ABET
Self-Study Report

for the

BS in Mechanical Engineering Technology

Program

at

Indiana State University

Terre Haute, Indiana, USA

July 1, 2009

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Self-Study Report

Mechanical Engineering Technology

Bachelor of Science

Indiana State University

BACKGROUND INFORMATION

- **Contact information**

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- **Program History**

The BS in Mechanical Engineering Technology (MET) program was started in Fall 2004 modifying the BS in Mechanical Design Technology (MDT) program on the recommendation of the Industry Advisory Committee (IAC) and student needs. We added extra Math and technical (related to MET) classes as well as enhanced a computer science class. We also created a new course MET 304 Engineering Analysis (Dynamics) as an elective. The program was revised in Spring 2008 due to the College of Technology re-organization and plan for ABET accreditation. We added MET 329 Fluid Power Technology and MET 337 Thermo Systems as electives. In light of the IAC recommendation in Spring 2008 and plan for ABET accreditation, the program has been revised again and the revision has been approved by the university in Spring 2009. We have moved MET 409 Senior Project, MET 329 Fluid Power Technology, and MET 304 Engineering Analysis (Dynamics) from elective to required category. MET 351 Co-op and internship are still electives. This makes sure that all the students take a course in which they will get the expereince of integration and application of the knowledge.

- **Options**

No option, track, or concentration yet.

- **Organizational Structure**

  Faculty in the Mechanical Engineering Technology (MET) program
  (2 tenured: one is the program coordinator and one is the department chair; 1 tenure-track starting Aug 2009, 1 full-time instructor, and 1 part-time)

  Coordinator, BS in Mechanical Engineering Technology (MET) program
  (Dr. M. Affan Badar since Fall 2007, prior to this Dr. Ming Zhou)

  Chair, Dept. of Electronics, Computer, and Mechanical Engineering Technology
  (Dr. Ming Zhou)

  Associate Dean, College of Technology
  (Dr. Jeffrey McNabb: Responsible for the college undergraduate programs, accreditation, course offerings, transfer agreements, and student issues including academic probation and counseling)

  Dean, College of Technology (Dr. W. Tad Foster until June 30, 2009)
  (New Dean: Dr. Bradford Sims effective Aug 1, 2009)

  Associate VP of Academic Affairs
  (Dr. Robert English: Takes care of the curriculum and accreditation issues in addition to other duties)

  Provost, VP of Academic Affairs (Dr. Jack C. Maynard)

  President of the university (Dr. Daniel J. Bradley)

  Board of Trustees

- **Program Delivery Modes**

  Generally the classes are offered during days on campus. Sometime we offer one or two sections of a course that has multiple sections in evenings. The classes are lecture classes or lecture-lab classes. Almost 80% of the classes are also offered at distance (web-based online) for the distance students (25% of our students are distance). Generally the distance students are transfer students who have completed 2-year degrees from community colleges. The classes containing labs in the curriculum, either these students have completed at their prior college or they need to take such classes at a college at their place.

- **Deficiencies, Weaknesses or Concerns Documented in the Final Report from the Previous Evaluation and the Actions taken to Address them**

  This is an initial accreditation.

CRITERION 1. STUDENTS

Indiana State University (ISU) has set policies and requirements for new and transfer student's admission. Students are admitted to the BS in MET program following these requirements. There also exist articulation/transfer agreements between the MET program and corresponding associate degree programs at some of the Indiana state community colleges approved by both the institutions. These students when they receive associate degrees from the specified colleges, get block transfer and complete the remaining courses at ISU to graduate with a BS in MET degree.

Each student on admission is assigned an MET faculty advisor/mentor to advise on curricular and career matters. In addition, the College of Technology Associate Dean's office has designated staffs to monitor student's progress and record. When a student is not doing academically well or is under probation, these staff members and faculty advisor do counseling of the student. If the program looks too difficult or not interesting to the concerned student, these staffs help him/her with major change. They also assist with class scheduling. For example, Melissa Froderman is the program assistant helping with the MET students. Rob Eberwein is the Associate Dean's assistant and helps with the major transfer. Marilyn Warden is the Records in-charge. Beverly Bitzegaio takes care of the Technology Student Services and helps with the counseling and recruiting activities.

ADMISSION REQUIREMENTS OF ISU

GENERAL POLICY

The primary criterion for admission is evidence that a candidate is prepared to succeed in a degree program. Admission standards are stated in terms of traditional school and college grading systems.

ADMISSION TO ACADEMIC PROGRAMS

The academic divisions of the University which may have additional admission requirements will notify applicants of these standards.

ADMISSION REQUIREMENTS---ALL STUDENTS

Closing Dates:	*Fall Semester	July 1
	**Spring Semester	December 1
	First Summer Session	May 1
	Second Summer Session	July 1

Required Transcripts:

Students must submit official transcripts from all institutions at which college course work has been attempted.

Transfer students who have earned 24 or more transferable semester credit hours need not ordinarily submit a high school transcript.

Test Scores

Freshman applicants under 21 years of age and transfers who have completed fewer than 24 transferable semester credit hours must submit scores for the SAT or the ACT.

Admission Requirements for Freshman

- Students who graduate from high school in 1998 or after are expected to complete the Indiana Core 40 curriculum (or equivalent for non-Indiana high school graduates) to qualify for unconditional admission.
- Freshmen candidates applying directly from high school are expected to complete a rigorous college preparatory curriculum (Core 40 curriculum for Indiana residents) and maintain a competitive grade point of 2.5 or higher on a 4.0 scale.

Admission Requirements for Transfer Students

- Transferability
- Applicability
- Articulated Programs
- The DegreeLink Program
- Admission by Exception

See more details on http://catalog.indstate.edu/

Admission Requirements for International Students

- The completed application
- Application fee (U.S. $25 for undergraduate)
- Affidavit of Financial Support
- Original current bank statement
- An official TOEFL report from Educational Testing Service
- Credential evaluation of official transcripts. Visit www.indstate.edu/admissions for more information

Table 1-1. History of Admissions Standards for Freshmen Admissions for Past Five Years

<< BS in MET Program, past 4-year data>>

Academic Year	Composite ACT		Composite SAT		Percentile Rank in High School		Number of New Students Enrolled
	MIN.	AVG.	MIN.	AVG.	MIN.	AVG.	
2008-09	22	22	910	1025	14	63.4	10
2007-08	17	17	780	971	38	64	8
2006-07	18	18	890	987	31	70.5	9
2005-06	19	19	830	994	52	67	6

Major codes for MET in the university Banner system: 2008=D732, 2005-2007=D941.

Table 1-2. Enrollment Trends for Past Five Academic Years (BS in MET)

	Year 2004-05 (Current-5)	Year 2005-06 (Current-4)	Year 2006-07 (Current-3)	Year 2007-08 (Current-2)	Year 2008-09 (Current-1)
Full-time Students	4	33	48	57	63
Part-time Students	4	12	11	23	26
Student FTE[1]	5.5	36.8	53.2	68	77
Graduates	-	1	4	6	11

[1] FTE = Full-Time Equivalent

Table 1-3. Transfer Students for Past Five Academic Years (BS in MET)

Academic Year	Number of Transfer Students Enrolled
2004-05	6
2005-06	14
2006-07	21
2007-08	37
2008-09	43

Table 1-4. Program Graduates (BS in MET)
(For Past Five Years or last 25 graduates, whichever is smaller)

Numerical Identifier	Year Admitted	Year Graduated	Certification/ Licensure (If Applicable)	Initial or Current Employment/ Job Title/ Other Placement
1 (BJH)	Fall-2002	5/01/2006		SONY DADC
2 (RWH)	Fall-2003	5/01/2007		Bemis
3 (JBL)	Spring-2003 (Tr, <24 cr)	5/01/2007		
4 (TS)	Fall-2005 (Tr, <24 cr)	5/01/2007		
5 (MJS)	Fall-2003	8/01/2007		Thermal structures & Inc.
6 (ZJH)	Fall-2004 (Tr, <24 cr)	12/01/2007		
7 (JWI)	Fall-2004 (Tr, <24 cr)	12/01/2007		SUPREME Heating & Cooling
8 (STJ)	Fall-2003	12/01/2007		
9 (SSS)	Fall-2003	12/01/2007		Grad School
10 (WJP)	Fall-2004	5/01/2008		Case New Holland
11 (MDM)	Fall-2006 (Tr)	5/01/2008		Sommerlot Engineering
12 (CGS)	Fall-2006 (Tr)	12/01/2008		Neoteric HC
13 (BKW)	Fall-2004	12/01/2008		Bemis
14 (ASH)	Fall-2004	12/01/2008		Jasper E&T
15 (SER)	Spring-2005 (Tr)	5/01/2009		ALCOA
16 (SKD)	Fall-2005	5/01/2009		
17 (AE)	Spring-2008 (Tr, 4-yr deg)	5/01/2009		DOD
18 (KMH)	Fall-2005	5/01/2009		Jasper E&T
19 (RDL)	Fall-2004	5/01/2009		
20 (PDL)	Fall-2006 (Tr, <24 cr)	5/01/2009		
21 (MM)	Fall-2005	5/01/2009		Grad School
22 (JLP)	Fall-2004	5/01/2009		Crane Naval Warfare

NOTE: Tr in the above table stands for transfer student.

CRITERION 2. PROGRAM EDUCATIONAL OBJECTIVES

ABET Definition: *Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.*

- **Mission Statement**

  INDIANA STATE UNIVERSITY MISSION STATEMENT

(Published at http://www.indstate.edu/academicaffairs/mission.htm as approved by the Board of Trustees on 2/22/08)
Indiana State University, a doctoral research university, combines a tradition of strong undergraduate and graduate education with a focus on community and public service. We integrate teaching, research, and creative activity in an engaging, challenging, and supportive learning environment to prepare productive citizens for Indiana and the world.

COLLEGE OF TECHNOLOGY MISSION STATEMENT
(Published at http://www.indstate.edu/tech/aboutcot/mission.htm)
The College of Technology will provide exemplary undergraduate and graduate programs, generate solutions and knowledge through research, and serve the technology needs of the State, the nation, and the international community.

DEPARTMENT OF ELECTRONICS, COMPUTER, AND MECHANICAL ENGINEERING TECHNOLOGY MISSION:
(Published at http://www1.indstate.edu/ecmet/)
The mission of the Department of Electronics, Computer, and Mechanical Engineering Technology (ECMET) at Indiana State University is to prepare students for careers as technical professionals to work in industry environment that involves applications in the areas such as design, manufacture, control and integration of electro-mechanical products or systems, and requires a practical problem solving approach that emphasizes hands-on skill with modern productivity tools (e.g. design, analysis, control, diagnostic, and project management tools).

BS IN MECHANICAL ENGINEERING TECHNOLOGY PROGRAM MISSION
(Published at http://www.indstate.edu/ecmet/accreditation/met.htm)
The mission of the BS program in Mechanical Engineering Technology (MET) is to prepare individuals by providing a comprehensive knowledge and hands-on skills in a state-of-the-art mechanical engineering technology education. The MET program perpetuates Indiana State University's mission to educate students to become productive citizens and enhance the quality of life of the citizens of Indiana by preparing technical professionals for business and industry through a balanced curriculum.

- **Program Educational Objectives**

The BS in Mechanical Engineering Technology (MET) program prepares graduates with knowledge, problem solving ability, and hands-on skills to enter careers in the design, installation, manufacturing, testing, evaluation, technical sales, maintenance, or management of mechanical and related systems and processes. The undergraduate program in Mechanical Engineering Technology will prepare graduates, who can (published at http://www.indstate.edu/ecmet/accreditation/met.htm):

1. Apply the latest technology and engineering tools to solve technical problems in the practice of mechanical engineering technology and related interdisciplinary fields.
2. Remain technically current and adapt to rapidly changing technologies through self improvement with continuous learning or post-graduate education.

3. Demonstrate independent thinking, self-management, and functioning effectively in team-oriented and open-ended activities in an industrial environment.
4. Communicate effectively in oral, written, and graphical forms.
5. Perform ethically and professionally in business, industry, and society.
6. Develop leadership skills and responsibility in their chosen career field.
7. Understand global issues and the impact of technology and engineering solutions on the society and environment.

- **Consistency of the Program Educational Objectives with the Mission of the Institution**

  The objectives are consistent with the missions of the department, college, and university.

- **Program Constituencies**

  Industry (employers), students and parents, faculty, administration (college, university, state government), and 2-year state community colleges.

- **Process for Establishing Program Educational Objectives**

  In the meeting on April 30, 2008, the Mechanical Engineering Technology program's Industry Advisory Committee (IAC) and faculty discussed what should be the educational objectives of the program and approved the above objectives. Sample statements of the objectives were also distributed to the students on April 30, 2008 in MET 302 (Applied Statics) class and MET 405 (Eco Analy for Engr and Tech) class for their input. The objectives were also shown to the Department Chair and the College Associate Dean for their review and input. The objectives were reviewed again at the IAC meeting on April 23, 2009 and by the MET 408, MET 302, and MET 299 students on April 27, 2009.

- **Achievement of Program Educational Objectives**
  See the description in Criterion 4.

CRITERION 3. PROGRAM OUTCOMES

ABET definition: *Program outcomes are narrower statements that describe what students are expected to know and be able to do by the time of graduation. These relate to the skills, knowledge, and behaviors that students acquire in their matriculation through the program.*

- **Process for Establishing and Revising Program Outcomes**

  The program coordinator (Badar) attended a workshop at the university (ISU) for developing the objectives, outcomes, and assessment of the MET program for the university report preparation for the accreditation by the North Central Association (NCA) in February 2008. He consulted the other program faculty (Zhou and Alberts) in February 2008 and came up with a number of outcomes. In March 2009 he participated in an ABET faculty workshop for the assessment. On return from the workshop, he discussed with the program faculty in March 2009 to modify the student outcomes. The ABET outcomes a thru k for the Engineering Technology programs were adopted as the student Learning Outcomes (LO). In addition, Program Outcomes (PO) were specified reflecting the MET program. The learning and program outcomes were reviewed and approved at the IAC meeting on April 23, 2009 and by the MET 408, MET 302, and MET 299 students on April 27, 2009.

- **Program Outcomes**

The Mechanical Engineering Technology (MET) discipline encompasses the areas (and principles) of materials, applied mechanics, computer-aided drafting/design, manufacturing, experimental techniques/procedures, analysis of engineering data, machine/mechanical design/analysis, cost analysis, and automation/control systems, among others. As explained above, the ABET outcomes a thru k for the Engineering Technology programs were adopted as the student Learning Outcomes (LO). In addition, Program Outcomes (PO) were specified reflecting the MET program.

Student Learning Outcomes

The student learning outcomes have been adopted from the ABET (TAC) website. The Mechanical Engineering Technology (MET) students by the time of graduation will have:

a. an appropriate mastery of the knowledge, techniques, skills, and modern tools of the MET discipline
b. an ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology.
c. an ability to conduct, analyze and interpret experiments, and apply experimental results to improve processes.
d. an ability to apply creativity in the design of systems, components, or processes appropriate to the MET program educational objective.
e. an ability to function effectively on teams.
f. an ability to identify, analyze and solve technical (close-ended analysis and open-ended design) problems.
g. an ability to communicate effectively through engineering drawings, written reports, or oral presentations.
h. a recognition of the need for, and an ability to engage in lifelong learning.
i. an ability to understand professional, ethical and social responsibilities.
j. a respect for diversity and a knowledge of contemporary professional, societal and global issues.
k. a commitment to quality, timeliness, and continuous improvement

Program Outcomes:

The MET program has the following program outcomes in addition to the above learning outcomes [a] through [k]. The students will be able to:

1. Develop, simulate, and analyze mechanical components/systems using computer-aided design and analysis tools.
2. Select engineering materials for specific applications.
3. Identify and inspect tolerances in mechanical parts and assemblies.
4. Manage design work/processes.
5. Implement design and produce parts.
6. Estimate cost and manage engineering projects.
7. Recognize the need and analyze/plan the requirement for system's control and integration.
8. Provide an integrated educational experience that develops the ability of students to apply pertinent knowledge to solving problems in MET specialty.

As mentioned before, the learning and program outcomes were reviewed and approved at the IAC meeting on April 23, 2009 and by the MET 408, MET 302, and MET 299 students on April 27, 2009. These outcomes have been posted at http://www.indstate.edu/ecmet/accreditation/met.htm.

- **Relationship of Program Outcomes to Program Educational Objectives**

  Table 3-1 in a matrix form illustrates how the Program Outcomes lead to the achievement of the Program Educational Objectives.

Table 3-1. Relationship between Program Outcomes (Learning Outcomes: LO a thru k and Program Outcomes: PO 1 thru 8) and Educational Objectives (EO 1 thru 7)

	EO 1	EO 2	EO 3	EO 4	EO 5	EO 6	EO 7
LO. A	x						
LO. B	x	x					
LO. C	x						
LO. D	x	x					
LO. E			x			x	
LO. F	x	x					
LO. G				x			
LO. H		x					
LO. I					x		
LO. J							x
LO. K		x					
PO 1-8	x						

- **Relationship of Courses in the Curriculum to the Program Objectives and Outcomes**

  The following matrices (tables) show the relationship between the courses and objectives, and courses and outcomes of the MET Program.

Table 3-2. Relationship between the courses and Educational Objectives of the MET Program.

	EO.1	EO.2	EO.3	EO.4	EO.5	EO.6	EO.7
MET 103	×	×		×			
MET 130			×	×	×	×	×
MET 203	×	×		×			
MET 215	×						
MET 302	×		×				
MET 304	×						
MET 306	×						
MET 329	×						
MET 351	×						
MET 403	×	×		×			
MET 404	×	×	×	×	×		×
MET 405	×	×	×	×		×	
MET 406	×	×	×				
MET 408	×	×	×	×		×	
MET 409	×	×	×	×			
MET 413	×	×					
MET 430				×	×		
MATH 115	×						
MATH 123	×						
MATH 301	×						
CHEM 100	×						
PHYS 105	×						
MFG 370		×					
MFG 371/225		×					
COMM 101				×			
ENG 305T				×			
TMGT 335							×
TMGT 421		×		×			
ECT 280	×	×					

Table 3-3. Relationship between the program courses and learning outcomes (a thru k)

	LO.a	LO.b	LO.c	LO.d	LO.e	LO.f	LO.g	LO.h	LO.i	LO.j	LO.k
MET 103	×			×			×				×
MET 130	×				×		×	×	×	×	×
MET 203	×			×			×				×
MET 215	×	×									×
MET 302	×	×		×	×	×					×
MET 304	×	×									×
MET 306	×	×		×		×					×
MET 329	×	×									×
MET 351	×										×
MET 403	×		×	×			×				×
MET 404	×					×	×		×		×
MET 405	×				×	×	×				×
MET 406	×	×	×	×	×	×					×
MET 408	×			×		×					×
MET 409	×			×		×					×
MET 413	×		×		×		×				×
MET 430	×						×	×	×		×
MATH115	×	×									×
MATH123	×	×									×
MATH301	×	×									×
CHEM100	×	×									×
PHYS 105	×	×									×
MFG370	×		×								×
MFG371/225	×		×								×
COMM 101	×						×				×
ENG 305T	×						×				×
TMGT 335	×									×	×
TMGT 421	×							×		×	×
ECT 280	×										×

Table 3-4. Relationship between the program courses and program outcomes (1 thru 8).

	PO.1	PO.2	PO.3	PO.4	PO.5	PO.6	PO.7	PO.8
MET 103	×		×					
MET 130								
MET 203	×							
MET 215								
MET 302								
MET 304								
MET 306	×							
MET 329								
MET 351					×			×
MET 403	×							
MET 404				×		×		
MET 405						×		
MET 406		×						
MET 408								
MET 409					×	×		×
MET 413			×					
MET 430								
MATH115								
MATH123								
MATH301								
CHEM100								
PHYS 105								
MFG 370					×			
MFG371/225					×			
COMM101								
ENG 305T								
TMGT 335								
TMGT 421								
ECT 280							×	

- **Documentation and Achievement of Program Outcomes**
  See the description in Criterion 4.

CRITERION 4. CONTINUOUS IMPROVEMENT

ABET definition: *Assessment is one or more processes that identify, collect, and prepare data to evaluate the achievement of program outcomes and program educational objectives.*

ABET definition: *Evaluation is one or more processes for interpreting the data and evidence accumulated through assessment practices. Evaluation determines the extent to which program outcomes or program educational objectives are being achieved, and results in decisions and actions to improve the program.*

- **Assessment of Program Educational Objectives**

  The MET faculty members have developed a set of performance criteria to measure the achievement of Educational Objectives (EO: 1-7). A survey is sent to the employers who have hired our graduates recently and to our recent graduates annually since April 2008. In the survey they are asked to assess the achievement on a scale of 1 to 4: 1 (rarely), 2 (sometime: little), 3 (most of the time: average), 4 (almost all the time: excellent), and N/A (not applicable). The performance criteria or survey questions for the assessment were as follows.

  EO1: Can integrate knowledge and apply to solve problems in MET related profession
  EO2: Have attended short-course, training, workshop, or professional meeting
  EO3:
  - Have worked in team
  - Did research on the task/project they were working on as a team
  - Listen to peers (co-workers)

  EO4:
  - Have prepared written reports
  - Have made presentations
  - Can understand, make or modify engineering drawings

  EO5: Follows ethics and codes of the profession and the company
  EO6:
  - Have led team or group and shown responsibility
  - Give credit to sub-ordinates and co-workers

  EO7:
  - Have considered selecting environmental friendly materials
  - Understand and consider energy efficient systems
  - Work-related travel outside of the normal work city in the US, how often?

  We have collected data from the employers who have hired our graduates recently or the recent graduates in April 2009 and April 2008. 'Recent' was considered to be within three years. We received three responses in 2009 and five in 2008. This survey questionnaire also included a question on assessing learning outcome LO (k): Show-up at work on time. The survey questionnaire and responses received have been kept in the

department in a folder, and will be made available to the ABET team on the visit. In the meantime the following tables summarize the responses.

Survey of recent graduates and employers who have hired recent graduates (April 2009)

#	Eo: 1	Eo: 2	Eo:3	Eo:3	Eo:3	Eo:4	Eo:4	Eo:4	Eo:5	Eo: 6	Eo: 6	Eo: 7	Eo: 7	Eo:7	Lo: K
1	4	2	3	4	4	2	1	na	4	3	4	na	na	na	4
2	4	4	2	3	4	2	2	4	4	2	4	na	na	2	4
3	3	2	3	3	3	4	3	3	4	3	3	4	3	4	4
Avg	3.7	2.7	3.22			2.62			4	3.17		3.25			4

Survey of recent graduates and employers who have hired recent graduates (April 2008)

#	Eo:1	Eo:2	Eo:3	Eo:3	Eo:3	Eo:4	Eo:4	Eo:4	Eo:5	Eo:6	Eo:6	Eo:7	Eo:7	Eo:7	Lo:K
1	4	2	4	4	3	4	1	3	4	4	4	4	4	3	4
2	3	2	4	3	4	2	3	4	3	3	3	3	3	2	3
3	4	2	4	4	4	2	3	3	3	3	4	2	2	4	3
4	3	2	3	4	3	1	2	4	4	4	4	2	2	2	4
5	3	2	3	2	2	2	4	3	3	2	2	2	2	1	4
Avg	3.4	2	3.4			2.73			3.4	3.3		2.53			3.6

- **Evaluation of Program Educational Objectives**

  From the above tables, the average scores on the scale of 1 to 4 in 2008 and 2009 on the achievement of Educational Objective (EO) 1, 3, 5, and 6 were between 3 and 4; for EO 2 and 4 the averages were between 2 and 3; and for EO 7 it was 3.25 in 2009 and 2.53 in 2008. This shows that our graduates have attained the objectives 1, 3, 5, and 6 well. The scores for EO 2, 4, and 7 were not as good. Note that some of the low scores could be due to the fact that a particular company may not have tasks involving all the seven educational objectives. For example, if the company is not a big corporate, their employees may not need to travel abroad much. Year 2008 was the first time the survey was conducted. The program faculty looked more into the performance criteria and refined these to make sure the survey was appropriate to assess the objectives. Now we have gotten two-year scores, the program faculty will collectively look into the data in Fall 2009 and discuss what we need to do for the continuous improvement.

- **Assessment of Program Outcomes**

  The MET faculty has adopted the following processes/evidences to assess the achievements of the student outcomes including computer usage, drawings, and written and oral communications. Single evidence may not be enough to assess all the outcomes. Therefore several evidences have been identified as follows.

  1. <u>Student survey for the outcome assessment</u>
     The following performance criteria were developed to measure the attainment of student outcomes, LO: a, f, g, and k, and PO: 1 and 2. Students were asked to assess on a scale of 1 to 5, 1 = very dissatisfied and 5 = very satisfied, and NA = not applicable to this course.

LO (a):

Can describe the necessary assumptions in designing mechanical systems

Can identify/compute force, moment, stress, factor of safety

LO (f)

Can solve close-ended (analysis) problems

Can design linkages, cams, gears, beams, shafts, and other machine elements

LO (g)

Can make engineering drawings

Can prepare technical reports, or oral presentations

LO (k): Student survey, scale of 1 to 5.

Submit home works/projects and take exams on time

Feedback from home works and exams help you improve

LO (k): Show-up at work on time. Industry survey, scale of 1 to 4, sees under 'Assessment of Educational Objectives.'

PO (1)

Can develop CAD models

Can analyze CAD models for stress and material strength

PO (2)

Can select proper materials for your design

The students in MET 203, 302, and 408 were surveyed for the first time in Spring 2009 to collect their responses for the assessment purpose. The survey would be conducted annually. In Spring 2009 we received 7 responses in MET 203, 7 in MET 302, and 11 in MET 408. All the gathered data have been presented here in tables and the hardcopies of the responses have been kept with the program folder in the department. These data will be made available to the ABET team.

MET-203 student survey to assess outcomes, LO: a, f, g, k, and PO: 1, 2 on 1 to 5 scale (Spring 2009)

#	Lo:a	Lo:a	Lo:f	Lo:f	Po:1	Po:1	Lo:K	Lo:K	Po:2	Lo:g	Lo:g
1	3	4	4	3	5	5	4	3	4	4	3
2	5	3	3	na	3	5	4	3	4	na	3
3	4	3	3	3	5	na	5	5	na	5	4
4	na	na	na	na	5	na	4	4	na	4	na
5	4	2	4	5	na	na	5	5	4	5	na
6	5	3	3	4	4	4	5	4	na	5	3
7	5	5	4	na	na	na	5	5	na	na	4
Avg	3.83		3.6		4.5		4.35		4	4	

MET-302 student survey to assess outcomes, LO: a, f, g, k, and PO: 1, 2 on 1 to 5 scale (Spring 2009)

#	Lo:a	Lo:a	Lo:f	Lo:f	Po:1	Po:1	Lo:K	Lo:K	Po:2	Lo:g	Lo:g
1	5	5	5	5	5	5	5	4	5	5	4
2	5	5	5	na	5	4	5	3	4	5	4
3	4	4	3	na	5	4	5	5	na	5	na
4	2	3	2	2	5	3	5	4	2	5	4
5	4	4	5	3	3	3	4	3	2	3	3
6	3	3	3	na	3	4	4	4	na	4	3
7	5	5	4	na	na	na	5	5	na	na	4
Avg	4.07		3.7		4.1		4.36		3.25	4.08	

MET-408 student survey to assess outcomes, LO: a, f, g, k, and PO: 1, 2 on 1 to 5 scale (Spring 2009)

#	Lo:a	Lo:a	Lo:f	Lo:f	Po:1	Po:1	Lo:K	Lo:K	Po:2	Lo:g	Lo:g
1	5	5	5	5	5	4	4	5	5	5	5
2	4	5	5	5	5	5	3	3	4	2	4
3	5	5	5	5	4	3	4	5	5	4	4
4	5	5	5	5	5	5	5	5	5	5	5
5	4	5	4	4	5	4	4	3	3	5	5
6	5	5	5	5	4	4	4	2	4	4	5
7	3	5	4	3	5	5	5	2	5	5	5
8	4	4	4	4	4	3	4	4	4	4	3
9	4	3	3	4	4	4	4	4	4	4	4
10	4	3	3	3	3	2	2	2	2	4	4
11	4	5	4	5	5	4	4	4	5	na	na
Avg	4.4		4.3		4.17		3.72		4.18	4.3	

2. Co-op and intern evaluation report:
   The university Career Center has prepared an evaluation report of the supervisors/employers of 444 student interns who were funded by the Indiana Focus grant covering Jan 2005 until Dec 2007. This report is available at http://www.indstate.edu/carcen/expLearning/default.aspx. Two MET student interns (M & S) in 2006 were included in this report. The evaluators were asked to rate interns on a scale of 1 (low) to 5 (high). Those broad constructs included:

   • Attitude toward work: Our two interns (M & S) received 4 and 4 respectively.
   • Ability to learn: Our two interns received 5 and 5 respectively.
   • Quality of work output (LO.k): Our two interns received 4 and 4 respectively.
   • Maturity: Our two interns received 4 and 4 respectively.
   • Dependability (LO.i): Our two interns received 5 and 5 respectively.
   • Quantity of work output: Our two interns received 4 and 4 respectively.
   • Ability to relate with others in the workplace (LO.j): Our two interns received 4 and 5 respectively.
   • Overall performance: Our two interns received 4 and 5 respectively.
   • Creative Problem Solving (LO.a,b,d, PO8): Our two interns received 5 and 4 respectively.
   • Appreciation for Opposing Views (LO.e): Our two interns received 3 and 4 respectively.
   • Effective Writing (LO.g): Our two interns received 'NA' and 5 respectively.
   • Effective Speaking (LO.g): Our two interns received 4 and 5 respectively.
   • Solving Complex Problems(LO.f, PO8): Our two interns received 4 and 4 respectively.
   • Working on a Team (LO.e): Our two interns received 4 and 5 respectively.
   • Respect from Others(LO.j): Our two interns received 4 and 5 respectively.
   • Reading Ability: Our two interns received 'NA' and 5 respectively.
   • Independent Thinking (LO.e): Our two interns received 4 and 5 respectively.
   • Critical Analysis (LO.f, PO7,8): Our two interns received 3 and 4 respectively.

   • Reasoned Inquiry (LO.h): Our two interns received 'NA' and 4 respectively.
   • Making Informed Choices (LO.b): Our two interns received 4 and 5 respectively.
   • Self Direct Learning (LO.h): Our two interns received 5 and 4 respectively.
   • General Learning Process (LO.h): Our two interns received 'NA' and 4 respectively.
   • Adaptabilit (LO.j): Our two interns received 4 and 4 respectively.

3. Course syllabi:
   Syllabi of all the required technical, math, and science courses have been attached in Appendix A and will be made available to the ABET team members on their visit as well. The syllabi demonstrate how the courses have been designed to deliver the program educational objectives (EO: 1-7), learning outcomes (LO: a-k), and program outcomes (PO: 1-8).
4. Senior Project Report: Sample senior project reports from MET 409 for Fall 2008 and Spring 2009 are available showing attainment of EO 1-4; LO a, d, f, and k, and PO 8. These sample reports are kept in the department and will be made available to the visiting team.

5. Course Project Report: Sample reports from MET 302, 405, 406, and 413 have been kept in the department and will be made available to the visiting team. These reports illustrate students' attainment of outcomes LO. a, b, e, f, g, h, k.
6. HW/Quiz/Exam: Sample of student work from MET 103, 130, 203, 299, 302, 306, 403, 404, 405, and 413 have been kept in the department and will be made available to the visiting team. The work samples from MET 103, 203, 306, and 403 show the achievement of PO1, MET 404 shows PO4 and PO6, MET 405 shows PO6, and MET 413 shows PO3, respectively.
7. Student Portfolio: Sample student portfolios from MET 430 have also been kept in the department and will be made available to the visiting team.

- **Evaluation of Program Outcomes**

The average scores on the scale of 5 from the tables for the assessment of LO.a, f, g, and k, and PO 1 and 2 by MET 203 (Intro to Solid Modeling) students in Spring 2009 were 3.83, 3.6, 4, 4.35, 4.5, and 4 respectively; MET 302 (Applied Statics) students in Spring 2009 were 4.07, 3.7, 4.08, 4.36, 4.1, and 3.25 respectively; and MET 408 (Elements of Machine Design) students in Spring 2009 were 4.4, 4.3, 4.3, 3.72, 4.17, and 4.18 respectively. This shows that our students are achieving the learning and program outcomes well. The score of PO 2 (material selection) in MET 302 was 3.25 because in this course the students compute resultant force and moment only and then in other courses (MET 406 and 408) they design mechanical parts and systems for which material selection is required. We can see that the corresponding score in MET 408 was 4.18, a significant improvement over 3.25. From the Educational Objectives assessment table we can see that the employers/graduates score for LO (k) on the scale of 4 was 3.6 in 2008 and 4 in 2009, again a very good score.

The assessment of the two student-interns by their employers also shows good achievement of the outcomes. The average scores on a scale of 5 for LO a, b, d thru k, and PO 7, 8 were almost close to 4.

Sample senior project reports also show the successful attainment of EO 1-4; LO a, d, f, and k, and PO 5, 6, and 8.

- **Continuous Improvement of the Program**

In general the program's Industry Advisory Committee (IAC) meets annually and gives their input on the educational objectives, program outcomes, and curriculum. The program coordinator calls in 2-3 meeting each semester of the program faculty (current department chair is also an MET faculty) to discuss the industry need, curriculum modification and accreditation, course development and offering, equipment and software need, IAC feedback, and student comment or concern to make the program better. These discussions and a desire for continuous improvement have lead to two program revisions after the program started in Fall 2004 (see Program History under Background Information). In Spring 2009 program faculty decided to collect students' input in the form of surveys on the outcome assessment as well as on their satisfaction with the MET program. The program faculty also wanted to continue with the employer/graduates survey that was started in Spring 2008. From the interpretation of these data it seems our program is doing well. The program faculty will meet in Fall

2009 to review/interpret the Spring 2009 data in detail to see what steps we can take to improve the program further. Generally we don't keep the minutes of the program faculty meeting, although we do keep the IAC meeting and department faculty meeting minutes. These minutes will be made available to the ABET team.

In regard to continuous improvement of the program, as mentioned above, a satisfaction survey was given to the students in Spring 2009. Students were asked to assess on a scale of 1 to 5, 1 = very dissatisfied and 5 = very satisfied, and NA = not applicable to the program. The student satisfaction surveys were collected from Sophomore to Senior levels of the MET program in Spring 2009. The survey questions were distributed in MET 103, 203, 302, 403, and 408 classes. A student was asked to respond to the student satisfaction survey only once even though he/she might have received the survey in more than one class. All the gathered data have been presented here in tables and the hardcopies of the responses have been kept with the program folder in the department. These data will be made available to the ABET team. The students were asked to rate 1. Quality of instruction in MET, 2. Quality of the design courses, 3. Quality of experimental labs, 4. Quality of CAD facilities, 5. Effectiveness of management courses, 6. Effectiveness of longer duration of classes to work on more problems in the class or labs, 7. Quality of advising and help with scheduling and academic progress, 8.Frequency of course-offerings, 9. Classroom environment conducive to learning, 10. Career planning assistance, job placement, and professional skills development, 11. Opportunities for networking with fellow students and faculty through professional societies, 12. Quality of help from the department staff (non faculty), 13. Overall professional learning experience at ISU, and 14. Overall quality of MET education. The average score in general seems to be good (4 and above), however there are some scores under 4 too, specially responses to course offerings (3.1 to 3.5). We have hired a new faculty (tenure-track) who will start in August 2009, and we believe that this will give us more flexibility in the course offerings.

MET Student feedback/satisfaction survey on 1 to 5 scale Spring 2009 Sophomore (26-55 hrs)

#	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14
1	5	na	na	5	na	4	5	2	5	na	4	5	5	5
2	4	5	5	5	na	4	5	2	3	4	4	3	4	4
3	4	4	na	4	na	4	4	2	4	3	3	4	4	4
4	5	5	5	5	5	5	5	5	5	5	5	5	5	5
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
6	4	5	na	4	na	4	4	2	5	4	na	3	5	5
7	4	4	4	4	4	4	5	3	4	4	3	5	4	4
8	5	5	na	5	na	5	5	4	5	5	na	5	4	5
Avg	4.5	4.71	4.75	4.6	4.6	4.3	4.7	3.1	4.5	4.2	4	4.3	4.5	4.6

MET Student feedback/satisfaction survey on 1 to 5 scale Spring 2009 Junior (58-85 hrs)

#	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	4	4	4	4	4	3	5	4	5	4	5	5	4	4
2	5	5	na	5	na	4	5	4	5	na	4	5	5	5
3	5	5	5	5	na	5	5	5	5	na	na	na	5	5
4	4	5	3	5	na	3	3	2	4	na	na	4	4	5
5	5	5	3	5	na	3	5	2	4	3	2	3	4	4
6	5	5	na	5	na	5	5	5	5	5	5	5	5	5
7	5	5	4	4	5	5	5	4	5	na	na	3	4	5
8	4	4	na	na	4	3	4	3	4	na	na	na	3	4
9	3	4	na	4	na	4	4	3	4	na	na	3	3	4
10	4	5	4	5	na	3	5	4	5	4	na	4	4	5
11	5	5	5	5	na	4	5	3	4	na	na	na	5	5
Avg	4.45	4.72	4	4.7	4.3	3.81	4.63	3.54	4.54	4	4	4	4.18	4.63

MET Student feedback/satisfaction survey on scale 1 to 5 Spring 2009 Senior (>86 hrs)

#	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	5	5	5	5	na	5	5	4	5	4	5	5	5	5
2	4	5	na	5	na	4	5	na	4	3	4	4	4	4
3	4	5	5	5	4	5	3	3	4	4	3	5	4	4
4	5	5	3	5	5	4	5	4	4	4	4	4	4	5
5	3	4	3	5	4	4	3	2	3	2	4	na	4	3
6	5	5	4	5	5	5	5	3	5	5	3	5	4	5
7	4	4	4	3	3	3	3	4	4	3	4	4	4	4
8	3	3	3	5	4	5	3	3	4	3	5	na	4	4
9	5	5	4	5	5	5	5	5	5	5	5	4	4	4
10	5	5	5	5	5	5	5	5	5	5	5	5	5	5
11	4	5	3	5	3	4	4	2	4	4	3	4	4	4
12	4	5	3	5	4	2	3	1	5	2	5	5	3	4
Avg	4.25	4.6	3.8	4.8	4.2	4.2	4.08	3.2	4.3	3.6	4.1	4.5	4.08	4.2

CRITERION 5. CURRICULUM

- **Program Curriculum**

  Table 5-1a. Curriculum for BS in Mechanical Engineering Technology Program as approved by the university CAAC in April 2009

  Major Required Courses: 57 hours

  MET 103 (3) Technical Graphics
  MET 130 (2) Intro to Engr. & Tech.
  MET 203 (3) Intro to Solid Modeling
  MET 302 (3) Applied Statics
  MET 304 (3) Engr. Analysis (Dynamics)
  MET 306 (3) Applied Mechanisms
  MET 329 (3) Fluid Power Technology

MET 403 (3) Advanced CAD Concepts
MET 404 (3) Engr. Design & Mgt.
MET 405 (3) Econ. Analy. For Engr. & Tech
MET 406 (3) Strength of Materials
MET 408 (3) Elements of Machine Design
MET 409 (3) Senior Project
MET 413 (3) Appl & Gaging of GD&T
MET 430 (1) Senior Seminar
CS 151 (3) Intro to Comp. Science
ECT 160 (3) Fund. of Electronics
*****ECT 280 (3) Intro to Automation
MFG 370 (3) Fund. of Mach. Tool Proc.
*****MFG 371 (3) Mfg. Processes & Materials

Electives: 9 hours from the following:
Technical: 3-6 hrs from the following:
MET 299 (3) CAD Fundamental
*MET 337 (3) Thermo Systems
MET 351 (3) Coop. Industrial Practice
MET 407 (3) Tools & Die Design
Other courses approved by the MET advisor

*Management: 3-6 hours from the following***:**
TMGT 471 (3) Production Plan & Control I
TMGT 473 (3) Quality control of Ind. Products I
TMGT 478 (3) Industrial Organ. & Functions
MGT 301 (3) Survey of Management

Science and Math Required Courses: 17 hours
MATH 115 (3) OR
MET 215 (3) Graphic Analysis
MATH 123 (3)
MATH 301 (3)
SMS: F (4) PHYS 105 & 105L
SMS: F or E (4) CHEM 100 & 100L

Liberal Studies: 41 - 44 hours
ENG 101 & 105 (6) Fundamental of Writing OR
ENG 107 (3) Freshman Writing*
ENG 305T (3) Technical Writing
COMM 101 (3) Intro to Speech
PE 101/L (2) Fitness for Life
_____ 101 (3) 2 sem of one Foreign Language (unless 2yrs HS, same language, w>(C-) AVG)
_____ 102 (3)
SBS: F (3)
SBS: E or F (3)
LAPS: LL (3)

LAPS: LL or E (3)
HS: R (3)
MCS: USD (3)
MSC: IC (3)
Gen Ed Capstone (3)

* or a similar course approved by the MET advisor
Total: Minimum 124 semester hours required for graduation.
Transfer credits will be accepted based on a course-by-course evaluation, or an agreement between ISU and a partner institution.
(Note: The link http://www1.indstate.edu/ecmet/acad/bs_met.htm will be updated to reflect the recent MET curriculum revision approved by the university in April 2009 and subsequent transfer agreements.)

Tables 3-2, 3-3, and 3-4 in Criterion 3 show how the curriculum meets the Program Educational Objectives and Outcomes. The courses prepare students for a professional career in MET discipline. Adequate time and attention are given to each curricular component, consistent with the objectives of the program and the institution. The program provides an integrated educational experience thru MET 409 Senior Project, MET 351 Co-op, and Internship, that develops the ability of graduates to apply pertinent knowledge to solving problems in the mechanical engineering technology specialty. The program requires a minimum of 124 semester hours with English 107 and 127 hours with English 101 and 105.

Table 5-1b. Sample 8-semester roll-out for BS in MET*
*Total hours = 127 with ENG 101 and 105

Fall		**Spring**	
Semester I		**Semester II**	
MET 103	3	MET 203	3
MET130	2	PHYS 105 & 105L	4
MATH 115 or MET 215	3	CS 151	3
ECT 160	3	MATH 123	3
ENG 101	3	ENG 105	3
COMM 101	3		Total: 16
	Total: 17		
Semester III		**Semester IV**	
CHEM 100 & 100L	4	MET 302	3
MET 329	3	*MFG 371	3
FL1	3	MATH 301	3
MFG 370	3	SBS:F	3
PE 101	2	HS	3
	Total: 15		Total: 15
Semester V		**Semester VI**	
MET 306	3	MET 403	3
ENG 305T	3	MET 408	3
MET 406	3	Elective2	3
Elective1	3	MET 304	3
FL2	3	Elective3	3
SBS:E	3		Total: 15
	Total: 18		
Semester VII		**Semester VIII**	
ECT 280	3	MET 405	3
MET 413	3	MET 409	3
MET 404	3	LAPS:LE	3
LAPS:LL	3	MCS:IC	3
MCS:USD	3	GECAP	3
	Total: 15	MET 430	1
			Total: 16

The communications content in COMM 101, English courses, and course project or term paper for technical courses develops the ability of graduates to

a. plan, organize, prepare, and deliver effective technical reports in written, oral, and graphical formats appropriate to the discipline and goals of the program,
b. incorporate communications skills throughout the technical content of the program,
c. utilize the appropriate technical literature and use it as a principal means of staying current in the mechanical engineering technology field, and
d. utilize the interpersonal skills required to work effectively in teams.

Mathematics course MATH 115 or MET 215 covers college algebra and trigonometry; MATH 123 is above the level of algebra and trigonometry and includes analytical geometry; and MATH 301 is calculus. Thus the level and focus of the mathematics content provides students with the skills to solve technical problems appropriate to the MET discipline and program educational objectives. Physical science courses CHEM 100 and 100L and PHYS 105 and 105L support the program educational objectives and include laboratory experiences which develop expertise in experimentation, observation, measurement, and documentation. The social sciences and humanities courses support technical education by broadening student perspective and imparting an understanding of diversity and the global and societal impacts of technology.

The required technical courses of 66 semester hours are more than 1/3 and less than 2/3 of the total 124 semester hours. The technical content develops the skills, knowledge, methods, procedures, and techniques associated with the MET discipline and appropriate to the goals of the program. The technical content consists of a technical foundation like MET 103, 302, 306, etc. and the increasingly complex technical specialties like MET 203, 304, 403, 406, 408, 413, etc. Laboratory activities in MFG 370 and 371, MET 329, 337, 406, and 413 develop student competence in the use of analytical and measurement equipment common to the MET discipline and appropriate to the goals of the program. Technical courses develop student knowledge and competence in the use of standard design practices, tools, techniques, and computer hardware and software appropriate to the MET discipline and goals of the program. Capstone MET 409 Senior Project or other integrating experiences MET 351 Co-op, and Internship draw together diverse elements of the curriculum and develop student competence in focusing both technical and non-technical skills in solving problems. Co-op is evaluated by the industry supervisor (employer) and the faculty who is teaching the course whereas internship is evaluated by the employer only. Evaluation forms have been developed by the university Career Center and are available at their website.

- **Prerequisite Flow Chart**

  Adequate placement examination score or MATH 111 - MATH 115

  MATH 115 – MATH 123

  MATH 115 – MATH 301

  MATH 115 or MET 215 – MET 306

  MATH 115 or MET 215 – MET 302 (Attention is paid in scheduling to make sure that the students take PHYS 105 and MATH 123 before MET 302 or together with MET 302)

MATH 301- MET 304

MET 302 – MET 406

MET 302 – MET 407

MET 306 and MET 406 - MET 408

MET 103- MET 203

MET 203 – ME T 403

MET 403 – MET 413

- **Course Syllabi**

  Course syllabi have been enclosed in Appendix A for each course used to satisfy the mathematics, science, and discipline-specific requirements required by Criterion 5.

Table 5-2. Course and Section Size Summary

<<BS in Mechanical Engineering Technology>>

Course No.	Title	Responsible Faculty Member	No. of Sections Offered in Current Year	Avg. Section Enrollment	Lecture[1]	Laboratory[1]	Other[1]
MET 103	Intro to Tech Graphics	T. Alberts	2 in Sp09, 2 in Fa08	21.5	50	50	
MET 203	Intro to Solid Modeling	T. Alberts	1	26	50	50	
MET 403	Adv Solid Modeling	Alberts/Zhou	1	12	50	50	
MET 430	Senior Seminar	T. Alberts	1 in Sp 09, 1 in Fa08	15	100		
MET 130	Intro to Engr & Tech	T. Alberts	2	15	80	20	
MET 299	Intro to CAD	T. Alberts	1	12	60	40	
MET 406	Strength of Materials	Badar	2*	9.5	95	5	
MET 409	Sr Project	Badar	1 in Sp09, 1 in Fa08	5			100
MET 413	App & Gaging of GD & T	Badar	2*	8.5	70	30	
MET 302	Applied Statics	Badar	2*	5.5	100		
MET 405	Eco Analy for Engr & Tech	Badar	1	27	100		
MET 408	Elements of Machine Design	Zhou	2*	10	100		
MET 404	Engr Design & Mgmt	Zhou	2*	10	100		
MET 306	Applied Mechanisms	Zhou	2*	8	90	10	
MET 329	Fluid Power Tech	Cochrane	1 in Sp 09, 1 in Fa09	12	60	40	
MET 304	Engr Analysis	Zhang	1	10	100		

*Two sections include one at distance

[1] Enter the appropriate percent for each type of class for each course (e.g., 75% lecture, 25% laboratory).

CRITERION 6. FACULTY

- **Faculty**

  1. Ming Zhou, PhD, Tenured Professor, ECMET Department Chair
  2. M. Affan Badar, PhD, Tenured Associate Professor, MET Program Coordinator
  3. Todd E. Alberts, Non-Tenure-Track Instructor
  4. Qun Zhang, Part-time, Sr. Research Scientist
  5. Mehran Shahhosseini, PhD, Tenure-Track Assistant Professor, new faculty: will be joining in August 2009. He has been a non-tenure track Assistant Professor at the Univ. of Louisville (Kentucky) for eight years.

  A resume for each of the above faculty member is included in Appendix B. Also see Tables 6-1a, 6-1b, and 6-2 describing the composition, size, credentials, experience, and workload of the faculty that supports this program.

  It should be noted that MET 329 (Fluid Power Tech) is taught by Dr. Phil Cochrane who is in our ECMET department but is associated with the Automotive Technology Management (ATM) program. The course is required in the ATM program as well.

- **Faculty Competencies**

  Zhou has received a BS in Mechanical Engineering and a PhD in Industrial and Systems Engineering; Badar has received a BS and an MS in Mechanical Engineering and a PhD in Industrial Engineering; Alberts has received a BS in Mechanical Technology and an MS in Industrial Technology, and has 17 years of industry experience in design/drafting and production; Zhang who teaches MET 304 Engineering Analysis (Dynamics) has an MS in Physics and over 5-year post-graduate training; and Shahhosseini has received a D. Eng. in Mechanical Engineering and has taught for 8 years in ME. Thus the program faculty members are competent in teaching the MET courses at ISU. Tables 5-2 and 6-1a show how the courses have been offered or taught adequately.

  As mentioned above, MET 329 (Fluid Power Tech) is taught by Dr. Phil Cochrane who is with the ATM program. He has earned a BS in Mechanical Engineering before getting his master's and doctoral degrees and working with automotive related industry and programs. Therefore he is also competent in teaching the course.

- **Faculty Size**

  Tables 6-1a, 6-1b, and 6-2 show the adequacy of the size of the faculty and the extent and quality of faculty involvement in interactions with students, student advising, service activities, and professional development.

Table 6-1a. Faculty Workload Summary

<<BS in Mechanical Engineering Technology Program>>

Faculty Member (name)	FT or PT[4]	Classes Taught (Course No./Credit Hrs.) Term and Year[1]	Total Activity Distribution[2]		
			Teaching/advising	Consulting/research	Other[3]/service/adm
M.A. Badar	FT	COT 899B/9.0, Fa08; MET 406/3.0, Fa08, MET 409/3.0, Fa08; MET 413/3.0, Fa08; MET 513/3.0, Fa08; MET 679/3.0, Fa08; MET 697/3.0, Fa08; MET 812/3.0, Fa08; COT 703/3.0, Sp09; MET 302/3.0, Sp09; MET 405/3.0, Sp09; MET 505/3.0, Sp09, MET 409/3.0, Sp09; MET 509/3.0, Sp09; MET 605/3.0, Su09.	60	20	20
M. Zhou		MET 404/3.0, Fa08; MET 504/3.0, Fa08; MET 306/3.0, Fa08; MET 408/3.0, Sp09; MET 633/3.0, Sp 09; MET 697/3.0, Sp09; COT 703/3.0, Sp09.	25	15	60
T. Alberts	FT	MET 103/3.0, Fa08; MET 130/2.0, Fa08; MET 430/1.0, Fa08; MET 103/3.0, Sp09; MET 203/3.0, Sp 09; MET 403/3.0, Sp 09, MET 430/1.0, Sp09, MET 633/3.0, Sp09.	90		10
Q. Zhang	PT	MET 304/3.0, Sp09	50	50	

[1] Indicate Term and Year for which data apply.
[2] Activity distribution should be in percent of effort. Members' activities should total 100%.
[3] Indicate sabbatical leave, etc., under "Other."
[4] FT = Full Time Faculty PT = Part Time Faculty

Table 6-1b. Faculty Workload Summary

	Range	Average
Credit Hours	9 - 15	12
Contact Hours Per Week	4 - 6	5
Laboratory Size	10 - 24	20
Class Size	8 - 25	16
Advisees	15 - 40	25

Indicate the number of credit and contact hours per week that is considered a normal full teaching load, and explain how a full-time load is determined.

Credit Hours Contact Hours

9-12 (T/TT faculty)and 12-15 (instructor) 4 (class with lecture only) and 6 (class with lab)

A full-time teaching load is 12 credit hours. 12 credit hours can be 1) four sections of one course each section having nearly 20 or more undergraduate students; 2) four separate classes; 3) four separate classes including one which does not meet as regularly as traditional classes meet like 351 (Co-op), 409 (Sr Project), or any other independent class; 4) three classes of which one is 400/500 levels combined. If the student credit hour (SCH) can be generated in the range of 225 by teaching less than 12 cr hrs, this can be considered as a full-time load for tenure/tenure-track faculty. If a T/TT faculty is teaching graduate courses, 9 cr hr may also be considered full time. If there are two sections: in-class and distance (online) of one course, and both sections combined the number of students is in the range of 12-25, it is considered as one course for practical purpose. For full-time instructors the load is 12-15 cr hrs. But if they can generate SCH in the range of 300 by teaching less than the normal cr hrs, this can be considered as a full-time load.

Table 6-2. Faculty Analysis

<<BS in Mechanical Engineering Technology>>

Name	Rank	Type of Academic Appointment TT, T, NTT	FT or PT	Degrees	Institution from which Degrees Earned & Year	Years of Experience			Professional Registration/ Certification	Level of Activity (high, med, low, none) in:		
						Govt./Industry Practice	Teaching	This Institution		Professional Society	Professional Development	Work in Industry
M. Zhou	Prof	T	FT	PhD	U. of Arizona, 1995	8	14	14		med	med	med
M.A. Badar	Assoc Prof	T	FT	PhD	U. of Oklahoma, 2002	2		7		high	med	low
T. Alberts	Instructor	NTT	FT	MS	Indiana SU, 2007	17	2.5	2.5		low	low	low
Q. Zhang	Sr Res Scienti	NTT	PT	MS	E. China Normal U, 1964	10	25	5		none	med	none
A.M. Shahhosseini	Asst Prof	TT	FT	Deng	Lamar U, 1999	5	9	0	EIT	low	med	low

Instructions: Complete table for each member of the faculty of the program. Use additional sheets if necessary. Updated information is to be provided at the time of the visit. The level of activity should reflect an average over the year prior to visit plus the two previous years.

Column 3 Code: TT = Tenure Track T = Tenured NTT = Non Tenure Track

- **Authority and Responsibility of Faculty**

  The program faculty has the primary authority and responsibility in developing, revising, and implementing curriculum issues. However the program educational objectives, outcomes, and curriculum have to satisfy the needs of industry, students/parents, college/university administration, and the state Higher Education guidelines. Before proposing a new development or revision, program faculty gets input from the students, graduates, employers, Industry Advisory Committee (IAC), Accreditation body, etc. and seeks the advice from the department Chair and college Dean's office. Generally the Dean makes sure that the program educational objectives, outcomes, and curriculum follow the state government and university administration (President and/or Provost's office) instructions. See the description in Criteria 2 and 3 how the educational objectives and program outcomes were established seeking inputs from the students, IAC members comprising of the graduates, employers, and 2-year community colleges where transfer students mostly come from. The approval process of course/curriculum development or revision starts from the program faculty and goes through the department faculty, department Chair, college curriculum committee, Dean, Registrar, Library, university curriculum committee, and the Academic Affairs (Provost).

- **Faculty Development**

  Table 6-2 and Appendix B containing faculty resume highlight the professional development activities for each faculty member. Each faculty member is supposed to attend in or present at a professional meeting or workshop once in a year. The department travel funds are used to support such travels, although the budgeted amount is limited. Beside several professional development workshops are organized for the faculty by the university CIRT (Center for Instructional Research and Technology).

- **Leadership Responsibilities**

  M. Affan Badar, PhD is the Program Coordinator since August 2007. There is no stipend or release time for this position. He initiates or coordinates the program faculty effort in consultation with the department Chair and college Dean's office concerning the program revision, accreditation, course roll-out and offering, student advising, community outreach, transfer agreements, and industry advisory committee.

CRITERION 7. FACILITIES

- **Major Instructional and Laboratory Equipment**

  Classrooms

  Most of the MET classes are taught in Technology Center Bldg, Room 202 and 217. Room 202 is used for lecture classes. This room consists of a computer for the instructor with an LCD projector, internet connection and audio/visual facility to be used for the instruction. Room 217 consists of a computer for the instructor and 24 computers for the

students. This room is also equipped with LCD projector with two screens, internet connection and audio/visual facility. The machines in Room 217 have the latest AutoCAD, Pro/E, Mechanica, MS Office, etc. All the computer, audio and visual needs are maintained and supported by the university Information Technology staff in conjunction with a college staff member.

Laboratory facilities and associated equipment

Computer-aided-design (3600 sq ft lab) is done using Master CAM, Pro Engineer, Mechanica, and Inventor/Auto-CAD. These are design-drafting and CNC programs that are used throughout industry. The College of Technology (COT) has a rapid prototyping system, two coordinate measuring machines (CMMs), and a 3D Reverse Engineering Digital Microscribe located in a lab (1400 sq ft). A 4000 sq ft machine shop is separated into chip-making and non-chip-making machines. COT also houses a 1000 sqft material science testing lab and a 4000 sq ft automotive lab. The computer integrated manufacturing (CIM) laboratory (3600 sq ft) has been developed to represent modern automation. In addition, the College has a lab dedicated to the study of programmable logic controllers (PLC) (2400 sq ft), a wet process control lab (2400 sq ft) that helps students learn about automation used in the chemical and plastics industries, and a Mitsubishi robot lab (2000 sq ft). A transistor lab and a micro-processor lab are also available to students.

The CIM lab has seven Adept robots, some with vision systems, a Fanuc robot, an automated guided vehicle (AGV), an automated storage and retrieval system (ASRS), and an automated conveyor system. All of these systems have been integrated so they function as an automated factory. The Mitsubishi lab has eight robots and I/O systems. COT also has a rapid prototyping system that can build a product that has been designed using a CAD system. All of these systems are computer operated and can be migrated for web delivery.

Research Centers

The ISU College of Technology has three Centers: Indiana Packaging Research and Development Center (4000 sq ft), Center for Systems Modeling and Simulation (1000 sq ft, with MATLAB, I-Grip, Rockwell Arena, etc.), and Center for Automation and System Integration.

Computing equipment and Information infrastructure

ISU contains 85 technology enhanced classrooms, 15 public labs and 45 discipline specific computer labs, and 5 distance-learning classrooms. Campus infrastructure currently supports over 100 servers and high performance computing facilities. The campus has become a notebook institution beginning with freshmen in fall 2007. The campus is served by an extensive fiber optic cable system, and uses a gigabit backbone to deliver data and interactive video connections to every building. Wireless network access is available in all academic areas. High speed connection to both the commercial Internet and Internet2 is provided for faculty and student use. Student computing needs are served by 450 microcomputers in general use computer clusters, and 600 microcomputers in special use clusters.

Auditorium
The College of Technology has an auditorium or theatre-like classroom as well as a large class room that holds more than 100 students. There is also an atrium to hold large social gathering.

Meeting Room
The ECMET Department has one meeting/conference room. In addition, the College of Technology has three meeting rooms and two breakout rooms.

CRITERION 8. SUPPORT

- **Program Budget Process and Sources of Financial Support**

  The Indiana State University is a public university and its main resources are state funds and tuition revenues. The university allocates its funds to each college following a formula that considers the number of faculty, staff, graduate assistants, and student workers with their salaries and benefits, number of students, student credit hours generated, equipment and supplies including labs, travel funds for professional development, etc. Our College of Technology Dean then allocates funds to each department. From the department it is used for different programs and associated faculty and equipment for the programs based on the need. The MET program in housed in the Electronics, Computer, and Mechanical Engineering Technology (ECMET) department.

- **Categories of Budget**

  As explained above the budget is prepared and allocated to the ECMET department which houses the MET program. Categories of budgeted items and corresponding amounts have been shown in Table D-3 for the ECMET department.

- **Adequacy of Budget**

  For most part, the department and program get a decent budget. However, certainly the more will be better. It should be noted that the equipment (measurement tools, CMM, manufacturing lab, materials lab, thermo lab, fluid lab, etc.) and software (AutoCAD, Pro/Mechanica, Pro/E, etc.) used in the MET program or any other program in the department or the college are expensive. Therefore the university budget process should take this into consideration in addition to the number of faculty, students, and student credit hours.

- **Support of Faculty Professional Development**

  The budget categories shown in Table D-3 include travel funds. These funds though limited are used to support the faculty travels related to the research and professional development. The faculty members are encouraged to make presentations at the professional meetings and/or attend professional workshops. Sometime the university's Center for Instructional Research and Technology (CIRT) organizes different types of

workshops for the faculty professional development. Each tenured/tenure-track faculty member is evaluated in terms of teaching, scholarship, and service. Thus the scholarship including professional development activities are very important.

- **Adequacy of Equipment**

  Every year the department gets budget for equipment and supplies. This fund is used to maintain and operate facilities and equipment appropriate to the department programs, and to acquire less expensive equipment. Higher cost items are generally obtained through donation or separate request to the college and university. For example every year the department requests the college Dean to provide additional support for the CAD software renewals.

- **Adequacy of Support Personnel and Institutional Services**

  The college's Associate Dean's office provides help for all the undergraduate programs. We have a program assistant, Melissa Froderman, who helps students with the scheduling and initial evaluation of the applications sent from the admission office. Another staff, Marilyn Warden helps with the record and graduation requirements. Rob Eberwein helps with monitoring the student's academic progress/probation. If a student is under probation, Technology Student Services of our college provide counseling. This support is in addition to the support from the university Office of Admissions, Dean of Students Office, Office of VP for Student Affairs, Affirmative Action Office, Office of Registration and Records, Degree Audit and Transfer, Office of Student Financial Aid, Distance Support Services, Cunningham Memorial Library, Computing Services (Office of Information Technology), and Student Activities and Organizations. The Student Academic Services Center helps those students who need special assistance due to disability and services include tutoring, counseling, etc. The Degree Audit and Record System (DARS) maintains the student courses and credits earned or transferred. The Career Center assists with resume and job interview preparation, co-op/internship, and full-time job search. The Student Government Association (SGA) and Student Judicial Programs are other platforms to bring students' concern and appeal to the university administration.

- **Program Advisement**

  MET's Industry Advisory Committee (IAC) consists of members from industry, alumni, and academics from two- and four-years colleges. The committee meets once a year. The members review the curriculum, give input on the industry needs, discuss the direction and objectives of the program, and recommend necessary changes in the curriculum to satisfy the objectives. Minutes of the each meeting are recorded. These minutes have been kept in a folder for the ABET team visit. Following the IAC recommendations in April 2008, the program has been revised and the revision was approved by the university in April 2009.

CRITERION 9. PROGRAM

Refer to the description under Criterion 3.

APPENDIX A – COURSE SYLLABI

Course syllabi have been enclosed herewith for each course used to satisfy the mathematics, science, and discipline-specific requirements required by Criterion 5.

Indiana State University
College of Technology
Department of Electronic, Computer, and Mechanical Engineering Technology

MET103 - 001 = Intro to Technical Graphics with CAD (3 credits) SPRING 2009

Instructor: Mr. Todd E. Alberts
PH: 237-3357
Cell: 1-812-249-9184
Office 201D – Myers Technology Building
talberts@indstate.edu
Office Hours: M-T-W 10:00 – 12:00

Class Times: Monday and Wednesday from 8:00 a.m. – 9:50 a.m.
Myers Tech Building room TC217

Course Description: Introduction to technical graphics and drawing standards. Topics will include items such as visualization, sketching, and drawings depicted in multi-view, auxiliary, and pictorial formats in both conventional hand drafting techniques as well as by use of Computer Aided Design. This course also addresses general ANSI Standard Y14.5 as they apply to print reading, dimensioning, and tolerancing of prints.

Textbook: Technical Drawing by Giesecke – 13th Edition, Prentice-Hall, ISBN-13: 978-0-13-513527-3

Required Materials for Lab Drawing: (* = this is optional equipment, but highly suggested!)

Compass
30/60/90 Degree Triangle – 6”
45/45/90 Degree Triangle – 6”
Protractor – 6”
2H & H Pencils (7mm or 5mm mechanical pencils are preferred)
12” Engineering Scales or Rulers (Metric & English Mechanical Scales)
¼” Engineering Paper Pad
Erasers
Masking Tape or Tape Dots
Calculator
Circle Templates - 1/16” to ≈ 2” (Metric & English)
*Eraser Shield
*Sanding Pad
*Isometric Paper Pad

Objectives: This course is designed to provide students with the knowledge and skills to sketch, visualize, draw, and document multiple technical graphic formats for the communication of various design and manufactured items. All drawings will be completed via ANSI industry specifications in both traditional manual methods as well as with modern state-of-the-art computer software. The course will help prepare students, who (after graduation) can:

1. Apply the latest technology and engineering tools to solve technical problems in the practice of mechanical engineering technology and related interdisciplinary fields. [EO:1]
2. Remain technically current and adapt to rapidly changing technologies through self improvement with continuous learning or post-graduate education. [EO:2]

3. Demonstrate independent thinking, self-management, and functioning effectively in team-oriented and open-ended activities in an industrial environment. [EO:3]
4. Communicate effectively in oral, written, and graphical forms. [EO:4]

Outcomes: Upon completion of this course, the students will have:

1. an appropriate mastery of the knowledge, techniques, skills, and modern tools of the MET discipline [LO:a]
2. an ability to apply creativity in the design of systems, components, or processes appropriate to the MET program educational objectives [LO:d]
3. an ability to identify, analyze and solve technical (close-ended analysis and open-ended design) problems [LO:f]
4. an ability to communicate effectively through engineering drawings, written reports, or oral presentations. [LO:g]
5. a commitment to quality, timeliness, and continuous improvement [LO:k]
6. Develop, simulate, and analyze mechanical components/systems using computer-aided design and analysis tools. [PO:1]
7. Identify and inspect tolerances in mechanical parts and assemblies. [PO:3]

Course Outline:

1. Intro to Technical Graphics
2. Sketching, Text, and Visualization
3. Engineering Geometry & Construction
4. Multi-view Drawings
5. Pictorial Drawings
6. Auxiliary Views
7. Section Views
8. Dimensioning & Tolerancing

Grading:

1. Tests (Midterm & Final)	35%
2. Lab Assignments & Chapter Questions	50%
3. Project and/or Research Paper	10%
4. Participation/Attendance	5%

Grading Scale:

A = 90 – 100%	C = 70 – 74%
B+ = 85 – 89%	D+ = 65 – 69%
B = 80 – 84%	D = 60 – 64%
C+ = 75 – 79%	F = 59% and below

Assignments:

All assignments are due 1 week after they are assigned, unless otherwise specified during class. All late assignments will have a penalty deduction of 50% per week if submitted past the due date. Each assignment must be submitted in electronic format (MS Word, Excel, PPT, etc.) with your name, class & section number, date, and assignment description placed at the top of the page. All lab drawings must include your name, class & section number, date, and drawing number.

All dates of tests will be determined throughout the completion of the course, and testing dates and subject matters will be announced one week prior to assessment. Study sessions for each test will take place prior to examination. Missed tests will only be allowed to be made up at a later date under instructor's discretion.

Class Accounts:

Each student will be allotted a class account or storage space on the university server for use related to the CAD drawing of this course. Only the work related to this class should be stored in this account. Students must submit assignments with the following information in the following format:

Your Initials, Date, Drawing #

Example: TEA-092306-12-8

There will also be the use of a "Shared Folder" under the class account in which materials and information may be provided to the entire class. The class account will be accessible to only the instructor of the course and the students.

Class Etiquette:

Attendance in both lecture and lab sessions is mandatory unless otherwise specified. Any time you will be absent or significantly delayed, please contact the course instructor via email or phone ASAP. Punctuality is just as important as attendance, so make arrangements to be in class on time. In the CAD Lab, any unauthorized use of internet browsing, text messaging, or email use during class time is prohibited and will be dealt with accordingly. Any behavior involved with academic integrity involving dishonesty/plagiarism will not be tolerated, thus resulting in an "F" grade in the class. Please consult Undergraduate Catalog for details and definitions related to academic integrity and plagiarism.

Criteria for Grading and Evaluating of Work:

All material will be graded on the values of workmanship, attention to detail, clarity, accuracy, speed, legibility, and neatness. This will be used for drawings, assignments, and tests in both conventional drafting as well as CAD.

Disability and Special Needs

Indiana State University provides services and accommodations for qualified individuals with documented disabilities. If you require any accommodation, you must register with the Disability Support Services at the beginning of the semester. You may contact them at 237-2301 or see them in person on the 2nd floor of Gillum Hall. Any other types of needs required for you (undocumented) to successfully excel in this class, feel free to see me so arrangements can be made to help you in any way possible.

Final exam: Friday, May 8, 2009 @ 8:00 a.m. in TC217.

***NOTE: The information and subject matter included in this syllabus is subject to change at the discretion of the course instructor and/or department officials. All changes will be communicated in full to the class.**

Indiana State University
College of Technology
Department of Electronic, Computer, and Mechanical Engineering Technology

MET130 - 001 = Intro to Engineering and Technology (2 credits) FALL 2008

Instructor: Todd E. Alberts
PH: 237-3357
Cell: 1-812-249-9184
Office 201D – Myers Technology Bldg.
talberts@indstate.edu
Office Hours: MWF 10:00 – 12:00

Class time: Tuesdays @ 2:00 – 3:50pm
Myers Technology Building Room TC202

Course Description: This course introduces students into the world of engineering and technology. It explains what this profession is, what important roles it plays, how it is different from other major professions in the society, and the career opportunities for engineering technology students. The course also introduces the basic principles of engineering in terms of problem solving, its methodology, the knowledge and skill involved.

Objectives: This course is designed to allow first semester freshman mechanical engineering technology students an overarching viewpoint and understanding of their field of study, future professional careers aspects, and allow them to garner a full understanding of university academic life. Course study is to include studies in the mechanical engineering technology curriculum and problem solving methodologies that will allow them success in future endeavors. The course will help prepare students, who (after graduation), can:

1. Apply the latest technology and engineering tools to solve technical problems in the practice of mechanical engineering technology and related interdisciplinary fields. [EO:1]
2. Demonstrate independent thinking, self-management, and functioning effectively in team-oriented and open-ended activities in an industrial environment. [EO:3]
3. Communicate effectively in oral, written, and graphical forms. [EO:4]
4. Perform ethically and professionally in business, industry, and society. [EO:5]
5. Understand global issues and the impact of technology and engineering solutions on the society and environment. [EO:7]

Outcomes: Upon completion of this course, the students will have:

1. an appropriate mastery of the knowledge, techniques, skills, and modern tools of the MET discipline [LO:a]
2. an ability to function effectively on teams [LO:e]
3. ability to identify, analyze and solve technical (close-ended analysis & open-ended design) problems [LO:f]
4. ability to communicate effectively through engineering drawings, written reports, oral presentations [LO:g]
5. a recognition of the need for, and an ability to engage in lifelong learning [LO:h]
6. an ability to understand professional, ethical and social responsibilities [LO:i]
7. a respect for diversity and a knowledge of contemporary professional, societal and global issues [LO:j]
8. a commitment to quality, timeliness, and continuous improvement [LO:k]

Prerequisite: Your genuine interest and desire to be an engineer or in a technical professional.

Textbook/Workbook: None, but I will distribute several handouts during the semester. Keeping good notes is very important and required in this class!

References: You can find many books about engineering and technology in the ISU or local libraries.

Grading: Grade Determination:

1. Assignments, projects and quizzes	50%
2. Tests - 2 tests	@ 25% each.

The grade is given based on a percentage of total points possible in the course:

A = 90 - 100 % B+ = 86 - 89% B = 80 - 85% C+ = 76 - 79 %
C = 70 -75% D+ = 66 - 69 % D = 60 - 65% F = below 60%

Assessment of outcomes: The course outcomes will be assessed through homework assignments, course projects, quizzes and exams. Every student is required to do a course project that applies an engineering approach to define a problem, develop solutions, plan and implement the solutions. The students are also required to present their projects to the class and instructor in addition to turning in a project report.

Assignments: All assignments are due on the specified date determined during class. Assignments will not be accepted beyond two weeks past the due date. All late assignments will have a penalty deduction of 25% for each week late. Each assignment must be submitted in electronic format (MS Word, Excel, PPT, AutoCAD, etc.) and/or engineering pad paper with your name, course number and assignment number at the top of each page turned into the instructor as per instructions. All dates of tests will be determined throughout the completion of the course, and testing dates and subject matters will be announced one week prior to assessment. Missed tests will only be allowed to be made up at a later date under instructor's discretion.

Criteria for evaluating the homework/projects:

(1) Completeness
- Show all steps of a problem-solving process
- Fulfill all required works (e.g. explanation, specification, analysis, diagrams, CAD drawings)

(2) Correctness
- Every step in the problem solving process must be correctly done (procedure) and only valid procedures are used
- Solution values should be correct

(3) Reasoning/Effectiveness
- Logical reasoning and justification of your solution method

(4) Neatness
- All works must be done clearly and cleanly on the required type of paper; and all textual information must be typed or printed clearly.
- Box your final answers if they are analytical solutions.

Class Etiquette:

Attendance in both lecture and lab sessions is mandatory unless otherwise specified. Any time you will be absent or significantly delayed, please contact the course instructor via email or phone ASAP. Punctuality is just as important as attendance, so make arrangements to be in class on time. Any behavior involved with academic integrity involving dishonesty/plagiarism will not be tolerated, thus resulting in an "F" grade in the class. Please consult Undergraduate Catalog for details and definitions related to academic integrity and plagiarism. In this class, any unauthorized use of internet browsing, text messaging, or email use during class time is prohibited and will be dealt with accordingly.

Disability and Special Needs

Indiana State University provides services and accommodations for qualified individuals with documented disabilities. If you require any accommodation, you must register with the Disability Support Services at the beginning of the semester. You may contact them at 237-2301 or see them in person on the 2nd floor of Gillum Hall.

Any other types of needs required for you (undocumented) to successfully excel in this class, feel free to see me so arrangements can be made to help you in any way possible.

Final exam time to be determined.

***NOTE: The information and subject matter included in this syllabus is subject to change at the discretion of the course instructor and/or department officials. All changes will be communicated in full to the class.**

Content of study

1. Definition of engineering and technology
    - History and development of engineering
    - Distinction between art, science and engineering
    - Engineering: engineering science and engineering technology
    - Careers in engineering profession
    - Professional organizations
2. Communication in engineering
    - Technical graphics (engineering graphics)
    - Technical writing
    - Standards for engineering (product design/development, and manufacturing)
3. Knowledge and methods used for engineering problem solving
    - A process model for engineering problem solving
    - Domain knowledge, methodological knowledge and/or implementation knowledge
    - Kinematics, statics, dynamics, and strength of materials
    - Engineering materials
4. Engineering design (product design and development)
    - Need/market analysis
    - Problem definition
    - Synthesis
    - Analysis
    - Evaluation of design alternatives and optimization
    - Product testing
    - Documentation and presentation
5. Other engineering functions in production and manufacturing systems
    - Process design and planning
    - Process control and automation
    - Quality control (SPC or SQC)
    - Production planning and inventory control
    - Plant maintenance and facility management
    - Information technology (IT): information systems, support and integration of the systems
6. Introduction of common engineering systems: Mechanical systems; Thermodynamic systems; Fluid systems; Electrical systems; Control systems; Electronic and digital systems
7. Conclusion: the future of engineering

Indiana State University
College of Technology
Department of Electronic, Computer, and Mechanical Engineering Technology

MET 203 – 001 Introduction to Solid Modeling (3 credits) SPRING 2009

Instructor: Todd E. Alberts
PH: 237-3357
Cell: 1-812-249-9184
Office - TC201D Myers Tech Building
talberts@indstate.edu
Office Hours: Tuesday and Thursday from 11:00 a.m. – 2:00 p.m.

Class Times: Tuesday and Thursday @ 8:00 a.m. – 10:45 a.m.
Myers Technology Building Room TC217

Course Description:

This course will introduce the fundamentals of interactive computer graphics utilizing computer aided design (CAD) tools with a strong emphasis on the basic concepts and principles of geometric modeling, solid modeling, and hands on practice with Pro-Engineering solid modeling software on PC based computer systems. Prerequisite: MET103

Textbook: Pro-Engineer Wildfire 3.0 Tutorial by Roger Toogood, SDC Publications, 2006 (ISBN = 1-58503-307-3)

Objectives: This course is formatted to allow students a full understanding of both the theoretical concepts as well as the hands-on application of three-dimensional solid modeling for the creation of virtual part models, assemblies, and engineering drawings. This course will help prepare students, who (upon graduation) can:

1. Apply the latest technology and engineering tools to solve technical problems in the practice of mechanical engineering technology and related interdisciplinary fields. [EO:1]
2. Remain technically current and adapt to rapidly changing technologies through self improvement with continuous learning or post-graduate education. [EO:2]
3. Communicate effectively in oral, written, and graphical forms. [EO:4]

Outcomes: Upon completion of this course, the students will have:

1. an appropriate mastery of the knowledge, techniques, skills, and modern tools of the MET discipline [LO:a]
2. an ability to apply creativity in the design of systems, components, or processes appropriate to the MET program educational objectives [LO:d]
3. an ability to identify, analyze and solve technical (close-ended analysis and open-ended design) problems [LO:f]
4. an ability to communicate effectively through engineering drawings, written reports, or oral presentations. [LO:g]
5. a commitment to quality, timeliness, and continuous improvement [LO:k]
6. Develop, simulate, and analyze mechanical components/systems using computer-aided design and analysis tools. [PO:1]

Course Outline:

1. Design Concepts
2. Feature based modeling & design
3. Parametric modeling
4. Solid modeling techniques
5. Part modeling
6. Assembly models
7. Engineering Drawings

Grading: Grading Scale:

1. Assignments & Drawings	50%	A = 90 – 100%	C = 70 – 74%
2. Tests & Quizzes	20%	B+ = 85 – 89%	D+ = 65 – 69%
3. Project	20%	B = 80 – 84%	D = 60 – 64%
4. Attendance & Participation	10%	C+ = 75 – 79%	F = 59% and below

Assignments:

All assignments are due on the specified date determined during class. All late assignments will have a penalty deduction of 25% for each week late. Each assignment must be submitted in electronic format (MS Word, Excel, PPT, AutoCAD, Pro-E, etc.) and placed in the specified class account locations or turned into instructor as per instructions. All dates of tests will be determined throughout the completion of the course, and testing dates and subject matters will be announced one week prior to assessment. Missed tests will only be allowed to be made up at a later date under instructor's discretion.

Class Accounts:

Each student will be allotted a class account or storage space on the university server for use related to the CAD drawing of this course. Only the work related to this class should be stored in this account. Students must submit assignments with the following information in the following format:

Your Initials, Date, Drawing #

Example: TEA-092306-12-8

There will also be the use of a "Shared Folder" under the class account in which materials and information may be provided to the entire class. The class account will be accessible to only the instructor of the course and the students.

Class Etiquette:

Attendance in both lecture and lab sessions is mandatory unless otherwise specified. Any time you will be absent or significantly delayed, please contact the course instructor via email or phone ASAP. Punctuality is just as important as attendance, so make arrangements to be in class on time. In the CAD Lab, any unauthorized use of internet browsing, text messaging, or email use during class time is prohibited and will be dealt with accordingly. Any behavior involved with academic integrity involving dishonesty/plagiarism will not be tolerated, thus resulting in an "F" grade in the class. Please consult Undergraduate Catalog for details and definitions related to academic integrity and plagiarism.

Criteria for Grading and Evaluating of Work:

All material will be graded on the values of workmanship, attention to detail, clarity, accuracy, speed, legibility, and neatness. This will be used for drawings, assignments, and tests in both conventional drafting as well as CAD.

Disability and Special Needs

Indiana State University provides services and accommodations for qualified individuals with documented disabilities. If you require any accommodation, you must register with the Disability Support Services at the beginning of the semester. You may contact them at 237-2301 or see them in person on the 2nd floor of Gillum Hall. Any other types of needs required for you (undocumented) to successfully excel in this class, feel free to see me so arrangements can be made to help you in any way possible.

Final exam information to be announced at a later date.

***NOTE: The information and subject matter included in this syllabus is subject to change at the discretion of the course instructor and/or department officials. All changes will be communicated in full to the class.**

Indiana State University, College of Technology, ECMET Dept.

MET 302-001 (17849) **Applied Statics,** 3 Cr Hr

Spring 2009 (Jan 12 – May 08)

MW 8:00 – 9:50 am, Rm TC 202

Instructor: Dr. M. Affan Badar
Office: 650 Cherry St., John Myers Tech Center, 201E
Terre Haute, IN 47809
Phone/fax: (812) 237-3982 (ph), 4527 (fax)

e-mail/web: mbadar@indstate.edu, http://www1.indstate.edu/ecmet/faculty/badar.htm
OH: MW 10 am – Noon, Tue 2 – 3 pm, or by appointment (phone/e-mail)

Graduate TA: Srikanth Inala

Accommodation: *Any student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact the instructor ASAP to discuss accommodations necessary to ensure full participation and facilitate educational opportunities.*

Academic Integrity and Plagiarism: Refer to http://www1.indstate.edu/academicintegrity.

Webpage: You can log into blackboard at http://blackboard.indstate.edu with your MyISU portal ID and password to access the contents of the course posted on the webpage.

Announcements: Announcements concerning the course throughout the semester will be made in one of the following ways: in the class, posted on the webpage, or e-mailed to your blackboard e-mail address. Please visit the webpage, verify your e-mail, and check your e-mail regularly.

Catalog Description: Resultants and equilibrium, force systems, reactions, moments, couples, trusses, frames, sheaves, pulleys, and friction. Graphic and analytic methods.
Prerequisite: MATH 115 or MET 215 or equivalent.

Objectives: This course is designed to provide students with the knowledge of logical design thinking by setting up and solving problems in mechanics. The students will be able to make free body diagrams for all applicable problems. Also they will learn how to determine unknown forces acting on a complex machine or frame by solving problems involving the laws of equilibrium, vector manipulation, and design thought process. The course (upon graduation) will help the students to:

1. Apply physics, mathematics, and engineering tools to solve technical problems in the practice of mechanical engineering technology, specifically mechanics. [EO:1]
2. Remain technically current through self improvement with continuous learning.[EO:2]
3. Demonstrate independent thinking, self-management, and functioning effectively in team-oriented and open-ended activities. [EO:3]
4. Communicate effectively in written and graphical forms. [EO:4]

Outcomes: Upon completion of the course, the students will have:

1. An appropriate mastery of the knowledge, techniques, skills, and modern tools of the MET discipline. [LO:a]
2. An ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology. [LO:b]
3. An ability to apply creativity in the design of systems, components, or processes appropriate to the MET program educational objectives. [LO:d]
4. An ability to function effectively on teams. [LO:e]
5. An ability to identify, analyze, and solve close-ended analysis and open-ended design problems. [LO:f]
6. A commitment to quality, timeliness, and continuous improvement. [LO:k]

Assessment of Objectives and Outcomes:
The course outcomes will be assessed through HW assignments, project, exams, and summative evaluations of all students' feedback. Feedback of the instructor and students in the other courses for which this course is pre-requisite will also be helpful for the outcome assessment.

Textbook: R.C. Hibbeler, *Engineering Mechanics Statics*, 11th edn, Prentice Hall (Pearson), Upper Saddle River, NJ, 2007.

Materials Needed:
Textbook, calculator with Trig function capability, and engineering pad (5 squares/inch) for homework.

HW Assignments: At the end of each topic/chapter, practice problems will be solved in the class and given as homework assignments. Homework will be due at the beginning of the class period on the stated due date. After that, 10% will be deducted for each day late. No assignment will be accepted after one week from the due date. Assignments are expected to be well organized and neatly written on engineering pad papers or computer printouts.

Field Trip: There may be a field trip, which will be counted as one HW. There will be no make-up for the missed field trip.

Groups: Students are required to make groups, 3 members per group, to do group work. For group work, submit only one report per group including a peer-evaluation indicating the contribution of each member.

Project: A project will be assigned during the semester to be completed in groups.

Exams: Two tests and a final exam will be given. As per the university schedule, the final is scheduled for May 06 Wed (8: 00 am in the class).

Grading:

Attendance	HW	Project	Tests	Final
5%	20%	10%	20×2 = 40%	25%

In exams, if the highest obtained by student(s) falls below the maximum points allowed, then the former will be considered as the maximum allowed.

Attendance: If any student is absent from the class 10 times or more, he/she will get an 'F' grade.

Letter Grade:

≥ 90 - 100%	A	≥ 85 & < 90	B^+	≥ 80 & < 85	B
≥ 75 & < 80	C^+	≥ 70 & < 75	C	≥ 65 & < 70	D^+
≥ 60 & < 65	D	< 60	F		

Course Content:

Chapter	Topic
1.	General Principles
2.	Force Vectors
3.	Equilibrium of a Particle
4.	Force System Resultants
5.	Equilibrium of a Rigid Body
6.	Structural Analysis
7.	Internal Forces
8.	Friction
9.	Center of Gravity and Centroid
10.	Moments of Inertia
11.	Virtual Work

Note:
The information and subject matter included in this syllabus is subject to change at the discretion of the course instructor and/or department officials. All changes will be communicated in full to the class.

MET 304

Engineering Analysis

With the hope that this class will stimulate an interest in Engineering Analysis focused on dynamics and provide an acceptable guide to its understanding

GENERAL INFORMATION

Course instructor:	Qun Zhang, Professor Emeritus
Instructor's office:	COT 201J
Instructor's office hour:	Thursday, 2:00 – 4:45 p.m.(online)
Instructor's phone number:	(812) 237-3349
Instructor's e-mail address:	qzhang3@isugw.indstate.edu
Classroom:	online
Class hours:	3 credit hours
Prerequisites:	MATH301 or equivalent.
Textbooks:	**Principles of Dynamics**, by R.C. Hibbeler, 2006
Reference: A Book and a few video materials	**Introduction to Engineering Analysis**, by Kirk D. Hagen, 2nd ed. 2005 http://www.learner.org/resources/series42.html?pop=yes&vodid=630072&pid=622# (Mechanical Universe) will be used.

COURSE CATALOG DESCRIPTION

3 hours. Introduction to the analysis of engineering problems including dynamics and thermodynamics using calculus based methods. The emphasis is given to the understanding of basic concepts and principles as well as the applications of related analysis in mechanical and manufacturing engineering. Pre-requisite: MATH301 or equivalent.

COURSE INTENT

IMT 304 involves the using mathematics and principles of science. The mathematical tools including calculus, vector, statistics, differential equations and will be introduced through practical problems in mechanical and manufacturing engineering.
The intent of this course is designed to introduce to the student how to master analytical solution of an engineering problem. However, the understanding dynamics including vibrations will be an important topic.

The purpose of this course is to enhance/develop your ability to use Engineering Analysis not only for design and failure, but also for test and proves. In class, you will learn to do basic engineering analysis focused on dynamics through reviewing physics principles and mathematics skills. You will be required to complete homework and some case studies. You are encouraged to do them independently, and you must complete them on time.

INSTRUCTIONAL GOALS

Upon the completion of this course, you will be able to do the following:
1. Review and evaluate basic mathematics skills and physics principles focused on dynamics.
2. Learn using engineering analysis in mechanical design.
3. Learn using engineering analysis to solve the failure of engineering project.
4. Search on the Internet for information about course teaching material and case study

REPRESENTATVE TEACHING METHODS

You will learn engineering analysis principles, strategies, and evaluation in this class. You must master all the above knowledge in order to solve engineering problem and get a valid and functional answer. Therefore, to "combine the theory with practice" is critical.

Class teaching material will be updated online weekly and you need hand on the homework before weekend each week. Although this is not a face-to-face class, online interactive time will be assigned for your communication with instructor via email or phone. Teaching activities will involve a great deal of examples. You will be advised for doing case study step by step. Through these activities, you can expect to complete your case study independently outside of class with no frustration and your engineering analysis skills will be enhanced.

Finally in this class, I can teach you the fact of Engineering Analysis, rules, dynamics principles, but I never teach you imagination, creativity, and judgment and above all of the engineer always have. If you want to be a qualified engineer, those things you have to supply by yourself.

TENTATIVE COURSE SCHEDULE

Week1 1/12/09 to 1/16/09	Unit 1: "Introduction" 1. Lesson 1 The role of analysis in engineering 2. Lesson 2 Dimensions and Units Read reference provided 3. Homework 1
Week2 1/19/09 to 1/23/09	Unit 2: "Analysis Methodology" 1. Lesson1 Analysis Methodology 2. Lesson 2 Review of Newton's Laws

	Read reference provided 3. Homework 2
Week3 1/26/09 to 1/30/09	Application Case Study1: Designing a Turnbuckle
Week4 2/02/09 to 2/06/09	Unit 3: "Kinematics of a Particle " 1. Lesson 1 Rectilinear Kinematics and Motion of a Projectile 2. Lesson 2 Curvilinear Motion Read chapter 12 from "Principles of Dynamics" 3. Homework 3
Week5 2/09/09 to 2/13/09	Unit 4: "Kinetics of a Particle: Force and Acceleration " 1. Lesson 1 Equation of Motion 2. Lesson 2 Motion in Different Coordinates Read chapter 13 from "Principles of Dynamics" 3. Homework 4
Week6 2/16/09 to 2/20/09	Application Case Study 2: Why the moon doesn't fall to the earth
Week7 2/23/09 to 2/27/09	Unit 5: "Work and Energy " 1. Lesson 1 Principle of Work and Energy 2. Lesson 2 Conservation of Energy Read chapter 14 and 18 from "Principles of Dynamics" 3. Homework 5
Week8 3/02/09 to 3/06/09	Unit 6: "Impulse and Momentum " 1. Lesson 1 Principle of Linear Impulse and Momentum 2. Lesson 2 Angular Momentum Read chapter 15 from "Principles of Dynamics" 3. Homework 6
Week 9 3/09/09 to 3/13/09	Spring Break
Week10 3/16/09 to 3/20/09	Unit 7: "Planar Kinematics of a Rigid Body " 1. Lesson 1 Rigid Body Motion 2. Lesson 2 Relative-Motion Analysis Read chapter 16 from "Principles of Dynamics" 3. Homework 7
Week 11 3/23/09 to 3/27/09	Unit 8: "Kinematics of a Rigid Body: Force and Acceleration " 1. Lesson 1 Moment of Inertia 2. Lesson 2 Translation and Rotation Read chapter 17 from "Principles of Dynamics" 3. Homework 8
Week 12 3/30/09 to 4/03/09	Application Case Study 3: Two-Body motion
Week 13 4/06/09 to 4/10/09	Unit 9: "Kinematics of a Rigid Body: Impulse and Momentum " 4. Lesson 1 Angular Momentum 5. Lesson 2 Conservation of Momentum Read chapter 19 from "Principles of Dynamics" Homework 9
Week 14 4/13/09 to 4/17/09	Unit 10: "Vibration, Oscillatory Motion " 1. Lesson 1 Un-damped Free Vibration 2. Lesson 2 Un-damped Force Vibration Read Chapter 22 from "Principles of Dynamics"

	3. Homework 10
Week 15 4/20/09 to 4/24/09	Unit 11: "Data Analysis" 1. Lesson 1 Data Analysis with Graph 2. Lesson 2 Data Analysis with Statistics Read reference provided 3. Homework 11
Week 16 4/27/09 to 5/01/09	Unit 12: "The first and second law of thermodynamics" 1. Lesson 1 The First Law of Thermodynamics 2. Lesson 2 The Second Law of Thermodynamics Final Examination

POLICIES

1) This course is designed to provide online independent learning environments that foster the basic engineering analysis knowledge and skill. Participation in all activities is considered to be essential to this class. The course outcomes will be assessed through homework assignments, case studies, and final project. Every student is required to do an analysis project that focuses on formulating problem, specifications, and project planning. The students are also required to present their projects to the class and instructor in addition to turning in a project report.

Grade Determination:

1. Homework (5% each, total 11 homework) 55 %
2. Case Study (9% each, total 3 case studies) 27 %
3. Final Examination 18 %

Note: The purpose of homework is to help you better understanding course. One more practice is welcome. If you don't satisfy the grade for your first handout, you may revise it and send back at the following weekend. But the grade will be 80% only.

The grade is given based on a percentage of total points possible in the course:

A = 90 - 100 % B+ = 86 - 89% B = 80 - 85% C+ = 76 - 79 %
C = 70 -75% D+ = 66 - 69 % D = 60 - 65% F = below 60%

2) All assignments are due on the date specified. Any late-turn-in assignment will be assessed a 30% reduction in score for each week late. All homework must be done on engineering pad paper format with your name, course number and assignment number at the top of each page.

3) Criteria for evaluating the assignments:

(5) Completeness
- Show all steps of a problem-solving process
- Fulfill all required works (e.g. specification, analysis, diagrams, CAD drawings)

(6) Correctness
- Every step in the problem solving process must be correctly done (procedure) and only valid procedures are used
- Solution values should be correct

(7) Reasoning/Effectiveness
- Logical reasoning and justification of your solution method

(8) Neatness
- All works must be done clearly and cleanly on the required type of paper; and all textual information must be typed or printed clearly.
- Box your final answers if they are analytical solutions.

4) Any behavior of academic dishonesty (see Undergraduate Catalog Book 2003-2004, page 18-19 or http://web.indstate.edu/~saa/code_of_conduct.htm) will not be tolerated (e.g. copying each other's homework assignment or test) and will result automatically an "F" grade in this class.

TENTATIVE COURSE SCHEDULE

Week1 1/12/09 to 1/16/09
Unit 1: "Introduction"
Lesson 1The role of analysis in engineering
Lesson 2 Dimensions and Units
Read reference provided
Homework 1

Week2 1/19/09 to 1/23/09
Unit 2: "Analysis Methodology"
Lesson1 Analysis Methodology
Lesson 2 Review of Newton's Laws
Read reference provided
Homework 2

Week3 1/26/09 to 1/30/09 **Application Case Study1: Designing a Turnbuckle**

Week4 2/02/09 to 2/06/09
Unit 3: "Kinematics of a Particle "
Lesson 1 Rectilinear Kinematics and Motion of a Projectile
Lesson 2 Curvilinear Motion
Read chapter 12 from "Principles of Dynamics"
Homework 3

Week5 2/09/09 to 2/13/09
Unit 4: "Kinetics of a Particle: Force and Acceleration "
Lesson 1 Equation of Motion
Lesson 2 Motion in Different Coordinates
Read chapter 13 from "Principles of Dynamics"
Homework 4

Week6 2/16/09 to 2/20/09 **Application Case Study 2: Why the moon doesn't fall to the earth**

Week7 2/23/09 to 2/27/09
Unit 5: "Work and Energy "
Lesson 1 Principle of Work and Energy
Lesson 2 Conservation of Energy
Read chapter 14 and 18 from "Principles of Dynamics"
Homework 5

Week8 3/02/09 to 3/06/09
Unit 6: "Impulse and Momentum "

Lesson 1 Principle of Linear Impulse and Momentum
Lesson 2 Angular Momentum
Read chapter 15 from "Principles of Dynamics"
Homework 6

Week9 3/09/09 to 3/13/09
Sprint Break

Week 10 3/16/09 to 3/20/09
Unit 7: "Planar Kinematics of a Rigid Body "
Lesson 1 Rigid Body Motion
Lesson 2 Relative-Motion Analysis
Read chapter 16 from "Principles of Dynamics"
Homework 7

Week 11 3/23/09 to 3/27/09
Unit 8: "Kinematics of a Rigid Body: Force and Acceleration "
Lesson 1 Moment of Inertia
Lesson 2 Translation and Rotation
Read chapter 17 from "Principles of Dynamics"
Homework 8

Week 12 3/30/09 to 4/03/09 **Application Case Study 3: Two-Body motion**

Week 13 4/06/09 to 4/10/09
Unit 9: "Kinematics of a Rigid Body: Impulse and Momentum "
Lesson 1 Angular Momentum
Lesson 2 Conservation of Momentum
Read chapter 19 from "Principles of Dynamics"
Homework 9

Week 14 4/13/09 to 4/17/09
Unit 10: "Vibration, Oscillatory Motion "
Lesson 1 Un-damped Free Vibration
Lesson 2 Un-damped Force Vibration
Read Chapter 22 from "Principles of Dynamics"
Homework 10

Week 15 4/20/09 to 4/24/09
Unit 11: "Data Analysis"
Lesson 1 Data Analysis with Graph
Lesson 2 Data Analysis with Statistics
Read reference provided
Homework 11

Week 16 4/27/09 to 5/01/09
Unit 12: "The first and second law of thermodynamics"
Lesson 1The First Law of Thermodynamics
Lesson 2The Second Law of Thermodynamics
Final Examination

INDIANA STATE UNIVERSITY
College of Technology

Department of Electronics, Computer, and Mechanical Engineering Technology

MET 306 – Applied Mechanisms, 3 credit

Fall, 2008

Instructor: Dr. Ming Zhou, TC201K, (812)-237-3983; mzhou@isugw.indstate.edu

Class meeting time: T.R. 9:00 – 10:45am

Course objective: The goal of this course is to prepare mechanical engineering students or related majors (e.g. manufacturing) for technical specialty study through the introduction of kinematics and related theories.

Course Description: Introduction to basic concept and analysis of motion, displacement, velocities, accelerations, and common mechanisms including cam, gears, belts, chains and linkages.

Textbook: ***Machines and Mechanisms: Applied Kinematic Analysis***, 3rd Ed., David H. Myszka, 2005.

Prerequisite: MATH115 or IMT215 and at least one course in technical graphics with CAD (some assignments will be required to be done with CAD). A calculator with trig functions is necessary.

Course Outline:

(1) Introductions: basic linkages	(2) Position and velocity analysis
(3) Acceleration analysis	(4) Mechanism design
(5) Design and analysis of cams	(6) Design and analysis of gears
(7) Belt and chain drives	(8) Screw mechanisms

Grading:

Grade Determination:

1. Collected homework assignments	40%
2. Tests - 2 tests @30% each	60%

The grade is given based on a percentage of total points possible in the course:

A [90, 100]	B+ [85, 90)	B [80, 85)	C+ [75, 80)
C [70, 75)	D+ [65, 70)	D [60, 65)	F = below 60%

Assignments: Each lesson will provide assignments for your problem-solving exercises. You should submit the homework on time and date specified. Any late-turn-in collection will be assessed a 20% reduction in score for each week late. Certain assignments can be done either manually or with CAD or using both. The assignments finished manually (e.g., calculations) must be done with Engineer's Pad papers.

Criteria for evaluating the homework/projects:

1. Completeness

Show all steps of a problem-solving process
Fulfill all required works (e.g. specification, analysis, diagrams, CAD drawings)

2. Correctness
   Every step in the problem solving process must be correctly done (procedure) and only valid procedures are used
   Solution values should be correct

3. Reasoning/Effectiveness
   Logical reasoning and justification of your solution method should be clearly shown

4. Neatness
   All works must be done clearly and cleanly on the required type of paper
   Box your final answers

Any behavior of academic dishonesty (see Undergraduate Catalog Book 2003-2004, page 18-19) will not be tolerated (e.g. copying each other's homework assignment or test) and will result automatically an "F" grade in this class.

Note: The course content outlined above is subject to change at the discretion of the instructor.

College of Technology
Indiana State University

I. Course Objectives

This course will broaden the student's knowledge of hydraulics and pneumatics. Students will be cognizant of the various types and properties of fluid control systems. As part of the course, students will gain insight into the hydraulic and pneumatic components used in mass production, transportation, and construction industries.

II. Resources

Student will use a variety of resources for the class. These resources include the text, internet, and various standardization documents.

Texts.

a. Fluid Power with Applications 7th ed Anthony Esposito
b. Industrial fluid power Volume 1: Basic text on hydraulics, air, & vacuum for industrial and mobile applications
c. Fluid Power MET 329 (Study Guide)

Laboratory manual. Student Lab Manual Fluid Power IMT 329

Calculator. An inexpensive yet durable calculator

Lab Garment. Hydraulic oil is messy and stains

Safety glasses. Mandatory

III. Catalog Description

Fluid Power Technology – 3 hours. Principles of hydraulics, pneumatics, and fluidics involving application and control of fluid power circuits.

IV. Prerequisites

a. Desire to learn
b. Ability to work with others

V. General Topics

a. Fluid power principles
b. Fluid power principles
c. Control values (3 way and 4 way)
d. Control valves (5 way)
e. Fluid power pumps
f. Ancillary components
g. Component design
h. Maintenance

VI. Attendance and Participation

Attendance is requisite to achieving course objectives. Students must also be timely. If a student is not able to attend class the following steps should be taken: (a) notify your instructor as soon as possible by email, (b) notify your lab partner that you will not be attending class, and (c) make arrangements to complete the lab at another time. Failure to take the aforementioned steps can have serious consequences.

VII. Course Conduct

Fluidics or fluid power is a unique opportunity for students to enhance their knowledge of fluid, pneumatics, and hydraulics, become knowledgeable of applications, and express their creativity. The lab is filled with an interesting variety of devices and controls. Student should make every effort enjoy designing and activating various machines. Enjoyment is never at the expense of safety or the academic environment.

VIII. Reading.

Weekly reading assignments are included within the contents of this syllabus. The assignment schedule should be followed unless supplemental guidance has been given. Students will often be given additional reading assignment requiring library or internet reference materials. Often there will be overlapping material/redundancy in the reading assignments. It follows that students should not focus on reading every page as much as mastering the concepts as presented in the texts and in class.

IX. Homework. (12.5%)

There is assigned homework, which must be completed within a one week time period of being assigned. The study questions at the end of each chapter must be completed by the following Monday. However, homework questions will not be turned-in. Instead students must take the homework quizzes on Blackboard. The quizzes will only be available for one week. Additional homework and readings will be assigned using Blackboard. Please be attentive to the assignments and their respective dates. Homework should be:submitted electronically

X. Laboratory TBD (50%)

There are 10 laboratory experiments, which must be completed. Laboratory experiments are considered completed when the report is submitted and a passing grade is received. The reports must follow a defined format and be submitted within 1 week of performing the laboratory exercise. A copy of the report should be submitted to the instructor and another copy of the report should be maintained in your notebook Each lab has a point value of 20 points.

Everyone will be assigned a laboratory partner. Every member of the partnership must submit a laboratory report. Certain sections of the report will require close collaboration. Other sections of the report should be accomplished independently. Generally, the instructor will not function as a mediator when there is conflict in the partnership. The requirement to work with a partner will not be waived under any circumstanced.

XI. Tests (12.5%)

Two tests will be given in the course of the semester. Generally, there will a variety of true/false, short answer, sentence completion, and bonus questions. Test will be announced a minimum of one week prior to the test date. Make-up exams will not be given. Each test is worth 100 points.

XII. Quizzes

Quizzes are unplanned will be given according the instructor's discretion. The point value of quizzes varies.

XIII. Grading

Source	Maximum Value
Tests	12.5%
Homework	12.5%
Report/project	25%
Laboratory	50%

Grade	Minimum Percentage
A	92
B+	88
B	82
C+	75
C	72
D	64

XIV. Contact information

Email: Office. pcochrane@isugw@indstate.edu
Home. Therevpc@aol.com

Telephone. Office 237-3978

Room Number 201G Second floor of the technology center

Office Hours. Will be posted.

XV. Right of Revision:
The instructor reserves the right to amend the course syllabus. Generally, changes will be discussed with students prior to being implemented.

XVI. **Academic Honesty**:
The University is committed to academic integrity in all of its practices. Faculty members value intellectual integrity and a high standard of academic conduct. Activities that violate the academic integrity undermined the quality and diminish the value of educational achievements.

Cheating on papers, tests or other academic works is a violation of University rules. NO student shall engage in behavior that in the judgment of the instructor of the class, may be construed as cheating. This may include, but is not limited to, plagiarism, or other forms of academic dishonesty, such as the acquisition without permission of test or other academic materials and or distribution of these materials and other academic work. This includes students who aid and abet was those who attempt such behavior. Such violations will result in a grade reduction and may lead to expulsion from the class.

XVII. ADA Statement:

Indiana State University seeks to provide effective services and accommodation for qualified individuals with documented disabilities. If you need an accommodation because of a documented disability, you are required to register with Disability Support Services at the beginning of the semester. Contact the Direct of Student Support Services. The telephone number is 237-2301 and that office is located behind Gillum Hall, in Room 202A. The Director will ensure that you receive all the additional help that Indiana State University offers. If you require assistance during an emergency notify your instructor immediately. Be mindful of the evacuation procedures and the room layout when first entering the classroom or laboratory.

XVIII. **Safety**

The need for safety can only be understated. Appropriate clothing must be worn at all times in the lab. Sandals are not permitted; legs must be covered and eye protection must be worn at all times. No food or drinks are permitted in the lab. In the event of an emergency notify the instructor immediately.

XIX. Final Project/Report (25%)

a. Students must complete a final report. The final report:
   i. Is 25% of the student's course grade
   ii. Must be related to topic presented during the course or outlined in the text
   iii. Must be in a modified APA format and include the following sections in the order listed:
      a. Title page
      b. Abstract (what the report is about)
      c. System or concept under investigation
      d. Theory of operation
      e. Strength and Weakness of design or application
      f. Future applications or design
      g. Conclusions
      h. Reference page

b. The report must be between five and seven pages in length
c. Students must submit a topic outline by February 27, 2009
d. Report Due Date is the third week in April 2009

I. Grading Rubric for final report
   a. General English (grammar and punctuation) 10%
   b. Format 10% (where the directions followed?)
   c. Clarity and Logic (readability, flow, and order of presentation) 10%
   d. Theory of operation (does the student understand the how the device works and what principles it employs?) 30%
   e. Strengths and Weaknesses (does the student understand the device's limitations and how those limitations govern application?) 30%
   f. References (did the student consult professional journals and a multitude of peer reviewed resources?) 10%

Week	Chapter	Objectives
1.	Fluid Power with Applications (FA) Chapters 1 & 2 Introduction to fluid power & Physical Properties of Fluid Power **Industrial Fluid Power (IFP)** Chapter 1 Fluid Power Principles	Understand and appreciate the history and applications of FA. Know the components of a typical FA system
2.	FA Chapters 2 & 3 Physical Properties of Hydraulic Fluids & Energy and Power in Hydraulic Systems **IFP** Chapter 1 Fluid Power Principles	Distinguish between fluid and gases and be able to define each; know terms such as specific weight/gravity, force pressure, head, and viscosity ....as related to physical properties and fluids. Perform rudimentary calculations with components of the aforementioned terms to include Pascal's, Bernoulli's, and Torcelli; be able to use basic equations to characterize system operation or principles
3.	FA Chapter 4: Frictional Losses in Hydraulic Pipelines **IFP**	Know and be able to articulate the differences between laminar and turbulent flow; understand frictional losses in hydraulic components to include basic system analysis and the use of equations.
4.	FA Chapter 5 Hydraulic Pumps **IFP Chapter 5 Air and Hydraulic Pumps**	Know the various types of hydraulic pumps... their advantages and disadvantages; know how pumps are classified and characterized; be able to use key equations to determine operating parameters; know/recognize basic

Week	Chapter	Objectives
		symbology
5.	FA Chapter 6 Hydraulic Cylinders **IFP Chapter 2 Fluid Power Cylinders**	Know the operating principles of hydraulic cylinders; know the related advantages and disadvantages, the applications for the various HD cylinder types; how to the terms force, velocity and power apply to HD cylinders? Be able use employ equations to approximate HD cylinder performance; what are some mechanisms used for mechanically linking HD cylinders to other systems?
6.	FA Chapter 7 Hydraulic Motors **IFP**	Know the types and applications for HD motors… gear, vane, and piston; be able to articulate the advantages and disadvantages associated with the most common types. Perform torque, efficiency and other calculations; know the associated symbology
7.	FA Chapter 8 Hydraulic Valves **IFP Chapter 3 & 4 Control Valves 2 – way and 3-way & Directional Control Valves, 4 way and 5-way**	Differentiate between the various types of valves; describe the construction, functionality and theory of operation for pressure relief and flow control valves; Describe how HD systems component are affect by flow control and pressure relief valves; Distinguish among the different types of flow and pressure relief valves, be able to articulate the advantage and

Week	Chapter	Objectives
		disadvantage of each type, be able to select appropriate valve based upon system requirements and other factors
8.	FA Chapter 9 Hydraulic Circuit Design and Analyses **IFP Appendix A Design Calculations and Appendix B Fluid Power Design Data**	Be able to describe the operation of an hydraulic circuit; perform mathematics based analyses of circuits; design basic HD circuits to meet load and speed requirements.
9.	FA Chapters 10 & 11 Hydraulic Conductors and Fittings & ancillary devices **IFP Chapter 6 Other Fluid Power Components**	Be able to select connectors and fittings based on flow-rate; know the terms burst pressure and working pressure; determine required wall thickness as well as know standard commercial sizes of pipes and tubing; be knowledge of flex hose construction and applications; be able to describe the function, construction and application of accumulators and reservoirs; know the various flow and pressure measurement devices; describe the various devices and strategies for controlling HD fluid temperature; know sealing devices and be able to articulate their advantages and disadvantages; select a sealing device based upon system/operational requirements.
10.	FA Chapter 12 Maintenance of Hydraulic Systems	Know the characteristics of commercial hydraulic fluids to include foam and fire

Week	Chapter	Objectives
	IFP Appendix C Troubleshooting Procedures	resistant fluids; describe why filters, strainers, and separators are needed and how they are rated; understand how system wear affects hydraulic fluid; describe the role of safety and environmental issues
11.	FA Chapter 13 Pneumatics Air Preparation and components **IFP Review Chapter 5 Air and Hydraulic Pumps**	Be able to correctly apply the mathematical principle/laws of perfect gases; be knowledge of the different types of compressors and be able to correctly determine the size of a compressor based upon flow rate; know the operation of air cylinders and flow control valves. Be able to describe the operation and components of a pneumatic cylinders and motors
12.	TBD	
13.		
14.		
15.		
16.		
17.		
18.		

Indiana State University

College of Technology

Department of Electronic, Computer, and Mechanical Engineering Technology

MET403/633 - 001 = Advanced CAD Concepts (3 credits) SPRING 2009

Instructor: Mr. Todd E. Alberts
PH: 237-3357
Cell: 1-812-249-9184
Office: TC201D – Myers Technology Building
talberts@indstate.edu
Office Hours: Tuesday and Thursday from 11:00 – 2:00

Class time: Monday and Friday @ 10:00am – 11:50am
Myers Technology Building room TC217 (CAD Lab); including lectures and in-class demonstration; open lab hour are available for exercise.

Course Description: Advanced concept and techniques of computer aided design (CAD). Topics include feature-based design, parametric modeling, advanced solid modeling, assembly models, assembly drawings, CAD standards, design analysis, mechanism design and motion analysis. Pro/ENGINEER is used as a primary software tool for the implementation of this course. Prerequisite: MET203 or consent of instructor.

Textbook: Pro/ENGINEER WildFire 3.0 Tutorial by Roger Toogood, 2006 (ISBN: 1-58503-307-3)

References: Several handouts will be given during the semester. Keeping good notes is very important and required in this class!

Objectives: This course builds upon the knowledge and experience gained in the preliminary solid modeling course to further understand the working theoretical aspects of three dimensional modeling and integrates advanced part modeling techniques for the production of detail/assembly models, as well as the full production of engineering drawings. Investigation and use of structural/stress analysis and kinematic motion analysis of mechanical assemblies is also prominent. The course will help prepare students, who (upon graduation) can:

1. Apply the latest technology and engineering tools to solve technical problems in the practice of mechanical engineering technology and related interdisciplinary fields. [EO:1]
2. Remain technically current and adapt to rapidly changing technologies through self improvement with continuous learning or post-graduate education. [EO:2]
3. Demonstrate independent thinking, self-management, and functioning effectively in team-oriented and open-ended activities in an industrial environment. [EO:3]
4. Communicate effectively in oral, written, and graphical forms. [EO:4]

Outcomes: Upon completion of the course, the students will have:

1. an appropriate mastery of the knowledge, techniques, skills, and modern tools of the MET discipline [LO:a]
2. an ability to conduct, analyze and interpret experiments, and apply experimental results to improve processes [LO:c]
3. an ability to apply creativity in the design of systems, components, or processes appropriate to the MET program educational objectives [LO:d]
4. an ability to identify, analyze and solve technical (close-ended analysis and open-ended design) problems [LO:f]
5. an ability to communicate effectively through engineering drawings, written reports, or oral presentations. [LO:g]
6. a commitment to quality, timeliness, and continuous improvement [LO:k]

7. Develop, simulate, and analyze mechanical components/systems using computer-aided design and analysis tools [PO:1]
8. Select engineering materials for specific applications [PO:2]

Course Outline:

(1) Design concept	(2) Feature based design
(3) Parametric modeling	(4) Solid modeling
(5) Assembly Models	(6) Assembly drawings
(7) Design Analysis & FEA	(8) 2D and 3D stress analysis
(9) CAD Standards	(10) Mechanism/Motion analysis

Grading:

Grade Determination:

1. Computer Assignments	40%
2. Individual design project	10%
3. Tests - 2 tests (including a final exam.)	25% each

The grade is given based on a percentage of total points possible in the course:

A = 90 - 100 %	B+ = 86 - 89%	B = 80 - 85%	C+ = 76 - 79 %
C = 70 -75%	D+ = 66 - 69 %	D = 60 - 65%	F = below 60%

Assignments: All assignments are due on the date specified. Any late-turn-in assignment will be assessed There will be at least a 25% reduction in score for each week late.

Project: Each student will do a design project for this class within the semester, and present to the instructor with a final report that contains all the materials related to the project, including part and assembly models, part drawings, results of analysis, a design summary and other pertinent information. The proposal of the project must be approved by the instructor no later than 03/09/09. The report is due by the end of the semester (05/01/09). It should be divided by section titles and is left up to each individual as to its content and style. All text must be typed.

Term paper (required only for graduate students): each **graduate student** is required to write a term paper about computer-aided engineering design. The topic can address general methodology issues, solution to a specific application, or a survey of technological advancement or development in CAD. The paper must be no more than six pages (including references), and must be typed and formatted by a common technical writing style. The deadline for turning the paper in is April 24, 2009.

Class account:

Each student will be given a "class account", i.e. a course-file space about 20 MB size on a server. Only works related to this class are allowed to be stored in this account. For each assignment, a student must setup a sub-folder that contains the works of that assignment (e.g. *Assignment 1 folder* may include two models: Bolt.prt and Nut.prt). You are required to save all your assignments in this class account.

Criteria for evaluating the homework/projects:

(1) Completeness
- Does your folder include all the required assignments?
- Has an assignment fulfilled all required work (e.g. design specification, required features, parametric relations, analysis, diagrams, drawings)

(2) Correctness
- Modeling: used appropriate and adequate features, constraints and/or procedure
- Geometric values should be correct
- Analysis concept and definitions, and solution values

(3) Finishing time
- Have you finished your assignment on time?

(4) Neatness (for hard copies)
- Plot on the required type of paper
- Satisfy required viewing mode (e.g. shaded, hidden or colored)

Class Etiquette: Attendance in both lecture and lab sessions is mandatory unless otherwise specified. Any time you will be absent or significantly delayed, please contact the course instructor via email or phone ASAP. Punctuality is just as important as attendance, so make arrangements to be in class on time. In the CAD Lab, any unauthorized use of internet browsing, text messaging, or email use during class time is prohibited and will be dealt with accordingly. Any behavior involved with academic integrity involving dishonesty/plagiarism will not be tolerated, thus resulting in an "F" grade in the class. Please consult Undergraduate Catalog for details and definitions related to academic integrity and plagiarism.

Disability and Special Needs

Indiana State University provides services and accommodations for qualified individuals with documented disabilities. If you require any accommodation, you must register with the Disability Support Services at the beginning of the semester. You may contact them at 237-2301 or see them in person on the 2nd floor of Gillum Hall. Any other types of needs required for you (undocumented) to successfully excel in this class, feel free to see me so arrangements can be made to help you in any way possible.

Final exam information to be announced at a later date.

***NOTE: The information and subject matter included in this syllabus is subject to change at the discretion of the course instructor and/or department officials. All changes will be communicated in full to the class.**

INDIANA STATE UNIVERSITY

School of Technology

Department of Industrial and Mechanical Technology

IMT 404/504 – Engineering Design & Management (3 credit hours)

Fall, 2008

Instructor: Dr. Ming Zhou, TC201K, (812)-237-3983

Class meeting time: M.W., 1:00 – 2:50 pm in room TC217

Course Description:

This course introduces fundamental concepts and principles used in the implementation and management of engineering design projects or processes. Topics include design communication, problem definition/formulation, concurrent engineering, economic evaluation, project planning, and decision making in engineering design and management.

Prerequisite: requires a general understanding of technical design and computer based design technology or at instructor's consent.

Textbook/Workbook:

Fundamentals of Engineering Design, 2nd Ed., by B. Hyman, 2003.

References:

Some handouts will be given during the semester. Keeping good notes is very important and required in this class!

Content:

Introduction to engineering design
Problem definition/formulation
Concept generation
Design project planning
Engineering economics
Design decision-making
Randomness and reliability
Optimal design
Information communication
Professional/social context

Grading:

Grade Determination:

1. Assignments, design projects and quizzes	50%
2. Tests - 2 tests	@ 25% each.

The grade is given based on a percentage of total points possible in the course:

A = 90 - 100 % B+ = 86 - 89% B = 80 - 85% C+ = 76 - 79 %
C = 70 -75% D+ = 66 - 69 % D = 60 - 65% F = below 60%

Assessment of outcomes:

The course outcomes will be assessed through homework assignments, design projects, quizzes and exams. Every student is required to do a design project that focuses on formulating problem, developing design specifications, and design project planning. The students are also required to present their projects to the class and instructor in addition to turning in a project report.

Assignments:

All assignments are due on the date specified. Any late-turn-in assignment will be assessed a 20% reduction in score for each week late. All homework must be done on engineering pad paper with your name, course number and assignment number at the top of each page.

Criteria for evaluating the homework/projects:

(1) Completeness
- Show all steps of a problem-solving process
- Fulfill all required works (e.g. specification, analysis, diagrams, CAD drawings)

(2) Correctness
- Every step in the problem solving process must be correctly done (procedure) and only valid procedures are used
- Solution values should be correct

(3) Reasoning/Effectiveness
- Logical reasoning and justification of your solution method

(4) Neatness
- All works must be done clearly and cleanly on the required type of paper; and all textual information must be typed or printed clearly.
- Box your final answers if they are analytical solutions.

Any behavior of academic dishonesty (see Undergraduate Catalog Book 2003-2004, page 18-19) will not be tolerated (e.g. copying each other's homework assignment or test) and will result automatically an "F" grade in this class.

Indiana State University, College of Technology, ECMET Dept.

MET 405-301 (17858) / 505-301 (17872), 3 Cr Hr
Economic Analysis for Engineering and Technology
Spring 2009 (Jan 12 – May 08)

Instructor: Dr. M. Affan Badar
Office: 650 Cherry St., John Myers Tech Center, 201E
Terre Haute, IN 47809
Phone/fax: (812) 237-3982 (ph), 4527 (fax)

e-mail/web: mbadar@indstate.edu, http://www1.indstate.edu/ecmet/faculty/badar.htm
OH: MW 10 am – Noon, Tue 2 – 3 pm, or by appointment (phone/e-mail)

Graduate TA: V. Prakash Vegunta

Accommodation: *Any student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact the instructor ASAP to discuss accommodations necessary to ensure full participation and facilitate educational opportunities.*

Academic Integrity and Plagiarism: Please refer to http://www1.indstate.edu/academicintegrity.

Webpage: You can log into blackboard at http://blackboard.indstate.edu with your MyISU portal ID and password to access the contents of the course posted on the webpage.

Announcements: Announcements concerning the course throughout the semester will be made in one of the following ways: posted on the webpage, or e-mailed to your blackboard e-mail address. Please visit the webpage, verify your e-mail, and check your e-mail regularly.

Catalog Description: This course is designed to provide students with the principles of investment economic analysis, decision-making among alternatives, and replacement analysis. Inflation, depreciation, cost concepts, bond, and income tax considerations are included.
Pre-requisite: MATH 115 or equivalent.

Objectives: This course aims to provide fundamentals of economic analysis techniques applied in engineering and technology requiring cost estimation, investment analysis, and decision-making, and may involve equipment acquisition, maintenance, and disposal. In addition the course will help students to:

1. Apply the latest technology and engineering tools to solve technical problems in the practice of mechanical engineering technology and related interdisciplinary fields. [EO:1]
2. Remain technically current and adapt to rapidly changing technologies through self improvement with continuous learning. [EO:2]
3. Demonstrate independent thinking, self-management, and functioning effectively in team-oriented and open-ended activities in an industrial environment. [EO:3]
4. Communicate effectively. [EO:4]
5. Develop leadership skills and responsibility in their chosen career field [EO:6]
6. Understand global issues and the impact of technology and engineering solutions on the society and environment. [EO:7]

Outcomes: Upon completion of this course, the students will be able to:

1. Use economic analysis concepts: time value of money with reference to interest rate, compounding, cash flow diagrams, and inflation for technology investments.
2. Apply economic equivalence to evaluate a single or multiple technology investments/projects. [PO:6]
3. Use financial functions of spreadsheets (Excel).
4. Compare alternatives including replacement pertaining to the technology field.
5. Perform break-even analysis for manufacturing/service industries.
6. Determine economic purchase and production quantities and select between make and buy options.
7. Estimate depreciation of machines.
8. Evaluate after-tax income or profit of technology investments.
9. Have an appropriate mastery of the knowledge, techniques, skills, and modern tools of the MET discipline. [LO:a]
10. Have an ability to function effectively on teams. [LO:e]
11. Have an ability to identify, analyze and solve technical (close-ended analysis and open-ended design) problems. [LO:f]
12. Have an ability to communicate effectively through written reports or oral presentations.[LO:g]
13. Have a commitment to quality, timeliness, and continuous improvement. [LO:k]

Assessment of Objectives and Outcomes:
The course objectives and outcomes will be assessed through HW assignments, project, exams, and summative evaluations of all students' feedback. Industry feedback of those students achieving employment in related field will also be helpful for the outcome assessment.

Textbook: D.G. Newnan, T.G. Eschenbach, and J.P. Lavelle, *Engineering Economic Analysis*, 10th edn, Oxford Univ. Press, Inc., New York, NY, 2004.

Reference Book (not necessary): G.J. Thuesen and W.J. Fabrycky, *Engineering Economy*, 9th edn, Prentice Hall, Upper Saddle River, NJ, 2001.

Materials needed: Textbook, calculator with math function capability, computer literacy in MS Word & Excel, and internet access.

HW Assignments: At the end of each topic/chapter, practice problems will be solved in the class and given as homework assignments. Homework will be due at the beginning of the class period on the stated due date. After that, 10% will be deducted for each day late. No assignment will be accepted after one week from the due date. Homework is expected to be well organized and neatly presented.

Field Trip: No field trip will be required for distance students (301 Section).

Groups: Students are required to make groups, 3 members per group, to do group work. For group work, submit only one report per group including a peer-evaluation indicating the contribution of each member.

Project: All students are required to do a project in groups. A final project report will be due one week before the study week. The report should include a title page including names of the students, course number, instructor's name, and peer-evaluation. The report should also include a summary, conclusion, and a list of references. Cite all the references as necessary in the body (text) of the report. Presentation on the project may be scheduled during the study week. For distance students, e-submission of presentation file will be okay.

Undergraduate student's project will involve the application of economic analysis and decision-making in a real-world case (e.g., leasing vs. buying of an automobile, a warehouse facility, etc.).

Graduate student's project will be more intensive fulfilling the requirements of a graduate-level course. An extensive search of the related literature is required. The project can be research-based or application-based in the engineering economic field.

Exams: Two tests and a final exam will be given. Distance students may need to arrange for time-off and internet access to take all the exams on specified date and time. They may also be required to get the exam proctored at work by supervisor or by taking it at a testing center at ISU, church, school, library, etc. Each student is required to send the proctor's info to the instructor in advance. No make-up exam will be given.

HW/Exam/Project Submission: Distance students can submit their work by fax to (812) 237-4527 (Attn: Dr. Badar) or digital dropbox in the word 97-2003 or pdf format.

Grading:

Participation	HW	Project	Tests	Final
5%	15%	15%	20×2 = 40%	25%

In exams, if the highest obtained by student(s) falls below the maximum points allowed, then the former will be considered as the maximum allowed.

Participation: Distance students are required to ask questions and share ideas with their peers and instructor via discussion forum or e-mail. If the number of such e-participation for any student is found to be less than five, he/she will get an 'F' grade.

Letter Grade:

≥ 90 – 100%	A	≥ 85 & < 90	B^+	≥ 80 & < 85	B
≥ 75 & < 80	C^+	≥ 70 & < 75	C	≥ 65 & < 70	D^+
≥ 60 & < 65	D	< 60	F		

Course Content:

	Topic(s)	Assignment
1.	Introduction: Economic analysis in E&T E&T costs, break-even, cost estimating, Cash flow diagrams	HW 1
2.	Time value of money, simple interest, compound interest, repaying a loan Discrete compounding: single payment compound amount or FW, PW	HW 2
3.	Uniform (equal) series, sinking fund, capital recovery, uniform (arithmetic) gradient, geometric gradient Nominal and effective interest Continuous compounding MS Excel (Spreadsheets) financial functions	HW 3

4.	Present worth analysis: equal, unequal (LCM or select a period) , infinite lives (capitalized cost) Bond Spreadsheets	HW 4
	Exam 1	**Project 1**
5.	Annual equivalent analysis: equal, unequal, and infinite lives Loan repayments Spreadsheets	HW 5
6.	Rate of return analysis: MARR, IRR (limited to cash flows yielding single value) Spreadsheets	HW 6
7.	Incremental analysis	HW 7
8.	Analysis using FW, benefit-cost ratio, payback period Sensitivity and break-even analysis	HW 8
9.	Economic order/purchase quantity, economic production quantity, make or buy decision	HW 9
10.	Project proposals & alternatives (independent, mutually exclusive, contingent), rationing capital among alternatives, ranking alternatives	HW 10
	Exam 2	
11.	Depreciation: SL, SOYD, DB, DB switching to SL, MACRS, UOP Depletion: cost method, % method.	HW 11
12.	Income tax rates, interest & taxes, depreciation & taxes, investment tax credit, after-tax cash flows	HW 12
13.	Replacement analysis, defender, challenger, sunk cost, outsider viewpoint, economic (minimum cost) life.	HW 13
14.	Inflation, market interest rate, inflation-free (real) interest rate, actual (then-current) dollar, constant (real) dollar, equivalence involving inflation	HW 14
15.	Economic analysis in public sector Accounting: balance sheet, income statement Cost accounting: direct & indirect costs	HW 15
	Final exam	

Note:
The information and subject matter included in this syllabus is subject to change at the discretion of the course instructor and/or department officials. All changes will be communicated in full to the class.

Indiana State University, College of Technology, ECMET Dept.

MET 406-001 (54066)**, Strength of Materials**, 3 Cr Hr

Fall 2008 (Aug 20 – Dec 12)

MW, 10:00 – 11:50 am, Rm TC 202

Instructor: Dr. M. Affan Badar
Office: 650 Cherry St., John Myers Tech Center, Rm 201E
Terre Haute, IN 47809
Phone/fax: (812) 237-3982 (ph), 4527 (fax)

e-mail/web: mbadar@indstate.edu, http://www.indstate.edu/imt/badar_faculty.htm
OH: MTWR 8:30 – 9:45 am or by appointment (phone/e-mail)

Graduate TA: Raghuma R. Sangali <rsangali@mymail.indstate.edu>

Any student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact the instructor personally ASAP to discuss the accommodations necessary to ensure full participation and facilitate the educational opportunities.

Webpage: You can log into blackboard at http://blackboard.indstate.edu with your Sycamore (MyISU portal) ID and password to access the contents of the course posted on the webpage.

Announcements: Announcements concerning the course throughout the semester will be made in one of the following ways: in the class, posted on the webpage, or e-mailed to your blackboard e-mail address. Please visit the webpage, verify your e-mail, and check your e-mail regularly.

Catalog Description: Centroids, moments of inertia of areas, stress, deformation, engineering materials, pressure vessels, torsion, stresses in beams and shafts, design of beams and shafts, combined stress, and columns. Prerequisite: MET 302.

Course Objectives: This course will prepare the students to:
1. Apply engineering tools to solve technical problems in the practice of mechanical engineering technology.
2. Remain technically current through self improvement with continuous learning.
3. Demonstrate independent thinking, self-management, and functioning effectively in team-oriented and open-ended activities.
4. Communicate effectively in written and graphical forms.
5. Perform ethically and professionally.
6. Understand global issues in design and the impact of engineering solutions on the society and environment.
7. Have knowledge, problem solving ability, and hands-on skills to enter careers in the design, testing, evaluation, technical sales, or maintenance of mechanical and related systems and processes.

Course Outcomes: Upon completion of this course, the students will be able to:
1. Analyze basic stress considering direct tension, compression, or shear.
2. Determine deformations under loads.
3. Analyze torsional shear stresses and stresses in beams.
4. Compute combined stresses.
5. Design shafts, beams, columns, and pressure vessels.
6. Identify mechanical systems that satisfy the given engineering requirements [1].

7. Describe the necessary assumptions in designing mechanical systems [2].
8. Apply proper engineering principles and theories to solve close-ended analysis and open-ended design problems [3].
9. Select engineering materials for specific applications [5].
10. Design mechanical parts and systems [6].
11. Have an appropriate mastery of the knowledge, techniques, skills, and modern tools of the MET discipline [a].
12. Have an ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology [b].
13. Have an ability to conduct, analyze and interpret experiments, and apply experimental results to improve processes [c].
14. Have an ability to apply creativity in the design of systems, components, or processes appropriate to the MET program educational objectives [d].
15. Have an ability to function effectively on teams [e].
16. Have an ability to identify, analyze and solve technical problems [f].
17. Have a commitment to quality, timeliness, and continuous improvement [k].

Assessment of Outcomes:
The course objectives and outcomes will be assessed through HW assignments, labs/projects, exams, and summative evaluations of all students' feedback. Industry feedback of those students achieving employment in related field will also be helpful for the outcome assessment.

Textbook:
R.L. Mott, *Applied Strength of Materials*, 5th edn, ISBN-10: 0-13-236849-8, ISBN-13: 978-0-13-236849-0, Pearson Prentice-Hall, Upper Saddle River, NJ, 2008.

Material needed:
Textbook, calculator with Trig function capability, drafting tools (set of compass, divider, triangle & French curve) or knowledge of a CAD software like AutoCAD, and engineering pad (5 squares/inch) for sketching/plotting.

HW Assignments: At the end of each topic/chapter, practice problems will be solved in the class or posted at the course site and given as homework assignments. Homework will be due at the beginning of the class period on the stated due date. After that, 10% will be deducted for each day late. No assignments will be accepted after a week from the due date. Assignments are expected to be well organized and neatly presented. Graphical assignments can be done with the help of drafting tools or using CAD.

Lab/Project: There will be a couple of labs and projects which will be discussed in the class.

Field Trip: There may be a field trip, which will be counted as one lab/HW. There will be no make-up for the missed field trip.

Exams: Two tests and a final (comprehensive) exam will be given. As per the university schedule the final is scheduled for Dec. 8 (Monday), 10 am.

Grading:

Attendance	HW/Lab/Quiz	Project	Tests	Final
5%	20%	10%	20×2 = 40%	25%

In exams, if the highest obtained by student(s) falls below the maximum points allowed, then the former will be considered as the maximum allowed.

Attendance: If any student is absent from the class 10 times or more, he/she will get an 'F' grade.

≥ 90 - 100%	A	≥ 85 & < 90	B^+	≥ 80 & < 85	B
≥ 75 & < 80	C^+	≥ 70 & < 75	C	≥ 65 & < 70	D^+
≥ 60 & < 65	D	< 60	F		

Course Contents:
Chap 1. Basic Concepts
Chap 2. Design Properties of Materials
Chap 3. Direct Stress (Normal, Shear, Bearing) and Design
Chap 3. Axial Deformation
Chap 3. Thermal Stress
Chap 4. Torsional Shear Stress and Torsional Deformation
Chap 6. Centroids and Moments of Inertia of Areas
Chap 5. Shear Forces and Moments in Beams (review; covered in MET 302)
Chap 7. Bending Stress
Chap 8. Shear Stress in Beams
Chap 9. Beam Deflection
Chap 10. Combined Stress
Chap 11. Columns
Chap 12. Pressure Vessels
Chap 13. Connections

Note:
The information and subject matter included in this syllabus is subject to change at the discretion of the course instructor and/or department officials. All changes will be communicated in full to the class.

INDIANA STATE UNIVERSITY
College of Technology

Department of Electronics, Computer, and Mechanical Engineering Technology

MET 408 – Elements of Machine Design, 3 credit hours

Instructor: Dr. Ming Zhou, TC201K, (812)-237-3983; mzhou@isugw.indstate.edu

Course objective: The goal of this course is to help mechanical engineering students or related majors (e.g. manufacturing) to master the technical skills required in design and analysis of mechanical elements used in the design and construction of machineries.

Course Description:
This class introduces students to basic concepts and principles of mechanical design with a focus on the design of machine elements through analytical and graphical solutions. Topics include mechanical drives such as belts, chains, gears, and shafts, springs, bearings, fasteners, and couplings. **Prerequisites**: MET302, MET306, and MET406 or equivalents.

Textbook/Workbook:
Machine elements in mechanical design, 4th Ed., by R. L. Mott, 2003.
You will need a pocket calculator with Trig. Function capability.

References: Applied strength of materials, 3rd ed. By R. L. Mott.
Several handouts will be given during the semester. Keeping good notes is very important and required in this class!

Course Outline:

(1) Principles of design analysis
(2) Materials in mechanical design
(3) Review of stress analysis
(4) Design of belt and chain drives
(5) Design and analysis of gears
(6) Rolling contact bearings
(7) Shaft design
(8) Tolerances and fits
(9) Design of fasteners
(10) Design of a power transmission

Grading:
Grade Determination:

1. Homework assignments	35%
2. Tests - 2 tests	@ 25% each.
3. Design project	15%

The grade is given based on a percentage of total points possible in the course:

A = 90 - 100 %	B+ = 86 - 89%	B = 80 - 85%	C+ = 76 - 79 %
C = 70 -75%	D+ = 66 - 69 %	D = 60 - 65%	F = below 60%

Assignments: Each lesson will provide assignments for your problem-solving exercises. I will not collect all of the exercise problems, but only part of them. I will specify the dates for collecting the **selected homework problems** through the "**Announcement**" mechanism of the class website. You must submit the collection on the date specified. Any late-turn-in collection will be assessed a 20% reduction in score for each week late. Certain assignments can be done either manually or with CAD or using both. The assignments finished manually (e.g., calculations) must be done with Engineer's Pad papers with your name, course number and assignment number at the top of each page.

Submission of Assignments: You may submit your assignments in the class room or via Digital Drop Box in the course website. The required format is WORD or PDF. Occasionally I may ask you to submit your work through regular email or fax (812-237-4527), or regular air-mail. If you fax your assignments, the content must be written clearly in pen, not pencil. Again, when you submit electronically, both **PDF** and **Word** format will be accepted. When you submit through regular mail, the due-date is the date that I receive the assignment, not the postage date when you send it out!

Note: The course content outlined above is subject to change at the discretion of the instructor. Whenever you encounter a problem with accessing course website or submitting you assignments online, you should call ISU OIT Help Desk at 812-237-2910.

Criteria for evaluating the homework/projects:

Completeness
- Show all steps of a problem-solving process
- Fulfill all required works (e.g. specification, analysis, diagrams, CAD drawings)

Correctness
- Every step in the problem solving process must be correctly done (procedure) and only valid procedures are used
- Solution values should be correct

Reasoning/Effectiveness

- Logical reasoning and justification of your solution method should be clearly shown

Neatness

- All works must be done clearly and cleanly on the required type of paper
- Box your final answers

Any behavior of academic dishonesty (see Undergraduate Catalog Book 2003-2004, page 18-19) will not be tolerated (e.g. copying each other's homework assignment or test) and will result automatically an "F" grade in this class.

Indiana State University, College of Technology, ECMET Dept.

MET 409-301(17867), **Senior Project in Industrial Technology**, 3 Cr Hr
Spring 2009 (Jan 12 – May 08)

Instructor: Dr. M. Affan Badar
Office: 650 Cherry St., John Myers Tech Center, 201E
Terre Haute, IN 47809
Phone/fax: (812) 237-3982 (ph), 4527 (fax)

e-mail/web: mbadar@indstate.edu, http://www1.indstate.edu/ecmet/faculty/badar.htm
OH: MW 10 am – Noon, Tue 2 – 3 pm, or by appointment (phone/e-mail)

Accommodation: *Any student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact the instructor ASAP to discuss accommodations necessary to ensure full participation and facilitate educational opportunities.*

Academic Integrity and Plagiarism: Please refer to http://www1.indstate.edu/academicintegrity.

Webpage: You can log into blackboard at http://blackboard.indstate.edu with your MyISU portal ID and password to access the contents of the course posted on the webpage.

Announcements: Announcements concerning the course throughout the semester will be made in one of the following ways: posted on the webpage, or e-mailed to your blackboard e-mail address. Please visit the webpage, verify your e-mail, and check your e-mail regularly.

Catalog Description: A project approved by the professor is planned and carried out by the student. The project must demonstrate an advanced level of design competency in the student's major and is performed in consultation with one or more faculty advisors. Collaboration with representatives of industry, government agencies, or community institutions is encouraged.

Objective: The course will help prepare students, who (after graduation) can:
1. Apply the latest technology and engineering tools to solve technical problems in the practice of mechanical engineering technology and related interdisciplinary fields. [EO:1]
2. Remain technically current and adapt to rapidly changing technologies through self improvement with continuous learning or post-graduate education. [EO:2]
3. Demonstrate independent thinking, self-management, and functioning effectively in open-ended activities. [EO:3]
4. Communicate effectively in oral, written, and graphical forms. [EO:4]
5. Perform ethically and professionally. [EO:5]
6. Understand global issues and the impact of technology and engineering solutions on the society and environment. [EO:7]

Outcomes: Upon completion of the course, the students will have:
1. An appropriate mastery of the knowledge, techniques, skills, and modern tools of the MET discipline [LO:a]
2. An ability to apply creativity in the design of systems, components, or processes appropriate to the MET program educational objectives [LO:d]
3. An ability to identify, analyze and solve technical (close-ended analysis and open-ended design) problems. [LO:f]

4. An ability to communicate effectively through engineering drawings, written reports, or oral presentations. [LO:g]
5. A commitment to quality, timeliness, and continuous improvement [LO:k]
6. An integrated educational experience that develops the ability of students to apply pertinent knowledge to solving problems in MET specialty. This may include design, production, cost estimation, or engineering project management. [PO:5,6,8]

Material Needed:
There is no specific textbook required for this course. Students are encouraged to utilize MET textbooks and other resources from the ISU library.

A technical log --- class/industry meeting activities conducted by the students and recorded in a notebook will be turned in to the instructor in the last week of classes (study week).

Course Requirements:

Each student is required to identify a design application problem, he or she proposes to pursue as a final project in this course. The students can work individually or in a team. Examples of these problems are but not limited to:

- Design of a gear-drive, belt-drive, or chain-drive (includes bearings, seals, etc.) for a specific application
- Design or improve a device/system to serve a specific need
- Production/manufacturing: Improvement of process, fixture, assembly line, facility layout, scheduling, and planning (may include DFT demand flow technology, JIT, lean manufacturing)
- GD&T and CMM
- Solid modeling and rapid prototyping
- Tolerancing, quality (six sigma), and reliability
- Packaging
- Automotive
- Logistics and supply chain
- Computer-based: Write code to design/select belts, journal bearings, gears, etc.

Important deadlines:

1. A **topic** for the semester study of the project should be submitted to the instructor for his approval by 1/**26**. Each student is expected to keep abreast of the project topic.
2. A **proposal** consisting of the problem statement (goal/objective), methodology to achieve the objective (at least one proper method), implementation plan, and criteria to evaluate the implementation (result) should be submitted to the instructor by **2/9**.
3. A **midterm report** on the project is due by **3/2**.
4. A **final report** (plastic covered) along with presentation/demonstration is due in the last week of classes (study week). Extensive library search is expected for writing this report. The report must be typed, double-spaced and free of spelling mistakes. It may consist of the following: title page, summary, introduction (problem statement), background info (literature review), methodology, calculations, drawings, results & discussion, conclusion, list of references, etc. The references must be cited in the text. The title page should include the topic, course #, industry & supervisor name (if applicable), instructor name, and student name.

Grading:

1. Efforts, notes, technical logbook 20%
2. Proposal 20%
3. Midterm report 20%
4. Final Report and Demonstration/Presentation 40%

≥ 90 – 100%	A	≥ 85 & < 90	B^+	≥ 80 & < 85	B
≥ 75 & < 80	C^+	≥ 70 & < 75	C	≥ 65 & < 70	D^+
≥ 60 & < 65	D	< 60	F		

Indiana State University, College of Technology, ECMET Dept.

MET 413-001(54069) / 513-001(54079): 3 Cr hr

Applications and Gaging of Geometric Dimensioning &Tolerancing

Fall 2008 (Aug 20 – Dec 12)

MWF, 3:00 – 4:50 pm, Rm TC 202

Instructor: Dr. M. Affan Badar
Office: 650 Cherry St., John Myers Tech Center, Rm 201E
Terre Haute, IN 47809
Phone/fax: (812) 237-3982 (ph), 4527 (fax)

e-mail/web: mbadar@indstate.edu, http://www.indstate.edu/imt/badar_faculty.htm
OH: MTWR 8:30 – 9:45 am or by appointment (phone/e-mail)

Graduate TA: Raghuma R. Sangali <rsangali@mymail.indstate.edu>

Any student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact the instructor personally ASAP to discuss the accommodations necessary to ensure full participation and facilitate the educational opportunities.

Course Web page: You can log into blackboard at http://blackboard.indstate.edu with your Sycamore (MyISU portal) ID and password to access the content of the course posted on the web page.

Announcements: Announcements concerning the course throughout the semester will be made in one of following ways: in the class, posted on the web page, or e-mailed to your blackboard e-mail address. Please visit the webpage, verify your e-mail, and check your e-mail regularly.

Catalogue Description: The ISO and ANSI technical graphic standards are studied and applied to assemblies with specific design requirements. The course primarily addresses methods of calculating positional and geometric form tolerances. Methods of verifying the geometric controls by gaging and inspection are also studied.
Prerequisite: MET 103 or equivalent.
Software: Knowledge of AutoCAD or Pro/E.

Course Objectives: The course will prepare student, who can:
1. Enter careers in the design, manufacturing, or inspection of mechanical parts and assemblies with necessary knowledge and hands-on skills.
2. Remain technically current through self improvement with continuous learning.
3. Demonstrate independent thinking, self-management, and functioning effectively in team-oriented activities.
4. Communicate effectively in oral, written, and graphical forms.
5. Perform ethically and professionally.
6. Understand global issues.

Course Outcomes: Upon completion of this course, the students will be able to:
1. Understand and use the Geometric Dimensioning & Tolerancing (GD&T) symbols and design philosophy for assembly requirements.
2. Identify and inspect tolerances in mechanical parts and assemblies [7].
3. Have an appropriate mastery of the knowledge, techniques, skills, and modern tools of the MET discipline related to tolerance [a].

4. Have an ability to conduct, analyze and interpret experiments, and apply experimental results to improve processes [c].
5. Have an ability to function effectively on teams [e].
6. Have an ability to communicate effectively [g].
7. Have a commitment to quality, timeliness, and continuous improvement [k].

Assessment of Outcomes:
The course objectives and outcomes will be assessed through Lab/HW assignments, project, exams, and summative evaluations of all students' feedback. Industry feedback of those students achieving employment in related field will also be helpful for the outcome assessment.

Textbook: A. Krulikowski, *Fundamentals of Geometric Dimensioning and Tolerancing*, 2nd edn, Delmar Publishers (a Division of Thomson Learning), Albany, NY, 1998.

Additional References:
1. *Y 14.5M – 1994 Dimensioning and Tolerancing*, ASME, New York, NY, 1994 (published), 1999 (reaffirmed date)
2. *GD&T – DVD 12 Profile Tolerances*, SME, Dearborn, MI, 2003
3. *Measurement & Gaging*, DVD, SME, Dearborn, MI, 2003
4. G.K. Griffith, *Geometric Dimensioning and Tolerancing Applications and Inspection*, 2nd edn, Prentice Hall, Upper Saddle River, NJ, 2002.
5. E.M. Raisor, *Engineering Graphics Principles with Geometric Dimensioning and Tolerancing*, SDC Publications, www.schroff.com, 2002
6. M. Fitzpatrick, *Working Skills in Geometric Dimensioning and Tolerancing*, Delmar Publishers, Albany, NY, 1993.
7. ASME *Journal of Manufacturing Science and Engineering*

Materials needed: Textbook, calculator, floppy disk, and CAD software for drawings.

Lab/HW: This will include practice problems at the end of each topic/chapter, CAD drawings, and geometric tolerance estimation using CMM (coordinate measuring machine). There will be no make-up for the missed CMM lab.

Field Trip: There may be a field trip, which will be counted as one lab/HW. There will be no make-up for the missed field trip.

Undergraduate Project and Review: Undergraduate students in groups will be required to review an article from a refereed journal or conference proceedings on a coordinate metrology topic as well as do a project. The review article will be assigned or will need to be approved by the instructor. The review should be 1-page and will be due after Exam 1. The project may include writing a term paper, making a part on RP machine, measuring tolerances on manufactured parts using CMM, etc. A final project report will be due on Nov. 24 (Monday). The report will consist of a title page, abstract, introduction, application/usage, method how to determine/inspect, figure/table, conclusion, references, etc. A term paper should contain a minimum of 8 references, and the references must be cited in the body of the paper. For project report, cite the references as necessary and there won't be any requirement on minimum # of references.

Graduate Project and Review(s): Graduate students in groups will be required to review four articles from refereed journals or conference proceedings on coordinate metrology topics as well as do a project. The review articles will be assigned or will need to be approved by the instructor. Each review should be 1-page and should also include any agreement or criticism as a reviewer. The first and second review will be due after Exam 1, third and fourth will be due after Exam 2. Graduate student's project will be more intensive fulfilling the requirements of a graduate-level course. An extensive search of the related literature is required. A final project report will be due on Nov. 24 (Monday). The project can be research-based or application-based in the GD&T field. Research topics may include sampling methods, tolerance zone estimation methods, etc. For a research topic, the term paper should contain a minimum of 15 references, and the references must be cited in the body of the paper. For an application-based topic, you will submit a project report citing the references as necessary and there won't be any requirement on minimum # of references.

Exams: Two tests and a final (comprehensive) exam will be given. The final is scheduled for Dec. 3 (Wed). All exams will be given at class time starting 3 pm on computer with the help of blackboard. No make-up exam will be given. In exams, if the highest obtained by student(s) falls below the maximum points allowed, then the former will be considered as the maximum allowed.

Undergraduate Grading:

Lab/HW	Attendance	Review	Project	Exams
20%	5%	5%	10%	20×3 = 60%

Graduate Grading:

Lab/HW	Attendance	Reviews	Project	Tests	Final Exam
20%	5%	10%	10%	17.5×2 = 35%	20%

Attendance: If any student is absent from the class 10 times or more, he/she will get an 'F' grade.

Letter Grade:

≥ 90 – 100%	A	≥ 85 & < 90	B^+	≥ 80 & < 85	B
≥ 75 & < 80	C^+	≥ 70 & < 75	C	≥ 65 & < 70	D^+
≥ 60 & < 65	D	< 60	F		

Course Content:
1. Engineering drawings & tolerancing
2: Intro to geometric tolerancing symbols & terms
3: Rules & concepts of GD&T
4: Form controls
5: Datums (planar)
6: Datums (axis & centerplane)
7: Orientation controls
8: Tolerance of position
9: Concentricity & symmetry controls
10: Runout controls
11: Profile controls

Note:
The information and subject matter included in this syllabus is subject to change at the discretion of the course instructor and/or department officials. All changes will be communicated in full to the class.

Indiana State University
College of Technology
Department of Electronic, Computer, and Mechanical Engineering Technology

MET430 - 301 = Senior Seminar (1 credit hour) SPRING 2009

Instructor: Todd E. Alberts
PH: 237-3357
Cell: 1-812-249-9184
Office 201D – Myers Technology Building
talberts@indstate.edu
Office Hours: Tuesday and Thursday 11:00 a.m. – 2:00 p.m

Class Times: Web based course managed via Blackboard.

Course Description: Senior seminar involves issues of industrial technologists related to career planning, job obtainment, and personnel matters in the development/management of your professional career. The main objective of this class is to put the finishing touches on a students current level of professionalism, refocus the nature and definition of the field of industrial technology, help the student start/advance their professional career, and prepare for life after this stage of their education.

Textbook: No formal textbook required. Internet, company, and library sources will be utilized.

Objectives: The course will help prepare students, who (upon graduation) can:

1. Remain technically current and adapt to rapidly changing technologies through self improvement with continuous learning or post-graduate education. [EO:2]
2. Demonstrate independent thinking, self-management, and functioning effectively in team-oriented and open-ended activities in an industrial environment. [EO:3]
3. Communicate effectively in oral, written, and graphical forms. [EO:4]

Outcomes: Upon completion of this course, the students will have:

1. an appropriate mastery of the knowledge, techniques, skills, and modern tools of the MET discipline [LO:a]
2. an ability to function effectively on teams [LO:e]
3. an ability to communicate effectively through engineering drawings, written reports, or oral presentations. [LO:g]
4. a recognition of the need for, and an ability to engage in lifelong learning [LO:h]
5. an ability to understand professional, ethical and social responsibilities [LO:i]
6. a commitment to quality, timeliness, and continuous improvement [LO:k]

Course Outline: Upon completion of this course the student will be able to:

1. Explain the students' major career field and what it prepares the students to do
2. Define, compare, and contrast industry, technology, industrial technology and related terms both orally and written
3. Dress, behave, and live for success
4. Function properly in a formal dining situation
5. Demonstrate interviewing skills through practice interviews
6. Understand the procedures employers use for indirect hiring, as well as direct hiring
7. Register with the ISU Career Center and possibly other recruiting services
8. Write an effective and accurate resume and cover letter
9. Make professional quality presentations
10. Plan career goals and potential paths of advancement
11. Set academic, personal, social, and professional goals

12. Locate, identify, describe, and evaluate a range of career resources
13. Employ strategies for developing career contacts
14. Develop a professional portfolio of skills, abilities, and accomplishments
15. Display conscientious personal and professional choices

Grading:

1. Final Project	25%
2. Weekly Assignments	65%
3. Participation in Discussion Boards	10%

Grading Scale:

A = 90 – 100%	C = 70 – 74%
B+ = 85 – 89%	D+ = 65 – 69%
B = 80 – 84%	D = 60 – 64%
C+ = 75 – 79%	F = 59% and below

Assignments:

All assignments are due according to the posted class schedule (see course documents in Blackboard), unless otherwise specified. All late assignments will have a penalty deduction of 25% per week if submitted past the due date. Each assignment must be submitted in electronic format (MS Word, Excel, PPT, etc.) to the proper discussion board location with your name, class & section number, date, and assignment description placed in the subject header. A couple of assignments are not time sensitive and have a variable due date by the nature of their intent (etiquette dinner, final project, etc.), so watch ahead to plan accordingly.

Class Etiquette: While this is an internet base course, all normal issues of participation, courtesy, professionalism, and ethics apply just as if you were in the classroom. Participation in discussion boards will be assessed toward your grade. The reading and replying to discussion board postings allows you to benchmark the work of others to find new ideas or help other students in the development of their portfolio items. While the instructors' inclusion in the discussion boards will vary, you should read, review, and reply in a short nature to at least 2 other students' postings each week. Don't go overboard, just give each other some feedback and help generate creative ideas that everyone can utilize.

Disability and Special Needs

Indiana State University provides services and accommodations for qualified individuals with documented disabilities. If you require any accommodation, you must register with the Disability Support Services at the beginning of the semester. You may contact them at 237-2301 or see them in person on the 2nd floor of Gillum Hall. Any other types of needs required for you (undocumented) to successfully complete this class, feel free to contact me so arrangements can be made to help you in any way possible.

There is NO comprehensive written final exam for this class however the FINAL PROJECT is due at the beginning of finals week and accounts for over 4% of your final grade.

***NOTE: The information and subject matter included in this syllabus is subject to change at the discretion of the course instructor and/or department officials. All changes will be communicated in full to the class.**

CS 151 Introduction to Computer Science

CRN 15743
Location: Root Hall room A017
Class meets TuTh 9:30-10:45

Instructor: Dr. Monica Marcus
Office: Root Hall room A-156
Phone number: (812) 237-2136
E-mail: gmarcus@isugw.indstate.edu
Office hours: TuTh 11:00 – 12:00 and by appointment

You are encouraged to see the instructor for every question or issue regarding this course.

Course Description

This is an introductory course to computer science, focused on programming in Python. It is a General Education course that aims to develop students' ability to analyze and solve problems. It also emphasizes the basics of logical and algorithmic thinking.

Course Objectives

Provided they successfully complete all the course requirements, students in this course will

- learn how to express and analyze problems in a precise, clear manner
- basically understand what computers are, their organization, what kind of problems they can solve and how to put them to use by running programs
- understand all the basic programming language constructs found in every modern high-level programming language: variables, input/output statements, the assignment statement, the sequence, selection and repetition structures
- learn how to write, run and debug Python programs

Textbook

The textbook for this course is *Think Python* by *Allen B. Downey* available for download as a PDF file from
http://www.greenteapress.com/thinkpython/thinkpython.html

Course Requirements

Instructors are required by University regulations to report the class attendance and students are expected to regularly attend classes. Class attendance, attitude and attentiveness during class hours contribute 20% towards the final grade.

The best way to learn a programming language is by practice: write lots of programs, run them and make sure they do what they are supposed to do. Students should take into account that they are expected to work a significant amount of time besides class time to meet the requirements for this course.

The final grade will reflect the student's activity throughout the semester, from the first class until the last class. The material taught in this course is built incrementally. To understand the new notions and concepts one needs to know the previously taught material. If some material is skipped now, later it will be harder if not impossible to continue. Therefore it is important to keep the pace and not fall behind.

It is expected that all students read and comply with the Indiana State University Code of Student Conduct, in particular the Policy on Academic Integrity.

Assignments and Grade Policy

The final grade has several components: quizzes, homework assignments, in-class assignments, participation in class, midterm exam and final exam. Each assignment and test is worth a number of points (to be specified with each test). The total number of points accumulated during the semester is the base for calculating the letter grade (see below.)

A. Quizzes are meant to test basic understanding of the material taught so far. The time to answer such a quiz is 15 – 20 minutes.

B. Homework assignments typically ask to write programs in the Python programming language. They have to be submitted on Blackboard. The student is expected to write, execute and debug each program before it is submitted.

C. There will be several in-class programming assignments. To obtain credit, these assignments have to be completed in class, during the class time, unless specified otherwise.

D. Class participation is also worth a number of points, up to 20% of the total number of points. It is meant to contribute up to 20% towards the final grade.

E. The midterm exam is scheduled for Tuesday, March 3rd, 2009. It will take place in Root Hall, room A-017, from 10:00 to 10:50 am (during the usual class meeting.)

F. The final exam is scheduled for Tuesday, May 5, 2009 from 10 a.m. to 11:50 a.m. The final exam is comprehensive.

There is no make-up for any test or assignment. Only under extreme documented verifiable circumstances satisfactory to me, make-ups will be given.

Letter Grades

Final letter grades will be calculated by applying the percentage to the total number of points, on the following basis:

More than 90% is an A
More than 85% but less than 90% is a B+
More than 78% but less than 85% is a B
More than 72% but less than 78% is a C+
More than 65% but less than 72% is a C
More than 60% but less than 65% is a D+
More than 55% but less than 60% is a D
Less than 55% is an F

Blackboard

Blackboard is used extensively in this course. Important announcements, assignments, slides used in class and solutions to assignments and quizzes are posted on Blackboard. Students are expected to check the Blackboard site of this course often.

Lab Computers and Laptop use

During class you are expected to use the computers (desktop or laptop) only for the purposes of this course, as indicated by instructor. It is also assumed that you are in compliance with the mandatory laptop policy of the university. You may bring your laptop to class and use it instead of a lab computer, provided you have installed Python on your laptop. Python is available for download at http://www.python.org/download/releases/2.5.4/

American with Disabilities Act Statement

"Indiana State University seeks to provide effective services and accommodation for qualified individuals with documented disabilities. If you need an accommodation because of a documented disability, you are required to register with Disability Support Services at the beginning of the semester. Contact the Director of Student Support Services. The telephone number is 237-2301 and the office is located in Gillum Hall, Room 202A. The Director will ensure that you receive all the additional help that Indiana State offers. If you will require assistance during an emergency evacuation, notify your instructor immediately. Look for evacuation procedures posted in your classrooms."

ECT 160 Electronic Fundamentals
Syllabus – Spring 2009

Department of Electronics, Computer, and Mechanical Engineering Technology
College of Technology
Indiana State University

Class Schedule: TR 2:00 pm – 4:45 pm, John T Myers Technology Center 0315

Instructor: Dr. Xiaolong Li
E-mail: xli3@isugw.indstate.edu
Phone: (812) 237-3451
Office: TC 301M

Office hour: MWF 3:00 pm - 5:00pm, TR 12:00pm – 2:00pm or by appointment

Required Course Material:
1. Textbook: Mitchel E. Schultz, Grob's Basic Electronics, McGraw Hill, Tenth Edition. ISBN-13: 978-0-07-297475-1; ISBN-10: 0-07-322276-3
2. ECT 160 Lab kit of electronics components
3. Scientific calculator.

Each student is responsible for bringing their own texts, calculators, and note taking materials to every class meeting. Students are expected to bring lab materials to every class meeting where a lab has been scheduled. (See the class schedule on the last page.) Failure to bring required materials to class is not an excuse for not completing the assignment.

Prerequisite
Cconsent of instructor

Course Description
ECT 160 provides an introductory study of electricity and electronics. Basic principles of electricity are covered, the operation of components, and the fundamental laws of circuit operation.

Course Objectives
Upon completion of this course, the student will be able to do the following:

1. The definition and basic units of measure of fundamental electrical/electronic quantities, including charge, voltage (AC & DC), current (electron and conventional flow), conductance, resistance, power, frequency, period, capacitance, inductance (mutual and self), reactance, and impedance.
2. Build basic electrical circuits from schematic diagrams, and be able to perform simple circuit analyses to determine current flow, voltage drop, or total resistance for these circuits or any part of the circuit.
3. Have a fundamental knowledge of the setup and use of common electronic equipment such as AC & DC power supplies, oscilloscopes, and using multimeters to measure voltage current, and resistance.

4. Identify basic electronic components, including resistors, capacitors, inductors, diodes, transistors, and know their schematic symbols.
5. Know and be able to use fundamental electrical laws and theories to analyze series, parallel, and complex circuits. These include Ohm's law, Watt's (Power) law, voltage divider and current divider laws, and Kirchoff's laws.

Course Schedule (subject to change)

Week	Date	Topics	Text ref.	HW
1	1/13	Syllabus and introduction to Power of 10	Ch 0	
	1/15	Introduction to Electricity Lab 1: Mathematics for Electronics	Ch 1	HW#1 (due 1/22)
2	1/20	Resistors Lab 2: Resistor Color Code	Ch 2	
	1/22	Ohm's Law Lab 3: Using Power Supply and DMM	Ch 3	HW#2 (due 1/29)
3	1/27	Lab 4: Ohm's Law		
	1/29	Series Circuits	Ch 4	HW#3 (due 2/5)
4	2/3	Lab 5: Series Circuit Analysis		
	2/5	Exercise #1		
5	2/10	Exam #1	Ch 1- 4	
	2/12	Parallel Circuits	Ch 5	HW#4 (due 2/19)
6	2/17	Lab 6: Parallel Circuits Analysis		
	2/19	Series-Parallel Circuits	Ch 6	HW#5 (due 2/26)
7	2/24	Lab 7: Series-Parallel Circuit Analysis		
	2/26	Lab 7: Series-Parallel Circuit Analysis		
8	3/3	Voltage Divider and Current Dividers	Ch 7	HW#6 (due 3/17)
	3/5	Lab 8: Voltage Dividers and bridge circuit		
9	3/9-13	Spring break; no class		
10	3/17	Magnetism and Electromagnetism	Ch 13, 14	
	3/19	Lab 9: The Oscilloscope and Function Generator		

11	3/24	Exercise #2		
	3/26	Exam #2		
12	3/31	Alternating Voltage and Current	Ch 15	HW#7 (due 4/7)
	4/2	Lab 10: AC Resistive Circuit		
13	4/7	Capacitance: introduction	Ch 16	
	4/9	Capacitive Circuits	Ch 17-18	HW# 8 (due 4/16)
14	4/14	Lab 11: Series RC Circuits		
	4/16	Introduction of Inductance	Ch 19	
15	4/21	Inductive Circuits	Ch 20-21	HW#9 (due 4/28)
	4/23	Lab 12: Series RL Circuits		
16	4/28	Review		
	4/30	Q/A		
17	5/4-8	Final Exam		

Evaluation Method

Homework Assignments	18%
Laboratory Assignments	16%
Exercises	6%
Exam I	15%
Exam II	15%
Final Exam	30%

Homework and Laboratory assignments are very important for this course. We will handout homework and laboratory assignment for every weekly topics. There will be two exams during the semester. Exams can only be made up if you have a valid medical excuse or if prior arrangements have been made with the instructor.

Course Grading

100-90 = A
89-85 = B+; 84-80 = B
79-75 = C+; 74-70 = C
69-65 = D+; 64-60 = D
59-0 = F.

Homework and Lab Report Policy:

- Homework is suggested to be typed.
- Homework submitted after they are due but within 24 hours will be accepted and *all* problems will be graded with a 20% penalty. Homework and lab report submitted between

24 and 48 hours late will be accepted and all problems graded with a 50% penalty. Homework and lab report over 48 hours late will not be accepted or graded.

- Collaboration in the form of discussion of formulation of solutions or results is encouraged; however, each individual must work independently to create the final homework solution.
- Lab report must be submitted at the end of lab class. Late lab report will not be accepted.

Lab policy:

The purpose of laboratory experiments is to provide each student with practical, or "hands on," experience in working with electronic components and to prove that theory can be applied to actual circuits. As there is often not enough lab equipment to permit every student to perform labs individually, students may work in lab groups no larger than two students.

Each student is expected to bring a breadboard and components to class to do their labs. Some labs will require that the student submit their circuits to the instructor for a part of their grade. Depending upon someone else to provide these materials is not advised. Someone else's failure to show up or bring supplies you need is not an excuse for you not having what you needed to do the day's assignment.

Attendance Policy:

Perfect and punctual attendance is expected. A role is taken at the beginning of each class. Consistent tardiness is unacceptable; three occurrences of a student arriving late for class equals to one absence. The following attendance bonus/penalty plan will apply to all students:

- NO absence – 5% bonus added to semester final score.
- One unexcused absence– 3% bonus added to semester final score.
- Two unexcused absences – semester final score is unchanged.
- Three unexcused absences – 1% subtracted from semester final score.
- For each subsequent unexcused absence greater than three, an additional 1% will be subtracted from the student's semester final score.

In order for an absence to count as an excused absence, appropriate documentation must be provided. This means that a phone-call or email before the class does not by itself make an absence excused.

Tardiness: Chronic tardiness is not allowed. Chronic tardiness will count as an absence.

Classroom Civility: Students should not leave and return during the classroom session. Students who leave the classroom in the middle of the session will not be allowed to return and that session will be counted as an absence.

Cell Phones and Laptops:

The use of cellular phones and pagers is common. However, the operation of a cell phone and papers during a university class is likely to disrupt the class. Therefore, all cell phones and pagers must either be turned off or set to a silent mode of operation (e.g., vibrating rather than beeping) during class and laboratory. If you must answer a call, please quietly leave the classroom. Student whose phones disrupt the course will be asked to verbally apologize to the entire class and will be required to leave the class for the remainder of that session. The class instructor may approve an exception for special circumstances, based on a student

request prior to class session. Laptops are not allowed in class during lecture.

ADA Policy

Indiana State University seeks to provide effective services and accommodation for qualified individuals with documented disabilities. If you need an accommodation because of a documented disability, you are required to register with Disability Support Services at the beginning of the semester. Contact the Director of Student Support Services. The telephone number is 237-2301 and the office is located in Gillum Hall, Room 202A. The Director will ensure that you receive all the additional help that Indiana State offers. If you will require assistance during an emergency evacuation, notify your instructor immediately. Look for evacuation procedures posted in your classrooms.

Student Expectations

My goal is for you to do well in this class and to develop the skills necessary to succeed in the workplace. However, you have the major responsibility for doing well. Achievement of course standards requires you to know what you need to do to improve your performance. You are expected to study carefully all reading material and the papers returned to you, to note evaluation comments made to the entire class regarding assignments returned, and to participate in group activities. As the semester progresses, you should be able to implement several ideas to improve your performance on written or oral work for future assignments. Also, you are expected to ask questions and /or schedule individual appointments to clarify evaluations or other aspects of the course that is not clear to you.

Professor Expectations

You can expect me to be fair. I will return papers in a timely fashion so you can learn from your mistakes. I will be in class on time and prepared. I will be available for during office hours to help you.

Success Tips

In addition to good attendance and completion of all assignments, planning and self-management skills, good study habits, good time management and a good attitude will greatly increase the likelihood of success in this course. Students needing assistance with any of these success tips need only ask. Indiana State University, along with your instructor, is committed to doing whatever is necessary to help you achieve your academic, and ultimately your career goals.

Syllabus ECT280 – Fall 2008

ISU College of Technology, ECMET Department

Rev 091508

Course Description

ECT280 serves as an introduction to the mechanical systems, electronic systems, and computer-based systems used in the operation and control of manufacturing and production processes. This course will involve the study of: (1) machine tools for automatic part processing; (2) automatic material handling systems; (3) robotics; (4) continuous manufacturing processes; and (5) computerized systems used for design, planning, and decision making to support manufacturing activities.

Meeting Times and Locations

The class will meet MWF, 10:00am – 10:50am. Meeting places – TC312, TC316, CIM lab, and other selected labs in the Myers Technology Center. Students enrolled in this class are expected to attend all scheduled class meetings. Attendance sign-up sheets may be periodically used. All course documents will be posted in your MYISU/MY Courses/ECT280 file area.

Instructor

Joe E Ashby, ECMET department assistant professor. Office located in the ECT office suite, hours as posted on office door and by appointment. Email jashby@indstate.edu . Please be professional when writing e-mails. I typically return (unread) e-mails that are written in *IM speak.*

Class Plan

The class will consist of introductory lectures on topics followed by lab work which will develop and expand on the topics The main topics will include relay logic, schematics, power considerations, programmable logic controller (PLC) programming and application, robotics programming and applications, CNC programming and applications, and exposure to a variety of topics all related to automation.

Labs:

There will be ten labs. Due dates will be stated on the lab write-ups. Ten percent deduct for 1 week late; fifty percent deduct after 1 week.

Lab1 – Relay0 (due Nov 3)	Lab6 - Robot0 (due Dec 5)
Lab2 – PLC0 (due Sept 12)	Lab7 - Robot1 (due Dec 5)
Lab3 – PLC1 (due Sept 19)	Lab8 - Robot2 (due Dec 5)
Lab4 – PLC2 (due Sept 26)	Lab9 - CNC0 (due Dec 5)
Lab5 – PLC3 (due Oct 10)	Lab10 – Integration (due Dec 5)

Friday Reality Check:

There will be a 1 question open book, open note exam/exercise posted on or before every Friday (starting August 29) on the course web site (MSWord document). This will be due the following Monday at the beginning of class (turn in hardcopy). You may work together on the solutions but each student must submit a document.

Textbook

Stenerson, J., (2003). *Industrial Automation and Process Control.* ISBN 0-13-033030-2. The book will not be covered chapter by chapter, but it is an excellent point of reference for the topics we will be covering. You are expected to read the textbook. The Friday checks and the final will have some questions taken from the text.

Grades

Grades will be assigned on the basis of performance on the Friday checks, lab work and the final. The final exam will be given on Monday, December 8 at 10am-noon.

Grades will be based on the following point assignments (400 points total):

Labs	37.5%	(10 @ 15 points ea)
Friday's Reality Check	25%	(15 @ 10 points ea)
Final Exam	25%	(1 @ 100 points)

An excellent opportunity will be offered to gain bonus points. More later.

Grading Scale

The grading scale for the course will be based on this chart:

A	92% - 100%	C	75% - 79%
B+	89% - 91%	D+	72% - 74%
B	83% - 88%	D	68% - 71%
C+	80% - 82%	F	67% and Below

Course Outline

Week	*Dates*	*Topics*
1	Aug 20&22	What is automation?
2	Aug 25, 27&29	All about relays & PLC introduction
3	Sept 3&5	PLC programming & lab work
4	Sept 8, 10&12	PLC programming & lab work
5	Sept 15, 17&19	Advanced PLC instructions & lab work
6	Sept 22, 24&26	PLC programming & lab work
7	Sept 29, Oct1&3	Robotics introduction
8	Oct 6&8	Robotics & lab work
9	Oct 13, 15&17	CNC introduction & lab work
10	Oct 20, 22&24	Lab work
11	Oct 27, 29&31	Lab work
12	Nov 3, 5&7	Topics in machine integration & lab work
13	Nov 10, 12&14	Lab work
14	Nov 17, 19&21	Topics in machine integration & lab work

15	Nov 24	Lab work
16	Dec 1, 3&5	Final exam tips, wrap up & lab work
	Dec 8	Final exam – 10am

INDIANA STATE UNIVERSITY
Manufacturing and Construction Technology Department
Spring 2006 Syllabus

Title: MCT 370 – Fundamentals of Machine Tool Processes – 3 cr hrs

Instructor: Mr. Mark J. Clauss, Myers Technology Center, Rm 115A, Phone: 7677
Email: imclauss@isugw.indstate.edu

Course Description:

This course is designed to develop student knowledge of metal machining principles through machine shop experience. The application of metal machining technology in industry is addressed. The focus is on chip making or metal removal type manufacturing processes and methods. Approximately 60% of class time will involve lectures, demonstrations, and other types of classroom activities. The remaining time will be spent in student centered laboratory activities aimed at integrating theory and practice.

Course Objectives:

At the conclusion of this course, the student will be able to:

1. Using appropriate terminology, communicate with persons knowledgeable in the field of machining and metal removal including machinists, machine operators, process engineers, CNC programmers, manufacturing engineers, supervisors, managers, etc.
2. Describe the function of all major machine tool processes.
3. Use appropriate machining parameters to quantify each of the major processes.
4. Make intelligent choices between processes as to their ability to meet specifications, demands on time, and other economic considerations.
5. Safely set up and operate a variety of machine tools, hand tools and measuring tools.
6. Select and sequence machine tool operations required to complete a part beginning with an engineering drawing.
7. Visually inspect an existing part and identify the processes involved in the manufacture of the part.
8. Develop an understanding of industry and its place in our culture.
9. Develop experience in worker cooperation, resource management, laboratory maintenance, and above all, shop safety.

IX. Drilling and Related Hole Making Processes
- A. Introduction, fundamentals, and terminology
- B. Types of drills
- C. Machine tools for drilling
- D. Hole finishing operations
- E. Counter boring, counter sinking, spot facing, and trepanning

X. Thread Production
- A. Introduction, thread basics, and nomenclature
- B. Producing external threads
- C. Producing internal threads

XI. Abrasive Machining
- A. Introduction to grinding
- B. Abrasives and grinding wheels
- C. Grinding machines and processes
- D. Grinding safety
- E. Honing, super finishing and lapping

XII. Shaping, Planning, Broaching, Sawing, Filing
- A. Introduction to each process
- B. Cutting tool types
- C. Machine types and processes

XIII. Work Holding Devices
- A. Principles of work holding
- B. Location and clamping
- C. Types of jigs and fixtures
- D. Multiple clamping or chucking

XIV. CNC Machining
- A. Introduction
- B. Turning centers
- C. Machining centers
- D. Ultra high speed machining centers

XV. Non-traditional Machining
- A. Electrical discharge machining
- B. Ram type and wire type
- C. Chemical N.T.M.
- D. Mechanical N.T.M.
- E. Thermal N.T.M.

XVI. Gear Manufacturing
- A. Theory and nomenclature
- B. Gear types
- C. Gear manufacturing methods

Attendance Policy:

Regular and punctual attendance is expected. Roll call will be taken at the beginning of each class. Consistent tardiness is unacceptable; three occurrences of a student arriving late for class will equate to one absence. The following attendance (excused or unexcused) bonus/penalty plan will apply to all students: NO absences-10 bonus points; One absence-6 bonus points; Two absences-3 bonus points; Three absences-No effect; Four absences-5 points deducted from student's final score; For each subsequent absence greater than four (excused or unexcused), an additional 5 points will be deducted from the student's final score (i.e. 5 absences = 10 points deducted, 6 absences = 15 points deducted from final score, etc.) If a student arrives to class after roll call, it will be recorded as an absence. It is the responsibility of the student to remind the instructor to change the "absence" to "arrived late" after class. The instructor retains the option to vary this attendance policy under extenuating circumstances.

An absence that occurs on the day of a regularly scheduled exam will be handled as follows: A student who knows in advance that they will be absent on the day of an exam will be required to inform the instructor of the absence at least 24 hours in advance in person, by phone, or by email. THIS IS FOR UNAVOIDABLE EMERGENCIES! Since illness can't be predicted 24 hours in advance, any absence due to illness that occurs on the day of an exam will require a written note from an official at the health center on campus or a written note from an independent doctor before consideration for a make-up exam will be given. Exam dates will be announced at least one week in advance.

Reading Assignments, Chapter Coverage and Video Presentation:

Chapter 1	Introduction to Materials and Processes in Manufacturing. Pgs 1-26
Chapter 21	Fundamentals of Machining-Orthogonal Machining. Pgs to be determined.
Chapter 22	Cutting Tools for Machining. Pgs to be determined. SME Videos: Cutting Tool Geometries, Cutting Tool Materials
Chapter 10	Measurement and Inspection. Pgs 189-231
Chapter 23	Turning, Boring and Related Processes. Pgs 548-582 SME Video: Turning and Lathe Basics
Chapter 25	Milling. Pgs 611-631 SME Video: Milling and Machining Center Basics
Chapter 24	Drilling and Related Hole Making Processes. Pgs 583-610 SME Video: Basic Hole Making
Chapter 30	Thread and Gear Manufacturing. Pgs 741-758 (threads)
Chapter 27	Abrasive Machining Processes. Pgs 656-683 SME Video: Basics of Grinding

The final letter grade assigned will be consistent with the following:

A = 90% -- denotes superior understanding of subject matter

B+ = 85%
B = 80% -- denotes excellent understanding of subject matter

C+ = 75%
C = 70% -- denotes fair understanding of subject matter

D+ = 65%
D = 60% -- denotes poor understanding of subject matter

F = below 60% -- denotes failure to understand subject

INDIANA STATE UNIVERSITY
Technology Management Department
Fall 2008 Syllabus

Title: MFG 371 – Manufacturing Materials and Processes

Instructor: Mr. Mark J. Clauss, Myers Technology Center, Rm 115A, Phone: 7677
Email: mclauss@.indstate.edu

Course Description:

This course is designed to develop student knowledge of some of the basic properties and characteristics of common metals and processes used in the industry to give metals useable form. The focus is on non-machining or non-chip making type manufacturing methods. Approximately 70% of the class time will involve lectures, demonstrations, and other types of classroom activities. The remaining time will be spent in student centered laboratory activities aimed at reinforcing classroom discussions.

Course Goals:

At the conclusion of this course, the students will be able to:

1. Analyze the scope and depth of metalworking as it relates to materials and processes in industry.
2. Evaluate materials and processes in manufacturing.
3. Demonstrate with competence manufacturing processes in the laboratory using modern equipment.
4. Demonstrate safety principles and responsible behavior in the laboratory.
5. Analyze the history of materials and processes in metals manufacturing.
6. Describe the current trends involving materials and processes in manufacturing.
7. Integrate cooperation and resource management skills in the laboratory.

Course Content:

Minimum lecture topics. The following outline highlights the topics and sequence of material to be covered using delivery methods including but not limited to lecture/discussion, video tape, demonstrations, and handouts.

I. Introduction to Manufacturing Materials and Processes
   A. Metallic materials used in manufacturing
   B. Overview of common manufacturing processes
   C. Common products manufactured from metal

II. Nature of Metals and Alloys
   A. Metallurgy defined
   B. Chemical terminology
   C. Atomic structure and bonding
   D. Deformation of metals, strain hardening
   E. Cold working, hot working, recrystallization
   F. Alloy types

III. Ferrous Metals and Alloys
   A. Manufacture of iron and steel
   B. Elements, carbon content and effects on steel
   C. Nomenclature of steel and chemical classification
   D. Numbering systems and alloying categories

IV. Nonferrous Metals and Alloys
   A. Alloy categories
   B. Physical and mechanical properties

V. Properties of Metals
   A. Physical properties
   B. Mechanical properties
   C. Mechanical testing methods

VI. Joining Processes
   A. Introduction to welding processes
   B. Welding basics, common concerns

VII. Gas Flame Processes
   A. Oxy-acetylene welding and cutting processes
   B. Brazing and soldering processes

VIII. Electric Welding Processes
   A. Shielded metal arc welding
   B. Gas metal arc welding
   C. Gas tungsten arc welding
   D. Resistance welding
   E. Related processes

IX. Electric Cutting Processes
   A. Plasma arc, manual and C.N.C.
   B. Carbon arc

X. Casting Processes
   A. Introduction and fundamentals
   B. Expendable mold casting processes
   C. Multiple use mold casting processes
   D. Continuous casting

XI. Heat Treatment Processes
   A. Purpose and definitions
   B. Through hardening processes
   C. Surface hardening processes
   D. Softening processes
   E. Microstructures, phase diagrams

XII. Rolling, forging, hot and cold forming
   A. Drawing, stamping, shearing, blanking

XIII. Powder metallurgy

Course Content (continued)**:**

Minimum student activities. In order to meet a major objective of this class, each student will be expected to perform a series of laboratory exercises. All lab work will be performed in the lab during the allotted class time and each student will complete his or her own work. Lab exercises done outside the lab or by persons not enrolled in the class will not be evaluated or count as credit toward the final lab score.

The following is a list of minimum student activities that will lead to the successful completion of all lab exercises for credit toward the final grade.

1. Visual inspection for material identification
2. Material testing
3. Oxy-acetylene fusion welding
4. Oxy-acetylene cutting
5. Shielded metal arc welding
6. Gas metal arc welding – solid wire
7. Gas metal arc welding – flux cored wire
8. Gas tungsten arc welding
9. Manual plasma cutting
10. C.N.C. plasma cutting
11. Torch soldering
12. Resistance spot welding
13. Green sand casting
14. Sheet metal processing

Required Student Materials:

1. Textbook: DeGarmo, E.P., Black, J.T., and Kohser, R.A. (2008) Materials and Processes in Manufacturing, 10th Edition. New York: John Wiley and Sons, Inc.
2. Safety glasses with side shields
3. Short cuff leather gloves

Laboratory Safety:

Course goal number 4 relates to the importance of learning and demonstrating safe and responsible behaviors in a laboratory that simulates an industrial manufacturing environment. General laboratory safety rules, procedures, and regulations will be addressed throughout the course. Discussions about specific safety rules relative to each process will accompany demonstrations in the lab.

Intensive laboratory activities will commence at approximately midterm. All students will be required to have their own safety apparel (safety glasses and gloves) before they will be allowed to work in the lab. Welding coats will be supplied for additional upper body coverage. Complete lower body coverage is mandatory during lab work days. Shorts, skirts, dresses, sandals, loose clothing, or open toe shoes of any kind will not allowed in the lab during lab work days.

If a student fails to attend a demonstration, it is likely that the student will not be able to use the demonstrated equipment or perform the process safely. In the interest of safety, that student should consider it unlikely that he or she will be allowed to use that piece of equipment. Significant time constraints do not allow for multiple duplicate demonstrations. It is exceedingly important to not be absent from classes during demonstrations!

Any student failing to make adequate progress in the lab throughout the course could generate a problem of safety when attempting to catch up. A determination of any unsafe behavior will be made by the instructor and it may be necessary to terminate a student's lab experience if unsafe actions transpire. This action will be preceded by a verbal warning explaining what safety rules were violated.

Attendance Policy:

As a student enrolled in (and paying for) this class, you no doubt have expectations that the instructor will not only regularly attend class, but will also be on time. The instructor has similar expectations of each student. Regular and prompt attendance in class is expected. Roll call will be taken at the beginning of class although only for the purpose of learning names.

Absence from class sometimes can't be avoided and the instructor acknowledges this at the outset of class. Certainly there could be periodic situations involving illness or emergencies impacting the student that will justify an absence. Similarly, there could be instances in which the instructor is ill or otherwise unable to attend class. Any problem caused by an extended absence from class by the instructor will be offset by a substitute instructor. Excessive absences from class or lab by the student will be accompanied by intrinsic natural and logical consequences, for example, failure to adequately understand the course material, inability to keep pace with progress of material coverage, failure to perform lab work safely, failure to perform satisfactorily on written exams, etc.

An absence that occurs on the day of a scheduled exam will be handled as follows: A student who knows in advance that they will be absent on the day of an exam will be required to inform the instructor of the absence at least 24 hours in advance in person, by phone, or by email. This is for unavoidable emergencies! Since illness can't be predicted 24 hours in advance, any absence due to illness that occurs on the day of an exam will require a written note from an official at the health center on campus or a written note from an independent doctor before consideration for a make-up exam will be given. Exam dates will be announced at least one week in advance.

It is the responsibility of the student to make up for missed work due to an absence. It is recommended that each student identify a fellow student in class on which they can rely for securing extra copies of handouts, copying missed notes, or just being appraised of what transpired during their absence. It is also recommended but not required that students identify potential lab partners with whom to work to facilitate the most efficient lab time usage possible.

Reading assignments, chapter coverage:

Quiz 1

"The Drama of Metal Forming" – **10 points**

Quiz 2

Definitions and terminology – **20 points**

Chapter 15 - Fundamentals of Metal Forming
Chapter 16 - Bulk Forming Processes
Chapter 17 - Sheet Forming Processes

Unit - Exam 1 – 90 points

Chapter 3 – Nature of Metals and Alloys
Chapter 6 – Ferrous Metals and Alloys
Chapter 7 – Nonferrous Metals and Alloys
Also lectures, demonstrations, handouts, and videos

Unit - Exam 2 -- 90 points

Chapter 2 – Properties of Materials
Chapter 30 – Fundamentals of Joining
Chapter 31 – Gas Flame and Arc Processes
Also lectures, demonstrations, handouts, and videos

Unit - Exam 3 – 90 points

Chapter 11 – Fundamentals of Casting
Chapter 12 – Expendable Mold Casting Processes
Chapter 13 – Multiple Use Mold Casting Processes
Also lectures, demonstrations, handouts, and videos

Unit - Exam 4 – Final Exam – 90 points

Chapter 32 – Resistance and Solid State Welding Processes
Chapter 33 – Other Welding Processes, Brazing and Soldering
Chapter 4 – Equilibrium Phase Diagrams and the Iron-Carbon System
Chapter 5 – Heat Treatment
Also lectures demonstrations, handouts, and videos

Student evaluation:

A student's final grade for the course will be based on the following:

1. Written quizzes and exams in class 70%
2. Laboratory work 30%

Weekly reading assignments will be made. Students are expected to stay current with these assignments. Exam items will be taken from lectures, readings, and illustrations from the text, videos, handouts, demonstrations, other (guest speakers, field trip, etc.). Some of the lecture material presented will come from sources other than the required textbook so it is very important to keep good notes. I will facilitate this with handouts (when appropriate) and by presenting information in outline form usually with transparencies and other multimedia. Question and answer reviews held in class will reflect the types of test items I will use on exams and quizzes, i.e. multiple choice, fill in the blank, short answer.

All assigned lab work will be turned in with the corresponding lab sheet at or near the end of the term. Lockers will be available in the lab when lab work commences at the approximate time of midterm. Students may choose to use these but will be required to supply their own lock.

As the need arises for a student to make up for an absence, it is strongly recommended that the student first seek a fellow student (preferably one who takes good notes) for the opportunity to copy his or her notes that were missed as a first course of action. Video presentations that are missed can be made up by viewing the video IN THE CLASSROOM ONLY at some time other than regularly scheduled class time to be agreed upon by the student in arrears and the instructor.

The final letter grade assigned will be consistent with the following:

A = 90% -- denotes superior understanding of subject matter

B+ = 85%
B = 80% -- denotes excellent understanding of subject matter

C+ = 75%
C = 70% -- denotes fair understanding of subject matter

D+ = 65%
D = 60% -- denotes poor understanding of subject matter

F = below 60% -- denotes failure to understand subject

Classroom points breakdown:

Quiz 1.....10 pts.
Quiz 2.....20 pts.
Exam 1.....90 pts.
Exam 2.....90 pts.
Exam 3.....90 pts.
Exam 4, Final.....90 pts.

Total points from quizzes and exams: .....390 pts.

Laboratory points breakdown:

1. Sheet Metal Tool Box.....20 pts.
2. Tensile Testing Exercise.....10 pts.
3. Oxy-Acetylene Flange Weld.....10 pts.
4. Oxy-Acetylene Weld, Bead.....10 pts.
5. Oxy-Acetylene Butt Joint.....10 pts.
6. Oxy-Acetylene Cutting.....10 pts.
7. Plasma Arc Cutting.....10 pts.
8. Shielded Metal Arc Welding.....15 pts.
9. Gas Metal Arc Welding, Solid Wire.....10 pts.
10. Gas Metal Arc Welding, Flux Core Wire.....10 pts.
11. Gas Tungsten Arc Welding.....10 pts.
12. Torch Soldering.....10 pts.
13. Resistance Spot Welding.....5 pts.
14. Foundry Casting.....15 pts.
15. C.N.C. Plasma Cutting.....10 pts.

Total Possible in Laboratory.....165 pts.

Total Possible Points Possible in Classroom and Laboratory: 555

Indiana State University
College of Technology
Department of Electronic, Computer, and Mechanical Engineering Technology

MET 299 - 001 = CAD Fundamentals (3 credits) SPRING 2009

Instructor: Todd E. Alberts
PH: 237-3357
Cell: 1-812-249-9184
Office TC201D – Myers Technology Building
talberts@indstate.edu
Office Hours: Tuesday & Thursday 11:00 a.m. – 2:00 p.m.

Class Times: Monday and Wednesday @ 3:00 p.m. – 4:50 p.m. in Myers Technology Building TC217

Course Description: This course will provide an understanding of the practical aspects of a variety of Computer Aided Design (CAD) software package features, with emphasis on the application of these features as they directly relate to each individuals students area of study.

Textbook: Autocad 2008 for Interior Design and Space Planning (Paperback, 2007)
Author: Beverly Kirkpatrick, James M. Kirkpatrick ISBN-13: 9780131592322

Objectives: This course is formatted in a manner in which students can learn, understand, and develop competency in the use of computer aided design (CAD) software in a manner relative to their areas of study. Theoretical and hands-on application of CAD software from the aspects of drafting, design, and geometric analysis are central. Project based learning will also take place via the completion of a design project relative to your degree pursuits that is applicable within your chosen professional setting. MET students in particular will also be introduced to methods of reverse engineering of mechanical parts to produce working detail and assembly drawing via ANSI standards. The course will help prepare students, who (upon graduation) can:

1. Apply the latest technology and engineering tools to solve technical problems in the practice of mechanical engineering technology and related interdisciplinary fields. [EO:1]
2. Remain technically current and adapt to rapidly changing technologies through self improvement with continuous learning or post-graduate education. [EO:2]
3. Demonstrate independent thinking, self-management, and functioning effectively in team-oriented and open-ended activities in an industrial environment. [EO:3]
4. Communicate effectively in oral, written, and graphical forms. [EO:4]

Outcomes: Upon completion of the course, the students will have:

1. an appropriate mastery of the knowledge, techniques, skills, and modern tools of the MET discipline [LO:a]
2. an ability to apply creativity in the design of systems, components, or processes appropriate to the MET program educational objectives. [LO:d]
3. an ability to identify, analyze and solve technical (close-ended analysis and open-ended design) problems [LO:f]
4. an ability to communicate effectively through engineering drawings, written reports, or oral presentations. [LO:g]
5. a commitment to quality, timeliness, and continuous improvement [LO:k]
6. Develop, simulate, and analyze mechanical components/systems using computer-aided design and analysis tools. [PO:1]
7. Identify and inspect tolerances in mechanical parts and assemblies. [PO:3]

Course Outline:

1. Introduction to AutoCAD Interface and control commands

2. Primary Commands
3. Modifying Existing Drawings
4. Dimensioning
5. Plotting and Documentation
6. Three Dimensional Drawing (optional)
7. Major project related to each individual's degree orientation

Grading:		Grading Scale:	
1. Assignments & Drawings	20%	A = 90 – 100%	C = 70 – 74%
2. Quizzes & Tests	20%	B+ = 85 – 89%	D+ = 65 – 69%
3. Project	50%	B = 80 – 84%	D = 60 – 64%
4. Attendance/Participation	10%	C+ = 75 – 79%	F = 59% and below

Assignments:

All assignments are due on the specified date determined during class. All late assignments will have a penalty deduction of 25% for each week late. Each assignment must be submitted in electronic format (MS Word, Excel, PPT, AutoCAD, etc.) and placed in the specified class account locations. All dates of tests will be determined throughout the completion of the course, and testing dates and subject matters will be announced one week prior to assessment. Missed tests will only be allowed to be made up at a later date under instructor's discretion.

Assessment:

All assignments will be graded on the reasoning of accuracy, attention to detail, conformation to industry standards (ANSI Y14.5, FAA Advisory Circular #150/5340-1J, NECA, etc.), clarity and neatness, and on time delivery.

Class Accounts:

Each student will be allotted a class account or storage space on the university server for use related to the CAD drawing of this course. Only the work related to this class should be stored in this account. Students must submit assignments with the following information in the following format:

Your Initials, Date, Drawing #

Example: TEA-092306-12-8

There will also be the use of a "Shared Folder" under the class account in which materials and information may be provided to the entire class. The class account will be accessible to only the instructor of the course and the students.

Class Etiquette:

Attendance in both lecture and lab sessions is mandatory unless otherwise specified. Any time you will be absent or significantly delayed, please contact the course instructor via email or phone ASAP. Punctuality is just as important as attendance, so make arrangements to be in class on time. In the CAD Lab, any unauthorized use of internet browsing, text messaging, or email use during class time is prohibited and will be dealt with accordingly. Any behavior involved with academic integrity involving dishonesty/plagiarism will not be tolerated, thus resulting in an "F" grade in the class. Please consult Undergraduate Catalog for details and definitions related to academic integrity and plagiarism.

Disability and Special Needs

Indiana State University provides services and accommodations for qualified individuals with documented disabilities. If you require any accommodation, you must register with the Disability Support Services at the beginning of the semester. You may contact them at 237-2301 or see them in person on the 2nd floor of Gillum Hall.

Any other types of needs required for you (undocumented) to successfully excel in this class, feel free to see me so arrangements can be made to help you in any way possible.

Final exam information to be determined.

***NOTE: The information and subject matter included in this syllabus is subject to change at the discretion of the course instructor and/or department officials. All changes will be communicated in full to the class.**

MA115 College Algebra and Trigonometry(Fall, 2008)

Time: 11:00am - 12:15pm, TR, Room: College of Education 0305

Instructor: Dr. Rao Kopparty
Department of Math & CS, Root Hall A-151
Phone: 812-237-2141; Email: bkopparty@isugw.indstate.edu

Office Hours: TR: 1:00pm-1:50pm
or by appointment (use e-mail)

Text: College Algebra with Trigonometry (8th edition) by Barnett, Ziegler and Byleen (McGraw Hill Publisher)

Contents:
Topic R. Basic Algebraic Operations;
Topic 1. Equations and Inequalities;
Topic 2. Graphs;
Topic 3. Functions;
Topic 4. Polynomial and Rational functions;
Topic 5. Exponential and Logarithmic Functions;
Topic 6. Trigonometric Functions;
Topic 7. Trigonometric identities and conditional equations

Outcomes:
In this class, students will learn: Basic Algebraic Operations; Equations and Inequalities; Functions and Graphs; Quadratic functions, Polynomial and Rational Functions; Exponential and Logarithmic Functions; Trigonometric functions and identities.

Grading Distribution:
• Two examinations (100pts each); 5 Homeworks (5 homeworks × 20= 100pts, online and open book); 5 Quizzes (5 quizzes × 20= 100pts, online taken and open book); Final Exam (comprehensive, 200pts). Total points: 600

Week 1 August 21	Introductions, Syllabus. Chapter R
Week 2 Aug 26, Aug 28	Chapter R, Sections 1.1 to 1.3
Week 3 Sep 2, Sep 4	Sections 1.1 to 1.6
Week 4 Sep 9, Sep 11	Sections 1.1 to 1.6
Week 5 Sep 16, Sep 18	Sections 2.1 to 2.4
Week 6 Sep 23, Sep 25	Sections 2.1 to 2.4
Week 7 Sep 30, Oct 2	Test # 1 on September 30, Sections 3.1 to 3.4
Week 8 Oct 7, Oct 9	Section 4.1 to 4.4
Week 9 Oct 14, Oct 16	Sections 4.1 to 4.4 Sections 5.1, 5.2

Indiana State University
College of Technology
Department of Electronics, Computer and Mechanical Engineering Technology

MET 215
Graphic Analysis
(Fall 2009)
3 credit hours

Professor: Dr. Randell Peters

Office: TC 201C
Phone: 237-4962
Email: rpeters@indstate.edu

I. Course Purpose:

This course is designed to develop and instill math problem solving skills necessary in order to understand the concepts and principles of technical mathematics, and to be able to use these concepts and principles to solve industrial/technical problems. For many majors (e.g. Automotive Technology Management, Industrial Technology, Mechanical Engineering Technology, and Packaging Technology and others) MATH 111 (or MATH 115 or MATH 131 or MATH 301) and IMT 215 satisfies your Quantitative Literacy Requirement. Please consult your advisor.

II. Catalog Description:

Graphically and analytically solving technical mathematical problems commonly encountered by engineers and technologists utilizing elements of algebra, geometry, trigonometry, and statistics.

III. Prerequisites:

MATH 115 or the Consent of the Instructor

IV. General Course Objectives/Topics:

- Appropriately select and utilize the following to solve problems
    - Algebraic Operations and Basic Geometry
    - Trigonometric functions
    - Vectors, determinants, and matrices
    - Financial and mixture formulas
    - Functions of moments and statics
    - Statistical measures
    - Exponential & Logarithm Functions
    - Simple & Quadratic Formulas
- Solve mathematical word problems relevant to industrial technologists in the various fields in which they serve
- Create charts and graphs displaying results of word problems
- Exhibit a working knowledge of statistics through
    - Calculating measures of central tendency
    - Calculating measures of dispersion
    - Converting to z-scores and transforming scores
    - Interpreting statistics
    - Solve mathematical problems through teamwork

V. Course Assignments:

a. Homework:

Each student is expected to complete the required reading and subsequent quiz over the material as assigned, in a timely manner. Quizzes will be on Blackboard/Courseinfo. Students are expected to log onto Blackboard at http://blackboard.indstate.edu and navigate to their appropriate class. The login for Blackboard is the same as your MyPortal login.

The advantage to taking quizzes online is the feedback. You will receive a score immediately and, in a few days, be able to see your mistakes (if any). This method provides more immediate feedback, which should help to prevent you from learning the wrong answer as true.

Follow the schedule of assignments as posted in ASSIGNMENTS under the heading of homework assignments. The assignments will not necessarily be problems in the textbook. The following is a step by step process for completing and submitting the homework.

Homework will only be available during the time allowed. Once the submission deadline is passed, you will no longer see the link. If you have clicked the save button at some point and not the submit button, I can still see the work you have saved. NO PROBLEM.

1. Work out the assigned problems. This will help you with the homework quizzes in understanding the concepts and problems.

2. Log onto the course site and navigate to ASSIGNMENTS

3. Proceed to Homework Quizzes section

4. Locate the corresponding chapter

5. Choose the quiz for the completed homework section. This quiz will contain the exact problems you were assigned as homework. The quiz is multiple-choice with four possible answers for each problem.

6. Select the best possible answer based on your calculations.

7. When you are finished answering all questions, click submit.

8. You may or may not see your grade for this section and you will not see the correct answers until I review the tests and post all the results.

9. After I have posted the results you will be able to view the homework and see the correct answers. If you missed something, take this golden opportunity to attempt to figure out your mistake. Don't hesitate in e-mailing the instructor if you can't figure out your mistake on your own.

As a helping hand, you will be able to go back into the homework quiz until the time of final submission. To be able to go back into the quiz, simply select the save button at the bottom of the test instead of the submit button.

There will be eleven homework assignments. I will drop your lowest grade.

b. Notebook

It is suggested that each student maintain a notebook containing pertinent class materials and that the notebook be organized somewhat in the following manner:

- Cover sheet: Name, Course Name, Semester Taken

- Section 1: Class Syllabus
- Section 2: General Class Notes and Those Taken from Readings
- Section 3: Homework Handouts
- Section 4: Exams

The complete notebook will likely be turned in near the conclusion of the course for a yet to be determined amount of extra credit.

The notebook will no doubt be a valuable asset when taking exams.

c. Professional activities:

You are encouraged to associate yourself with student groups such as SAE, SME, NAIT, etc. These organizations sponsor programs and activities on and off campus that will be of benefit to you in your educational and professional development.

d. Participation

Face-to-face students get the best results (grades) by attending class regularly.

Attendance will be taken each session. Attendance will give you points of extra credit to be added throughout the semester. Normally there will be one point awarded for each session attended.

e. Quizzes

It is highly probable that there will be a quiz at the beginning or end of every class period. These quizzes will count toward your final grade. You may not make up quizzes if you are absent or otherwise not present during the time the quizzes are given. I will drop your lowest 2 quizzes.

f. Exams

NINE chapters in the textbook will be covered. There will be five mini-exams covering approximately two chapters each. These exams will consist of two parts with the exception of the last exam. One part will be taken in-class or on-line with time constraints and one part will be take-home. All tests are open-book. You are not to discuss the take-home test with any one other than myself until after you have submitted the exam.
There will be five exams total. No exam score will be dropped.
There will be no comprehensive final exam, although you will be required to take an exam on the scheduled final date. This "final exam" will be one part only.

VI. Course Evaluation Methods:

The student's final grade for this course will be based upon the total points accrued in the following areas.

Participation	Bonus	50 points @ 1 per visit + other
Quizzes	25%	200 points @ 10 each
Assigned Homework	30%	250 points @ 25 each
Exams	45%	375 points @ 75 each
	100%	

A	=	92% - 100%,	**B+**	=	88% - 91%
B	=	82% - 87%,	**C+**	=	78% - 81%
C	=	72% - 77%,	**D+**	=	69% - 71%
D	=	64% - 68%,	**F**	=	0% - 63%

VII. Homework Schedule

MET 215 Schedule Fall 2009

Dates given are the DUE dates for having online items submitted.

Week 1 Ending Sunday Aug 27 Pretest	2 Sep 3 Chapter 1 Chapter 2	3 Sep 10 Chapter 3	4 Sep 17 Test over Chapters 1, 2, and 3
5 Sep 24 Work on Chapter 4	6 Oct 1 Chapter 4 & 8	7 Oct 8 Chapter 8	8 Oct 15 Test over Chapters 4 and 8
9 Oct 22 Chapter 9	10 Oct 29 Chapters 9 and 10	11 Nov 5 Test over Chapters 9 and 10	12 Nov 12 Chapter 5
13 Nov 19 Test over just Chapter 5	14 Dec 3	15 Dec 10 Chapter 22	16 **Tuesday** **December 12 1-3PM** Last test Covers only chapter 22

VIII. Course Materials:

Textbook: ***Basic Technical Mathematics,8 th ed.***
Allyn J. Washington
ISBN: 0-321-13193-2

Software: Access to the Internet is essential

Reference Materials: None

Other Materials: To adequately complete this course you will need to acquire a graphing calculator.

This course will specifically demonstrate the usage of a Texas Instrument 83+ or 89 series graphing calculator.

I cannot stress enough how much this calculator will help you throughout this course.

Please purchase, or have at your disposal, a TI-83+ or TI-89 calculator. The price, for these, ranges from about $90 to as much as $200 depending on the extras.

I have found these readily available at STAPLES or OFFICE MAX.

Other Fees: None

IX. **Ways to Contact Professor:** Randy Peters

Email: Office rpeters@indstate.edu

Phone: Office 812-237-4962
Cell 765-592-1227

I will often be available in my office (between 9 am and 430 pm) when not in a classroom or lab.
The very best way to contact me is via e-mail.

X. RIGHT OF REVISION:

This course syllabus, the schedules, and procedures are subject to change at the discretion of the instructor.

XI. ATTENDANCE:

Students are expected to attend (and participate in) all class sessions. Please refer to the University Policy on attendance as published in the University Standards.

XII. ACADEMIC HONESTY STATEMENT:

The University is committed to academic integrity in all its practices. The faculty value intellectual integrity and a high standard of academic conduct. Activities that violate academic integrity undermine the quality and diminish the value of educational achievement.

Cheating on papers, tests or other academic works is a violation of University rules. No student shall engage in behavior that, in the judgment of the instructor of the class, may be construed as cheating. This may include, but is not limited to, plagiarism or other forms of academic dishonesty such as the acquisition without permission of tests or other academic materials and/or distribution of these materials and other academic work. This includes students who aid and abet as well as those who attempt such behavior.

XIII. AMERICANS WITH DISABILITIES ACT:

Indiana State University seeks to provide effective services and accommodation for qualified individuals with documented disabilities. If you need an accommodation because of a documented disability, you are to register with Disability Support Services at the beginning of the semester. Contact the Director of Student Support Services, Gillum Hall, room 202A, 237-2301. The director will ensure that you receive all the additional help that ISU offers. If you will require assistance during an emergency evacuation, notify your instructor immediately. Look for evacuation procedures posted in your classroom.

Math 123
Mrs. R. A. Meyerholtz
Office: Root Hall A168 Ext. 7649 (x2130 to leave a message)
Office Hours: M, W, F
Textbook: "Analytic Geometry"; Douglas F. Riddle (6th Edition)

Attendance: Regular attendance is expected. If you are unable to attend class, I suggest you get the notes and assignment from a classmate. It is unnecessary for you to contact/call me.

Homework: Homework assignments are given as a reinforcement tool; I do not collect/grade homework. Homework problems, lecture examples, and class discussions/topics are good examples of the types of problems used on quizzes and tests. On occasion, the quiz will consist of homework problem(s), and you will be allowed to use your notes/homework. This will not always be the case, and you will not be allowed to use notes or other reference materials on tests.

Calculators: Calculators may be used in this class, but a specific calculator is not required. I will not use a calculator during the material presentation, nor will I teach "keystrokes". If you choose to use a calculator, it is your responsibility to know how to use your model.

Quizzes: There will be at least 12 quizzes/activities each worth 10 points; the greatest 10 scores will be counted towards your final grade i.e. at least 2 dropped scores/100 total points from quizzes/activities. There will be a scheduled quiz every Friday unless announced otherwise. There may also be "unannounced" quizzes/activities given at my discretion i.e. be prepared at ALL times.

Exams: There will be four 100 point exams throughout the semester, one of which will be given as a final exam on the university scheduled day and time. Each exam date will be announced at least one week prior to the test.

Make-ups: If you are required to miss class for any university sponsored activity, you must show me an authorization (provided by your coach, instructor, and/or sponsor) PRIOR to that class period. In that situation, the quiz or exam can be taken BEFORE the missed class. Any quiz missed due to temporary illness, "broken" alarm clocks, personal trips, or any other reason will be one of your dropped scores. In the unlikely event that an EMERGENCY occurs on an exam day, a make-up will be given IF the following criteria are met: 1) I receive notification PRIOR to the missed exam; the best way to insure this is to leave a message at x2130 2) I agree that it IS an emergency situation. 3) Validation of the emergency is presented. Failure to comply with this policy will result in a score of "0" for the missed exam.

Grading Scale: 500 Total Points

450 - 500	A
440 - 449	B+
400 - 439	B
390 - 399	C+
350 - 389	C
340 - 349	D+
300 - 339	D
299 or less	F

MATH 301 – Survey of Calculus
Syllabus

Instructor:	David Hutchison
Office:	Root Hall A141
Office Phone:	237-2152
E-mail:	mahutch@laurel.indstate.edu
Office Hours:	MW 2:00 – 3:00 TR 3:15 – 5:00 and by appointment
Teaching:	CS 258.001 TR 12:30-1:45 RO A012 MA 4/531 TR 2:00-3:15 RO A008 MA 301.401 TR 5:00-6:15 RO A005 MA 301.301 WEB
Text:	*Brief Calculus and Its Applications* 11th Edition, by Goldstein, Lay & Schneider, Prentice Hall Publication

We will cover Chapters:

0 – Review of basic algebra, laws of exponents, functions
1 – Limits, the derivative e, rules of differentiation
2 – omit 2.7 – application of the derivative, graphing, optimization
3 – Chain rule, implicit differentiation, related rates
4 – The exponential and natural logarithm and differentiation rules
5 – omit 5.3 & 5.4 – Exponential growth/decay, interest components
6 – up to/including 6.7 – Integration, indefinite and definite, the fundamental theorem of calculus, applications, techniques of integration, improper integrals

We will turn in a great deal of home work: 20 – 30%

And have 2 exams – First after 3.1 – second may be a take home

A <u>Comprehensive Final</u> on Tuesday, May 5, 5 – 7 p.m.

INDIANA STATE UNIVERSITY
DEPARTMENT OF PHYSICS

PHYSICS 105 - 002

INSTRUCTOR:	Dr. Valentina French
OFFICE:	S-165F
OFFICE PHONE:	(812) 237-2272
OFFICE HOURS:	MWF 11:00 a.m. - 12:00 p.m., Thu 1:00 – 1:50 p.m., and by appointment
EMAIL:	vfrench@isugw.indstate.edu
CLASS TIME:	MWF 1:00 – 1:50 p.m.
LOCATION:	S-138
CREDIT:	3 semester hours
TEXT:	Cutnell & Johnson, Physics

If you prefer to use only the online textbook, you can purchase access to the online textbook and to WileyPLUS when you register for the course at:
http://edugen.wiley.com/edugen/class/cls52167/
Please be sure that you purchase Cutnell / Physics, Seventh Edition WileyPLUS Registration Code.

LABORATORY: Concurrent enrollment in 105L is part of the course requirement (unless 105L has already been successfully completed)

Purpose and objectives: This course constitutes the first semester of General Physics, an algebra-based introductory Physics course. Proficiency in intermediate algebra is an essential requirement for this course. **Each student needs to bring a scientific calculator to class every day.**

The course will feature lectures, demonstrations, discussions and problem solving. The objectives of this class are threefold: **1)** to help students develop a conceptual understanding of physical principles, **2)** to develop knowledge of how these principles fit together to describe the physical world, and **3)** to develop deductive reasoning skills and to test the understanding of the physical principles and concepts through problem solving.

In the study of physics you will learn that concepts build upon one-another, and are related to each other like the links of a chain. It is therefore vital that you keep up with the material and not fall behind, because just as one weak link spoils a chain, so will superficially-learned concepts undermine your understanding of later course material.

Class Participation: It will be very important for you to participate in class discussions so that I can gauge your understanding of the concepts that we have covered. This is especially critical in view of the nature of physics knowledge as a system of interrelated concepts. It is an unfortunate but common occurrence for students to come to me on the eve of an exam and express their lack

of understanding of concepts or problem-solving skills that were covered in class long ago. This admission is often accompanied by considerable hand wringing and expressions of despair. Had they contributed to class discussions and asked a few choice questions in a timely manner, their problems would have been resolved much earlier and they would have been in a position to face the exam with much greater confidence. **It is also very important that you read and study the relevant chapters in the textbook.**

Grading will be based on the following:

1. **EXAMS: 400 points**
Two one-hour exams worth *100 points each*. The first exam will be during the week of February 4th, and the second during the week of March 17th (the exact dates will be announced in class). ***Please note that Sunday, March 23rd is the last day to drop a class.***
Final exam: *200 points, comprehensive*. The final exam will be on Wednesday, April 30th, at 1:00 p.m. It is a two-hour exam.
Review sessions will be scheduled before each exam.

2. **HOMEWORK: 170 points**
There will be homework assignments for each chapter covered. The homework will be done online at the following address: http://edugen.wiley.com/edugen/class/cls52167/
To access the homework you need to use the access code packaged with your textbook or purchase an access code online at the above address. The homework is graded online and you have access to your scores at all times. Each homework set will have a due date. After the due date, the homework can be viewed only, but not submitted for credit. While I cannot give out solutions to the homework assignments before the due-date, students are invited to discuss questions about the homework in class. The number of homework assignments is open, but at the end of the semester the total homework points will be scaled to 170 points.
3. **QUIZZES: 80 points**
There will be ten unannounced quizzes. Each quiz is worth 10 points. Each quiz will cover material discussed since the previous quiz. At the end of the semester, the lowest two quiz scores will be dropped. Because of that, **no make-up quizzes will be given.**

MAKE-UP EXAMS: In order to make up a missed exam you must present documented evidence that the reason for missing the exam was serious and beyond your control. **Sleeping-in and vacation travel are NOT acceptable reasons.**

FINAL GRADE: As a final letter grade, you will not receive less than indicated by the following scale: 585-650 points = **A**; 520-584 points = **B**; 455-519 points = **C**; 390-454 points = **D**. A higher grading curve is possible, depending on the class average performance.

In addition to the regular classes, there will be a **Physics Help Center** in room S 115. The Help Center will open on Wednesday, January 9, and the hours will be posted on the door. Please take advantage of this valuable resource.

Code of Student Conduct: All students are expected to comply with ISU Code of Student Conduct, which can be found online at the following address: http://www.indstate.edu/sjp/code/code2004.pdf

COURSE OUTLINE:

Introduction and measurements
Vectors
Kinematics in one-dimension
Kinematics in two dimensions (projectile motion)
Forces and Newton's laws of motion
Uniform Circular Motion
Work and energy; conservation of energy
Impulse and momentum
Rotational kinematics
Rotational dynamics
Simple harmonic motion and elasticity
Fluids
Temperature and heat
Transfer of heat

PHYSICS 105L, Section 002 – General Physics II Laboratory
Syllabus

INSTRUCTOR:	Michelle Baltz-Knorr
OFFICE:	S-165L
OFFICE PHONE:	(812) 237-2039
EMAIL:	mbaltzknorr@isugw.indstate.edu
OFFICE HOURS:	Monday 1-2 pm; Wednesday 10-11 am
TIME & LOCATION:	Thursday, 10:00-11:50 am, S-105
CREDIT:	1 semester credit hour
TEXTS:	ISU Physics 105 Laboratory Manual (light blue cover) Physics, Cutnell & Johnson

Purpose and Objective: Physics 105 and its laboratory component, Physics 105L, constitute the first semester of General Physics, an algebra-based introductory physics course. The laboratory component is designed to provide hands-on experience of the concepts you will cover in the lectures. You may see concepts in the lab before you see them in the course.

Lab Reports: During the semester you will perform 14 lab experiments, one every week. Every team of students is required to write a lab report on each lab experiment performed. The report should be typed and follow the lab report format. This report is due **at the beginning** of the next lab session. Each lab report is worth 50 points. Remember to put units on all of your answers and also to carry units through your calculations. **If you do not include units in your work, you will lose points.**

Lab Quizzes: You are expected to read through the lab **before** you come to class. You may not understand everything, but reading the lab will help to familiarize you with what you will be doing during the experiment. You will be given questions to answer based on your reading of the lab **and** on activities related to the **previous laboratory report**. You will be given 10 minutes at the beginning of class for the quiz. **Don't be late to class.**

Grades: Your final grade will be determined by the average of your laboratory scores after dropping the lowest Report score and the lowest Lab Quiz score. There will be no make-up labs, no make-up Lab Quizzes, and you may not drop either of the last two laboratory Reports or Lab Quizzes. If you miss more than one lab, you will receive a grade of zero for the additional labs and Lab Quizzes missed. Lab reports account for 90%, and Lab quizzes for 10% of your grade.

Cell Phones: Cell phones are not to be used during class and should be either turned off or set to vibrate. Not adhering to this policy will result in a 5 point penalty on your lab report.

No food or drinks are permitted in the lab. In addition, no tobacco use is permitted in the classroom.

Code of Student Conduct: The Code of Student Conduct applies to all work done in this class. The names listed on a lab report indicate that each person has contributed equally to that report.

Chemistry 100.002- Reactions and Reason, Fall, 2008
Dr. J.M. Allen, Office 051H Science
Lecture: MWF 11:00-11:50 Room 0018 Science
Office Hours: MWF 10:00-11:00. Other times can be arranged on an individual basis.
Text: *Chemistry Matters*, by S.K. Allen and J.M. Allen

This course is intended for students who wish to have a general introduction to chemistry and assumes no previous coursework in chemistry. **This course is not intended to prepare you to take upper-level coursework in chemistry**. It has been developed for students who wish to gain a broad-based understanding of the fundamental concepts of science with a concentration upon chemistry. The material covered will largely be descriptive in nature as opposed to quantitative. I hope that in the process of taking this course you realize that science is not terribly difficult and is actually interesting and can even be fun.

You should keep up with the material presented in class by reading the appropriate chapters in the text and reviewing your class notes. You should anticipate studying about two hours outside of class for each lecture. It will be most helpful for you to read and carefully think over the questions scattered throughout each chapter in the book. I will not collect and grade homework.

Grades

Four Tests (15% each)	A- 90- 100
Comprehensive Final Exam (25%)	B- 80- 89
Quizzes (15%)	C- 70- 79
	D- 60- 69
	F- Below 60

Important Dates

Test I	Friday September 12
Test II	Wednesday October 8
Test III	Friday November 7
Test IV	Friday December 5
Final Exam:	Friday December 12 at 10:00 am

The tests will be an hour in duration and I will tell you what to expect. The final exam will cover everything in the course. ***MAKE-UP TESTS WILL ONLY BE GIVEN WITH A MEDICAL EXCUSE***. I will not take attendance. However, the quizzes will be unannounced and given whenever the room looks empty. Missed quizzes will be assigned a grade of zero and no make-ups will be given.

Chemistry 100L Syllabus

Course: Chemistry 100L; Reactions and Reasons Laboratory

Instructor: William (Bill) Flurkey
Room 35 G Science Building
Phone: 237-2245
Email: wflurkeyiii@isugw.indstate.edu

Office hours: Open any time I am not in class

Text: A Foundational Laboratory Experience by Alan Siegel

Description A series of qualitative and quantitative experiments designed to augment understanding of scientific principles and applications discussed in Chemistry 100. Prerequisite: successful completion of or concurrent enrollment in Chemistry 100. General Education Credits [GE2000; Scientific and Mathematical Studies Foundational]

Intent This course is intended to provide the laboratory component of Chemistry 100. It has been designed for students who wish to gain a broader understanding of the fundamental concepts of chemistry in a laboratory based context.

Requirements:

Attendance **Attendance is mandatory**. Those who attend regularly usually do better. Due to scheduling, safety considerations, and staffing, **it is not possible to make up labs**. Please arrive on time. **Students arriving later may not be allowed to participate in lab that day**. If there are unusual circumstances, please inform your instructor.

NO make up exams will be given. All laboratory work must be turned in at the end of the laboratory period. **NO lab reports will be accepted after that time**. Also, failure to heed safety rules may result in expulsion from the lab.

Grading Mini exams (10% each)
Lab reports (60-70 %)

Grading scale:		
	90-100	A
	80-89	B
	65-79	C
	50-64	D
	0-49	F

Schedule

8/25	Check in safety video
9/8	An exercise in making observations
	How to clean pennies, an exercise in designing an experiment
9/15	M&Ms, an exercise in measurements
9/22	Density, an exercise in determining the sugar content in soft drinks
9/29	Mini-exam 1
	Recording or sharing observations or Discovering the recipe for soap
10/13	Separation and analysis – solubility and distillation
10/20	Separation and analysis - solubility cont. and chromatography of dyes
10/27	Let's have fun
11/3	Mini-exam 2
11/10	Hydrocarbons and isolation of limonene
11/17	Esters: preparation of aspirin and oil of wintergreen
11/24	Carbohydrates
	Proteins
12/1	Mini-exam 3

APPENDIX B – FACULTY RESUME

Dr. Ming Zhou, Professor and Chair

Department of Electronics, Computer and Mechanical Engineering Technology, Indiana State University, Terre Haute, IN 47809. Phone: (812)-237-3983; Fax: (812)-237-4527; Email: mzhou@isugw.indstate.edu

EDUCATION

Ph.D. Systems and Industrial Engineering, 1995, The University of Arizona, Tucson, Arizona.
Ph.D. Thesis advisor: Dr. Ronald G. Askin, Professor, Chair, Department of Systems and Industrial Engineering, University of Arizona, Tucson, AZ 85721.

B.S. Mechanical Engineering, 1982, Wuhan Institute of Technology, P.R.China.

PROFESSIONAL EXPERIENCE

2007 – Present, Professor and Chairperson, Department of electronics, computer and mechanical engineering technology.

2003 – Present, Director, Center for Systems Modeling and Simulation, Indiana State University

1995 – Present, Assistant Professor, Associate Professor (2000), and Professor (2005), Indiana State University, College of Technology. Courses taught include engineering mechanics, reliability and failure analysis, statistics for experimental research, computer graphics and computer-aided design, experimental design and process analysis, simulation modeling and analysis, survey of logistics and distribution systems, etc.

1992 – 1995, Research Assistant, University of Arizona, involved in following projects:
(1) Sequence-constrained flow-line manufacturing cells design.
(2) Operation-based Group-Technology oriented manufacturing cells design.
(3) Mixed-model assembly line balancing (nonlinear models and task-assignment)
(4) Incomplete unbalanced factorial design of a mine production planning system
(5) Baseball bat analysis (Design of Experiment, ANOVA, regression analysis)

1987 – 1990, Project Coordinator, Wuhan Association of Science & Technology, P.R.C.

1982 – 1987, Engineer, Design and Process Engineering, Wuhan Marine Machinery Co., P.R.C.

SELECTED PUBLICATIONS (refereed journal papers/books)

1. Zhou, M., and R. Askin, "Formation of General GT Cells: Operation-based approach", *Journal of Computers & Industrial Engineering*, Vol. 34, No. 1, 1998, pp. 147-157.
2. Askin, R., and M. Zhou, "Formation of Independent Flow-line Cells Based on Operations Requirement and Machine Capability". *IIE Transactions*, Vol. 30, 1997, pp. 319-329.
3. Zhou, M., "A Fuzzy Set Theory Based Method for Design and Quality Planning", *International Journal of Industrial Engineering*, Vol. 5, No. 4, pp.278-287, 1998.
4. Zhou, M. and J. Paik, "Damage Prediction Using Neural Networks", *International Journal of Industrial Engineering*, Vol. 7, No. 2, 2000, pp.140-146.
5. Zhou, M., "On Engineering Design Task Organization and Assignment", *International Journal of Industrial Engineering*, Vol. 8, No. 1, 2001, pp. 28-36.
6. Zhou, M., and C. Zhao, "An Optimization Model and Multiple Matching Heuristics for Quality Planning in Manufacturing Systems", *Journal of Computers & Industrial Engineering*, No. 42, 2002, pp. 91-101.

7. Zhou, M., and J. Paik, "An Application of Neural Network and Genetic Algorithm for Optimizing Food Extrusion Process Parameters", *International Journal of Industrial Engineering*, Vol. 11, No. 2, 2004, pp 132-139.
8. Zhou, M., J. Son and Z. Chen, "Knowledge Representations for Conceptual Simulation Modeling", *Proceedings*, 2004 Winter Simulation Conference. Washington D.C., 2004.
9. Zhou, M. and B. Hu, *Modeling, Analysis and Application of Discrete Event Simulation*, Hua Zhong University of Science and Technology Press, P.R.C., 2005.
10. Zhou, M., Z. Chen and K. Setavoraphan, "Conceptual Simulation Modeling of Warehousing Operations", *Proceedings*, 2005 Winter Simulation Conference. Orlando, Fl., 2005.

SYNERGISTIC ACTIVITIES AND PROFESSIONAL MEMBERSHIP/SERVICE

PI has been actively involved in curricula/program development at ISU, and developed at least seven new courses for graduate and undergraduate curricula since he joined ISU in 1995. The projects that benefited communities outside PI's institution include: Scheduling heuristics for multistage continuous Process (I2 Technology); Plant layout/work method analysis (Shenango Industries); Re-design, modeling and analysis of bulk-packaging line (Digital Audio Disc Corporation), Simulation analysis of DVD/CD distribution system (Columbia House); ER performance improvement through Lean-manufacturing and simulation studies (Union Hospital).

1994 – present, member, Institute of Industrial Engineers (IIE)

1997 – present, member of the Editorial Board, International Journal of Industrial Engineering

2006 – present, member of the Editorial Board, Journal of Simulation

1999, 2001, 2003, 2004, 2005, 2006 Session/track Chairs, 8th and 10th Industrial Engineering Research Conference (IERC99); and Winter Simulation Conferences (WSC).

Since 1996: invited referee for Journal of Computers & Industrial Engineering, IIE Transactions (Design & Manufacturing Systems), IEEE Transactions (Neural Networks), Pentice Hall (Reliability analysis), Reviewers for IERC97, 98, 99, 2000; and WSC04 and 05.

COLLABORATORS AND OTHER AFFILIATION

- **Research collaborators**: Dr. Young Jun Song, Systems and Industrial Engineering Department, The University of Arizona; and Dr. Leslie Gardner, School of Business, University of Indianapolis.
- **Thesis and Graduate Advisors**: Dr. Ronald Askin, Dr. Jeffery Goldberg, Systems and Industrial Engineering Department, The University of Arizona.

SELECTED GRANT/AWARDS RECEIVED (all as **Principal Investigator**)

(1) Research grants from ISU University Research Council, $2350, 1996; Process Selection and Tolerance Allocation for Rotational Surfaces; $2800, 1997. Fuzzy Set Theory Based Methodology for Target Value Problem in Quality Improvement.

(2) Indiana State University Research Proposal Incentive Fund Award: $4165; 1997. Integrated Design and Optimization of Distributed Packaging Systems.

(3) Received, in December 1998, the "**Best Paper Award for 1997**" from **IIE Transactions**, "Formation of Independent Flow-Line Cells Based On Operations Requirement and Machine Capability", $500.

(4) Awarded a research grant in 1999: Artificial Intelligence and Knowledge Based System for Design and Optimization of Food Extrusion Process. $58,740; Kellogg

Company, Battle Creek, Michigan.

(5) Lilly Faculty Fellowship, 1999, Data mining research on the first-year undergraduate students profile database ($5,000), Lilly Foundation.

(6) Indiana State University IRTS Technology Research Grant: $5000, Intelligent conceptual simulation modeling; 2005.

(7) Corporate funding through contracted research at ISU Center for Systems Modeling and Simulation: $45,000; 2004-present.

M. AFFAN BADAR, Ph.D.

PROFESSIONAL PREPARATION

Aligarh Muslim University (India),	Mechanical Engineering,	BS (Hons),	Jul 1988
Aligarh Muslim University (India),	Industrial Engineering,	MS,	Oct 1990
KF Univ of Petrol & Minerals (Saudi Arabia),	Mechanical Eng'g,	MS,	Jan 1993
University of Oklahoma,	Industrial Engineering,	PhD,	Dec 2002

APPOINTMENTS

- 5/9/09 – 7/6/09, Acting Chair, ECMET Department, Indiana State Univ.
- 08/2007 – present, Coordinator, BS in Mechanical Engr. Tech., Indiana State Univ.
- 01/2004 – present, Assistant Director, Center for Systems Modeling and Simulation, ISU
- 08/2008 – present, Tenured Associate Professor, Dept. of ECMET, Indiana State University
- 08/2002 – 08/2008, Assistant Professor, Dept. of ECMET, Indiana State University
- 06/1999 – 12/2001, taught as a PhD candidate, School of Industrial Engr., Univ. of Okla.
- 05/1999 – 08/2000, Manufacturing Engineering Intern, York International, Norman, OK
- 08/1998 – 01/1999, Mechanical Design Engineer, Weatherford ALS, Odessa, TX
- 03/1993 – 08/1995, Lecturer, Dept. of Mechanical Engr., KF Univ. of Petroleum & Minerals

SELECTED PUBLICATIONS

1. M.A. Badar, "Lean Manufacturing Cell," in *Handbook of Industrial and Systems Engineering*, A.B. Badiru (ed.), CRC Press, Taylor & Francis Group, Boca Raton, FL, Chapter 18 (2006).
2. M. Chandler and M.A. Badar, **"**Effect of Individual Components on System's Reliability: A Case of Web-Based US Federal Highway Administration Project Recommendation and Approval Software," Emerald *Int. J. of Quality & Reliability Mgmt*., accepted.
3. H. El Mounayri, M.A. Badar, and G.A. Rengifo, "Multi-parameter ANN Model for flat-end milling," CSME, *Transactions of the Canadian Soc. for Mech. Engineering*, 32, 3-4, 523-536 (2008).
4. R. Yarlagadda, M.A. Badar, and B. Blyukher, "A review on oil and gas pipeline safety," *Proceed. of the ASME International Mechanical Engineering Conf. & Exposition 2007*, 739-750, Seattle, WA (Nov 11-15, 2007).
5. B.A. Thomson, M.A. Badar, and M. Zhou, "Implementing QFD into a small job shop design process: a case study," IIE *Proceed. of the 2007 Industrial Engineering Research Conf., G. Bayraksan, W. Lin, Y. Son, and R. Wysk (eds.)*, p. 1126-1131, CD-ROM:IIE07/Research/IIE-202A.pdf, Nashville, TN (May 19-23, 2007).
6. R. Pondhe, S.A. Asare, M.A. Badar, M. Zhou, and R. Leach, "Applying lean techniques to improve an Emergency Department," *Proceed. of the IIE Annual Conference 2006, Session: IERC03 Engineering Management 6*, CD-ROM, Orlando, FL (May 20-24, 2006).
7. T.E. Alberts, M.A. Badar, and B. El-Mansour, "Teaching engineering economics to engineering technology students," *Proceed. of the IIE Annual Conference 2005, Research Track: Engineering Economics*, CD-ROM, Atlanta, GA (May 14-18, 2005).

8. M.A. Badar, S. Raman, P.S. Pulat, and R.L. Shehab, “Experimental analysis of search-based selection of sample points for straightness and flatness estimation”, ASME *J. of Manufacturing Science and Engineering*, 127, 1, 96-103 (2005).
9. M.A. Badar, S. Raman, and P.S. Pulat, “Experimental verification of manufacturing error pattern and its utilization in form tolerance sampling,” Elsevier *Int. J. of Machine Tools and Manufacture*, 45, 1, 63-73 (2005).
10. S.M. Zubair, A.K. Sheikh, M.O. Budair, and M.A. Badar, "A maintenance strategy for heat-transfer equipment subject to fouling: a probabilistic approach," ASME *J. of Heat Transfer*, 119, 575-580 (1997).

SYNERGISTIC ACTIVITIES

1. Developed courses MET 605 Adv Economic Analysis for Technology and MET 513 Application and Gaging of GD&T, Lean Manufacturing Techniques (non-credit workshop). Modified MET 405/505 Eco Analysis for Engr & Technology. Developed following courses for online delivery: MET 405/505 Eco Analysis for Engr & Tech, MET 413/513Application and Gaging of GD&T, MET 302 Applied Statics, MET 406 Strength of Materials, COT 703 Adv Statistical Analy in Tech..
2. Developed articulation agreement with the Vinayaka Missions University (India) to transfer their Mechanical, Production, and Mechatronics Engineering students into the BS in Mech Engr Tech program, Aug 2007. Assisted Dr. Zhou (then Program coordinator) in the proposal for a BS in Mechanical Engineering Technology program with changes in the existing BS in Mech Design Tech program, approved Fall 2004. Modified BS in MET program to meet the ABET-TAC criteria, approved Apr 2009.
3. Received Infusing Technology into Education grant from the IT Innovations Mini-grant program, $1,695, PI, Digital kit for geometric dimensioning and tolerancing, Feb 2005. Awarded Emerging Technologies grant from the IT Innovations Mini-grant Program, $4000, Co-PI (PI: McNabb, Co-PI: Zhou), 3D Reverse Engineering Digital Microscribe, Feb 2007.
4. Received Promising Scholar grant from the Div. of Academic Affairs, supported by the Lilly Foundation, $15,000, PI, Improving Healthcare Systems Using Lean Manufacturing and Simulation Modeling Techniques, Jan 2006. Awarded Undergraduate Fellowship grant from the Alliance for Excellence through Engagement and Experiential Learning supported by the Lilly Foundation, $5,000, PI (Co-PI: Zhou), Implementation of Industrial Engineering Methods to Benefit Local Industries, July 2005. Awarded collaborative linkage travel grant from the NATO Security through Science Program, $18,000, Investigator, [PIs: Blyukher (USA), Belhaq (Morocco) and Malachowski (Poland)], Development of methods of improvement of oil and gas pipeline security and defense against terrorism, Dec 2005.
5. Director, IIE Engineering Economy Division, 2005-07; Session Chair, Engr Eco 2, Engineering Economics Track, IIE Annual Research Conference (IERC) 2009; Track Chair Engineering Economics and IERC 2005 Organizing Committee member (Chair: Georgia-Ann Klutke); Reviewer for ASME journals and other journals & proceedings.

COLLABORATORS & OTHER AFFILIATIONS

Collaborators

Dr. Leslie Gardner, University of Indianapolis
Dr. Hazim El-Mounayri, Indiana Univ.-Purdue Univ., Indianapolis

Dr. Ming Zhou, Indiana State University
Dr. Yuetong Lin, Indiana State University
Dr. Boris Blyukher, Indiana State University
Dr. Bassou El Mansour, Indiana State University

Graduate (PhD Dissertation) Advisors
Dr. Shivakumar Raman, University of Oklahoma
Dr. P. Simin Pulat, University of Oklahoma

Thesis Advised

Nicole Radziwill (member), Sp 2009; Todd E. Alberts, Sp 2007, Indiana State U; Gustavo A. Rengifo (member), Sp 2007, Cummins Inc; Michael Stroup, Fa 2006, Sony DADC; Kitti Setavoraphan (member), Fa 2005, admitted to U of Okla (PhD)
Ramesh Pondhe, Fa 2005, started with a hospital group in PA
Stephen A. Asare (co-advisor), Fa 2005; Ben Thomson, Sp 2005, Reynold's Co.; Sunil S. Sawle, Fa 2005, started w/ Great Dane Trailers; Ashish Singhal, Fa 2004.

Curriculum Vita

Qun Zhang
617 Dobbs Dell Street
Terre Haute 47803
Telephone: (812)-877-6782
E-mail: qun_john@yahoo.com

PROFESSIONAL EXPERIENCE

Senior Research Scientist 2003—
Joint computer simulation research project at Indiana State University, Terre Haute, IN
Deputy Director 1998—2002 Tongji University, Shanghai, China**.**
Co-founder of the Biomedical Engineering Research Center, Supervised teaching and research

1. Developed the hospital PACS (Picture Archiving and Communication System) including DICOM3.0 protocol implementation, MRI, digitized film (CT /nuclear medicine) integration, and network modification and maintenance.
2. Designed home healthcare devices, Holter (Electrocardiography Monitor), EEG and so on
3. Completed and published "Computer Cryptography" and " Foundation of Medical Imaging" graduate textbooks
4. Taught courses on "Foundation of Medical Imaging", "Advanced Computer Architecture", "Software Engineering", "Digital Signal Processing", "Data Communication and Networking", and the Graduate Research Seminar

System Engineer, 2000—2001, Motorola, Inc., Schaumburg, IL
Managed and implemented wireless network projects in the Network Section of Motorola

1. Installed, integrated, and upgraded the network components, e. g. MDG (Mobile Data Gateway), Billing Accumulator, and Intelligent Database in Nextel Mobile Switching Offices nationwide.
2. Built a lab with colleagues for Implementation Group testing products and training people
3. Created training tutorials: Packet Data and CALEA (Communications Assistance for Law Enforcement Act)

Senior Research/Training Manager, 2000, Advanced Technical Support, Inc., Schaumberg, IL

1. Developed the software testing workshops (IDL, SDL, and TTCN)
2. Worked as a contractor in the Implementation Group of Motorola

Post-Graduate Research Associate 1993—1998, Purdue University, West Lafayette, IN

1. Joined the high energy physics group as an Electronic Support Engineer to work on DAQ (Data Acquisition) for the CLEO III silicon tracker (a detector system to record fundamental particles) funded by DOE and completed system modification and maintenance for the Microstripe Gas Chamber aging research funded by NSF
2. Funded by NIH (National Institute of Health), Created a New Algorithm, Hybrid-Hybrid Matrix Method, to upgrade MORASS (Multiple Overhauser Relaxation AnalysiS and Simulation) and completed research with 3D NOE-NOE data analysis for determining protein structure using NMR
3. Designed /developed the "Mint Virtual Library" including DBMS development, SQL database, and Web-based applications for the Mint Industry Research Council
4. Taught courses on "Operating System", "Software Engineering", and Graduate Research Seminar

Associate Professor, 1986—1992, Computer Science Department, Tiedao University, Shanghai, China

Supervised the Computer Application Education Division and Campus Computer Center

1. Designed various real-time embedded systems for transportation and manufactory including hardware, C/Assemble languages programming, in-circuit testing and field implementation
2. Invented a microcomputer-based boiler water analyst and developed it as a commercial product
3. Group member, for designing and completing the China Railway Computer Network Phase 1
4. Taught courses on "Microprocessor and Microcomputer based Instrument Design", "Real-time monitor and control system", "Programming", "Data Communication and Networking", "Digital Signal Processing", "Introduction to Computer", "Computer Organization", and Graduate Research Seminar

Lecturer, 1976—1986, Physics Department, East China Normal University, Shanghai, China

Supervised the NMR laboratory and joined a team to found the Department of Computer Science at Teidao University

1. Team leader to complete the Fourier Transfer module for FT-NMR Spectroscopy
2. Cooperated with the hospital to complete cancer diagnosis research with NMR
3. Member of the first minicomputer family (DJS-100) design group in China with the specific responsibility designing and implementation of the memory system
4. Designed Special Purpose Computer (STY-1, 2) for railway signal testing and monitoring
5. Taught courses on "Principle of Operational Amplifier", "Digital Circuit Design and Application", "Introduction to Computer", "Computer Organization and Architecture", and "Algorithm and Data Structure"

Assistant Professor, 1964—1976, Physics Department, East China Normal University, Shanghai, China

Supervised the NMR laboratory

1. Designed Nuclear Magnetic Resonance (NMR) Spectroscopy, Electron Paramagnetic Resonance (EPR) Spectroscopy, magnet**,** and other scientific instruments, and cooperated with the company to make them as commercial products used in universities and institutes labs in China
2. Advisor of Shanghai Semiconductor Device Co., helping in IC product troubleshooting and test instrument development
3. As head of the campus observatory to supervised undergraduate astronomy activities
4. Taught Courses on "General Physics", "Application of Electronic Circuits in Experimental Physics", "Nuclear Magnetic Resonance Theory and Experiments", "Radio Frequency and Microwave Technique", "Transistor Circuits", and "Integration Circuit Design and Performance Testing"

EDUCATION

Post-graduate training, through the Exchange Visitor Program No. P-1-0622 (Computer Data Process), Purdue University, West Lafayette, IN, U.S. A. (1993—1998)

Master of Science Degree in Physics, NMR specialization, East China Normal University, Shanghai, China (1964)

Electronics Faculty Training, Peking University, Beijing, China (1962)

Bachelor of Science Degree in Physics, East China Normal University, Shanghai, China (1961)

HONORS and AWARDS

Honor for the best textbook " Introduction to Computer" from Railway Ministry, China (1996)
National Award for Computer Education Research, National Education Committee, China, (1994)
National Third Award for NMR Instrument, The First National New Products Exhibition, Beijing, China (1965)
The Second Research and Technology Development Award from the Railway Ministry for the Microcomputer-Based Boiler Water Analyst (1986)
Member of Educational Committee, Computer Society in China, (1986-2002)
Recipient, Confederation of British Industry Overseas Scholarships, (1982)

SELECTED PUBLICATIONS

Articles

"Design and Initial Performance of the CLEO III Silicon Tracker" Nuclear Instruments and Methods in Physics Research, E. Von Toerne, et al. A 473 (2001) pp.17-25
"An Aging Study of Semi-conductive Microstrip Gas Chambers" Nuclear Instruments and Methods in Physics Research, E.K.E. Gerndt, I.P.J. Shipsey Q. Zhang, et al. A 422 (1999) pp.282-285
"A Study of Semiconductive Glass Substrate Microstrip Gas Chambers" Transactions, American Nuclear Society, J. Miyamoto, I.P.J. Shipsey, Q. Zhang, et al. Vol., 79 (1998) pp.106-107
"PACS and DICOM3.0", Computer World, Q. Zhang, Nov. 1999
" Medical Imaging Instrument in Development", Journal of Shanghai Medical Instrument and Device, Q. Zhang, January, 1999
*"Developing an Electronic Archival Library on Mint: year 1—Implementation of a Database", 1994,1995,1996 MIRC Proceeding***,** Jim Simon and Q. Zhang, Dec. 12-15, Las Vegas, NV.
"A Hybrid-Hybrid Matrix Method for 3D NOE-NOE Data Analysis", Journal Magnetic Resonance, Qun. Zhang, David G. Gorenstein et al. B106, pp.164-169 (1995)
"A Hybrid-Hybrid Matrix Method for 3D NOE-NOE Data Analysis-Further Studies", Bulletin of Magnetic Resonance, Q. Zhang, David G. Gorenstein Vol17, No.1-4, pp.61-66 (1996)
"The Software Developing Strategy for NMR Data Analysis" Chinese Journal of Magnetic Resonance Spectroscopy Vol. 13, No. 5 Q. Zhang (1996)
"The Influence of Internet in Biomedical Science" Shanghai Journal of Biomedical Engineering Vol. 17 No. 2 Q. Zhang (1996)
"The Real-time Measurement of Non-Sinusoidal AC Electrical Parameters", Q. Zhang et al., *IEEE TENCON'93 International Conference,* 1994, Beijing
"The Measurement of Motor Parameters with Embedded System", Q. Zhang, Journal of Shanghai Institute of Railway Technology, Vol. 14, No. 3 1993

"Microcomputer-Based Boiler Water Analyst" Q. Zhang, H.Q. Zhu, Transaction of Computer Application in Shanghai Vol. 16 1984
"Orientation of Polymer fiber measurement with NMR" Q. Zhang, et al., *Physics Society Conference,* Dec. 1964, Shanghai
"Broad-line NMR Spectroscopy" Q. Zhang, et al, *Physics Society Conference*, Dec. 1964, Shanghai

Books

Reveal the Secret of Computer Q. Zhang Beijing: Tsinghua University Publishing House (2002)
Foundation of Medical Imaging graduate textbook Q, Zhang, H.F. Qi, (2003)
Computer Cryptography**,** H. Feng, F. Q. Lai, Q. Zhang, Beijing: Railway Publishing House (1999)
The Guide of the Internet**,** Q. Zhang, H. Feng, Beijing: Railway Publishing House (1995)
Introduction to Computer undergraduate textbook, Q. Zhang Beijing: Railway Publishing House (First Edition 1986, Second Edition 1992, Third Edition 1996)
Physics Handbook , Q. Zhang (chief editor) Shanghai: People Education Publishing House (1978)
Earth-orbiting Satellites, Q. Zhang, Shanghai: People Publishing House (1972)

A. MEHRAN SHAHHOSSEINI
Assistant Professor, Department of Mechanical Engineering, University of Louisville

Degrees

D.Eng.	Mechanical Engineering	Lamar University	1999
M.Sc.	Materials Engineering	Isfahan University of Technology	1991
B.Sc.	Metallurgical Engineering	Tehran University	1988

Appointment Information

Nine (9) years service
Original appointment as Post-Doctorate Research Associate - 2000
Promoted to Assistant Professor - 2001
Portion of time available for research or scholarly activities - 40 percent
Portion of time committed to the program - 50 percent

Related Experience

10/89-8/94, Arak Machine Manufacturing Plant, Arak, Iran. Senior Research Engineer.

7/87-9/87, Pars Metal Casting Plant, Tehran, Iran. Engineering Intern.

7/86-9/86, Steel Profile Manufacturing Plant, Tehran, Iran. Engineering Intern.

Professional Registration

Engineer-in-Training (EIT) Certificate, Texas, 1999

Principal Publications (Past Three Years)

Zhang, S., Prater, G., Shahhosseini, A.M., Osborne, G., "Experimental Validation of Structural Gauge Sensitivity Indices for Vehicle Body Structure Optimization," Experimental Techniques, Vol. 32, Issue 2, 2008.

Prater, G., Zhang, S., Shahhosseini, A.M., Osborne, G., "Application and Experimental Validation of Gauge Sensitivity Indices for Vehicle Body Structure Optimization," SAE Transactions, paper no. 08B-311, 2008.

Osborne, G., Prater, G., and Shahhosseini, A.M., "Finite Element Concept Modelling Methodologies for Pickup Truck Boxes," International Journal of Heavy Vehicle Systems, submitted January 2008, accepted.

Prater, G., Shahhosseini, A.M., Osborne, G., Lone, J., Zhang, S., "Simulation Studies for Determining Hydraulic Hybrid Powertrain Subframe Response Characteristics," International Journal of Heavy Vehicle Systems, submitted October 2007, accepted.

Shahhosseini, A.M., Prater, G., Osborne, G., Kuo, E., and Mehta, R., "Major Compliant Joint Modelling for Automotive Body Structures," International Journal of Vehicle Systems Modelling and Testing, submitted October 2007, accepted.

Prater, G., Zhang, S., Shahhosseini, A.M. and Richards, C.M., "Gauge Sensitivity Indices for Vehicle Body Structure Assessment and Optimization," International Journal of Vehicle Systems Modelling and Testing, submitted October 2007, in review.

Kuo, E., Mehta, P., Prater, G., and Shahhosseini A.M., "Analytical Benchmarking of Body Architectural Efficiency of Competitive Vehicles," SAE Transactions, paper no. 07M-291, 2007.

Keshmiri, H., Shahhosseini, M.H., Shahhosseini, A.M., and Ebrahimi, G., "Effect of Temperature and Strain Rate on Secondary Phase Formation in 2205 Duplex Stainless Steel under Hot Working Condition," *Materials Science and Technology 2008 Conference*, Pittsburgh, PA, October 5-9, 2008.

Keshmiri, H., Shahhosseini, M.H., Shahhosseini, A.M., Ebrahimi, G., and Asadi, S., "Effect of Aging Temperature on Microstructure and Mechanical Properties of 2205 Duplex Stainless Steel," *Materials Science and Technology 2008 Conference*, Pittsburgh, PA, October 5-9, 2008.

Keshmiri, H., Shahhosseini, M.H., Shahhosseini, A.M., and Ebrahimi, G., "Investigation of Hot Deformation Behavior of 1.4563 Super-Austenitic Stainless Steel," *Materials Science and Technology 2008 Conference*, Pittsburgh, PA, October 5-9, 2008.

Heidari, G., Mosavi-Khoie, M., Hasanzadeh, A., Marashi, P., Keshmiri, H., and Shahhosseini, A.M., "Investigation of Zinc Thermal Diffused Coatings by Solid State Diffusion Method," *Materials Science and Technology 2008 Conference*, Pittsburgh, PA, October 5-9, 2008.

Scientific and Professional Societies

- Society of Automotive Engineers (SAE)
- A Society of Materials (ASM)
- Association for Iron & Steel Technology (AIST)
- The Minerals, Metals & Materials Society (TMS)

Honors and Awards

- Academic Fellowship, Lamar University, Texas, 1996 - 1999
- Top Ten Faculty Favorites out of 237 faculty members, University of Louisville, 2007
- Sigma Xi, The Scientific Research Society

Institutional and Professional Service (Past Five Years)

- Reviewed submissions for the following journals: SAE Technical Papers and International Journal of Heavy Vehicle Systems
- Reviewed proposal submissions for California Energy Commission, Energy Innovations Small Grant (EISG) Program

Professional Development Activities (Past Five Years)

- Attended and presented at the 2008 Materials Science and Technology Annual Conference, Pittsburgh, PA

TODD E. ALBERTS
Indiana State University
Electronic, Computer, and Mechanical Engineering Technology Dept.

SUMMARY

Motivated professional with 17 years of industry experience in designing, testing, and manufacturing of a wide range of electro-mechanical machine platforms. Solid technical background in all phases of engineering design and project management. Proven oral and written communication skills. Successful interaction with vendors and customers.

PROFESSIONAL EXPERIENCE

Indiana State University – Terre Haute, IN 47809
An institute of higher education utilizing research and applied sciences in the pursuit of advanced academic studies.
Instructor – Industrial and Mechanical Engineering Technology Department 8/25/07 til present
Lecturer I – Industrial and Mechanical Engineering Technology Department 1/01/07 til 5/07/07
Graduate Teaching Assistant – Industrial and Mechanical Engineering Technology Dept. 8/01/05 til 1/01/07

1. Development and delivery of classroom curriculum related to Mechanical Engineering Technology coursework, grading and assessment of all homework, quizzes, tests, and laboratory assignments
2. Mentoring and teaching of student chapter organizations such as Society of Manufacturing Engineers
3. Faculty appointment to Project Lead The Way (PLTW) program

* Teaching and instructional duties related to MET103 Intro to Technical Graphics, MET 130 Intro to Engineering Technology, MET203 Introduction to Solid Modeling, MET299 CAD Fundamentals, MET403 Advanced Solid Modeling, MET 430 Sr. Seminar, MET633 CAD Software

Pfizer Pharmaceuticals – Terre Haute, IN 47802
A global research and development site for the evolution and discovery of veterinarian related pharmaceuticals.

Project Engineer - Facilities Engineering Dept. 9/14/02 until 10/10/03

1. Capital project improvements and implementation management
2. Facility layout design and floor plan utilization improvements
3. Creation and implementation of Service Level Agreement Contracts
4.

* Lead a $110,000 update/modification project of facilities controls packages to veterinarian vivarium section of a Level 2 BIOS environmental containment facility. Project completed on time and 12% under budget.

Jones Tool and Machine Inc. – Terre Haute, IN 47805
A local family owned machine shop dealing in the fields of conventional/CNC machining, welding & fabricating, as well as specializing in the design and building of specialty machinery.
Project Engineer / Coordinator 7/14/98 to 8/12/02

1. Engineering Design & drafting of specialty machinery applications
2. Project process development
3. Purchasing and Procurement

* Lead contact responsible for all production and design aspects associated with one individual customer for the daily manufacturing and development of various machine parts/machine assemblies/machine designs that account for estimated $2,500,000 sales on an annual basis.

Alcoa Inc. - Closure Systems International Division - Crawfordsville, IN 47933
A global OEM supplier of closure manufacturing equipment as well as beverage closures to the bottling industry.
Sr. Designer - Machinery Engineering R &D Division 8/4/93 to 12/31/97

1. Mechanical engineering/design/drafting
2. Prototype testing and evaluation
3. Project management (1K – 350K)
4. Cost reduction / MTBF improvements / Design for Manufacturing improvements

* Lead designer for engineering development, project management, installation and training of 2 new scoring machines for "Sport-Lok" product development project. Budget of $350,000 for machinery portion of project resulting in estimated annual EVA of $4,000,000 gross sales.

Machine Tool Service Inc - Terre Haute, IN 47807
A manufacturer and rebuilder of CNC machine tools, CNC machinery retrofits, and specialty machinery design.
Mechanical Designer/Drafter 6/88 to 8/1/93
Duties and Responsibilities:

1. Electro/Mechanical design and drafting
2. Electrical/CNC/PLC wiring schematics
3. Project management (1K – 225K)
4. Purchasing and procurement

* Project Coordinator and lead designer for $225,000 CNC retrofit of centerless grinder for use by United States Department of Defense at Norfolk Naval Shipyards.

EDUCATION

Indiana State University - Terre Haute, IN

Major: *MS Industrial Technology*	Graduate: May 5, 2007	GPA = 4.00 / 4.00
Major: *BS Mechanical Technology*	Graduate: August 12, 2005	GPA = 4.00 / 4.00
Minor: *Manufacturing Technology*		GPA = 4.00 / 4.00

Ivy Tech State College - Terre Haute, IN

Major: *A.S. CAD/CAM* Graduate: February 1988 GPA = 3.94 / 4.00

Sullivan High School - Sullivan, IN
Advanced Academic Diploma Graduation Date: May 18, 1986

Additional Engineering Related Career Training

1. Pursuing professional status as Certified Manufacturing Technologist (SME)
2. Geometric Dimensioning & Toleranceing Y14.5
3. Engineering Ergonomics
4. Root Cause Analysis
5. Failure Modes Effects Analysis- FMEA

SOFTWARE

Pro-Engineer Wildfire 3.0, Autocad V10 thru 2009, Autocad LT, Hewlett Packard ME10, SPSS Statistical Software, AS400, Windows Operating Systems, MS Word, MS Excel, MS Outlook, MS Powerpoint, Internet Explorer, Adobe Photoshop, Adobe Premiere, Blackboard

PUBLICATIONS

T.E. Alberts. (2007). *An Experimental Evaluation of Performance Variance for Internally Threaded Geometry Related toExtended Tap Wear in Low Carbon Steel.* Master's Thesis, Indiana State University, Terre Haute, Indiana

T.E. Alberts, M.A. Badar, and B. El-Mansour, Teaching Engineering Economics to Engineering Technology Students, *Proceed. of the IIE Annual Conference 2005, Research Track: Engineering Economics*, CD-ROM, Atlanta, GA (May 14-18, 2005).

PRESENTATIONS

T. E. Alberts, Managing the Human Element of the Lean Manufacturing Culture, Management Track, 2006 NAIT National Conference, Cleveland, OH (November 15 – 18, 2006).

APPENDIX C – LABORATORY EQUIPMENT

See the description under Criterion 7.

APPENDIX D – INSTITUTIONAL SUMMARY

The institution may employ any means it chooses to represent itself to ABET and the visiting team. Consequently, the references to specific tables in the following are for guidance only. The information may be presented in any manner the institution chooses.

The Institution

Indiana State University is located in Terre Haute, Indiana, serving approximately 10,500 graduate and undergraduate students. The university is a doctoral research university, combining a tradition of strong undergraduate and graduate education with a focus on community and public service. We integrate teaching, research, and creative activity in an engaging, challenging, and supportive learning environment to prepare productive citizens for Indiana and the world.

Address: Indiana State University
200 North 7th Street
Terre Haute, IN 47809

President: Dr. Daniel J. Bradley

Type of Control

Indiana State University (ISU) is a state university.

History of Institution

Taken from http://www1.indstate.edu/archives/history/essay/essay.html

From Normal School to University

The Beginning:

Indiana State University was created by House Bill 119 (December 20, 1865), in which the General Assembly of the State of Indiana established "a State Normal School, the object of which shall be the preparation of teachers for teaching in the common schools of Indiana." Tuition was to be free to residents of Indiana and admission to "the privileges of instruction in the Normal School" were conditioned upon requirements which included sixteen years of age for females, and eighteen for males; good health; and, satisfactory evidence of undoubted moral character.

The Board of the Normal School was authorized to advertise throughout the State of Indiana for donations of land, money, and buildings as a site for the new school. Terre Haute was the only community in the state to make such an offer of money and land. The State Normal School was constructed on donated ground, which is now the present day site of the Quadrangle. On January 6, 1870 the partially constructed and poorly equipped Indiana State Normal School building was opened to students. On this day, President William Jones greeted 23 students and a faculty

comprised of three assistants. Later in the year the student body increased to 40 and three additional faculty were hired.

During the early years of operation, the majority of the students attending the Indiana State Normal School had only completed elementary school with perhaps a couple of years of high school. Very few were high school graduates. The Normal School and its course of instruction were characterized by strict discipline and classroom recitations requiring analysis of principles and an abundance of mental exercise. While this level of instruction would characterize the curriculum of the Normal School for decades, the institution met the requirements of its mission to the state of Indiana with remarkable success. By 1880, the State Superintendent of Public Instruction would note that wherever he went in the state, "I find that Normal graduates are doing the very best kind of work and I think that to their efforts is due in a large measure the rapid advancement which our schools have made during the past few years". Graduates of the Normal School would be teaching in public schools and sister normal institutions throughout the United States, and as far away as Argentina, Uruguay, Paraguay, and the Philippine Islands by the end of the century.

On April 8, 1888, the Indiana State Normal School was completely destroyed by fire. The event was described as "the most unfortunate single catastrophe that could happen to Terre Haute". Thanks to the resolve of President William Wood Parsons, students of the school missed only one day of classes. The City of Terre Haute rallied to support the school by providing temporary quarters in the community and appropriating money for the immediate rebuilding of the school. Instruction resumed in a new Normal School building built on the same site in the fall of 1888. In addition to this catastrophe, the Normal School weathered several crises and controversies during these formative years; facing such challenges as the resignation of one-half the faculty in a dispute with the Board of trustees in 1881, and the cancellation of the 1893 Commencement as the result of a student led protest by the Senior Class.

The late nineteenth century also witnessed the emergence to several student-oriented activities that survive to this day. In November of 1895 students produced the first issue of the Normal School Advance. Over the years this publication developed into a yearbook and newspaper format. In the 1920's the yearbook was named "The Sycamore" and the newspaper was named the "Indiana Statesman." During the winter term of 1893-1894 the students promoted intramural and intercollegiate athletic competitions for men and women by forming an Athletic Association. In 1896 the women of the Normal School formed the Women's League in order to enhance social and cultural functions. This league provided the foundation upon which the Greek sorority system developed.

Master Plan I: In 1893, and later in 1903, the state authorized the first expansions of the Normal School. An addition (North Hall) was placed on the north side of the main building to house science laboratories, the school's first library, and two gymnasiums for men and women. A Training School was later built to the south and east. All structures were architecturally compatible and similar in appearance. They were all located on the site of the present day Quadrangle.

Indiana State developed a curriculum, that enabled it to emerge into the twentieth century, and was recognized as one of the premier normal schools involved in teacher training in the United States. In several areas this level of excellence was apparent and readily supported by the State of Indiana. Indiana State was a pioneer in the training of teachers in the field of Industrial Arts,

and in 1915 constructed a large building to house this and the Home Economics programs. The State Normal Library was constantly rated as the second largest teachers college library in the United States (behind Columbia University) and was housed in a magnificent structure which was described as one of the most magnificent library buildings in the mid-west. In the decade prior to and immediately following World War I the Indiana State Normal School prospered. The successful development of the institution led to calls from around the state of Indiana for the creation of another institution to train teachers. Rather than create a new school, the Indiana State Normal School was authorized to open a branch campus in Muncie, Indiana. The Indiana State Normal School- Eastern Division opened in the 1918

It was not until the year 1907 that the State of Indiana required a high school diploma of all teachers licensed to teach in Indiana. In response to this initiative, high school graduation was made a requirement for admission to the Normal School, and a four-year College Course was established. The first bachelor's degrees were awarded in June 1908. The first North Central Association accreditation of the Normal School was awarded in 1915. During the period from 1907-1924, a large part of the curriculum in the elementary teacher training program was of sub-collegiate quality, and often not accepted for transfer by other colleges and universities as college level work. The academic structure of Normal School was reorganized to form 13 departments in 1923. In the following year 1924, all course offered were elevated on a college level. In 1927, a Graduate School was created at the Normal School to administer the programs of students pursuing graduate study in education. The first master's degrees were awarded in 1928

Through the decade of the 1920's, the task of elevating the academic curriculum of the institution, as well as the scholarly credentials of the faculty, was undertaken in order to meet the requirements of accreditation. In 1929, the name of the institution was changed to Indiana State Teachers College. In 1930, the institution was admitted to the American Association of Teachers Colleges and was accredited by the North Central Association of Colleges and Secondary Schools.

The decades of the 1930s was a difficult time for academic institutions. The depression of that decade coupled with the threat of global war had a limiting effect on enrollments. The academic reputation of the institution as a teachers college was secure but the physical plant had suffered years of neglect. The college was located in the heart of a thriving commercial district, but lacked a cohesiveness which identified it as a college community. It is fortunate that federal funding from PWA and WPA programs were available to colleges and universities who were in desperate need of assistance.

Master Plan II: By the end of the 1930's, a building program had resulted in the construction of a Laboratory School. A state of the art model in teacher training facilities which was one of the largest and best equipped such facilities in the nation. A new Student Union Building, and the Fine Arts and Commerce building were nearing completion, and students enjoyed the benefits of campus residence in two dormitories (Women's Residence Hall and Parsons Hall for men) which provided room and board for a cost of $90.00 per quarter. Eagle and Mulberry Streets, through the heart of the campus, were closed and a pedestrian Quadrangle was developed to form an open green space around which the campus could grow.

The years during World War II were difficult for the university as men and women left school to join the military service or work in war-industry related occupations. The V-5 and V-12 Naval

training units located at Indiana State helped maintain enrollment levels and the financial security of the institution.

In 1940, a bachelor's degree was made a requirement of all teachers licenses issued in Indiana. As this requirement took effect, the students of Indiana State Teachers College were graduated with a bachelors degree and the final lingering vestiges of the Old Normal School course of study were eliminated from the curriculum. As Indiana State celebrated its 75th anniversary in 1945, President Ralph Tirey could note with pride that throughout it's history as a Normal School and Teachers College, Indiana State had been recognized as one of the outstanding teacher training institutions in the United States. Many graduates of the institution have taught in Indiana public schools and assumed positions of leadership in Indiana education. Practically every school district in the state of Indiana has felt the influence of Indiana State teachers.

Within a decade, President Raleigh Holmstedt was able to note that while the preparation of teachers remained the principal function of the Teachers College, the graduate curriculum at Indiana State was designed primarily for teachers and school administrators, "strong undergraduate program permitted an increasing proportion of its graduates to prepare for other professions and vacation." By 1958, nearly one-third of the graduates of Indiana State entered professions and vocations other than teaching. The post-war period witnessed a profound trauma in American education. Returning veterans took advantage of educational opportunities offered to them under the G.I. Bill of Rights and returned to pursue complete college degrees. Enrollment in 1945 was 788 and in 1947, this number increased to 2555. In subsequent years their children, the "baby-boomers", flooded primary and secondary schools throughout the country and finally entered colleges and universities in the late 1950s and 1960s. This staggering increase in the number of students effected Indiana State in two ways; first, teachers had to be trained to fill the elementary and secondary school classrooms being built all over the state; and second, college enrollments soared as the "baby-boomers," entered higher education. At Indiana State, enrollment in 1959 was 5,189 and by 1968 was 12,892 at the Terre Haute campus with a total of 16,532 in all programs of both the Terre Haute and Evansville campuses.

The growth of the academic curriculum doubled with the tremendous increases in enrollment produced a period of explosion unparalleled in institutional history. In the decade from 1959 to 1969 a total of 15 residence halls would also be constructed on the campus. The Married Student Housing Complex would be completed and plans were made for the construction of Lincoln Quad. During the decade, the academic curriculum and administration were reorganized to form the College of Arts and Sciences (1962), the School of Education (1960), the School of Graduate Studies (1961), the School of Nursing (1962), the School of Business (1964), the School of Health Education and Recreation (1965), and the School of Technology (1968). In 1965 Indiana State University started its own doctoral study program with a Ph.D. degree in elementary education and guidance-psychological services. In the same year, Indiana State established an Evansville campus (ISUE) and enrolled its first class in September of that year. In 1985 this Evansville branch campus became the University of Southern Indiana and joined Ball State University as an outstanding institution of higher education originally founded by Indiana State University.

The peak of campus growth and enrollments occurred in the early 1970s. By September 1971, there were 806 members of the faculty at Indiana State University and an enrollment of 18,898 students served on the Terre Haute campus, the Evansville campus, and by off-campus extension

programs. Faced with the explosion in the number of students and faculty required to teach them, facilities were developed in every available structure in or near the campus, plans were made for new construction, and the boundaries of the campus were pushed outward into the surrounding communities in all directions.

Indiana State University now offers students more than 175 undergraduate programs of study and selected study to the doctoral level. National accreditation for professional programs has been attained in all academic units of the University.

Master Plan III: Indiana State University developed a plan in 1985 that was designed to realize a long held dream of creating a cohesive pedestrian campus by closing several streets through the center of the campus and building pedestrian plazas and walkways to connect various areas of the campus. A new Hulman Memorial Student Union, Dede Plaza, and the Sycamore Walkway highlight the transformation.

Student Body

Indiana State is a diverse campus, with a total of 69 countries represented. However the main population is the domestic students coming from Indiana and surrounding states. Our students are active participants in learning, inside and outside the classroom.

Regional or Institutional Accreditation

ISU is accredited by the North Central Association (NCA). The next accreditation evaluations are due in 2010.

Personnel and Policies

- The promotion and tenure system
  The ISU policies, guided by AAUP Policy Documents and Reports, for Faculty appointment, promotion, and tenure are outlined in the university Handbook and posted at http://www.indstate.edu/adminaff/handbook/SectionIII.pdf. Following these policies each academic unit (department or college) has a specific set of criteria for promotion and tenure. In the College of Technology, there exists a promotion and tenure document approved by the college faculty, Dean, and university senate. This document is used in reviewing the promotion and tenure within the College of Technology. The document states: "The purpose of promotion is to recognize the achievement in the broad areas of teaching, scholarly activity, service, and academic credentials. At the heart of promotion is the demonstration of increased leadership, ability, and value to the department, College, university, and profession. Tenure confers permanent faculty membership. Tenure is recognition that the faculty member has sustained and will continue a high level of teaching, scholarly activity, and service. Evaluation of faculty provides information to make the following types of decisions: promotion, tenure, faculty self-assessment and continual enhancement, recognition and reward, and salary adjustments. Faculty at the upper ranks (Associate Professor and Professor) should serve as mentors for junior faculty through their accomplishments and example."

  For the promotion or promotion and tenure, a faculty member submits his/her dossier to the department along with the university specific form. The document goes through the following stages in sequence: department personnel committee, department chair, college

committee, college dean, university vice president for academic affairs, university president, and board of trustees. There exists a promotion and tenure oversight committee at the university level where a faculty member can appeal the decision.

- The process used to determine faculty salaries
  A faculty position request is initiated by an academic department based on the staffing plan and need. The request is reviewed and approved by the Dean, Provost, and President. This request contains salary information as well trying to adjust the salary of the previous search in the department with the current market. For example in the ECMET department, the starting salary of a new assistant professor is in the range of $60,000. When an offer is made, the candidate can negotiate with the Dean around this figure. Note that those who were hired before, their salaries may be lower than this. Once a faculty member has joined the university, the salary is increased generally by 2 to 5%. At the time of promotion, the university gives a flat- dollar increment of $2100 from assistant to associate professor rank. Sometime at the time of promotion, the Dean (specially, professional college Dean) may recommend an additional increment for market adjustment, which may or may not be approved by the Provost office depending on the university budget. The ECMET department faculty salary data is presented in Table D-6.

- Faculty benefits
  The ISU faculty benefits are posted at http://www.indstate.edu/humres/benefits.htm. The benefits include retirement and health (medical, prescription drug, and dental) plans. Vision plan is optional. Flexible Spending Account, tuition fee waiver, life insurance, disability, and express health benefits are also provided.

Education Unit

There are five colleges: Arts and Sciences, Business, Education, Health and Human Services, and Technology, and a school of Graduate Studies at the Indiana State University. The College of Technology (COT) offers accredited programs at the associate, baccalaureate, master, and doctoral levels. Programs are accredited by the Association of Technology, Management, and Applied Engineering (ATMAE, formerly NAIT), American Council on Construction Education (ACCE) and the National Council for Accreditation of Teacher Education (NCATE/CTTE). This year COT has applied for TAC-ABET accreditation for the BS in Mechanical Engineering Technology and BS in Computer Engineering Technology programs. COT has 47 faculty members, 14 staff members, 890 undergraduate students, and 280 graduate students. COT has three departments: Aviation Technology; Electronics, Computer, and Mechanical Engineering Technology (ECMET), and Technology Management. COT also houses the Air Force Reserve Officer Training Corps and the Technology Services Center that sponsors projects with businesses and industries throughout the region. The programs offered by the COT's ECMET department have been listed in Table D-1 including the BS in MET program. Organization Structure in the Background Information describes the administrative chain of responsibility from the individual responsible for the program to the chief executive officer of the institution including names and titles.

Credit Unit

One semester credit normally represents one class hour or three laboratory hours per week. One academic year (Fall and Spring semesters) normally represents at least 28 weeks of classes, exclusive of final examinations.

Instructional Modes

See 'Program Delivery Modes' in 'Background Information.

Grade-Point Average

The grade-point average (GPA) required for graduation is 2.0 on a scale of 4.0.

Academic Supporting Units

- ECT courses like ECT 160, ECT 280, etc. are offered by the ECMET department.
- Department of Technology Management (Chair: Dr. James Smallwood, Professor): MFG 370, MFG 371, TMGT 471, TMGT 473, and TMGT 478.
- Organizational Department (Chair: Dr. Herschel Chait, Associate Professor): MGT 301
- Department of Mathematics and Computer Science (Interim Chair: Dr. Steven Pontius, Professor): CS 151, MATH 115, MATH 123, and MATH 301
- Department of Chemistry and Physics (Chair: Dr. Eric Glendening, Professor): PHYS 105 & 105L, CHEM 100 & 100L
- Department of English (Chair: Dr. Robert Perrin, Professor): ENG 101, ENG 105, ENG 107, ENG 305T
- Department of Communication (Chair: Dr. David Worley, Professor): COMM 101
- Department of Physical Education (Acting Chair: Dr. Jeffrey Edwards, Professor): PE 101 & 101L
- Department of Languages, Literatures, and Linguistics (Chair: Dr. Ronald Dunbar, Professor): Foreign Languages
- Department of History (Chair: Dr. Christopher Olsen, Associate Professor)

Non-Academic Supporting Units

See the description 'Adequacy of Support Personnel and Institutional Services' in Criteria 8. Provide information about units that provide non-academic support to the programs being evaluated, e.g., library, computing facilities, placement, tutoring, etc. Include names and titles of the individuals responsible for these units>>

Faculty Workload

See Tables 6-1a and 6-1b and the explanation of full-time load under Table 6-1b.

Tables D-1 to D-6

Table D-1. Programs Offered by the Educational Unit (Dept of Electronics, Computer, & Mech Engineering Tech)

Program Title[1]	Modes Offered[2]				Nominal Years to Complete	Administrative Head	Administrative Unit or Units (e.g. Dept.) Exercising Budgetary Control	Submitted for Evaluation[3]		Offered, Not Submitted for Evaluation[4]	
	Day	Co-op	Off Campus	Alternate Mode				Now Accredited.	Not Now Accredited	Now Accredited	Not Now Accredited
BS in Mech Eng Tech	x				4	Badar/Zhou	ECMET		x		
BS in Computer E T	x				4	Lin/Zhou	ECMET		x		
BS in Automation & Control ET	x				4	Ashby/Zhou	ECMET				x
BS in Automotive TM	x				4	Peters/Zhou	ECMET				x
BS in Electronics T	x				4	Malooley/Zhou	ECMET				x
AS in Electronics T	x				2	Malooley/Zhou	ECMET				x
BS in Info Tech	x				4	Farha/Pontius	Math/Comp				x
MS in Elect/Comp T	x			online	2	Clyburn/Cockrell	ECMET				x
MS in Industr Tech	x			online	2	Hayden/Smallwood	Tech Mgmt				x
PhD in Tech Mgmt				online	4	Maughan	COT				x

List of the titles of all degrees offered by the education unit responsible for the programs being evaluated, undergraduate and graduate, granted by the institution. If there are differences in the degrees awarded for completion of co-op programs, these should be clearly indicated.

[1] Give program title as shown on a graduate's transcript

[2] Indicate all modes in which the program is offered. If separate accreditation is requested for an alternative mode, list on a separate line. Describe "Other" by footnote.

[3] Only those programs being submitted at this time for reaccredidation (now accredited) or initial accreditation (not now accredited) should be checked in this column.

[4] Programs not submitted for evaluation at this time should be checked in this column.

Table D-2. Degrees Awarded and Transcript Designations by Educational Unit

<<Department of Electronics, Computer and Mechanical Engineering Technology>>

Note: Table D-1 contains this information. Hence no need to complete Table D-2.

Program Title[1]	Modes Offered[2]				Name of Degree Awarded[3]	Designation on Transcript[4]
	Day	Co-op	Off Campus	Alternative Mode		

[1] Complete the table for all programs, as follows:
[2] Give the program title as officially published in catalog.
[3] List degree awarded for each mode offered. If different degrees are awarded, list on separate lines.
[4] Indicate how the program is listed on transcript for each mode offered. If different designations are used, list on separate lines.

Table D-3. Support Expenditures

<<Department of Electronics, Computer and Mechanical Engineering Technology>>

Fiscal Year	(previous year)[1]	(current year)[2]	(year of visit)[3]
Expenditure Category	2007-08	2008-09	2009-10
Operations (not including staff)[4]	$72,641.87	$26,584	
Travel[5]	$8,515.5	$12,304	
Equipment[6]			
(a) Institutional Funds	$14,432	$12,458.4	
(b) Grants and Gifts[7]			
Graduate Teaching Assistants	$54,693.24	$60,485.92	
Part-time Assistance[8] (other than teaching)	$16,960	$26,057.13	
Faculty Salaries	$1,043,372.3	$968,280.8	

Report Department Level and Program Level data for each program being evaluated. Updated tables are to be provided at the time of the visit.

1 Provide the statistics from the audited account for the fiscal year completed year prior to the current fiscal year.

2 This is your current fiscal year (when you will be preparing these statistics). Provide your preliminary estimate of annual expenditures, since your current fiscal year presumably is not over at this point.

3 Provide the budgeted amounts for your next fiscal year to cover the fall term when the ABET team will arrive on campus.

4 Categories of general operating expenses to be included here.

5 Institutionally sponsored, excluding special program grants.

6 Major equipment, excluding equipment primarily used for research. Note that the expenditures (a) and (b) under "Equipment" should total the expenditures for Equipment. If they don't, please explain.

7 Including special (not part of institution's annual appropriation) non-recurring equipment purchase programs.

8 Do not include graduate teaching and research assistant or permanent part-time personnel.

Table D-4. Personnel and Students

<<Department of Electronics, Computer and Mechanical Engineering Technology>>

Year[1]: 2008

	HEAD COUNT		FTE[2]	RATIO TO FACULTY[3]
	FT	PT		
Administrative[4]	0.5	0	0.5	
Faculty (tenure-track)	12.5	0	12.5	
Other Faculty (excluding student Assistants)	1	1	1.5	
Student Teaching Assistants	0	11	5.5	0.4
Student Research Assistants	0	13	1	0.07
Technicians/Specialists	0	0	0	0
Office/Clerical Employees	1	0	1	0.07
Others[5] Professional temp (NSF grant)	0	1	0.53	0.038
Undergraduate Student enrollment[6]	206	54	225	16.07
Graduate Student enrollment	50	36	41	2.93

Report data for the program unit(s) and for each program being evaluated.

1 Data on this table should be for the fall term immediately preceding the visit. Updated tables for the fall term when the ABET team is visiting are to be prepared and presented to the team when they arrive.

2 For student teaching assistants, 1 FTE equals 20 hours per week of work (or service). For undergraduate and graduate students, 1 FTE equals 15 semester credit-hours (or 24 quarter credit-hours) per term of institutional course work, meaning all courses — science, humanities and social sciences, etc. For faculty members, 1 FTE equals what your institution defines as a full-time load.

3 Divide FTE in each category by total FTE Faculty. Do not include administrative FTE.

4 Persons holding joint administrative/faculty positions or other combined assignments should be allocated to each category according to the fraction of the appointment assigned to that category.

5 Specify any other category considered appropriate, or leave blank.

6 Specify whether this includes freshman and/or sophomores. Yes.

Table D-5. Program Enrollment and Degree Data
<<BS in Mechanical Engineering Technology Program>>

	Academic Year		Enrollment Year					Total Undergrad	Total Grad	Degrees Conferred			
			1st	2nd	3rd	4th	5th			Bachelor	Master	Doctor	Other
CURRENT	2008	FT	23	16	13	9	2	63					
	2009	PT	9	12	2	2	1	26		11			
1	2007	FT	19	17	14	7		57					
	2008	PT	16	3	4			23		6			
2	2006	FT	21	17	10			48					
	2007	PT	6	5				11		4			
3	2005	FT	20	13				33					
	2006	PT	11	1				12		1			
4	2004	FT	4					4					
	2005	PT	4					4					
5		FT											
		PT											

Give official fall term enrollment figures (head count) for the current and preceding five academic years and undergraduate and graduate degrees conferred during each of those years. The "current" year means the academic year preceding the fall visit.

FT--full time
PT--part time

Table D-6. Faculty Salary Data[1]

<< Department of Electronics, Computer and Mechanical Engineering Technology >>

Academic Year 2008-09 (as of Nov 1, 2008)

	Professor	Associate Professor	Assistant Professor	Instructor
Number	4	3	6	1
High	$80,356	$70,483	$64,139	
Mean	$78,664	$66,833	$59,974	$46,575
Low	$77,594	$62,064	$58,167	

[1] If the program considers that this information to be confidential, it can be provided only to the Team Chair.

SUPPLEMENTAL MATERIALS

University Catalog: It is available at http://catalog.indstate.edu.

Program Promotional Material: Attach a pdf file of the MET 2009 brochure.

Be prepared for the future

Through knowledge gained in mechanical design, computer-aided design and modeling, computer-aided engineering analysis, mechanisms and power systems, tools and fixture design, cost estimating and economic analysis, and management of product design/development projects, graduates of the program are prepared for management-oriented positions that require a strong background in applied technology.

Typical positions:

- Mechanical engineer
- Product design engineer
- Production engineer
- Project engineer
- Manufacturing engineer
- Quality engineer

With experience you may advance to positions such as:

- Team leader
- Head designer
- Supervisor
- Project manager
- Technical manager
- Plant manager

Typical employers:

- Sony DADC Company
- Great Dane, Inc.
- Cummins Inc.
- Unison Engine Components
- Bemis Company
- AET Company
- Bogo North America Company
- TRW Company
- Toyota Motor Manufacturing
- Caterpillar, Inc.

Indiana State's $18.7 million John T. Myers Technology Center has more than 20 state-of-the-art laboratories filled with the most up-to-date equipment and supplies.

Investigate financial assistance

Indiana State offers many types of financial assistance including scholarships, grants, work study/employment, and student loans. A variety of scholarship funds are available, many awarded by individual academic departments. Eligibility varies among scholarships. For more information, contact your major department or the Office of Student Financial Aid, Tirey Hall, room 150, Terre Haute, IN 47809, toll free 800-841-4744.

To find out more

To learn more about mechanical engineering technology at Indiana State, or to arrange a tour of our facilities, contact:

Department of Electronics, Computer, and Mechanical Engineering Technology
College of Technology
Indiana State University
Terre Haute, IN 47809
Phone: 812-237-3456
www.indstate.edu/ecmet/
or
www.indstate.edu/ecmet/acad/BS_MET.htm

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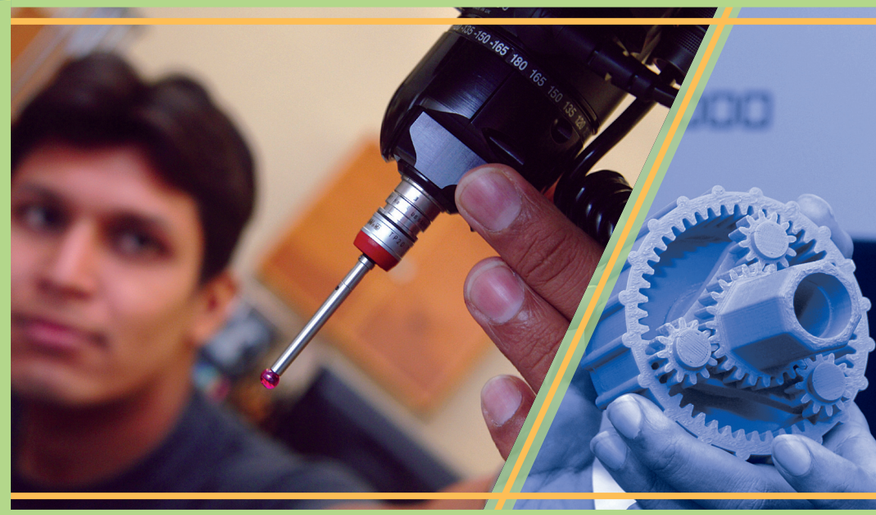
Mechanical Engineering Technology

College of Technology



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Indiana State University's Mechanical Engineering Technology Program focuses on engineering design, especially mechanical design and management of technical design processes, to prepare you for both technical and managerial positions in a variety of industries. The program emphasizes study in computer-aided design (CAD) and its integration with other computer-aided engineering (CAE) tools through hands-on experiences and technical problem-solving assignments with state-of-the-art computer-aided technologies. In addition you learn the knowledge and develop the skills needed to manage people, resources, processes, and systems for design and manufacturing.

The program is part of Indiana State's College of Technology, a national leader in providing a quality education in a broad range of technologies. The college offers specialized and well-equipped laboratories for study, and its faculty are current on trends in the various technology areas, making these programs some of the most advanced and informative in the country.

Programs in mechanical engineering technology

Indiana State's Mechanical Engineering Technology Program includes study in the mathematical and scientific principles, taught in an applied environment, that are needed to solve design and other technical problems. It also teaches theories and applications of computer-aided design such as solid modeling, assembly models, design analysis, dimensioning and tolerancing, mechanisms, and simulations. The 128 credit hour mechanical engineering technology major requires completion of 65 credit hours of course work in technical and management areas and leads to a bachelor of science degree.

Additionally, students can earn credit degree requirements by means of transfer of course work through articulation programs with other institutions and courses offered via other modes of teaching including Web-based Internet classes for distance education possibilities.

What makes us different?

In the mechanical engineering technology major, your education includes laboratory and academic course work that integrates theoretical concepts and hands-on experiences in real world situations that prepare you for a variety of positions in numerous industries. Your study is led by faculty who have applied research and extensive industrial experience that contribute to the quality of the program's laboratory-approach to teaching technolnogy. The program is designed to offer you learning experiences in group, laboratory, and industrial settings.

Among subjects you will study are:

- Technical graphics
- Introduction to 3-D solid modeling
- Applied statics and dynamics
- Applied mechanism and fluid power
- Elements of machine design
- Manufacturing processes and materials
- Machine tools and processes
- Electronic fundamentals
- Automation (Robotics and PLC)
- Engineering design and management
- Advanced CAD concepts
- Tools and fixture design
- Economic analysis for engineering and technology
- Geometric dimensioning and tolerancing
- Quality control

As a student in the Mechanical Engineering Technology Program you also have opportunities to conduct research with the program's faculty in collaborative projects with industries. Professional training experiences through internship/co-op programs allow you to obtain practical hands-on skills and develop professional abilities in real world situations while employed in a position related to your degree. You may simultaneously earn academic credit toward your degree, earn a portion of your college expenses, and have the opportunity to learn about specific positions and companies throughout the United States.

Enrich your experience through student involvement

A number of national professional organizations sponsor student chapters on the Indiana State campus. As a mechanical engineering technology major you may choose to join one or more of these groups to learn about your field of study and to make professional contacts. Indiana State students frequently attend these organizations' national conventions and meetings. Professional organizations available to you at Indiana State include the American Society of Mechanical Engineers, Epsilon Pi Tau (the international honorary for professions in technology), Society of Mechanical Engineers, Society of Automotive Engineers, Society of Manufacturing Engineers, and The Association of Technology, Management, and Applied Engineering.

The College of Technology's involvement with industry, government, and business, together with faculty and student participation in "real world" projects, provides students with educational experiences designed to expand their career opportunities.