Course Change Request  

Check Appropriate Boxes:  
Undergraduate credit ☑  
Graduate credit ☐  
Professional credit ☐  

1. School/Division  
HERRON SCHOOL OF ART AND DESIGN  

2. Academic Subject Code  
HER  

3. Current Course Number  
E113  

4. Current Credit Hours  
2  

5. Current Title  
INTRODUCTION TO SCULPTURE  

6. Effective Semester/Year for changes listed below:  
FALL 08  

7. Instructor:  
TBA  

Type of Change Requested (Check appropriate boxes and indicate changes)  

☐ 8. Change course number to:  

☐ 9. Change course title:  

☐ 10. Change credit hours fixed at:  

☐ 11. Change lecture contact hours fixed at:  

☐ 12. Change non-lecture contact hours fixed at:  

☐ 13. Is this course currently graded with S-F (only) grades?  
Yes ☐  
No ☐  

☐ 14. Does this course presently have variable title approval?  
Yes ☐  
No ☐  

☐ 15. Is variable title approval being requested?  
Yes ☐  
No ☐  

☐ 16. Current course description  

Change course description to (not to exceed 50 words)  

Provide an overview of basic skills to create three-dimensional art to explore traditional and contemporary sculptural materials. Emphasis is on both additive and subtractive methods of working form. Includes acquiring technical skills, understanding the physical and expressive possibilities of sculpture and learning to select appropriate tools and materials.  

17. Justification for change  

Credit hours do not fit with current course format  

(Use additional paper if necessary)  

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

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

Submitted by:  
Department/Division:  
Date 1/29/08  
Dean of Graduate School (when required)  

Approved by:  
Valerie E. Kneuer  
Date 1/29/08  
Dean  

Chancellor/Vice-President  
Date  

University Enrollment Services  
Date  

University Enrollment Services Final—White, Chancellor/Vice-President—Blue, School/Division—Yellow, Department/Division—Pink, University Enrollment Services Advance—White.
New Course Request

Indiana University

Check Appropriate Boxes:
- Undergraduate credit
- Graduate credit
- Professional credit

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

3. Course Number: TCM 450 (must be cleared with University Enrollment Services)
4. Instructor

5. Course Title: Approaches for Technical and Professional Communication

   Recommended Abbreviation (Optional): AppTechProfComm

   (Limited to 22 Characters including spaces)

6. First time this course is to be offered (Semester/Year): Spring 2007

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

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

9. Is variable title approval being requested? Yes [ ] No [X]

10. Course description (not to exceed 50 words) for Bulletin publication:
    Examine quantitative and qualitative research techniques practiced by professionals working in technical and business communication. It explores both primary (i.e., field) and secondary (i.e., library) research approaches for learning about content, audience, and publication design. Prereq. TCM 220 or TCM 320 or ENG W231 or similar course.

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

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

13. Estimated enrollment: 15 of which 0% percent are expected to be graduate students.

14. Frequency of scheduling: Each spring

15. Justification for new course: See Attachments

16. Are the necessary reading materials currently available in the appropriate library? Yes—see bibliography

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

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

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

Submitted by:

[Signature]
Department Chairman/Division Director

Date

Approved by:

[Signature]
Dean

Date

Dean of Graduate School (when required)

Date

Chancellor/Vice-President

Date

University Enrollment Services

Date

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

UPS: 174
University Enrollment Services Final—White; Chancellor/Vice-President—Blue; School/Division—Yellow; Department/Division—Pink; University Enrollment Services Advance—White.
Research Approaches for Technical & Professional Communication

Spring 2007 - M 6:00-8:40 - ET 205A
Marj Rush Hovde, Associate Professor of Technical Communication and English
mhovde@iupui.edu - (317) 274-0825 - ET314B - Office Hours 1:30-2:30 MW

In creating professional publications, the processes of learning about content, audience, and document design are crucial and complex. Professional and technical communicators need to know how to learn quickly and well. In this course, we will focus on how one learns what one needs to know about content, readers, and document design in order to produce high quality publications.

Texts and Supplies

- Multiple means for storing electronic files.

Major units for the course:

1. Generating questions, generating answers
2. Indirect or secondary approaches to research
3. Direct or primary approaches to research
4. Designing and conducting research
5. Analyzing and writing about the results of research

Course Projects

In learning how to learn about content, audience and document design, we will look at how to conduct both primary/secondary or direct/indirect research through completing the following projects.

Project #1 (Group) 10 points. Generating questions for the semester’s research. Due Jan. 22
Project #2 (Group) 10 points. Generating an annotated bibliography of secondary sources to begin to answer research questions. Due Feb. 5
Project #3 (Group) 20 points. Tentative primary research designs. (A collection of 5 weekly assignments.)
Project #4 (Group) 10 points. Research plan. Due March 26
Project #5 (Group) 20 points. Final oral and written report for client. Due April 30
Project #6 (Individual) 10 points. Reading logs, project logs, and class participation. Due April 30
Project #7 (Individual) 20 points for undergrads, 10 points for graduate students. Presenting guidelines and leading a discussion on a research method. (1 for undergrads, 2 for graduate students). Done throughout the semester.
Project #8 (Individual – grad students only) 10 points. Designing a research project for a specific situation. Due April 23.

Graduate students will be expected to take leadership in group projects in addition to completing the additional work listed above. I will provide details of each assignment as the semester progresses.
Additional Resources

A list of additional resources will be available for you on OnCourse. These will be especially useful as you complete your individual projects.

Grading

Grades will be based on a 100 point total with letter grades according to a 10-point scale. In other words, 90-100 is an A, etc. Grades close to the cutoff will be recorded as a plus or minus. Discuss possible pass/fail grades, incomplete grades, and withdrawals with the professor.

Attendance, Deadlines, Extensions, etc.

Because this is a participation course, you need to attend class meetings. If you cannot be here, let me know that you will be gone and what you will do to make up missed work. I will keep an attendance record on OnCourse; unexcused absences will decrease your class participation score.

Assignment due dates are listed in the syllabus. If you need more time, negotiate a new due date with the professor. Because of the complexity of group projects, extensions for those will generally not be available. If you are contemplating a P/F, W, or I grade, please confer with me. Also, if you wish to complete extra credit work, discuss it with me, although such work is usually not necessary.

Academic Integrity

Professional ethics require that you give others proper credit for their work. Therefore, you need to cite your sources of information appropriately. I will help you determine suitable ways to give credit to the sources of your ideas and information. If you present a document or any section of a document as your work when it is not, you will receive an F for the document, and/or you may be referred for disciplinary action. For more details, see: http://www.upinu.edu/crestv/

Philosophy of Teaching and Learning

For the type of learning that we will complete in this course, students learn best by applying the theories that we cover. Students will take a great deal of initiative and use creative thinking to solve situated problems. As the professor, I will serve as a guide to the processes involved in shaping situated research that yields rich results.

Weekly Schedule

Generating Questions, Generating Answers

January 8.
Introduction to the course and the semester research.
Discuss generating questions.
Discuss reading logs.

Assignment for the next class:
Write what you already know or assume about the group's project. Write the questions the client might like to have answered. (Project # 1)
Read textbook chapters on Principles of Research and Using Personal Experiences.
Begin Reading Logs.

January 15 No class - MLK day

Indirect/secondary approaches to research

January 22
Collect group's questions for research. (Project #1)
Discuss learning through personal experience.
Discuss readings.
Discuss Project #7.

Assignment for next class:
Begin exploring the background for the semester project.
Read chapter on Conducting Secondary Research.
Begin work on Project #7.

January 29
Learning through print and on-line resources.
Work at using on-line library resources.
Discuss Project #8.

Assignment for next class:
Prepare an annotated bibliography of print and on-line sources that the group could employ to answer some of the research questions for the group project. (Project #2)
Read chapter on Informational Interviews.
Continue working on individual reports and projects.

Direct/primary approaches to research

February 5
Annotated bibliography due (Project #2)
Discuss learning through interviews. (Project #7 reports begin.)

Assignment for next class:
Prepare questions for an interview and types of potential interviewees for the group project. (Project #3A)
Read chapter on Questionnaires and Surveys.

February 12.
Project 3A due.
Preliminary description of Project #8 due. (Grad students only)
Discuss learning through questionnaires and surveys.

Assignment for next class:
Prepare questions for a questionnaire or survey and determine a way to distribute them to potential respondents for the group project. (Project #3B)
Read chapter on Experimental Research.
Write description of individual project.
February 19
Project 3B due.
Discuss learning through experimentation.

Assignment for next class:
Design an experiment to test a hypothesis for the group project. (Project 3C).
Read chapter on Focus Groups.

February 26
Project 3C due.
Discuss Focus Groups.

Assignment for next class:
Design a focus group for the group project. (Project 3D).
Read chapter on Usability Evaluation.

March 5
Project 3D due.
Discuss learning through Usability Evaluation.

Assignment for next class:
Design a usability evaluation for the group project. (Project 3E)
Begin thinking about how to design the overall study.

March 12 Spring Break

Designing and conducting research

March 19
Project 3E due.
Design research methods for group project. Begin writing research plan. (Project # 4)

Assignment for next class:
Complete the research plan.
Create a tentative outline and bibliography for the individual project.

March 26
Research plan due.
Complete the details of conducting the research.

Assignment for next class:
Conduct the group research

April 2
Continue conducting the group research

Assignment for next class:
Bring notes of the research results.

April 9
Begin analyzing the results.
Assignment for next class:
   Bring notes of the research results.
   Polish individual reports.

Writing about the results of research

April 16
Discuss how to report research results.

Assignment for next class:
   Read chapter on Additional Approaches to Research
   Work on drafting the final report.
   Complete Project #8 (grad students only)

April 23
Work on creating final report.
Project #8 presented (grad students only)
Discuss additional approaches to research

Assignment for next class:
   Complete final report
   Complete reading and project logs

April 30
Final report due and Project logs due.
Course summary.
"Show and Tell" with client on group research project.
### Purdue University

**Request for Addition, Expiration, or Revision of an Undergraduate Course (101-400 Level)**

**Department:** Technical Communications

**Effective Session:** Spring 2007

**Course Title:** Research Approaches for Technical and Professional Communication

**Subject Abbreviation:** TCM

**Course Number:** 450

**Duration:** 15 weeks

**Credit:** 3 credits

---

### Course Attributes

**Check All That Apply:**

- [X] Pass/No Pass Only
- [X] Satisfactory/Unsatisfactory Only
- [ ] Repeatable
- [ ] Maximum Repeatability: 0
- [X] Credit by Examination
- [X] Designated Required
- [ ] Special Fees

**Instructional Type:**

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<th>Lecture</th>
<th>Recitation</th>
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<th>Studio</th>
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<th>Research</th>
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### Course Description (Include Prerequisites)

Examine qualitative and quantitative research techniques practiced by professionals working in technical and business communication. It explores both primary (i.e., field) and secondary (i.e., library) research approaches for learning about content, audience, and publication design. Prerequisite: TCM 220 or TCM 320 or Eng W231 or similar course.

---

**Department Heads**

- **Calumet Department Head:** [Signature]
  - Date: [Date]
- **Fort Wayne Department Head:** [Signature] 10/18/06
  - Date: [Date]
- **Indianapolis Department Head:** [Signature]
  - Date: [Date]
- **North Central Department Head:** [Signature]
  - Date: [Date]
- **West Lafayette Department Head:** [Signature]
  - Date: [Date]

**School Deans**

- **Calumet School Dean:** [Signature]
  - Date: [Date]
- **Fort Wayne School Dean:** [Signature]
  - Date: [Date]
- **Indianapolis School Dean:** [Signature]
  - Date: [Date]
- **North Central School Dean:** [Signature]
  - Date: [Date]
- **West Lafayette School Dean:** [Signature]
  - Date: [Date]
New Course Request

Induana University

Indianapolis Campus

Check Appropriate Boxes: Undergraduate credit [✓] Graduate credit [ ] Professional credit [ ]

1. School/Division: School of Engineering and Technology
2. Academic Subject Code: BME

3. Course Number: 442 (must be cleared with University Enrollment Services)
4. Instructor

5. Course Title: Biofluid and Biosolid Mechanics
   Recommended Abbreviation (Optional): Biofluid Biosolid Mech
   (Limited to 32 Characters including spaces)

6. First time this course is to be offered (Semester/Year): Spring 2008

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

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

9. Is variable title approval being requested? Yes [ ] No [✓]

10. Course description (not to exceed 50 words) for Bulletin publication:
    This course explores fluid and solid mechanics in the context of the human circulatory system. Principal equations are derived from differential analysis of fluid flow, and models of characteristic flow conditions are fully analyzed. Biosolid mechanics, vessel biomechanics, and hemodynamic analysis of the circulation system will also be discussed. Prerequisites: BME 352, BME 354.

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

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

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

14. Frequency of scheduling: yearly
    Will this course be required for majors? yes

15. Justification for new course: New BME undergraduate curriculum

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

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

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

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

Submitted by: [Signature]
Department Chairman/Division Director
Date: 12/10/07

Approval by: [Signature]
Dean
Date: 12/11/07

Dean of Graduate School (when required)

University Enrollment Services
Date

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

UPS 724
University Enrollment Services Final—White; Chancellor/Vice-President—Blue; School/Division—Yellow; Department/Division—Pink; University Enrollment Services Advance—White
BME 442    BIOFLUID & BIOSOLID MECHANICS

SPRING 2008

Instructor:  Julie Y. Ji, Ph.D.
Office:       SL-220J
Phone:       317-278-2275
E-mail:       jji@iupui.edu

Class:        Tue and Thur, 10:30 – 11:45 AM, SL-???
Office Hours: TBA
Prerequisite: BME 352/354
Reference Textbooks:
   WM Deen, Analysis of Transport Phenomena, Oxford 1998
   CR Ethier, CA Simmons, Introductory Biomechanics, Cambridge 2007

Course Description:
This course explores fluid and solid mechanics in the context of the human circulatory system. Principal equations are derived from differential analysis of fluid flow, and models of characteristic flow conditions are fully analyzed. Biosolid mechanics, vessel biomechanics, and hemodynamic analysis of the circulation system will also be discussed.

Instructional Goals:
After completion of this course students should be able to:

1. Understand basic physical properties of fluids.
2. Evaluate force and pressure balances acting on fluid.
3. Derive conservation of mass and linear momentum.
4. Derive and apply Navier-Stokes equations.
5. Able to solve classic flow models.
6. Analytically approach and solve fluid flow problems.
7. Evaluate stress and strain analysis of solids.
8. Understand physiology of the human circulation system.
10. Apply fluid mechanics to blood flow models.
11. Evaluate and design biofluid mechanics problems (project).

Content:  Topics to be covered in this course can be primarily divided into 3 parts, with an emphasis on fundamental principles of fluid mechanics. This course will present an integrated introduction to basic fluid mechanics. Understanding basic physical properties of fluids and analyzing force and pressure balances are fundamental to solving engineering problems. Conservation of mass and linear momentum are derived from basic differential analysis of fluid flow. Problems-solving approaches and concepts are
explored for classic fluid dynamic models. Second part of this course will include an introductory to solid mechanics, with discussions on mechanics of materials stresses and strains, and viscoelasticity. Final part of this course will cover integration of fluid and solid mechanics in the human circulation systems. Principles of fluid and solid mechanics are used in the context of blood rheology, vessel biomechanics, and vascular implants.

Outline of Topics: (roughly by lectures, order may vary)
I. Principles of fluid mechanics
   1. Introduction: basic terms defined, viscosity
   2. Fluid statics: pressure and force balances
   3. Fluid kinematics: velocity, acceleration fields
   4. Control volume analysis, Reynolds Transport Theorem
   5. Differential analysis of fluid flow
   6. Conservation of Mass and Linear Momentum (continuity, momentum equations)
   7. Viscous flow – Navier-Stokes Equations
   8. Couette flow, Poiseuille flow
   9. Dimensional analysis
  10. Low Reynolds number flow – Stokes or creeping flow
  11. High Reynolds number – Bernoulli Equation
  12. Rotational, irrotational flow
  13. Viscous flow in pipe
  14. Boundary layer
II. Solid mechanics
   15. Introduction to solid mechanics – elasticity, stress and strain
   16. Analysis of thin, thick-walled cylindrical tube
   17. Blood vessel mechanics
   18. Special topic – Equilibrium equation
   19. Special topic – Viscoelasticity
   20. Special topic – Properties of biomaterials
III. Biomechanics of the human circulation
   21. Rheology of blood
   22. Pressure-flow relationships in blood
   23. Static and steady flow – Applications of Bernoulli equation
   24. Static and steady flow – Rigid tube model, entrance length
   25. Unsteady and non-uniform models, Windkessel model, pulsatile flow condition
   26. Hemodynamics of atherosclerosis, curvatures and bifurcation of vessels

Grading:
- Homework (10) 20%
- Exam 1 20%
- Exam 2 20%
- Group Project 10%
- Final Exam 30%

Notes:
- There will be occasional guest lectures, with reading materials to be distributed separately.
- There will be approximately 1 homework assignment a week, usually given out on Wednesday and due the following Wednesday.
- Homework should be based on individual efforts.
- Projects may be group efforts – more instructions to come.
- No cell phones in class.
Office of the Registrar
FORM 40 REV. 7/05

PURDUE UNIVERSITY
REQUEST FOR ADDITION, EXPIRATION,
OR REVISION OF A COURSE

DEPARTMENT Biomedical Engineering EFFECTIVE SESSION Spring 2007

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

1. New course with supporting documents
2. Add existing course
3. Expiration of a course
4. Change in course number
5. Change in course title
6. Change in course credit type
7. Change in course attributes
8. Change in instructional hours
9. Change in course description
10. Change in course requisites
11. Change in semesters offered
12. Transfer from one department to another

PROPOSED:

<table>
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<th>Subject Abbreviation</th>
<th>Course Number</th>
<th>Long Title</th>
<th>Short Title</th>
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<tr>
<td>BME</td>
<td>442</td>
<td>Biofluid and Biosolid Mechanics</td>
<td>Biofluid Biosolid Mech</td>
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EXISTING:

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<tr>
<th>Subject Abbreviation</th>
<th>Course Number</th>
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</table>

TERMS OFFERED: Check All That Apply:

- Summer [x]
- Spring [x]
- Fall [x]

CAMPUS(ES) INVOLVED:

- Calumet [x]
- Ft. Wayne [ ]
- Indianapolis [x]
- W. Lafayette [x]
- N. Central [ ]
- Tech Statewide [ ]

- Cont Ed [x]

CREDIT TYPE

1. Fixed Credit: Cr. Hrs: [x] 3
2. Variable Credit Range: Minimum Cr. Hrs: [ ] Or [ ] Maximum Cr. Hrs: [ ]
3. Equivalent Credit: Yes [x] No [ ]
4. Thesis Credit: Yes [x] No [ ]

COURSE ATTRIBUTES: Check all That Apply

- 7. Registration Approval Type
- 8. Variable Title
- 9. Remedial
- 10. Honors
- 11. Full Time Privilege
- 12. Off Campus Experience

Instructional Minutes Per Mgr

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<th>Minutes Per Mgr</th>
<th>Meetings Per Week</th>
<th>Weeks Offered</th>
<th>% of Credit Allocated</th>
<th>Delivery Method (Asyn, Or Sym)</th>
<th>Delivery Medium (Audio, Internet, Live, Text-Based, Video)</th>
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Cross-Listed Courses

- Calumet Undergrad Curriculum Committee Date
- Calumet Department Head Date
- Calumet School Dean Date
- Fort Wayne Undergrad Curriculum Committee Date
- Fort Wayne Department Head Date
- Fort Wayne School Dean Date
- Fort Wayne Chancellor Date
- Graduate Council Chair Date
- Graduate Council Secretary Date
- Graduate Council Chair Date
- Graduate Council Secretary Date
- North Central Department Head Date
- North Central Chancellor Date
- North Central School Dean Date
- Undergrad Curriculum Committee Date
- Undergrad Curriculum Committee Date
- West Lafayette Department Head Date
- West Lafayette College/School Dean Date
- West Lafayette Registrar Date
- West Lafayette Registrar Date

COURSE DESCRIPTION (INCLUDE REQUISITES):
P: BME 352 and BME 354. This course explores fluid and solid mechanics in the context of the human circulatory system. Principal equations are derived from differential analysis of fluid flow, and models of characteristic flow conditions are fully analyzed. Biosolid mechanics, vessel biomechanics, and hemodynamic analysis of the circulation system will also be discussed.

OFFICE OF THE REGISTRAR
New Course Request

Indiana University
Indianapolis Campus

Check Appropriate Boxes: Undergraduate credit ☑ Graduate credit ☐ Professional credit ☐

1. School/Division: School of Engineering and Technology
2. Academic Subject Code: BME

3. Course Number: 442 (must be cleared with University Enrollment Services)
4. Instructor:

5. Course Title: Biofluid and Biosolid Mechanics
   Recommended Abbreviation (Optional): Biofluid Biosolid Mech
   (Limited to 32 Characters including spaces)

6. First time this course is to be offered (Semester/Year): Spring 2008

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

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

9. Is variable title approval being requested? Yes ☐ No ☑

10. Course description (not to exceed 50 words) for Bulletin publication: This course explores fluid and solid mechanics in the context of the human circulatory system. Principal equations are derived from differential analysis of fluid flow, and models of characteristic flow conditions are fully analyzed. Biosolid mechanics, vessel biomechanics, and hemodynamic analysis of the circulation system will also be discussed. Prerequisites: BME 352, BME 354.

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

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

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

14. Frequency of scheduling: Yearly
   Will this course be required for majors? Yes ☑

15. Justification for new course: New BME undergraduate curriculum

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

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Submitted by: ____________________________ Date 12/10/07
Department Chairman/Division Director

Approved by: ____________________________ Date 12/11/07
Dean

Dean of Graduate School (when required)

Chancellor/Vice-President

University Enrollment Services

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

UPS 724 University Enrollment Services Final—White; Chancellor/Vice-President—Blue; School/Division—Yellow;
Department/Division—Pink; University Enrollment Services Advance—White
BME 442  BIOFLUID & BIOSOLID MECHANICS

SPRING 2008

Instructor:  Julie Y. Ji, Ph.D.
Office:  SL-2201
Phone:  317-278-2275
E-mail:  jjii@iupui.edu

Class:  Tue and Thur, 10:30 – 11:45 AM, SL-???

Office Hours:  TBA

Prerequisite:  BME 352/354


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4. Derive and apply Navier-Stokes equations.
5. Able to solve classic flow models.
6. Analytically approach and solve fluid flow problems.
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10. Apply fluid mechanics to blood flow models.
11. Evaluate and design biofluid mechanics problems (project).

Content:  Topics to be covered in this course can be primarily divided into 3 parts, with an emphasis on fundamental principles of fluid mechanics. This course will present an integrated introduction to basic fluid mechanics. Understanding basic physical properties of fluids and analyzing force and pressure balances are fundamental to solving engineering problems. Conservation of mass and linear momentum are derived from basic differential analysis of fluid flow. Problems-solving approaches and concepts are
explored for classic fluid dynamic models. Second part of this course will include an introductory to solid mechanics, with discussions on mechanics of materials stresses and strains, and viscoelasticity. Final part of this course will cover integration of fluid and solid mechanics in the human circulation systems. Principles of fluid and solid mechanics are used in the context of blood rheology, vessel biomechanics, and vascular implants.

Outline of Topics: (roughly by lectures, order may vary)

I. Principles of fluid mechanics
   1. Introduction: basic terms defined, viscosity
   2. Fluid statics: pressure and force balances
   3. Fluid kinematics: velocity, acceleration fields
   4. Control volume analysis, Reynolds Transport Theorem
   5. Differential analysis of fluid flow
   6. Conservation of Mass and Linear Momentum (continuity, momentum equations)
   7. Viscous flow – Navier-Stokes Equations
   8. Couette flow, Poiseuille flow
   9. Dimensional analysis
   10. Low Reynolds number flow – Stokes or creeping flow
   11. High Reynolds number – Bernoulli Equation
   12. Rotational, irrotational flow
   13. Viscous flow in pipe
   14. Boundary layer

II. Solid mechanics
   15. Introduction to solid mechanics – elasticity, stress and strain
   16. Analysis of thin, thick-walled cylindrical tube
   17. Blood vessel mechanics
   18. Special topic – Equilibrium equation
   19. Special topic – Viscoelasticity
   20. Special topic – Properties of biomaterials

III. Biomechanics of the human circulation
   21. Rheology of blood
   22. Pressure-flow relationships in blood
   23. Static and steady flow – Applications of Bernoulli equation
   24. Static and steady flow – Rigid tube model, entrance length
   25. Unsteady and non-uniform models, Windkessel model, pulsatile flow condition
   26. Hemodynamics of atherosclerosis, curvatures and bifurcation of vessels

Grading:
- Homework (10) 20%
- Exam 1 20%
- Exam 2 20%
- Group Project 10%
- Final Exam 30%

Notes:
- There will be occasional guest lectures, with reading materials to be distributed separately.
- There will be approximately 1 homework assignment a week, usually given out on Wednesday and due the following Wednesday.
- Homework should be based on individual efforts.
- Projects may be group efforts – more instructions to come.
- No cell phones in class.
PURDUE UNIVERSITY
REQUEST FOR ADDITION, EXPIRATION,
OR REVISION OF A COURSE

DEPARTMENT: Biomedical Engineering
EFFECTIVE SESSION: Spring 2007

INSTRUCTIONS: Please check the items below which describe the purpose of this request:
1. New course with supporting documents
2. Add existing course
3. Expansion of a course
4. Change in course number
5. Change in course title
6. Change in course credit type
7. Change in course attributes
8. Change in instructional hours
9. Change in course description
10. Change in course requirements
11. Change in semesters offered
12. Transfer from one department to another

PROPOSED:

<table>
<thead>
<tr>
<th>Subject Abbreviation</th>
<th>Course Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>BME</td>
<td>442</td>
</tr>
</tbody>
</table>

Long Title: Biofluid and BioSolid Mechanics
Short Title: Biofluid BioSolid Mech
Abbreviated title will be entered by the Office of the Registrar if omitted. (22 CHARACTERS ONLY)

COURSE ATTRIBUTES: Check all that apply
7. Registration Approval Type
   - Instructor
8. Variable Title
9. Remedial
10. Honors
11. Full Time Privilege
12. Off Campus Experience

CREDIT TYPE
1. Fixed Credit: Cr. Hrs.
   - 3
2. Variable Credit Range: Minimum Cr. Hrs
   - (Check One) To
   - Or
   - Maximum Cr. Hrs
3. Equivalent Credit: Yes
4. Thesis Credit: Yes

Instructional Minutes Per Cr. Hrs. Meetings Per Week Weeks Offered % of Credit Allocated Delivery Method Delivery Medium (Audio, Internet, Live, Text-Based, Video)
- Lecture: 75 2 15
- Recitation: 
- Presentation: 
- Laboratory: 
- Lab Prep: 
- Studio: 
- Distance: 
- Clinic: 
- Experiential: 
- Research: 
- Ind. Study: 
- Pract/Obser: 

COURSE DESCRIPTION (INCLUDE REQUISITES):
P: BME 352 and BME 354. This course explores fluid and solid mechanics in the context of the human circulatory system. Principal equations are derived from differential analysis of fluid flow, and models of characteristic flow conditions are fully analyzed. Biofluid mechanics, vessel biomechanics, and hemodynamic analysis of the circulation system will also be discussed.

Cross-Listed Courses

Calumet Undergrad Curriculum Committee Date
- Fort Wayne Department Head Date
- Indianapolis Department Head Date
- North Central Department Head Date
- West Lafayette Department Head Date
- Graduate Council Area Committee Chair Date

Calumet Department Head Date
- Fort Wayne School Dean Date
- Indianapolis School Dean Date
- North Central Chancellor Date
- West Lafayette College/School Dean Date
- Graduate Dean Date

Calumet School Dean Date
- Fort Wayne Chancellor Date
- Undergrad Curriculum Committee Date
- Date Approved by Graduate Council
- Graduate Council Secretary Date
- West Lafayette Registrar Date

OFFICE OF THE REGISTRAR
New Course Request

Indiana University

Check Appropriate Boxes: Undergraduate credit CheckBox  Graduate credit CheckBox  Professional credit CheckBox

1. School/Division  Engineering and Technology

2. Academic Subject Code

3. Course Number  TECH104  (must be cleared with University Enrollment Services)

4. Instructor  D. Acheson

5. Course Title  Technical Graphics Communications

   Recommended Abbreviation (Optional)  Tech Graphics Com

   (Limited to 32 Characters including spaces)

6. First time this course is to be offered (Semester/Year):  Fall 2008

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

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

9. Is variable title approval being requested? Yes  No  

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

    An introduction to the graphic language used to communicate design ideas using CAD.

    Topics include sketching, multiview drawings, auxiliary views, section views, pictorial views and dimensioning practices as well as an introduction to three-dimensional modeling, lighting and rendering.

11. Lecture Contact Hours: Fixed at  2  or Variable from  _________ to  _________

12. Non-Lecture Contact Hours: Fixed at  2  or Variable from  _________ to  _________

13. Estimated enrollment:  30  of which  0  percent are expected to be graduate students.

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

15. Justification for new course:  To serve the programs within the newly-formed Engineering Technology Department.

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

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

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

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

Submitted by:

[Signature]  Date  2/15/07

Department Chair/Division Director

Dean of Graduate School (when required)

Approved by:

[Signature]  Date  3/1/07

Dean

Chancellor/Vice-President

University Enrollment Services

Date

Date

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

UPS 724

University Enrollment Services
Final—White; Chancellor/Vice-President—Blue; School/Division—Yellow;
Department/Division—Pink, University Enrollment Services Advance—White
COURSE DESCRIPTION

Revised: 21 - November 2007

<table>
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<tr>
<th>Course:</th>
<th>TECH 104 – Technical Graphics Communications</th>
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<tr>
<td>Catalog Data:</td>
<td>2 Lecture Hours</td>
</tr>
<tr>
<td>Prerequisites: None</td>
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<td>Offerings:</td>
<td>Fall / Spring / Summer</td>
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<tr>
<td>Other Required Material</td>
<td>Mechanical pencil: .5mm, H or HB lead w/ Eraser (1) Flash Drive</td>
</tr>
<tr>
<td>Course Coordinator:</td>
<td>Doug Acheson, Associate Professor of Mechanical Engineering Technology</td>
</tr>
</tbody>
</table>

Learning Objectives

1. Create sketches of technical ideas and problem solutions.

2. Create orthographic views of 3 dimensional objects.

3. Create pictorial drawings of 3 dimensional objects.

4. Extract section & auxiliary views from primary views.

5. Add dimensions and tolerances using standard practices.

6. Use AutoCAD to generate two-dimensional engineering drawings.

7. Gain general understanding of 3D modeling in AutoCAD.
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>Engineering Graphics Overview</td>
</tr>
<tr>
<td>2</td>
<td>Sketching, Text, and Visualization</td>
</tr>
<tr>
<td>3</td>
<td>Multiview Drawings</td>
</tr>
<tr>
<td>4</td>
<td>Multiview Drawings – Continued</td>
</tr>
<tr>
<td>5</td>
<td>Auxiliary View Drawings</td>
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<tr>
<td>6</td>
<td>Section View Drawings</td>
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<tr>
<td>7</td>
<td>Dimensioning</td>
</tr>
<tr>
<td>8</td>
<td>Midterm Exam</td>
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<tr>
<td>9</td>
<td>Tolerancing Practices</td>
</tr>
<tr>
<td>10</td>
<td>Working Drawings</td>
</tr>
<tr>
<td>11</td>
<td>Pictorial Drawings</td>
</tr>
<tr>
<td>12</td>
<td>3D Modeling Basics</td>
</tr>
<tr>
<td>13</td>
<td>Solid Modeling</td>
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<tr>
<td>14</td>
<td>Solid Features</td>
</tr>
<tr>
<td>15</td>
<td>Advanced Solid Features</td>
</tr>
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<td>16</td>
<td>Final Exam</td>
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</table>

Prepared by: Douglas C. Acheson  
Date: November 21, 2007
### PURDUE UNIVERSITY

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

**DEPARTMENT: Engineering Technology**  
**EFFECTIVE SESSION: Fall 2007**

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

- [ ] 1. New course with supporting documents
- [ ] 2. Not existing course offered at another campus
- [ ] 3. Expiration of a course
- [ ] 4. Change in course number
- [ ] 5. Change in course title
- [ ] 6. Change in course credit/type
- [ ] 7. Change in course attributes (department head signature only)
- [ ] 8. Change in instructional hours
- [ ] 9. Change in course description
- [ ] 10. Change in course requisites
- [ ] 11. Change in semesters offered (department head signature only)
- [ ] 12. Transfer from one department to another

**PROPOSED:**

- **Subject Abbreviation:** TECH
- **Course Number:** 104
- **Long Title:** Technical Graphics Communications
- **Short Title:** Tech Graphics Comm.

**EXISTING:**

- **Subject Abbreviation:**
- **Course Number:**
- **Long Title:**
- **Short Title:**

**TERMS OFFERED:** Check All That Apply:

- [ ] Summer
- [ ] Fall
- [ ] Spring

**CAMPUS(ES) INVOLVED:**

- Cabaret
- Cont Ed
- H. Wayne
- W. Lafayette
- Indianapolis

**CREDIT TYPE:**

1. Fixed Credit, Cr. Hrs.: 3
2. Variable Credit Range: [ ]
3. Minimum Cr. Hrs. (Check One): [ ]
4. Maximum Cr. Hrs. (Check One): [ ]
5. Equivalent Credit: [ ]
6. Thesis Credit: [ ]

**INSTRUCTIONAL TYPE:**

- Lecture: [ ]
- Recitation: [ ]
- Presentation: [ ]
- Laboratory: [ ]
- Shop/Shop: [ ]
- Clinic: [ ]
- Experimental: [ ]
- Research: [ ]
- Ind. Study: [ ]
- Practicum: [ ]

**Cross-Listed Courses:**

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<thead>
<tr>
<th>Cross-Listed Courses</th>
<th>Course</th>
<th>Department</th>
<th>Instructor</th>
<th>Delivery Medium</th>
<th>Delivery Medium (Audio, Interact, Live)</th>
</tr>
</thead>
</table>

**COURSE ATTRIBUTES:** Check All That Apply:

- [ ] 1. Pass/No Pass Only
- [ ] 2. Satisfactory/Unsatisfactory Only
- [ ] 3. Repeatable
- [ ] 4. Maximum Repeatable Credit
- [ ] 5. Credit by Examination
- [ ] 6. Designator Required
- [ ] 7. Full Time Equivalent
- [ ] 8. Off Campus Experiences

**COURSE DESCRIPTION (INCLUDE PREREQUISITES):**

This course is an introduction to the graphic language used to communicate design ideas using CAD. Topics include: sketching, multi-view drawings, auxiliary views, section views, pictorial views and dimensioning practices as well as an introduction to three-dimensional modeling, lighting and modeling.

**Signature Page:**

- **Calumet Department Head:**
- **Calumet School Dean:**
- **Fort Wayne Department Head:**
- **Fort Wayne School Dean:**
- **Indianapolis Department Head:**
- **Indianapolis School Dean:**
- **North Central Department Head:**
- **North Central Chancellor:**
- **West Lafayette Department Head:**
- **West Lafayette College/School Dean:**
- **West Lafayette Registrar:**

**OFFICE OF THE REGISTRAR**

---

Date: **11/13/07**  
Date: **10/13/07**  
Date: **10/13/07**
New Course Request

Indiana University

Check Appropriate Boxes:
Undergraduate credit ✔
Graduate credit □
Professional credit □

1. School/Division: Engineering and Technology
2. Academic Subject Code:

3. Course Number: MET305 (must be cleared with University Enrollment Services)

4. Instructor: D. Acheson

5. Course Title: Computer-Aided Design with Applications
   Recommended Abbreviation (Optional): CAD Use Parametr Model
   (Limited to 32 Characters including spaces)

6. First time this course is to be offered (Semester/Year): Fall 2008

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

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

9. Is variable title approval being requested? Yes ☐ No ✔

10. Course description (not to exceed 50 words) for Bulletin publication:
    P: TECH104 or CGT110 (Or Instructors Consent). This course provides advanced study of computer-aided drafting and design utilizing current industrial computer-aided design systems. The course covers the use of these systems in three dimensional and parametric modeling applications.

11. Lecture Contact Hours: Fixed at 2 or Variable from ______ to ______

12. Non-Lecture Contact Hours: Fixed at 2 or Variable from ______ to ______

13. Estimated enrollment: 15 of which 0 percent are expected to be graduate students.

14. Frequency of scheduling: Summer/Fall/Spring
    Will this course be required for majors? Yes ☐ No ✔

15. Justification for new course: To partially fulfill the requirements for a newly-proposed CAD certificate program at IUPUI.

16. Are the necessary reading materials currently available in the appropriate library? Yes ☐ No ✔

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

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

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

Submitted by:

Michael E. Ophir
Department Chairman/Division Director

Date: 11/2/07

Dean

Date: 12/11/07

Chancellor/Vice-President

Date:

University Enrollment Services

Date:

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

UPS 724
University Enrollment Services Final—White; Chancellor/Vice-President—Blue; School/Division—Yellow; Department/Division—Pink; University Enrollment Services Advance—White
COURSE DESCRIPTION

Revised: 21 - November 2007

<table>
<thead>
<tr>
<th>Course:</th>
<th>MET 305 – Computer-Aided Design with Applications</th>
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<tr>
<td>Catalog Data:</td>
<td>2 Lecture Hours 2 Lab Hrs. 3 Credit Hours Prerequisites: TECH104 or CGT110 (Or Instructors Consent)</td>
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<td>Offerings:</td>
<td>Fall / Spring / Summer</td>
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<td>Textbooks:</td>
<td>Engineering Drawing with SolidWorks, 2008, Schroff Development Group</td>
</tr>
<tr>
<td>Other Required Material</td>
<td>(1) Flash Drive</td>
</tr>
<tr>
<td>Course Coordinator:</td>
<td>Doug Acheson, Associate Professor of Mechanical Engineering Technology</td>
</tr>
</tbody>
</table>

**Learning Objectives**

1. Understand the basic concepts of constraint-based 3D modeling.
2. Understand the basic concepts of parametric modeling techniques.
3. Define the role of 3D solid modeling in concurrent engineering.
4. Define the role of 3D solid modeling for manufacturing.
5. Describe solid modeling database structures.
6. Explain data exchange concerns of 3D solid modeling databases.
7. Explore various applications involving 3D solid modeling databases.
8. Delineate between 3D solid modeling and knowledge-based engineering.
9. Gain an overview of various constraint-based solid modeling systems.
MET 305 - Tentative Course Outline

Week 1  Introduction to Constraint-Based Modeling – Course Overview
Week 2  Exploring SolidWorks
Week 3  2-D Sketches and Layouts
Week 4  Primary Features
Week 5  Treatment Features
Week 6  Creating Drawings of 3-D Models
Week 7  Dimensions and Annotations
Week 8  Midterm Exam Review
Week 9  Midterm Exam
Week 10  Sheet Metal Features
Week 11  Advanced Sheet Metal
Week 12  Assembly Design
Week 13  Presentation and Animation
Week 14  Document Management
Week 15  Final Exam Review
Week 16  Final Exam

Prepared by: Douglas C. Acheson  Date November 21, 2007
**PURDUE UNIVERSITY**

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

**DEPARTMENT**: Engineering Technology  
**EFFECTIVE SESSION**: Fall 2008

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

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

**PROPOSED**

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<table>
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<tr>
<th>Long Title</th>
<th>Short Title</th>
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<tbody>
<tr>
<td>Computer-Aided Design with Applications</td>
<td>CAD Line Prenator Model</td>
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Attaching site will be entered by the Office of the Registrar (22 CHARACTERS ONLY)

**CREDIT TYPE**

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<th>4. Thesis Credit: Yes</th>
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**COURSE/ATTRIBUTES**: Check All That Apply

- 7. Registration Approval Type
- 8. Instructor
- 9. Remit
- 10. Hours
- 11. Full-Time/Part-Time
- 12. Off-Campus Experience

**INSTRUCTIONAL TYPE**

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<th>Recitation</th>
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<th>Studio</th>
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<td>16</td>
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<td>Internet, Live, Text-based, Video</td>
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**COURSE DESCRIPTION**

Include (If Required)

- 1. This course provides an advanced study of computer-aided drafting and design using current industrial computer-aided design systems. The course covers the use of these systems in three-dimensional and parametric modeling applications.

**SIGNATURES**

- **Catalog Department Head**: [Signature] Date: 11/1/07
- **Catalog School Dean**: [Signature] Date: 12/1/07
- **Fort Wayne Department Head**: [Signature] Date: 12/1/07
- **Fort Wayne School Dean**: [Signature] Date: 12/1/07
- **Indianapolis Department Head**: [Signature] Date: 12/1/07
- **Indianapolis School Dean**: [Signature] Date: 12/1/07
- **North Central Department Head**: [Signature] Date: 12/1/07
- **North Central School Dean**: [Signature] Date: 12/1/07
- **West Lafayette Department Head**: [Signature] Date: 12/1/07
- **West Lafayette College/School Dean**: [Signature] Date: 12/1/07

**OFFICE OF THE REGISTRAR**
New Course Request

Check Appropriate Boxes: Undergraduate credit [✓] Graduate credit [ ] Professional credit [ ]

1. School/Division: Engineering and Technology
2. Academic Subject Code: 

3. Course Number: MET209 (must be cleared with University Enrollment Services)
4. Instructor: D. Acheson

5. Course Title: Three Dimensional NURBS Modeling
   Recommended Abbreviation (Optional): 3D NURBS MODELING
   (Limited to 32 Characters including spaces)

6. First time this course is to be offered (Semester/Year): Fall 2008

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

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

9. Is variable title approval being requested? Yes [ ] No [✓]

10. Course description (not to exceed 50 words) for Bulletin publication:
    P: TECH104 or CGT110 (Or Instructor's Consent) - Introduction to 3D geometric modeling using NURBS-based CAD modeling. Emphasis on creating, editing, manipulating and presenting 3D conceptual and production models. Efficient modeling strategies, data exchange and an overview of downstream applications is included.

11. Lecture Contact Hours: Fixed at 2 or Variable from to

12. Non-Lecture Contact Hours: Fixed at 2 or Variable from to

13. Estimated enrollment: 15 of which 0 percent are expected to be graduate students.

14. Frequency of scheduling: Summer/Fall/Spring
   Will this course be required for majors? Yes [ ] No [✓]

15. Justification for new course: To partially fulfill the requirements for a newly-proposed CAD certificate program at IUPUI.

16. Are the necessary reading materials currently available in the appropriate library? Yes [ ] No [✓]

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

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

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

Submitted by: Michael E. Child
Department Chairman/Director Date 11/17/07
Dean of Graduate School (when required)

Approved by: Willard S. Park Date 12/4/07
Dean
Chancellor/Vice-President
University Enrollment Services

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

UPS 724
University Enrollment Services Final—White; Chancellor/Vice-President—Blue; School/Division—Yellow; Department/Division—Pink; University Enrollment Services Advance—White
# COURSE DESCRIPTION

Revised: 21 - November 2007

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<th>MET 209 – Three Dimensional NURBS Modeling</th>
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</thead>
<tbody>
<tr>
<td><strong>Catalog Data:</strong></td>
<td>2 Lecture Hours 2 Lab Hrs. 3 Credit Hours</td>
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<tr>
<td>Prerequisites:</td>
<td>TECH104 or CGT110 (Or Instructors Consent)</td>
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<tr>
<td>Description:</td>
<td>Introduction to 3D geometric modeling using NURBS-based CAD modeling. Emphasis on creating, editing, manipulating and presenting 3D conceptual and production models. Efficient modeling strategies, data exchange and an overview of down-stream applications is included.</td>
</tr>
<tr>
<td><strong>Offerings:</strong></td>
<td>Fall / Spring / Summer</td>
</tr>
<tr>
<td><strong>Textbooks:</strong></td>
<td>Rhinoceros NURBS Modeling for Windows, 2007, Robert McNeel and Associates</td>
</tr>
<tr>
<td><strong>Other Required Material:</strong></td>
<td>(1) Flash Drive (8) Color Photo Prints</td>
</tr>
<tr>
<td><strong>Course Coordinator:</strong></td>
<td>Doug Acheson, Associate Professor of Mechanical Engineering Technology</td>
</tr>
</tbody>
</table>

## Learning Objectives

1. To understand the primary differences between conventional 3D modeling packages and NURBS-based modelers.

2. To develop an intermediate proficiency in the operation of the Windows-based NURBS modeling software package “Rhinoceros”.

3. To be able to produce relatively complex and accurate solid and surface models.

4. To achieve an intermediate level of proficiency in the application of textures and lighting schemes to illustrate products in an effective and attractive manner.

5. To develop an understanding of the various types of file formats that Rhinoceros has the capability to import and export, what their native programs are and how to convert various file formats to be compatible with other CAD, vector-based and output programs.
MET 209 - Tentative Course Outline

Week 1  Rhino Basics
Week 2  Creating Two-Dimensional Objects
Week 3  Precision Modeling
Week 4  Display Options
Week 5  Editing Objects
Week 6  Point Editing
Week 7  Midterm Review and Project Work
Week 8  Midterm Exam
Week 9  Creating Deformable Shapes
Week 10  Modeling with Solids
Week 11  Creating Surfaces
Week 12  Importing and Exporting Models
Week 13  Textures and Rendering
Week 14  Virtual Lighting Schemes
Week 15  Final Exam Review and Project Work
Week 16  Final Exam

Prepared by: Douglas C. Acheson  Date: November 21, 2007
New Course Request

Indiana University
Indianapolis Campus

Check Appropriate Boxes: Undergraduate credit □ Graduate credit □ Professional credit □

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

3. Course Number 209 (must be cleared with University Enrollment Services) 4. Instructor Barbara Christie

5. Course Title BMET Microprocessor Applications

Recommended Abbreviation (Optional) BMET Microprocessor Applications

(Limited to 32 Characters including spaces)

6. First time this course is to be offered (Semester/Year): Fall 2008

7. Credit Hours: Fixed at ______ or Variable from __________ to __________

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

9. Is variable title approval being requested? Yes □ No □

10. Course description (not to exceed 50 words) for Bulletin publication: This course will explore fundamental microprocessor theory and applications in health care technology. Hardware and software in specific equipment will be discussed.

11. Lecture Contact Hours: Fixed at ______ or Variable from __________ to __________

12. Non-Lecture Contact Hours: Fixed at ______ or Variable from __________ to __________

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

14. Frequency of scheduling: ______ per year Will this course be required for majors? Yes □

15. Justification for new course: BMET students need a specialized course related to the discipline

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

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

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

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

Submitted by:

Michael C. Golub
Department Chairman/Division Director
Date 12/11/07

Approved by:

William O'Sullivan
Dean
Date 12/11/07

Dean of Graduate School (when required)

Date

Chancellor/Vice-President

Date

University Enrollment Services

Date

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

UPS 724
University Enrollment Services Final—White; Chancellor/Vice-President—Blue; School/Division—Yellow; Department/Division—Pink; University Enrollment Services Advance—White
BMET 209  BMET Microprocessor Applications

Course Descript:  (2 credits) This course will explore fundamental microprocessor theory and applications in health care technology. Hardware and software in specific equipment will be discussed.

Prerequisite:  ECET 109

Textbook  Microprocessor Technology by J S Anderson

Goals:  Students will learn the fundamental principles of microprocessors and their application in the technology used in patient care.

Topics:
1. Number Systems
2. CPU and microprocessor system
3. Memory organization
4. Machine code
5. Machine code instructions
6. Organization and use of a stack
7. Input and Output ports
8. Programming and decision making applications
9. Microprocessor use in patient beds
10. Microprocessor use in signal processing – ESU
11. Other microprocessor applications

Evaluation Methods:
Average of Exam 1 and 2: 30%
final exam: 35%
Homework and Quiz grades, averaged together: 10%
Lab: 25%

Prepared by:  Barbara Christe

Revised:  11/27/07
**PURDUE UNIVERSITY**  
REQUEST FOR ADDITION, EXPIRATION, OR REVISION OF AN UNDERGRADUATE COURSE  
(100-400 LEVEL)

**DEPARTMENT** Engineering and Technology  
**EFFECTIVE SESSION** Fall 2008

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

- [ ] New course with supporting documents
- [ ] Add existing course offered at another campus
- [ ] Expansion of a course
- [ ] Change in course number
- [ ] Change in course title
- [ ] Change in course credit type
- [ ] Change in course attributes (department head signature only)
- [ ] Change in instructional hours
- [ ] Change in course description
- [ ] Change in course requisites
- [ ] Change in semesters offered (department head signature only)
- [ ] Transfer from one department to another

**PROPOSED:**
- Subject Abbreviation: BMET
- Course Number: 209
- Long Title: BMET Microprocessor Applications
- Short Title: BMET Microprocessor Ap

**EXISTING:**
- Subject Abbreviation
- Course Number

**TERMS OFFERED:**
- Check All That Apply: Summer, Fall, Spring

**CAMPUS(ES) INVOLVED:**
- Calumet
- Cont Ed
- Ft. Wayne
- N. Central
- Tech Statewide
- W. Lafayette
- Indianapolis

| Abbreviated title will be entered by the Office of the Registrar if omitted. (22 CHARACTERS ONLY: |

**CREDIT TYPE**
- 1. Fixed Credit: Cr. Hrs.: [ ]
- 2. Variable Credit Range: Minimum Cr. Hrs.: [ ]
- Maximum Cr. Hrs.: [ ]
- Equivalent Credit: Yes [ ] No [x]
- Thesis Credit: Yes [ ] No [x]

**COURSE ATTRIBUTES:**
- 1. Pass/Not Pass Only
- 2. Satisfactory/Unsatisfactory Only
- 3. Repeatable
- 4. Credit by Examination
- 5. Designator Required
- 6. Special Fees

**Course Description (Include Requisites):**

P: ECET 109 This course will explore fundamental microprocessor theory and applications in health care technology. Hardware and software in specific equipment will be discussed.

**Culminating Department Head Date**  
**Culminating School Dean Date**

**Fort Wayne Department Head Date**  
**Fort Wayne School Dean Date**

**Indianapolis Department Head Date**  
**Indianapolis School Dean Date**

**North Central Department Head Date**  
**North Central Chancellor Date**

**West Lafayette Department Head Date**  
**West Lafayette School Dean Date**  
**West Lafayette Registrar Date**

**OFFICE OF THE REGISTRAR**
New Course Request

Indiana University
Off campus

Check Appropriate Boxes: Undergraduate credit ☑ Graduate credit ☐ Professional credit ☐

1. School/Division: School of Engineering and Technology
   Academic Subject Code: ECET

2. Course Number: 351 (must be cleared with University Enrollment Services)
   Instructor: Cooney

3. Course Title: Instrumentation Applications for Technology
   Recommended Abbreviation (Optional): Inst. Apps for Tech.

4. First time this course is to be offered (Semester/Year): Fall, 2008

5. Credit Hours: Fixed at 4 or Variable from __________ to __________
   Is this course to be graded S-F (only)? Yes ☐ No ☑
   Is variable title approval being requested? Yes ☐ No ☑

6. Prereq: Math 221 and ECET 116 or ECET 107 (4 cr.) Class 3, Lab 2. Introduction to the basic concepts and terminology of instruments. This course covers the procedures and techniques essential to measurement of physical quantities (such as pressure, flow, temperature, and level measurement) and analysis of that data. Students will use data acquisition systems and computer control software to complete laboratory exercises.

10. Lecture Contact Hours: Fixed at 3 or Variable from __________ to __________
11. Non-Lecture Contact Hours: Fixed at 2 or Variable from __________ to __________
12. Estimated enrollment: 20 of which 0 percent are expected to be graduate students.
13. Frequency of scheduling: once/year
14. Will this course be required for majors? No
15. Justification for new course: will serve needs of multiple programs within department (rather than separate courses)
16. Are the necessary reading materials currently available in the appropriate library? Yes
17. Please append a complete outline of the proposed course, and indicate instructor (if known), textbooks, and other materials.
18. If this course overlaps with existing courses, please explain with which courses it overlaps and whether this overlap is necessary, desirable, or unimportant.
19. A copy of every new course proposal must be submitted to departments, schools, or divisions in which there may be overlap of the new course with existing courses or areas of strong concern, with instructions that they send comments directly to the originating Curriculum Committee. Please append a list of departments, schools, or divisions thus consulted.

Submitted by: Richard E. McElheny Date 12/11/07
Department Chairman/Division Director

Approved by: William A. McElheny Date 12/11/07
Dean

Dean of Graduate School (when required) Date
Chancellor/Vice-President Date

University Enrollment Services Date
University Enrollment Services Final—White; Chancellor/Vice-President—Blue; School/Division—Yellow; Department/Division—Pink; University Enrollment Services Advance—White
ECET 351 – Instrumentation Applications for Technology

Catalog Description: (4 cr.) Class 3, Lab 2. Introduction to the basic concepts and terminology of instruments. This course covers the procedures and techniques essential to measurement of physical quantities (such as pressure, flow, temperature, and level measurements) and analysis of that data. Students will use data acquisition systems and computer control software to complete laboratory exercises.

Prerequisite: Math 221 and ECET 116 or ECET 107

Co-requisite: None


Coordinator: Elaine Cooney, Professor of ECET

Goals: Students will interface a variety of physical systems to computers for measurement and control.

Prerequisites by topic:
1. Prototype circuits with at least 10 components given a schematic.
2. Use of the following laboratory equipment:
   a. Current meter
   b. Volt meter
   c. Power Supply
   d. Function Generator
   e. Solderless Proto-board
3. Differentiate and integrate linear expressions

Course Outcomes: Upon completing this course, students should be able to:
1. Select and implement appropriate sensors to measure the following [3]:
   a. temperature
   b. pressure
   c. flow
   d. level measurements
   e. displacement
2. Write computer programs, using graphical program language, to collect, analyze and display sensor data using data acquisition hardware. [5]
3. Use PID control algorithms to control a physical plant. [2]
4. Use project management skills to complete a project in a timely manner. [11]
5. Function as a member of a team to complete a task. [6]

Topics:
1. Introduction (2 lectures)
2. Signal conditioning (4 lectures)
3. LabVIEW for Data Acquisition (4 lectures)
4. Thermal Sensors (3 lectures)
5. Mechanical sensors (6 lectures)
6. Mechanical actuators (4 lectures)
7. Control Principles (2 lectures)
8. PID Control (2 lectures)
Laboratory Experiments (some assignments are multi-period):
1. Amplifiers and filters
2. LabVIEW programming
3. Thermal sensors
4. Position sensors
5. Position control
6. Pressure sensors
7. Flow sensors
8. Fluid Process control
9. Thermal process control

Computer Usage:
1. LabVIEW programming language will be used to control data acquisition hardware and provide process control environment
2. Excel and Word will be used to present laboratory results and analysis

Evaluation Methods: Tests and quizzes, Laboratory assignments, homework, team projects

Prepared by: Elaine M. Cooney
Revised: November 27, 2007
PURDUE UNIVERSITY
REQUEST FOR ADDITION, EXPIRATION,
OR REVISION OF AN UNDERGRADUATE COURSE
(100-400 LEVEL)

DEPARTMENT: Engineering Technology
EFFECTIVE SESSION: Fall 2006

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

☐ 1. New course with supporting documents
☐ 2. Add existing course offered at another campus
☐ 3. Expiration of a course
☐ 4. Change in course number
☐ 5. Change in course title
☐ 6. Change in course credit type

PROPOSED:
Subject Abbreviation: MET
Course Number: 204
Long Title: Product Design and Specifications
Short Title: PRODUCT DESIGN SPEC

EXISTING:
Subject Abbreviation: MET
Course Number: 204

TERMS OFFERED:
☐ Summer ☐ Fall ☐ Spring

CAMPUS(ES) INVOLVED:
☐ Columbia ☐ Cont Ed ☐ Ft. Wayne
☐ Indianapolis ☐ Tech Statewide ☐ West Lafayette

☐ Indianapolis

CREDIT TYPE:
| 1. Fixed Credit: Cr. Hrs. | 3 |
| 2. Variable Credit Range: | |
| Maximum Cr. Hrs. | |
| Minimum Cr. Hrs. | |

INSTRUCTIONAL TYPE:
| Lecture |
| Lab Prep |
| Studio |
| Clinic |
| Experiential |
| Ind. Study |
| Pract/Observer |

MEASURES PER WEEK:
| Minutes |
| 50 |
| 2 |

WEEKS OFFERED: 15

COURSE ATTRIBUTES: Check All That Apply
☐ 1. Pass/Fail Pass Only
☐ 2. Satisfactory/Unsatisfactory Only
☐ 3. Repeatable
☐ 4. Credit by Examination
☐ 5. Designator Required
☐ 6. Special Fees

% OF CREDIT ALLOCATED:
| Delivery Method |
| Syn. |
| 16 |
| Lab |

DELIVERY MEDIUM (Audio, Internet, Live, Ten-Based, Video, Live):

<table>
<thead>
<tr>
<th>Cross-Listed Courses</th>
</tr>
</thead>
</table>

COURSE DESCRIPTION INCLUDES:
| TECH 104 or COT 110, TECH 106 or MET 106 (See Instructor Consent) The design, evaluation and documentation of engineering specifications required of manufacturing and assembly are introduced. Emphasis on CAD-based design, drafting, design layout, equipment installation and related industrial practices.

Column: Department Head
Date: 11/24/07

Column: School Dean
Date: 11/24/07

Column: Second Department Head
Date: 11/24/07

Column: School Dean
Date: 11/24/07

Column: Third Department Head
Date: 11/24/07

Column: School Dean
Date: 11/24/07

Column: Fourth Department Head
Date: 11/24/07

Column: School Dean
Date: 11/24/07

Column: Fifth Department Head
Date: 11/24/07

Column: School Dean
Date: 11/24/07

Column: Sixth Department Head
Date: 11/24/07

Column: School Dean
Date: 11/24/07

OFFICE OF THE REGISTRAR
New Course Request

Check Appropriate Boxes: Undergraduate credit ☑ Graduate credit ☐ Professional credit ☐

1. School/Division: Engineering and Technology
2. Academic Subject Code: MET

3. Course Number: MET204 (must be cleared with University Enrollment Services)
4. Instructor: D. Acheson

5. Course Title: Product Design and Specifications
   Recommended Abbreviation (Optional): Prdct Design Spcs
   (Limited to 32 characters including spaces)

6. First time this course is to be offered (Semester/Year): Fall 2008

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

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

9. Is variable title approval being requested? Yes ☐ No ☑

10. Course description (not to exceed 50 words for Bulletin publication):
    P; TECH104 or CBT110, TECH105 or MET105 (Or Instructors Consent -
    The Design, evaluation and documentation of engineering specifications required of
    manufacturability and assembly are introduced. Emphasis on CAD-based details, assemblies,
    design layouts, equipment installations and related industrial practices.)

11. Lecture Contact Hours: Fixed at 2 or Variable from _________ to _________

12. Non-Lecture Contact Hours: Fixed at 2 or Variable from _________ to _________

13. Estimated enrollment: 30 of which 0 percent are expected to be graduate students.

14. Frequency of scheduling: Summer/Fall/Spring
   Will this course be required for majors? Yes ☑ No ☐

15. Justification for new course: To serve the MET program requirements within the newly-formed Engineering Technology Department.

16. Are the necessary reading materials currently available in the appropriate library? Yes ☑ No ☐

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

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

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

Submitted by: Michael E. Off Date 11/3/07
Department Chairman/Division Director

Approved by: William J. Date 12/11/07
Dean

Date
Chancellor/Vice-President

Date
University Enrollment Services

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

UPS 724
University Enrollment Services Final—White; Chancellor/Vice-President—Blue; School/Division—Yellow;
Department/Division—Pink; University Enrollment Services Advance—White
COURSE DESCRIPTION

Revised: 21 - November 2007

<table>
<thead>
<tr>
<th>Course: MET 204 – Product Design and Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Catalog Data:</strong> 2 Lecture Hours 2 Lab Hrs. 3 Credit Hours</td>
</tr>
<tr>
<td>The Design, evaluation and documentation of engineering specifications required of manufacturability and assembly are introduced. Emphasis on CAD-based details, assemblies, design layouts, equipment installations and related industrial practices.</td>
</tr>
<tr>
<td><strong>Offerings:</strong> Fall / Spring / Summer</td>
</tr>
<tr>
<td><strong>Other Required Material:</strong> Mechanical pencil: .5mm, H or HB lead w/ Eraser (1) Flash Drive</td>
</tr>
<tr>
<td><strong>Course Coordinator:</strong> Doug Acheson, Associate Professor of Mechanical Engineering Technology</td>
</tr>
</tbody>
</table>

**Learning Objectives**

1. Apply ANSI drawing techniques unique to various specialty industrial manufacturing processes in the production and interpretation of engineering drawings.

2. Follow current ANSI practices in generating a complete assembly/detail dimensioned set of drawings, given design intent and a mechanical design.

3. Apply standard rules for numerical significance, maintenance of design intent and with awareness of cost/benefit concerns when performing hard and soft conversions for dimensional specifications to/from metric units.

4. Use default specifications, standards documents and/or handbook data to verify design intent by calculating and documenting, via standard practices, allowable limits for any dimension or feature on the drawing, given an engineering drawing with custom and standard parts.

5. Use default specifications, standards documents and/or handbook data to verify design intent by calculating and documenting via standard practices, allowable limits and multi-part fits between parts for any dimension or part on the assembly, given engineering drawings for an assembly with custom and standard parts.
6. Isolate, revise and document the changes to engineering drawings via standard practices, when given a drawing set and engineering change authorization.

7. Seek answers to questions on technical specifications, company procedures, products or services, etc., using handbooks, national/international engineering standards, the internet or other references, to formally report, critique and/or present answers.

8. Cooperate with all team members to complete the common goals of a team project.
MET 204 - Tentative Course Outline

Week 1  Casting Drawings
Week 2  Casting Drawings (Continued)
Week 3  Weldments
Week 4  Weldments (Continued)
Week 5  Industrial Sketching
Week 6  Pattern Development
Week 7  Midterm Review
Week 8  Midterm Exam
Week 9  Assembly/Detail Sets
Week 10 Assembly/Detail Sets (Continued)
Week 11 Fits and Change Orders
Week 12 Geometric Dimensioning and Tolerancing
Week 13 Geometric Dimensioning and Tolerancing (Continued)
Week 14 Commercial Drawings
Week 15 Final Exam Review
Week 16 Final Exam

Prepared by: Douglas C. Acheson

Date November 21, 2007
PURDUE UNIVERSITY
REQUEST FOR ADDITION, EXPIRATION,
OR REVISION OF AN UNDERGRADUATE COURSE
(100-400 LEVEL)

DEPARTMENT Engineering Technology, IUPUI
EFFECTIVE SESSION Fall, 2008

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

PROPOSED:
- New course with supporting documents
- Add existing course offered at another campus
- Exploitation of a course
- Change in course number
- Change in course title
- Change in course credit/grade type

EXISTING:
- Subject Abbreviation: ECET

TERMS OFFERED
- Summer
- Fall
- Spring

COURSE ATTRIBUTES: Check All That Apply
- Course Title
- Instructor
- Cross-Listed Courses

COURSE DESCRIPTION (INCLUDE REQUISITES):
(4 cr.) Class 3, Lab 2, Prereq: Math 221 and ECET 116 or ECET 107. Introduction to the basic concepts and terminology of instruments. This course covers the procedures and techniques essential to measurement of physical quantities (such as pressure, flow, temperature, and level measurements) and analysis of that data. Students will use data acquisition systems and computer control software to complete laboratory exercises.

Office of the Registrar
FORM 40 REV. 9/06