2008 RCEAS Course and Curriculum Changes
to University Faculty for February 11, 2008 meeting

**BioEngineering Program** (pages 1.1 to 1.9)
BioE1, BioE2
*APC 10/16/07, RCEAS 10/22/07, Ed Pol 10/24/07, Univ. Faculty (12/10/07)*
BioE120, 121, 321, 325, 335
*APC 11/27/07, RCEAS 12/3/07, Ed Pol (1/30/08), Univ. Faculty (2/11/08)*

**Computer Science & Engineering** (pages 2.1 to 2.9)
CSE 42, 319, 341, program changes
*APC 10/16/07, RCEAS 10/22/07, Ed Pol 10/24/07, Univ. Faculty (12/10/07)*

**Chemical Engineering** (pages 3.1 to 3.2)
ChE85, ChE344
*APC 11/27/07, RCEAS 12/3/07, Ed Pol (1/30/08), Univ. Faculty (2/11/08)*

**Industrial & Systems Engineering** (pages 6.1 to 6.3)
ISE 170, 171, 172
*APC 11/13/07, RCEAS 12/3/07, Ed Pol (1/30/08), Univ. Faculty (2/11/08)*

**Materials Science & Engineering** (pages 7.1 to 7.3)
MAT 10
*APC 11/13/07, RCEAS 12/3/07, Ed Pol (1/30/08), Univ. Faculty (2/11/08)*

**Mechanical Engineering Mechanics** (pages 9.1 to 9.2)
ME 312
*APC 11/27/07, RCEAS 12/3/07, Ed Pol (1/30/08), Univ. Faculty (2/11/08)*
RCEAS: Bioengineering Program

Proposed Course Changes

1. Current course number, title, course description, and credits:

**BioE 1. Freshman Seminar 1, Introduction to Bioengineering 1: Philosophy to Practice (1)**
fall
Overview of the bioengineering field, the advancements of related topics in sciences, technology, engineering and applications for health care and medicine. Humanity and ethical issues.

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

**BioE 1. Freshman Seminar 1, Introduction to Bioengineering 1: Philosophy to Practice (1)**
fall
Overview of the bioengineering field, the advancements of related topics in sciences, technology, engineering and applications for health care and medicine. Humanity and ethical issues. Pass/Fail grading.

3. Nature of proposed change(s)

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

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

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

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

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

The only change to this first year course is to make it pass/fail. Bioengineering students do not take Engr 5, and part of this course accomplishes an introduction to Bioengineering. Other courses introducing First Year Engineering students have been Pass/Fail (e.g. Engr 2 in AY 1995-96 to 2002-03)

4. Resource Impact: None
RCEAS: Bioengineering Program

Proposed Course Changes

1. Current course number, title, course description, and credits:

BioE 2. Freshman Seminar 2, Introduction to Bioengineering II: Current Topics (1) spring
Overview of a broad spectrum of current topical areas in biotechnology and bioengineering and
their applications in health care and medicine.

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

BioE 2. Freshman Seminar 2, Introduction to Bioengineering II: Current Topics (1) spring
Overview of a broad spectrum of current topical areas in biotechnology and bioengineering and
their applications in health care and medicine. Pass/Fail grading.

3. Nature of proposed change(s)

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

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

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

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

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

The only change to this first year course is to make it pass/fail. Bioengineering students do not take Engr 5, and part
of this course accomplishes an introduction to Bioengineering. Other courses introducing First Year Engineering
students have been Pass/Fail (e.g. Engr 2 in AY 1995-96 to 2002-03)

4. Resource Impact: None
Bioengineering

Proposed Program Changes

1. Name and summary of current Program: Bioengineering Program

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

   A. Remove SSP 135 from general requirements and add four free electives to general requirements

   B. Under Bioengineering Core Requirements “Engineering” change requirements to

      Biopharmaceutical Engineering Track
      MAT 33    Engineering Materials and Processes (3)
      CHE 51    Material and Energy Balance (3)
      CHE 44    Fluid Mechanics (3)
      CHE 210   Chemical Engineering Thermodynamics (4)
      CHE 211   Chemical Reactor Design (3)

      Bioelectronic/Biophotonics Engineering Track
      MECH 3    Elementary Engineering Mechanics (3)
      MAT 33    Engineering Materials and Processes (3)
      ECE 81    Principles of Electrical Engineering (4)
      ECE 123   Electronic Circuits (3) or
      PHY 190   Electronics (3)
      ECE 202   Introduction to Electromagnetics (3) or
      PHY 212   Electricity and Magnetism I (3)

      Cell and Tissue Engineering Track
      MECH 3    Elementary Engineering Mechanics (3)
      MAT 33    Engineering Materials and processes (3)
      ME 231    Fluid Mechanics (3)
      ME 104    Thermodynamics (4) or
      PHY 340   Thermal Physics (3)
      MECH 12   Strength of Materials (3)

   C. Under Integrated Bioengineering delete “Students must take six (6) credits from the following” to read “Students must take three (3) credits from the following:

      BIOE 321  Biomolecular & Cellular Mechanics (3)
      BIOE 335  BioFluid Mechanics of Physiological Systems (3)
      CHE 341   Biotechnology (3)
      CHE 344   Molecular Bioengineering (3)
C. Students must take nine (9) credits from approved electives; no more than 6 can be from BioE 132, BioE 142, BioE 242, and BioE 290

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>BIOE 321</td>
<td>Biomolecular &amp; Cellular Mechanics (3)</td>
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<td>BIOE 335</td>
<td>Biofluid Mechanics of Physiological Systems (3)</td>
</tr>
<tr>
<td>BIOE 380</td>
<td>Biomolecular &amp; Cellular Biophysics (3) (BIOS 380)</td>
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<td>BIOE 132</td>
<td>Bioengineering Research 1 (2)</td>
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<td>BIOE 142</td>
<td>Bioengineering Research 2 (2)</td>
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<td>BIOE 242</td>
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<tr>
<td>BIOE 290</td>
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<td>BIOE 395</td>
<td>Inorganic Biomaterials (3)</td>
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<td>BIOE 350</td>
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<td>BIOS 371</td>
<td>Elements of Biochemistry (same as Chm 371 (3)</td>
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<td>BIOS 345-346</td>
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<td>BIOS 367</td>
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<td>BIOS 371</td>
<td>Elements of Biochemistry (same as Chm 271 (3)</td>
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<td>BIOS 177</td>
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<td>BIOS 277</td>
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<td>CHE 341</td>
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<td>CHE 342</td>
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<td>CHE 344</td>
<td>Molecular Bioengineering (3)</td>
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<td>CHE 388</td>
<td>Polymer Synthesis and Characterization Laboratory (3) (Chm 388 or Mat 388)</td>
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<td>CHE 391</td>
<td>Colloid and Surface Chemistry (3) (Chm 391)</td>
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<td>CHM 332</td>
<td>Analytical Chemistry (3)</td>
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<td>CSE 408</td>
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<td>ECE 202</td>
<td>I introduction to Electromagnetic (3)</td>
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<td>ECE 333</td>
<td>Medical Electronics (3)</td>
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<td>PHY 212</td>
<td>Electricity and Magnetism I (3)</td>
</tr>
<tr>
<td>PHY 352</td>
<td>Modern Optics (3)</td>
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3. Description of proposed change(s)

A) The requirement for SSP 135 will be dropped and the students given 4 free elective credits.
B) The chemistry department changed their physical chemistry course (CHEM 187) in a manner that made it less appropriate for Bioengineering students. The credits previously required as CHEM 187 are now required as an additional engineering course.
C) Specific advanced engineering courses, using advanced mathematics, are now required as part of the engineering elective portion of the curriculum.
D) The remaining engineering elective requirement now totals 9 credits.
4. Rationale for proposed change(s)
   A) The decision to drop SSP 135 was the result of an evaluation of the course by Bioengineering faculty and feedback from students regarding the relevance of the course to bioengineering careers.
   B) Due to the Chemistry Department’s decision to change the course CHEM 187, a determination was made by the Bioengineering faculty that Bioengineering students should receive training in physical chemistry principles through engineering courses. Additionally, the faculty felt that the change to engineering courses would increase the depth of the Bioengineering tracks.
   C) The Bioengineering faculty felt that Bioengineering undergraduates needed additional opportunities to apply advanced mathematics; specifically, differential equations and statistics. In order provide this opportunity, it was decided that previously developed advanced courses would be made requirements, and that MATH 205 and MATH 231 would be prerequisites for those courses.
   D) The remaining 9 elective credits can be chosen from courses previously identified as appropriate for Bioengineering students.

5. Academic Impact Statement:
   A) Are these proposed program changes interdisciplinary? Yes
   B) Identify any known effects of the proposed program changes on other programs in the University:
      This change might require the addition of a section of MECH 12 to be taught each academic year. Similarly, a few additional students (less than 5) might take ECE 202 or Phy 212.
   C) If there are known effects, individuals in charge of the affected programs must be consulted about the proposed program changes and the following information provided:

      (1) Who was consulted?
      The MEM, ECE, and PHY departments were consulted.

      (2) Is the proposed program change acceptable to the affected Programs: Yes

      (3) Will any changes be required in the affected programs: An additional section of MECH 12 may need to be offered each academic year.

   D) Identify any known effects of the proposed program changes on the University’s commitment to diversity: none

6. Resource Impact Statement:
   (a) Provide each of the following:

      (1) Library impact statement: none
      (2) Computer impact statement: none
      (3) Faculty impact statement: none
      (4) Facilities impact statement: none

   (b) Provide a statement indicating who will assume financial responsibility for any new resources required: Bioengineering Program
Proposed New Course
Department of Materials Science and Engineering
Bioengineering Program

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

**BioE 325 (MAT 325) - Inorganic Biomaterials (3) Fall**
The course will review the material selection process as well as various methods of shaping metals and ceramics and controlling their desired bulk and surface physical properties for biomedical applications. Special attention will be paid to the microstructure development during materials shaping, processing and service since microstructure is linked directly to the final material physical and chemical properties (strength, fatigue, corrosion, biocompatibility). Real life examples of design and fabrication of medical devices such as dental, orthopedics implants, filters for kidney dialysis as well as stents will be discussed. Understanding of the biomaterials physical and chemical functionality in these applications will be made a core objective of the course. Other current research topics will also be discussed. Prerequisites BioE 110 or MAT 33, or consent of instructor.

2. Instructional mode (i.e., lecture, recitation, laboratory, seminar, independent study, or other) and number of contact hours per week:
Lecture course with 3 contact hours per week.

3. Rationale for proposed new course:
This course has been an experimental course taught for the Bioengineering Program for two years under an experimental course number. This course will be the complement of another new course to be taught starting this spring entitled “Organic Biomaterials”. The latter course is operating with an experimental number next term.

4. Academic impact on programs affected by new course:
   - Is this proposed new course cross-listed?
     Yes, it has a BIOE number and a MAT number.
   - Is the proposed new course acceptable to all affected programs?
     Yes
   - If there are known effects, individuals in charge of the affected programs must be consulted about the changes and the following information provided:
     Course was requested by the BIOE program.
     - Who was consulted?
       Anand Jagota
     - Is the proposed new course acceptable to the affected program?
       Yes
     - Will any changes be required in the affected programs? If so, describe.
       None known.

5. Resource Impact Statement:
   - Provide each of the following: No impact
     - Library impact statement: No impact
     - Computer impact statement: No impact
     - Faculty impact statement: No impact
     - Facilities impact statement: No impact

   Provide a statement indicating who will assume financial responsibility for any new resources required:
   - No impact
Bioengineering

Proposed Course Changes

1. Current course number and course descriptions (from course catalog)

**BioE 321 (Phy 321) – Biomolecular & Cellular Mechanics (3)**
Mechanics and physics of the components of the cell, ranging in length scale from fundamental biomolecules to the entire cell. The course covers the mechanics of proteins and other biopolymers in 1-D, 2-D, and 3-D structures, cell membrane structure and dynamics, and the mechanics of the whole cell. Prerequisites Math 205 and Phy 13/22 or Phy 21/22, or permission of the instructor.

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

**BioE 321 (Phy 321) – Biomolecular & Cellular Mechanics (3)**
Mechanics and physics of the components of the cell, ranging in length scale from fundamental biomolecules of the entire cell. The course covers the mechanics of proteins and other biopolymers in 1-D, 2-D, and 3-D structures, cell membrane structure and dynamics, and the mechanics of the whole cell. Prerequisites Math 205, Math 231 and Phy 13/22 or Phy 21/22, or permission of the instructor.

3. Description of proposed change(s)
Addition of the prerequisite Math 231

4. Rationale for proposed change(s)
The course already requires a knowledge of MATH 231 since students are required to use statistical mechanics. The prerequisite change addresses a weakness identified in our program by our ABET evaluator. Specifically, it forces our students to achieve a C- or better in MATH 205 and MATH 231 in order to be able to take this (or other) required elective courses that use advanced mathematics.

5. Impact Statement
None
Bioengineering

Proposed Course Changes

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

BioE 335 – BioFluid Mechanics of Physiological Systems (3)
Applications of advanced fluid dynamic principles to physiological systems with emphasis on micron sized structures such as pulmonary airway/alveoli, small blood vessels and biological cells. Introduction to advanced topics relevant to the human body including a) oscillatory and transient flows in the cardiovascular and pulmonary systems b) non-Newtonian flows, c) surface tension driven flows, d) fluid-structure interactions, and e) cellular fluid mechanics. Prerequisites Math 205, ME 231 or an equivalent introductory fluid mechanics course, or instructor permission.

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

BioE 335 – BioFluid Mechanics of Physiological Systems (3)
Applications of advanced fluid dynamic principles to physiological systems with emphasis on micron sized structures such as pulmonary airway/alveoli, small blood vessels and biological cells. Introduction to advanced topics relevant to the human body including a) oscillatory and transient flows in the cardiovascular and pulmonary systems b) non-Newtonian flows, c) surface tension driven flows, d) fluid-structure interactions, and e) cellular fluid mechanics. Prerequisites Math 205, Math 231 ME 231 or an equivalent introductory fluid mechanics course, or instructor permission.

3. Description of proposed change(s)
Addition of the prerequisite Math 231

4. Rationale for proposed change(s)
The course already requires knowledge of MATH 231. The prerequisite change addresses a weakness identified in our program by our ABET evaluator. Specifically, it forces our students to achieve a C- or better in MATH 205 and MATH 231 in order to be able to take this (or other) required elective courses that use advanced mathematics.

5. Impact Statement
None
Bioengineering

Proposed Course Changes

1. Current course number and course descriptions (from course catalog)

**BioE 120/121 – Biomechanics and Biomechanics Laboratory (3/1) Fall**
Applications of mechanics to study behavior of anatomical structures and biological tissues of the musculoskeletal system. Specific topics include structure and function of biological tissues, mechanical properties of biological tissues, and analysis of specific tissues (i.e. bone, muscle, and soft connective tissue) Co-prerequisites MECH 2.

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

**BioE 120/121 – Biomechanics and Biomechanics Laboratory (3/1) Fall**
Applications of mechanics to study behavior of anatomical structures and biological tissues of the musculoskeletal system. Specific topics include structure and function of biological tissues, mechanical properties of biological tissues, and analysis of specific tissues (i.e. bone, muscle, and soft connective tissue) Co-prerequisites MECH 3.

3. Description of proposed change(s)

Prerequisites changed from MECH 2 to MECH 3

4. Rationale for proposed change(s)

The course content of MECH 2 and MECH 3 was changed by the Mechanical Engineering Department. MECH 3 is the appropriate course for Bioengineering students.

5. Impact Statement

None
RCEAS: CSE Department

Proposed New Course

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

CSE 042 Principles of Computer Game Design

Modern topics on game design: Finite State Machines, iterative design process, systems and interactivity, designing rules for digital games, emergence in games, games as Schemas of Uncertainty, games as Information Theory Schemas, games as Information Systems, games as Cybernetic Systems. The course does not count as a technical elective for majors in Computer Science, Computer Science and Business, or Computer Engineering. Prerequisites: none.

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

Lecture, three hours/week.

3. Rationale for proposed new course:

From the early text-based, one-player computer games to the modern 3D games with thousands of gamers sharing the same virtual gaming world simultaneously, computer games have gone through a remarkable evolution. Despite this evolution, principles of computer game design are not well understood. In this course we will study the broad issue of game design, particularly tailored towards video games. We will present an conceptual model for game design and analyze various modern computer games from the perspective of this model. Course has been thought as an experimental course twice. The enrollment each time was around 30 students. Average score given by the students in the course evaluation to the class is above 4.3.

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

   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:

**5. 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:
RCEAS: CSE Department

Proposed New Course

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

   CSE 319 Image Analysis and Graphics (3)

   State-of-the-art techniques for fundamental image analysis tasks: feature extraction, segmentation, registration, tracking, recognition, search (indexing and retrieval). Related computer graphics techniques: modeling (geometry, physically-based, statistical), simulation (data-driven, interactive), animation, 3D image visualization, and rendering. Credit will not be given for both CSE 319 and CSE 419.
   Prerequisite: CSE 313 or consent of the instructor.

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

   Lecture, three hours/week.

3. Rationale for proposed new course:

   Imaging and Graphics are two closely-related fields with intertwined technology bases. This course introduces students to practices covering the whole spectrum from raw images of a world object, to extracting and abstraction of its properties, and finally to its visualization, even synthesis, by computer graphics. Each student will have the option to work with images or videos of interest, and develop an application that recognizes and segments an object in images, tracking its motion over time, creating a 3D graphics model based on image information, simulating the object using CG and manipulating it through user interaction. The course has been taught as an experimental course once. The enrollment was 11 students. Average score given by the students in the course evaluation is above 4.6 (effective teaching 4.7; course quality 4.8).

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

   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:

5. 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. This course has been taught as an experimental course by a new faculty member whose expertise is in Graphics.

(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:
RCEAS: CSE DEPARTMENT
Proposed New Course

1. Proposed new course number and course description (as is it will appear in course catalog):
   CSE 341. Database Systems, Algorithms, and Applications (3)
   Design of large databases; Normalization; Query languages (including SQL); Transaction-processing protocols; Query optimization; Performance tuning; Distributed systems. Not available to students who have credit for CSE 241 or IE 224. Prerequisites: CSE 17 or consent of Instructor.

2. Instructional mode (i.e., lecture, recitation, laboratory, seminar, independent study, or other) and number of contact hours per week:
   lecture / seminar, 3 hours per week

3. Rationale for proposed new course:
   This proposed new course arise from a revision of CSE 241 to have a stronger application focus. CSE 341 covers much of the material of the old 241 but with a much stronger focus on database system internals and the underlying algorithms. This course will be more suitable for those undergraduates interested in the construction of large system software whereas 241 is more suitable for students interested in using existing database systems to construct applications. Both this and the CSE 241 proposal should be reviewed together. The two course descriptions look similar but the subtle distinctions are intentional. For example, 241 covers transaction processing as in “how to use transactions in your application” while 341 also covers “protocols,” which are the rules used within the system to ensure proper implementation of transactional properties. Other such examples can be provided to distinguish these 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 (need to check with CSB formally, but informal indication is that it is)
   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? Jim Hall and Ed Kay for the impact on CSB.
      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. Yes.
         CSE 241 is a required course in the CSB major and will remain so, but students will have the option of choosing CSE 341 in lieu of CSE 241.
   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:**
The course will not require any additional library books.

(2) **Computer impact statement:**
Students will use their own and the department computers to complete programming assignments. There will be a greater use of the departmental computer that provides database service for the course.

(3) **Faculty impact statement:**
Prof. Korth will teach the course in the same semester he teaches CSE 241. Although this is an additional course, it will replace in his teaching load the 400-level Database Theory course that he has been teaching.

(4) **Facilities impact statement:**
No additional facilities are required.

b. Provide a statement indicating who will assume financial responsibility for any new resources required:
No additional resources are required.
RCEAS - CSE: Proposed Program Change

Name and summary of current program:
Computer Science and Business Program

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

Current catalog entry:
Required Computer Science course (40 credit hours)

CSE 241 Data Base Systems

Proposed catalog entry:
Required Computer Science course (40 credit hours)

CSE 241 Data Base Systems and Applications or CSE 341. Database Systems, Algorithms, and Applications (3)

Description of proposed change(s):
Enable students to take either CSE 241 or CSE 341 to satisfy the requirement for a data base course. Also, this change recognizes the change in title for CSE 241.

Rationale for proposed change(s):
We are reorganizing our offerings in the area of data bases. CSE 241 was required of CSB students.

We are modifying the course to put greater emphasis on applications. We are introducing CSE 341 to emphasize the more theoretical side of data bases. Either course is suitable for CSB students. Note that credit cannot be obtained for taking both courses.

Academic Impact Statement:
Is this proposed program change interdisciplinary?
Yes.

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.
None.

Resource Impact Statement: N/A
Provide each of the following:
Library impact statement
Computer impact statement
Faculty impact statement
Facilities impact statement

Provide a statement indicating who will assume financial responsibility for any new resources required:
No new resources are required.

RCEAS: CSE Department

Proposed New Course

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

CSE 419 Image Analysis and Graphics (3)

State-of-the-art techniques for fundamental image analysis tasks: feature extraction, segmentation, registration, tracking, recognition, search (indexing and retrieval). Related computer graphics techniques: modeling (geometry, physically-based, statistical), simulation (data-driven, interactive), animation, 3D image visualization, and rendering. This course, a graduate version of CSE 319, requires additional advanced assignments. Credit will not be given for both CSE 319- and CSE 419. Prerequisite: CSE 313 or consent of the instructor.

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

Lecture, three hours/week.

3. Rationale for proposed new course:

Imaging and Graphics are two closely-related fields with intertwined technology bases. This course introduces students to practices covering the whole spectrum from raw images of a world object, to extracting and abstraction of its properties, and finally to its visualization, even synthesis, by computer graphics. Each student will have the option to work with images or videos of interest, and develop an application that recognizes and segments an object in images, tracking its motion over time, creating a 3D graphics model based on image information, simulating the object using CG and manipulating it through user interaction. The course has been taught as an experimental course once. The enrollment was 11 students. Average score given by the students in the course evaluation is above 4.6 (effective teaching 4.7; course quality 4.8).

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

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:

5. 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. This course has been taught as an experimental course by a new faculty member whose expertise is in Graphics.

(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:
Proposed New Course

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

ChE 85 Undergraduate Research (1)

Independent study of a problem involving laboratory investigation, design, or theoretical studies under the guidance of a faculty. May be repeated for credit up to a maximum of 3 credits.

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

3. Rationale for proposed course
We would like to add this course to provide additional opportunities to sophomores and juniors to work in research projects.

4. Academic impact on programs affected by new course
   a) Is this proposed new course cross-listed? NO
   b) Identify any known effects of the proposed new course on other programs at the university. NA
   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? NA
      2) Is the proposed new course acceptable to all other programs affected? NA

5. Resource Impact
   A. Provide each of the following:
      (1) Library impact statement: None
      (2) Computer impact statement: None
      (3) Faculty impact statement: None
      (4) Facilities impact statement: None

   B. Provide a statement indicating who will assume financial responsibility for any new resources required:
The ChE Department will be responsible for the overall operation and management of the course.
Proposed New Course

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

ChE 344 – Molecular Bioengineering (3)
Subjects included in this course will be kinetics in small systems, stochastic simulation of biochemistry processes, receptor-mediated adhesion, dynamics of ion-channels, ligand binding, biochemical transport, surface plasmon resonance, DNA microarray design, and chemical approaches to systems biology. Prerequisites Math 205 and Math 231, or senior standing in ChE.

2. Instructional mode (i.e. lecture, recitation, laboratory, seminar, independent study or other)
Lecture – 3 50 minute meetings per week

3. Rationale for proposed course
We would like to add this course as a senior elective for Chemical Engineering and Bioengineering undergraduate and graduate students in various disciplines. Bioscience and the Applied Life Science students who wish to take ChE minors will be able to take this course to satisfy minor requirements.

4. Academic impact on programs affected by new course
a) Is this proposed new course cross-listed? NO
b) Identify any known effects of the proposed new course on other programs at the university. None. This course will be used as an elective in other programs.
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? ChE faculty members.
   2) Is the proposed new course acceptable to all other programs affected? No effect to other programs.
   3) Will any changes be required in the affected program? I so describe:
   d) Does the proposed new course affect the University’s commitment to diversity in any way? If so please describe below:

5. Resource Impact
   A. Provide each of the following:
      (1) Library impact statement: None
      (2) Computer impact statement: None
      (3) Faculty impact statement: No new faculty is needed to teach this course. A experimental version of the course has been taught by Professor Ian Laurenzi in previous semesters.
      (4) Facilities impact statement: None.

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

      The Department of Chemical Engineering assumes financial responsibility for this course.
RCEAS: ISE Department
Proposed New Course

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

IE 172. Algorithms in Systems Engineering (4) spring
Use of computers to solve problems arising in systems engineering. Design and implementation of algorithms for systems modeling, systems design, systems analysis, and systems optimization. Computer systems, basic data structures, the design and implementation of efficient algorithms, and application of algorithms to the design and optimization of complex systems such as those arising in transportation, telecommunications, and manufacturing. Weekly laboratory with exercises and projects. Prerequisites: CSE 17.

2. Instructional mode (lecture, recitation, laboratory, seminar, independent study, or other) and number of contact hours per week:
Lecture, three hours/week; Lab 3 hours/week.

3. Rationale for proposed new course:
This new course is proposed by combining IE 170 Algorithms in Systems Engineering (3) and IE 171 Algorithms in Systems Engineering Lab (1) into a single course. The two courses must always be taken together and the same grade has been given in both courses. This change simplifies student registration and scheduling. Also, the prerequisite of Engineering 1 is dropped because it is also the prerequisite for CSE 17 so the requirement is redundant.

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
   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? No. If so, please describe below:

5. 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 beyond what was used in IE 171 in past years.
   (3) Faculty impact statement (how proposed program affects load on existing faculty or requires new faculty)
   NONE. The same faculty member has always been responsible for IE 170 and IE 171.
   (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:

Graduate & Research Committee: (Rev. 7/06/04)
RCEAS: ISE

Proposed Course Changes

DROP

1. Current course number, title, course description, and credits (from present course catalogue):
   IE 170. Algorithms in Systems Engineering (3)
   Introduction to the use of computers to solve problems arising in systems engineering. Focus on the
design and implementation of algorithms for systems modeling, systems design, systems analysis, and
systems optimization. Fundamentals of computer systems, basic data structures, the design and
implementation of efficient algorithms, and application of algorithms to the design and optimization of
complex systems such as those arising in transportation, telecommunications, and manufacturing.
Prerequisites: ENGR 1, CSE 17.

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.
   DROP THE COURSE. IE 170 and IE 171 are being combined into a single course (IE 172).

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:

Graduate & Research Committee: (Rev. 7/06/04)
RCEAS: ISE

Proposed Course Changes

DROP

1. **Current course number, title, course description, and credits** (from present course catalogue):
   
   **IE 171. Algorithms in Systems Engineering Laboratory (1)**
   
   Introduction to the use of computers to solve problems arising in systems engineering. Focus on the design and implementation of algorithms for systems modeling, systems design, systems analysis, and systems optimization. Fundamentals of computer systems, basic data structures, the design and implementation of efficient algorithms, and application of algorithms to the design and optimization of complex systems such as those arising in transportation, telecommunications, and manufacturing.

   Prerequisites: ENGR 1, CSE 17.

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.

DROP THE COURSE. IE 170 and IE 171 are being combined into a single course (IE 172).

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:

Graduate & Research Committee: (Rev. 7/06/04)
Proposed Program Changes for APC
P.C. Rossin College of Engineering and Applied Science
Materials Science and Engineering Department
Realigning Curriculum for Majors
(Submitted 11-12-07; revised 11-19-07; revised 11-28-07)

Preface
It is proposed that credit awarded for MAT 10 be increased from 1 credit to 2 credits. This change adds one credit to the total program. Thus, the total number of credits in the program for future graduating classes will be as follows according to the program changes passed last year: Class of 2008 = 135, 2009 = 135, 2010 = 134, 2011 = 131. The present change would require the Class of 2012 to have 132 credits to graduate.

Names and summary of current program:
Bachelor of Science in Materials Science and Engineering, a four-year program preparing students for careers in materials science and engineering.

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

Sophomore year, first semester (17 credits)
MAT 33 Engineering Materials and Processes (3)*
MAT 103 Materials Laboratory (2)
MATH 23 Analytic Geometry & Calculus III (4)
PHY 21, 22 Introductory Physics and Laboratory (5)
ECO 1 Economics (4)

Sophomore year, second semester (18–19 credits)
MAT 20 Computational Methods in Materials Science (3)
MAT 203 Materials Structure at the Nanoscale (3)
MAT 205 Thermodynamics of Macro/Nanoscale Materials (3)
MATH 205 Linear Methods (3)
MECH 3 Fundamentals of Engineering Mechanics (3)
HSS Humanities/Social Sciences Elective (3 or 4)

Junior year, first semester (18 credits)
MAT 201 Physical Properties of Materials (3)
MAT 216 Diffusion and Phase Transformations (3)
MAT 218 Mechanical Behavior of Macro/Nanoscale Materials (3)
MAT 301 Professional Development (2)
HSS Humanities/Social Sciences Elective (4)
Free Elective (3)

Junior year, second semester (18–19 credits)
MAT 204 Processing and Properties of Polymeric Materials (3)
MAT 205 Processing and Properties of Metals (3)
MAT 214 Processing and Properties of Ceramic Materials (3)
MAT 211 Integrated Product Development Project I (3)
HSS Humanities/Social Sciences Elective (3 or 4)
Free Elective (3)

Senior year, first semester (15 credits)
MAT 302 Electronic Properties of Materials (3)
MAT 212 Integrated Product Development Project II (2)
ENGR SCI ELECT Engineering Science Elective (3)
ENGR SCI ELECT Engineering Science Elective (3)
HSS Humanities/Social Sciences Elective (4)

Senior year, second semester (16 credits)
MAT 338 Materials Selection and Failure Analysis (3)
CHE 60 Unit Operations Survey (3)
ECE 81 Introduction to Electrical Engineering (3)
ECE 163 Electrical Laboratory I (1)
APPR ELECT Approved Elective (3)
Free Elective (3)

*MAT 33 is taught in both the fall and spring semesters.
Description of proposed change(s):
1. Increase MAT 10 from 1 credit to 2 credits (see accompanying course change).
2. Cross-list ENGR 211 and ENGR 212 as MAT 211 and MAT 212 (see separate proposals appended).
3. Increase total credits to graduate from 131 credits for the Class of 2012.

Rationale for proposed change(s):
1. To save the MAT 10 lab instructor from having to give the same lecture four times, at the beginning of each lab session, a new lecture time is proposed so that the lecture material for the course can be given only once. This increases the consistency of information about the labs to the students and allows more time in the lab period for hands on work. Aside: students from outside the department have complained for years about the amount of work required in this course for a single credit.
2. Because this required course for juniors and seniors is listed with an ENGR designation instead of an MAT designation, there have been occasions when the registrar books other required MAT courses at the same time as the ENGR 211/212 capstone courses.
3. Increase in credit for MAT 10 discussed above causes an increase in total credits to graduate.

Academic Impact Statement:
Is this proposed program change interdisciplinary?
No, all courses are required for MAT undergraduates.
Identify any known effects of the proposed program change on other programs at the University.
Cross-listing of required courses ENGR 211/212 as required courses MAT 211/212. This will have no effect on other programs.
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:
N.A.
Who was consulted?
N.A.
Is the proposed program change acceptable to the affected programs?
N.A.
Will any changes be required in the affected programs? If so, describe.
N.A.
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: No impact
- Computer impact statement: No impact
- Faculty impact statement: No impact
- Facilities impact statement: No impact

Provide a statement indicating who will assume financial responsibility for any new resources required:
No impact
Proposed Changes for APC Consideration
P.C. Rossin College of Engineering and Applied Science
Department of Materials Science and Engineering

Change in Course Description
(submitted 11-12-07; 11-28-07)

Description of proposed changes (see change in catalog description on next page):
MAT 10 – Materials Laboratory. This one credit laboratory currently has three to four
sessions per week of the same laboratory exercise, depending on the total number of
students per class (laboratory size is held to 10-12 students per session). A brief lecture is
required before each laboratory session. It is proposed to change this course from a one
credit laboratory that meets once/week for three hours to a combined lecture/laboratory
worth two credits. With the proposed change, a single 50 minute lecture session will be
held for all students once/week. Each student will then report to their designated
laboratory session at the appropriate time during the week.

Rationale for proposed changes:
This proposed change will address two longstanding issues with this course. First,
students have invariably complained about the one credit received for the relatively large
amount of work required in the course. All faculty members in the department agree that
students deserve more credit for this course. The proposed change will thus provide
students with a more appropriate credit level for the work involved. Second, there is
usually insufficient time to properly cover topics required for both the lecture and the
laboratory exercise in the allotted three hour time period. The change to a combined
lecture/laboratory will also correct this problem.

Academic Impact Statement:
- Is this proposed program change interdisciplinary?
  No. MAT 10 is not a required course for students outside of the Materials Science & Engineering Department.
- 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:
  N/A
  Who was consulted?
  N/A
  Is the proposed program change acceptable to the affected programs?
  N/A
  Will any changes be required in the affected programs? If so, describe.
  N/A
- Identify any known effects of the proposed program change on the University’s commitment to diversity.
  None
Resource Impact Statement:
- Provide each of the following:
  - Library impact statement  No effect
  - Computer impact statement No effect
  - Faculty impact statement  No effect
  - Facilities impact statement  No effect

- Provide a statement indicating who will assume financial responsibility for any new resources required:
  No effect

Current Course Description

**MAT 10. Materials Laboratory (1) fall**
Introduction to experimental methods used to fabricate and measure the structure and properties of materials. Thermal and mechanical processing and properties are emphasized. Specimen preparation and examination by light optical microscopy. Prerequisite: MAT 33 previously or concurrently. DuPont

New Course Description

**MAT 10. Materials Laboratory (2) fall**
Introduction to experimental methods used to fabricate and measure the structure and properties of materials, and presentation of data and results through effective report writing. Thermal and mechanical processing and properties are emphasized. Specimen preparation and examination by light optical microscopy. Fundamental concepts covered in lecture are linked to individual laboratory exercises. Prerequisite: MAT 33 previously or concurrently. DuPont
# RCEAS: Mechanical Engineering and Mechanics

## Proposed Course Changes

1. Current course number, title, course description, and credits:

   **ME 312. Synthesis of Mechanisms (3) fall**
   
   Geometry and constrained plane motion with application to linkage design. Type of number synthesis. Comparison of motion analysis by graphical, analytical, and computer techniques. Euler-Savary and related curvature techniques as applied to cam, gear and linkage systems. Introduction to the analysis of space mechanisms. Prerequisites: MATH 205, MECH 102. Chew

2. Proposed course number, title, course description, and credits:

   **ME 312. Analysis and Synthesis of Mechanisms (3) fall**
   

3. Nature of proposed change(s)

   **A. Course title change? If so, provide rationale below:**
   
   Topics in course now include analysis of mechanisms in addition to synthesis of mechanisms.

   **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:**
   
   New description reflects an increase in depth and variety of analytical methods over such topics in previous version of course.

   **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)  

   **No effect**

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Graduate & Research Committee: Course Changes (7/6/04 rev)

[This form not used to propose new courses, programs, or certificates. Each of those has its own form.]
(2) **Computer impact statement** (attach statement, if provided by LTS)

No effect

(3) **Faculty impact statement** (how proposed program affects faculty load)

No effect on faculty load

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

No effect

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

No new resources required