sterilization, media formulation, biochemical and enzyme assays, recombinant DNA technique, protein and DNA isolation and purification, for microbial fermentation and animal cell culture. Integration of biotechnology techniques for biopharmaceutical production. Prerequisites BioE 110, CHE 341, and permission of instructor.

1. Description of proposed change(s):

Course number change from BioE 243 to BioE 343

2. Rationale for proposed change(s):

We would like to move BioE labs to a 3XX level as we plan for our students to take them later and are adding prerequisites so they are better prepared to benefit from them.

5. Impact Statement:

New prerequisites will have an effect on when students can take these courses.
Students may take it as part of a Graduate Program.

Proposed Course Changes

1. Current course number and course description (from course catalog):

BioE 257. Integrated Biostructural Mechanics Lab (2) (No description in catalog)

2. Proposed course number and course description (as it will appear in course catalog):

BioE 357. Integrated Biostructural Mechanics Laboratory (2) Junior fall

Basic concepts of bioengineering design through experimental designs and procedures involving cellular and tissues and their interface with synthetic implants. Experimental techniques include surface characterization and interactions, spectroscopy, and advanced techniques in microscopy. Nerve action, electrocardiography, mechanics of muscle membranes and other model systems in vitro. Prerequisite BioE 110 and permission of instructor

3. Description of proposed change(s):

Course number change from BioE 257 to BioE 357

4. Rationale for proposed change(s):

We would like to move BioE labs to a 3XX level as we plan for our students to take them later and are adding prerequisites so they are better prepared to benefit from them

5. Impact Statement:

New prerequisites will have an effect on when students can take these courses
Students may take it as part of Graduate Program

#12

Approved

S'05

Engineering: Chemical Engineering

Proposed Course Changes

1. Current course number, title, course description, and credits (from present course catalogue):

ChE 335. (Mat 335) Principles of Semiconductor Materials Processing (3)
Description and analysis of the processing steps involved in microelectronic material fabrication. Emphasis will be placed on the chemistry of the fabrication steps, mathematical modeling of the transport and chemical reaction phenomena and interpretation of experimental methods and data. Prerequisite: a course in thermodynamics and senior standing.

2. Proposed course number title, course description, and credits (as it will appear in course catalogue):

3. Nature of proposed change(s)

A. Course title change? If so, provide rationale below:

B. Course number change? If so, provide rationale below:

C. Change in course credits? If so, provide rationale below:

D. Change in course description? If so, provide rationale below:

E. Other change(s)? If so, please describe below and provide rationale for each change.

Delete course. It has not been given for a long time and, according to the Materials Science and Engineering department, it is anticipated that it will not be given again. This course has always been taught by a faculty member of the Materials Science and Engineering and the Chemical Engineering department has no interest in offering this course.

4. Resource Impact

A. Provide impact statements in the four areas listed below:

(1) Library impact statement (attach statement, if provided by LTS)

(2) Computer impact statement (attach statement if provided by LTS)

(3) Faculty impact statement (how proposed program affects load on existing faculty or requires new faculty)

(4) Facilities impact statement (how proposed program affects load on existing facilities or requires new facilities)

B. Provide a statement indicating who will assume financial responsibility for any new resources required:

Engineering: Chemical Engineering

Proposed Course Changes

1. Current course number, title, course description, and credits (from present course catalogue):

ChE 367. (Mat 367) Metal Films and Coatings: Processing, Structure, and Properties (3)

Focus will be on the processing, structure, and properties of metal films and coatings. Processing methods will include evaporation, sputtering, chemical vapor deposition (CVD), plasma-assisted CVD, ion implantation, electrodeposition, metal bath solidification, weld overlay, thermal spraying, and diffusion. Characterization of thin films and coatings will be done with the use of sophisticated analytical instrumentation, including spectroscopic methods, microscopy and diffraction techniques. Characterization methods are explored in conjunction with processing techniques and film/coating properties via class assignments that are designed to introduce students to the archival scientific literature. Prerequisite: Senior standing in Chemical Engineering or Materials Science and Engineering, or permission of the instructor(s).

2. Proposed course number, title, course description and credits (as it will appear in course catalogue):

3. Nature of proposed change(s)

A. Course title change? If so, provide rationale below:

B. Course number change? If so provide rationale below:

C. Change in course credits? If so provide rationale below:

D. Change in course description? If so, provide rationale below:

E. Other change(s)? If so please describe below and provide rationale for each change.

Delete course. It has not been given for a long time and, according to the Materials Science and Engineering department, it is anticipated that it will not be given again. This course has always been taught by a faculty member of the Materials Science and Engineering and the Chemical Engineering department has no interest in offering this course.

4. Resource Impact

A. Provide impact statements in the four areas listed below:

(1) Library impact statement (attach statement, if provided by LTS)

(2) Computer impact statement (attach statement, if provided by LTS)

(3) Faculty impact statement (how proposed program affects load on existing faculty or requires new faculty)

(4) Facilities impact statement (how proposed program affects load on existing facilities or requires new facilities)

B. Provide a statement indicating who will assume financial responsibility for any new resources required: