ABET
Self-Study Report

for the

Mechanical Engineering Technology

at

Indiana State University

Terre Haute, Indiana

June 30, 2015

CONFIDENTIAL

The information supplied in this Self-Study Report is for the confidential use of ABET and its authorized agents, and will not be disclosed without authorization of the institution concerned, except for summary data not identifiable to a specific institution.

Program Self-Study Report
for
ETAC of ABET
Accreditation or Reaccreditation

BACKGROUND INFORMATION

A. Contact Information

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B. Program History

This is the first re-accreditation for ETAC of ABET for the Mechanical Engineering Technology program.

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 Industrial Advisory Board (IAB) and student needs. We added extra Math and technical classes (related to MET) 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 IAB recommendation in spring 2008 and plan for ABET accreditation, the program was revised again effective 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.

The Table below displays all the current AETM undergraduate programs. With enrollments for the past six years. The MET student enrollment since ABET accreditation

in 2010 has tripled, with enrollment projections topping the 300 level for the Fall 2015 semester.

APPLIED ENGINEERING & TECHNOLOGY MANAGEMENT	Fa14	Fa13	Fa12	Fa11	Fa10	Fa09
Advanced Manufacturing Management (BS)	6	7	7	3	3	8
Automotive Engineering Technology (BS)	48	44	50	49	43	50
Civil Engineering Technology (BS)	63	33	2			
Engineering Technology (BS)	19	16	8			
Mechanical Engineering Technology (BS)	**275**	**246**	**173**	**153**	**126**	**97**
Packaging Engineering Technology (BS)	24	26	23	24	24	24
Technology & Engineering Education (BS)	9	17	23	21	20	18
Technology Management (BS)	56	58	56	50	60	61

Since 2009 the MET program curriculum has remained stable. Now housed in the Applied Engineering and Technology Management Department with seven other similar programs, the curriculum was modified effective fall 2015.

The management elective was removed from the program and TMGT 361 Quality Systems and Tools was made a required course, which was previously a management elective.

The AETM Department has worked to develop a list of common courses for the engineering technology programs listed in the table above. That list of a minimum of 29 credits includes:

- MATH 131 or the combination of MATH 123 and MATH 129 (additional 3 if MATH 115 is needed) — 4 or 6 credits
- PHYS 105/L — 4
- CHEM 105/L (or ENVI 170/L for CVET) — 4
- ECT 160 – Electronic Fundamentals — 3
- MET 103 – Intro to Technical Graphics — 3
- MET 130 – Intro to Engineering Technology — 2
- MET 329 – Fluid Power Technology — 3
- MET 405 – Economic Analysis — 3
- TMGT 361 – Quality Systems and Tools — 3

With regard to MATH, we are now requiring the culminating MATH requirement to be MATH 131 or the combination of MATH 123 and MATH 129 (formerly known as MATH 301). Since these are STEM related degree programs, and since incoming students can test into MATH 123 or MATH 131 without taking other lower MATH courses, we feel that requiring students to take MATH 115 is not necessary for every student. Should a student not have the appropriate placement score, they will have to take the appropriate math courses to be ready for MATH 123 or MATH 131. It should be pointed out that we are looking at two paths. MATH 131 is calculus with trigonometry. Our programs require a level of proficiency with trigonometry that is included in MATH 123 and not in MATH 129. Our students require MATH 129 or MATH 131 to satisfy the

ABET standards for math above the level of college algebra and trigonometry. This combination works for all six majors.

C. Options

There are no options, tracks, or concentrations in the program

D. Program Delivery Modes

Describe the delivery modes used by this program, e.g., days, evenings, weekends, cooperative education, traditional lecture/laboratory, off-campus, distance education, web-based, etc.

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 nearby college.

E. Program Locations

All major courses are delivered in the Myers Technology Center and the Technology Annex facilities. Mathematics, science, computer science and Foundational Studies courses are offered at a number of locations on the ISU Terre Haute campus.

F. Public Disclosure

The MET program educational objectives, student outcomes, annual enrollment and graduation data can be found:

1. On the ISU 2015-2016 Undergraduate Catalog, in the section detailing the AETM Department and all its majors, on-line at: http://catalog.indstate.edu/preview_entity.php?catoid=24&ent_oid=1249&returnto=618

G. Deficiencies, Weaknesses or Concerns from Previous Evaluation(s) and the Actions Taken to Address Them

Finding #1 Criterion 2. The Program Educational Objectives were not published.

The program educational objectives and the student learning objectives are part of the catalog in the AETM Department section at this url: http://catalog.indstate.edu/preview_entity.php?catoid=24&ent_oid=1249&returnto=618

Finding #2 Criterion 3. A mapping matrix was provided to link courses with program outcomes [a] through [k], but it was not evident that the program was addressing [h], [j], and [k]. Student surveys have been used to assess the achievement of outcomes and display material included samples of student work to indicate that all defined outcomes

were being addressed in the curriculum. However, there was no evaluation of assessment data or comparison to benchmarks that would indicate the levels of achievement of those outcomes.

Since 2010, benchmarks or indicators of achievement have been put in place on the survey instruments used. The average score of 60% on the survey items is used to indicate the satisfactory level of achievement in the category. Results of the survey from the fall 2012 are in included in this self-study. The faculty continue to review the 60% measurement.

Finding #3 Criterion 4 Continuous Improvement: Demonstrate that results from the evaluation of program educational objectives and program outcomes are being used to effect continuous improvement of the program through a documented plan.
Several results of measurements in place have indicated achievement of desired results without need for improvement. In recognition of this, more direct measures such as external exams have been put in place for additional data points. This external exam process has been piloted for two years with nominal results due in part to implementation. In faculty department meetings these implementation procedures were discussed and vetted with a formal departmental policy expected this fall.

GENERAL CRITERIA

CRITERION 1. STUDENTS

A. Student Admissions

The AETM department and the MET program adheres to the general admissions policy of the university which are detailed in the undergraduate catalog provided. A few of the requirements are listed here.

- To be considered for admission, candidates must submit a completed admission application, $25 non-refundable application processing fee, and have official transcripts sent directly from all secondary and post-secondary institutions
- In order to correctly place new students in mathematics courses at ISU, all new students are required to take a mathematics placement examination.
- 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.

The following are general admission standards for transfer students:

- Be in good standing at last accredited institution attended.
- Have a high school record that meets the entrance requirements of freshmen admitted to Indiana State University.
- Have earned 2.0 cumulative grade point average (GPA) in all college level studies.

  The academic dean of the college of the student's intended major determines the transferability and applicability of transfer credits. Transfer credit will be re-evaluated if a transfer student changes his/her degree program.

The following guidelines govern transfer of courses:

- Only transfer credits earned in college-level courses (typically numbered 100 or higher) from a regionally accredited college or university will be assigned credit. Credit from nationally accredited and/or non-accredited colleges and universities will not transfer.
- Only transfer courses in which a grade of C or higher was earned will be assigned credit; courses with a grade of C- or below will not be assigned credit.
- A maximum of 90 transfer credits may be assigned toward a bachelor's degree.
- Transfer credits are assigned only for college-level courses.
- The dean of the college may determine which of the courses taken by the student more than seven years prior to graduation may be applicable to a baccalaureate degree.

If you successfully complete the Statewide Transfer General Education Core (STGEC) at an Indiana public institution of higher education, you can transfer that coursework as a block of 30 credit hours towards completion of Foundation Studies requirements at Indiana State University.

Students who have earned articulated associate of science (A.S.) degrees, associate of applied science (A.A.S.) degrees, or have accumulated credits from accredited collegiate institutions may be eligible to enroll in DegreeLink programs on the Indiana State University campus or through Indiana State On-line.

B. Evaluating Student Performance

To earn a bachelor's degree in mechanical engineering technology, students must complete the subjects in the curriculum, have minimum GPA of 2.0/4.0 in all work attempted at ISU. Other requirements include a minimum of 45 hours of 300/400 level courses, and 30 hours of residency, etc.

Program faculty share ideas and information regarding the grading of coursework. Rubrics are encouraged and often used for grading consistency in student work.

Pre-requisites for MET courses are strictly enforced. Passing the pre-requisite is necessary to continue to be enrolled in the next course in the sequence the following semester. An 'F' grade in courses that are pre-requisites for other courses in the curriculum requires the failed course to be repeated.

Students are prevented from automatically registering for classes if the prerequisites for the course are not met. However, to allow for advance registration, students are allowed to register for courses in the upcoming semester if they are currently enrolled in the pre-requisite course. At the conclusion of each semester, after final grades are available to students, the dean's office runs a report of enrolled students for the next semester who have not met the pre-requisites and provides this list to the AETM Department Chair for review. These students are notified of the issue prior to being removed from the course for which they do not meet the prerequisite.

Rules regarding class attendance, load, grades, and appeals are located in the undergraduate catalog provided to the visiting team.

C. Transfer Students and Transfer Courses

Transfer students must meet graduation requirements as stated in the graduation section of this Catalog. The academic dean of the college of the student's intended major determines the transferability and applicability of transfer credit hours. The transfer credit will be re-evaluated if a transfer student changes his or her degree program.

Only transfer credit hours earned in college-level courses (typically numbered 100 or higher) from regionally accredited colleges or universities will be considered for acceptance. Transfer courses in which a grade of C or higher was earned will be assigned credit. Courses with a grade of C- or below will not be assigned credit.
Successful completion of the Statewide Transfer General Education Core (STGEC) at an Indiana public institution of higher education transfers as a block of 30 credit hours towards completion of Foundation Studies requirements at Indiana State University.

MILITARY CREDIT
Credit will be granted by Indiana State University according to the guidelines of the American Council of Education (ACE). The Office of Registration and Records works with the academic departments to determine how credits transfer. If ACE guidelines are in conflict with Indiana State University policies, the latter takes precedence.

Students who have successfully completed college-level studies or DSST (Dantes) Subject Standardized Tests while in the military may be eligible to receive credit if their official military transcript indicates attainment of college-level equivalency.
Credit for military training and experience is granted based on official transcripts and/or discharge forms (DD214). Service members (from all branches except the Air Force) using veterans benefits must submit an official Joint Services Transcript. All service members qualify for 2-8 credits, based on completion of basic training and length of service as indicated on the DD214. Two credits are awarded for physical education with completion of basic training. Additional elective credit is granted for service time as follows:

2 credits for 12-15 months service.
3 credits for 16-17 months service.
4 credits for 18-19 months service.
5 credits for 20-21 months service.
6 credits for 22 months of service or more.

A maximum of 63 credits may be granted based on a combination of military service, training, and education. Credit from the Community College of the Air Force is applied per Indiana State University's standard transfer guidelines for regionally accredited institutions. A maximum of 90 credits may be applied from CCAF and other regionally accredited colleges and universities.
Contact the Office of Registration and Records for more information.

D. Advising and Career Guidance

Academic advising is an integral part of the educational process in the individual program and the College of Technology. The primary purpose of advising is to assist students in the development of meaningful educational plans compatible with the attainment of their life goals.

Advisor and Student Role. Academic advising is an interactive process in which both students and advisors share the responsibility. Academic advisors should foster a good working relationship with students, and adapt to their experiences and changing needs to assure the effectiveness of advising. By having faculty members serving in university and college level academic affairs committees, the program is able to enhance understanding, affirming, and respecting the individual differences within the University community to assure quality advising. The department and program expect advisors to develop the knowledge, experience, and interest for successfully communicating with students in a genuine, sincere, accurate, and confidential manner. Students are expected to understand University and program requirements and accept the responsibility for fulfilling them. Together advisors and students are expected to maintain a professional and mutually

respectful relationship as they review students' progress toward the attainment of educational objectives.

Advising Units. Advising in the major starts from the freshman year and will continue through the senior year. Students have a variety of advising resources provided by units at the college and department level. Non-transfer freshmen are co-advised by the University College and the respective program advisors. Upon completion of 30 credits, students matriculate from the University College co-advising program, then receiving all academic and career advising from program and department faculty. As a student progresses through the academic program, each advising unit will play a different role, depending on the status and concern of the student. Key advisement personnel include:

1. Associate Dean's office. The Associate Dean is the chief administrator in the College of Technology for undergraduate academics. This office oversees and adds consistency to advising and curriculum issues across the College of Technology. Support staff work in this office, available to help students with advising, scheduling and registration, serving as a backup when department faculty are not available.
2. The College of Technology central records coordinator. This role is to assist the Associate Dean in organizing and coordinating the review of degree requirements at the time of graduation, review and ensure proper course transfer documentation, coordinate requests for course substitutions and oversee the academic records of students in the College of Technology.
3. Academic advisor. When a student declares a major, he/she is assigned an academic advisor who is a full-time member of the faculty. The student will retain this advisor as long as he/she feels advising has been productive, thereby enabling the development of a closer, more interactive relationship between the two parties. Students may request a change in their assigned advisor at any time by contacting the department chair. The role of the faculty advisor is to provide general guidance regarding curriculum and career paths. Each faculty advisor has a crucial role in monitoring and advising students and in catching academic problems before they become serious.

Advising Tools. Student progress is tracked by advisors with Degree Works™ (implemented fall 2013) academic advising and tracking tool, named MySAM by the university. Students also have full access to the tool. This software application holds academic records including progress toward the degree, course grades, remaining coursework to be completed, class registration tools, what-if functions for degree major or minor additions or changes and a note area for academic advisor notes and recommendations. Prior to Degree Works/MySAM the Degree Audit Reporting System (DARS) software package was used. Students who entered the program before Fall 2012 are still using the DARS tool. The upgrade to Degree Works has been well received, giving students and advisors additional and more flexible academic review tools. For a printout example from the MySam, see Figure 1.1, 1.2, and 1.3.

Class History

Student View AB126pJj as of 05/13/2015 at 07:06

Student	[redacted]	**Level**	Undergraduate	**4 Year Guarantee**	Not Reported
ID	[redacted]	**Degree**	Bachelor of Science	**Honors**	N/A
Classification	Senior 2	**College**	College of Technology	**Sport**	N/A
Advisors	Shahhosseini, Ali M Lawyer, Kristina M Froderman, Melissa G	**Major**	Mechanical Engineering Technol	**Distance Learner**	N/A
Overall GPA	3.696	**Minors**	Advanced Mfg Management Automotive Engineering Tech	**Concentration**	N/A
Alternate PIN	N/A	**Graduation Application Status**	Mechanical Engineering Technol:Applied 201601	**Academic Standing**	Good Standing
Citizenship	Citizen	**Gender**	M	**Holds**	No Holds
Transfer Hours	6	**ISU Earned Hours**	100	**GPA Hours**	100
Veteran	N/A	**Seeking Multiple Degrees**	N/A	**GPA Quality Points**	369.6
Transfer Institution/Degree	Ivy Tech Comm Clg-Indianapolis	**Previous ISU Degree**	N/A	**Admit Term**	Fall 2012

Degree Progress

Requirements 95%

Bachelor of Science — Catalog Year: 2012-2013 Credits Required: 124; GPA: 3.696 Credits Applied: 122

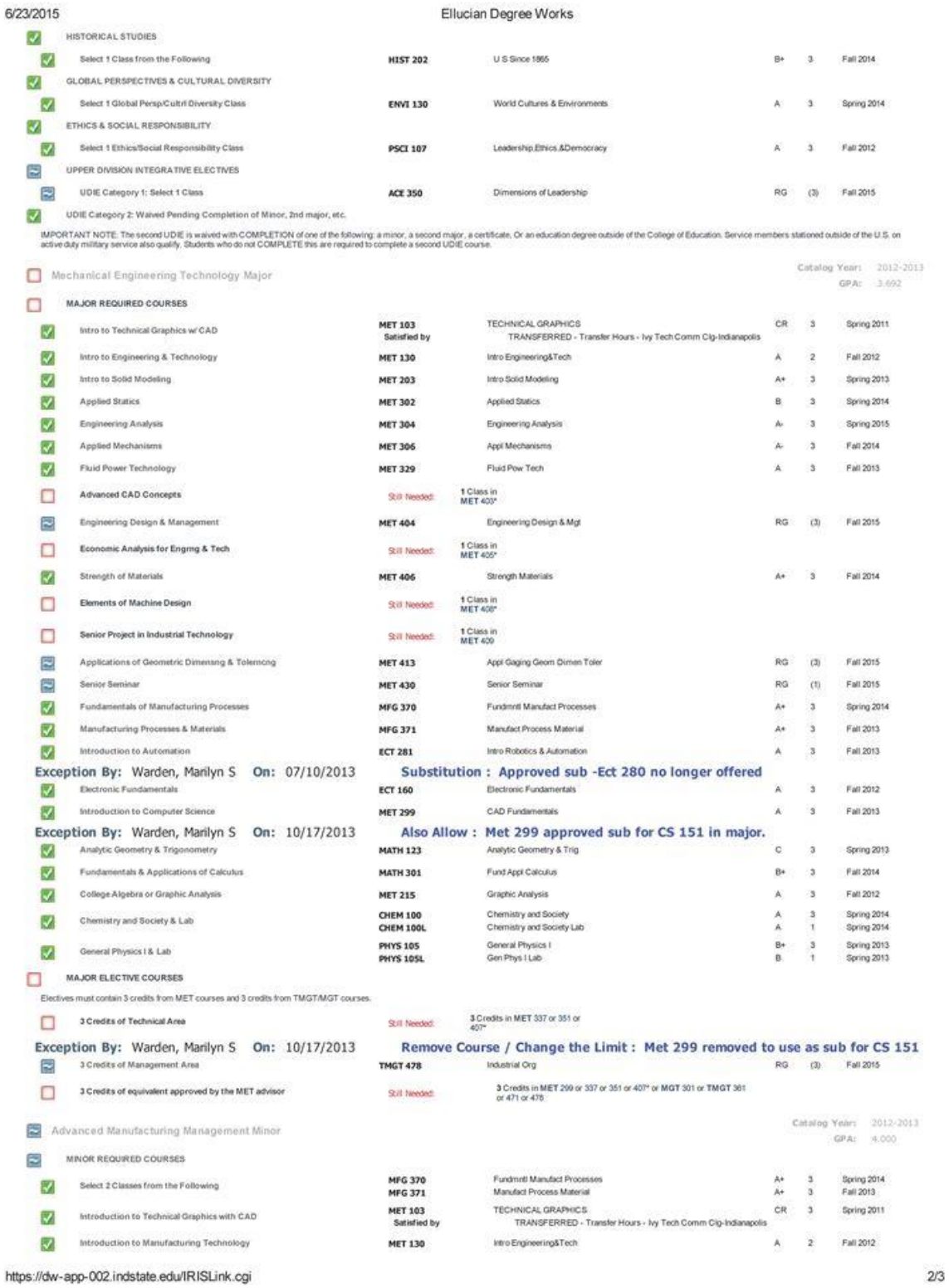
☐	**Minimum 124 Credits to Graduate**	Still Needed:	124 Credits are required to graduate. You currently have 122, you still need at least 2 more.
☑	Minimum 45 Credits in 300-400 Level Courses		
☑	Minimum 9 Residency Credits in 300-400 Level Courses		
☑	Minimum 30 Residency Credits Requirement		
☑	Minimum 2.0 Cumulative GPA Met		
☑	Applied for Graduation		
~	Foundational Studies Requirements		
☐	**Major Requirements**	Still Needed:	See **Mechanical Engineering Technology Major** section
~	Minor Requirements		

Foundational Studies — Catalog Year: 2012-2013 GPA: 3.587

You are highly encouraged to review your major area for any Foundational Studies courses that may be required for your major. To Learn More About This Requirement by CLICKING THIS LINK. IMPORTANT NOTE: All students must complete at least one UPPER DIVISION INTEGRATIVE ELECTIVES(UDIE) course at ISU. (It may be completed online.) The second UDIE may also be fulfilled by completing a minor, certificate, or second major; completing a content specific education major; or completing applicable study abroad course work. Contact your advisor or the Study Abroad Office for more information.

☑	FRESHMAN COMPOSITION					
☑	Freshman Writing I & II	**ENG 101**	Freshman Writing I	B	3	Fall 2012
		ENG 105	Freshman Writing II	B+	3	Spring 2013
☑	JUNIOR COMPOSITION					
	ENG 105 (or another specified course) is a required prerequisite for Junior Composition and must be completed even if it is waived for Foundational Studies purposes. International students may be required to complete ESL 103A and/or ESL 103B in addition to ENG 105.					
☑	Junior Composition Prerequisite	**ENG 105**	Freshman Writing II	B+	3	Spring 2013
☑	Select 1 Junior Composition Class	**HRD 340**	Writing for the Workplace	A	3	Spring 2015
☑	COMMUNICATION					
☑	Select 1 Communication Class	**COMM 101**	Intro Sp Commun	A	3	Spring 2013
☑	QUANTITATIVE LITERACY & MATHEMATICS					
☑	Quantitative Literacy/Mathematics	**MATH 301**	Fund Appl Calculus	B+	3	Fall 2014
☑	NON-NATIVE LANGUAGE-Met by High School Foreign Language					
☑	HEALTH & WELLNESS					
	Students who have completed U.S. Military Basic Training may request credit for this requirement by submitting an official Military transcript or DD-214 form.					
☑	Fitness for Life & Laboratory	**P_E 101**	Fitness For Life	A	2	Fall 2012
		P_E 101L	Fitness for Life Lab	A+	1	Fall 2012
☑	SCIENCE & LABORATORY					
☑	Chemistry and Society & Lab	**CHEM 100**	Chemistry and Society	A	3	Spring 2014
		CHEM 100L	Chemistry and Society Lab	A	1	Spring 2014
☑	SOCIAL & BEHAVIORAL SCIENCE					
☑	Select 1 Social & Behavioral Class	**EPSY 202**	Psy Child Adole	B	3	Spring 2014
☑	LITERARY STUDIES					
☑	Select 1 Literary Studies Class	**ENG 239**	Literature & Human Experience	B+	3	Fall 2013
☑	FINE & PERFORMING ARTS	**ART 151**	Vis Art In Civiliz	B+	3	Fall 2013

Figure 1.1



6/23/2015 Ellucian Degree Works

HISTORICAL STUDIES

Select 1 Class from the Following	HIST 202	U S Since 1865	B+	3	Fall 2014

GLOBAL PERSPECTIVES & CULTURAL DIVERSITY

Select 1 Global Persp/Cultrl Diversity Class	ENVI 130	World Cultures & Environments	A	3	Spring 2014

ETHICS & SOCIAL RESPONSIBILITY

Select 1 Ethics/Social Responsibility Class	PSCI 107	Leadership,Ethics,&Democracy	A	3	Fall 2012

UPPER DIVISION INTEGRATIVE ELECTIVES

UDIE Category 1: Select 1 Class	ACE 350	Dimensions of Leadership	RG	(3)	Fall 2015

UDIE Category 2: Waived Pending Completion of Minor, 2nd major, etc.

IMPORTANT NOTE: The second UDIE is waived with COMPLETION of one of the following: a minor, a second major, a certificate, Or an education degree outside of the College of Education. Service members stationed outside of the U.S. on active duty military service also qualify. Students who do not COMPLETE this are required to complete a second UDIE course.

Mechanical Engineering Technology Major — Catalog Year: 2012-2013 — GPA: 3.692

MAJOR REQUIRED COURSES

Intro to Technical Graphics w/ CAD	MET 103 Satisfied by	TECHNICAL GRAPHICS TRANSFERRED - Transfer Hours - Ivy Tech Comm Clg-Indianapolis	CR	3	Spring 2011
Intro to Engineering & Technology	MET 130	Intro Engineering&Tech	A	2	Fall 2012
Intro to Solid Modeling	MET 203	Intro Solid Modeling	A+	3	Spring 2013
Applied Statics	MET 302	Applied Statics	B	3	Spring 2014
Engineering Analysis	MET 304	Engineering Analysis	A-	3	Spring 2015
Applied Mechanisms	MET 306	Appl Mechanisms	A-	3	Fall 2014
Fluid Power Technology	MET 329	Fluid Pow Tech	A	3	Fall 2013
Advanced CAD Concepts	Still Needed:	1 Class in MET 403*			
Engineering Design & Management	MET 404	Engineering Design & Mgt	RG	(3)	Fall 2015
Economic Analysis for Engrng & Tech	Still Needed:	1 Class in MET 405*			
Strength of Materials	MET 406	Strength Materials	A+	3	Fall 2014
Elements of Machine Design	Still Needed:	1 Class in MET 408*			
Senior Project in Industrial Technology	Still Needed:	1 Class in MET 409			
Applications of Geometric Dimensng & Tolerncng	MET 413	Appl Gaging Geom Dimen Toler	RG	(3)	Fall 2015
Senior Seminar	MET 430	Senior Seminar	RG	(1)	Fall 2015
Fundamentals of Manufacturing Processes	MFG 370	Fundmntl Manufact Processes	A+	3	Spring 2014
Manufacturing Processes & Materials	MFG 371	Manufact Process Material	A+	3	Fall 2013
Introduction to Automation	ECT 281	Intro Robotics & Automation	A	3	Fall 2013

Exception By: Warden, Marilyn S On: 07/10/2013 Substitution : Approved sub -Ect 280 no longer offered

Electronic Fundamentals	ECT 160	Electronic Fundamentals	A	3	Fall 2012
Introduction to Computer Science	MET 299	CAD Fundamentals	A	3	Fall 2013

Exception By: Warden, Marilyn S On: 10/17/2013 Also Allow : Met 299 approved sub for CS 151 in major.

Analytic Geometry & Trigonometry	MATH 123	Analytic Geometry & Trig	C	3	Spring 2013
Fundamentals & Applications of Calculus	MATH 301	Fund Appl Calculus	B+	3	Fall 2014
College Algebra or Graphic Analysis	MET 215	Graphic Analysis	A	3	Fall 2012
Chemistry and Society & Lab	CHEM 100 CHEM 100L	Chemistry and Society Chemistry and Society Lab	A A	3 1	Spring 2014 Spring 2014
General Physics I & Lab	PHYS 105 PHYS 105L	General Physics I Gen Phys I Lab	B+ B	3 1	Spring 2013 Spring 2013

MAJOR ELECTIVE COURSES

Electives must contain 3 credits from MET courses and 3 credits from TMGT/MGT courses.

3 Credits of Technical Area	Still Needed:	3 Credits in MET 337 or 351 or 407*			

Exception By: Warden, Marilyn S On: 10/17/2013 Remove Course / Change the Limit : Met 299 removed to use as sub for CS 151

3 Credits of Management Area	TMGT 478	Industrial Org	RG	(3)	Fall 2015
3 Credits of equivalent approved by the MET advisor	Still Needed:	3 Credits in MET 299 or 337 or 351 or 407* or MGT 301 or TMGT 361 or 471 or 478			

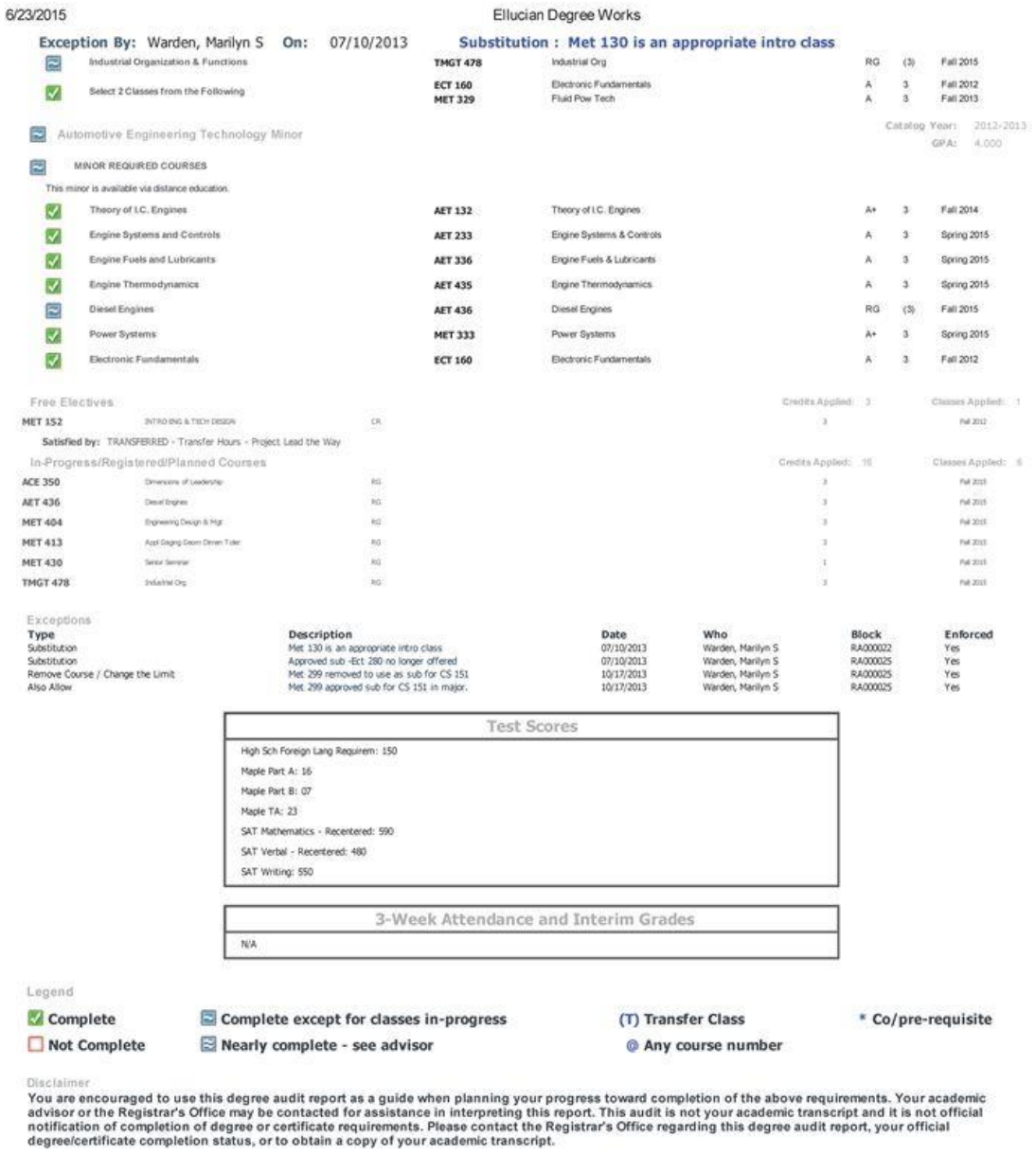
Advanced Manufacturing Management Minor — Catalog Year: 2012-2013 — GPA: 4.000

MINOR REQUIRED COURSES

Select 2 Classes from the Following	MFG 370 MFG 371	Fundmntl Manufact Processes Manufact Process Material	A+ A+	3 3	Spring 2014 Fall 2013
Introduction to Technical Graphics with CAD	MET 103 Satisfied by	TECHNICAL GRAPHICS TRANSFERRED - Transfer Hours - Ivy Tech Comm Clg-Indianapolis	CR	3	Spring 2011
Introduction to Manufacturing Technology	MET 130	Intro Engineering&Tech	A	2	Fall 2012

https://dw-app-002.indstate.edu/IRISLink.cgi 2/3

Figure 1.2



6/23/2015 Ellucian Degree Works

Exception By: Warden, Marilyn S **On:** 07/10/2013 **Substitution : Met 130 is an appropriate intro class**

Industrial Organization & Functions	TMGT 478	Industrial Org	RG	(3)	Fall 2015
Select 2 Classes from the Following	ECT 160	Electronic Fundamentals	A	3	Fall 2012
	MET 329	Fluid Pow Tech	A	3	Fall 2013

Automotive Engineering Technology Minor — Catalog Year: 2012-2013 — GPA: 4.000

MINOR REQUIRED COURSES

This minor is available via distance education.

Theory of I.C. Engines	AET 132	Theory of I.C. Engines	A+	3	Fall 2014
Engine Systems and Controls	AET 233	Engine Systems & Controls	A	3	Spring 2015
Engine Fuels and Lubricants	AET 336	Engine Fuels & Lubricants	A	3	Spring 2015
Engine Thermodynamics	AET 435	Engine Thermodynamics	A	3	Spring 2015
Diesel Engines	AET 436	Diesel Engines	RG	(3)	Fall 2015
Power Systems	MET 333	Power Systems	A+	3	Spring 2015
Electronic Fundamentals	ECT 160	Electronic Fundamentals	A	3	Fall 2012

Free Electives — Credits Applied: 3 — Classes Applied: 1

MET 152	INTRO ENG & TECH DESGN	CR	3	Fall 2012

Satisfied by: TRANSFERRED - Transfer Hours - Project Lead the Way

In-Progress/Registered/Planned Courses — Credits Applied: 16 — Classes Applied: 6

ACE 350	Dimensions of Leadership	RG	3	Fall 2015
AET 436	Diesel Engines	RG	3	Fall 2015
MET 404	Engineering Design & Mgt	RG	3	Fall 2015
MET 413	Appl Gaging Geom Dimen Toler	RG	3	Fall 2015
MET 430	Senior Seminar	RG	1	Fall 2015
TMGT 478	Industrial Org	RG	3	Fall 2015

Exceptions

Type	Description	Date	Who	Block	Enforced
Substitution	Met 130 is an appropriate intro class	07/10/2013	Warden, Marilyn S	RA000022	Yes
Substitution	Approved sub -Ect 280 no longer offered	07/10/2013	Warden, Marilyn S	RA000025	Yes
Remove Course / Change the Limit	Met 299 removed to use as sub for CS 151	10/17/2013	Warden, Marilyn S	RA000025	Yes
Also Allow	Met 299 approved sub for CS 151 in major.	10/17/2013	Warden, Marilyn S	RA000025	Yes

Test Scores

High Sch Foreign Lang Requirem: 150
Maple Part A: 16
Maple Part B: 07
Maple TA: 23
SAT Mathematics - Recentered: 590
SAT Verbal - Recentered: 480
SAT Writing: 550

3-Week Attendance and Interim Grades

N/A

Legend

Complete — Complete except for classes in-progress — (T) Transfer Class — * Co/pre-requisite
Not Complete — Nearly complete - see advisor — @ Any course number

Disclaimer

You are encouraged to use this degree audit report as a guide when planning your progress toward completion of the above requirements. Your academic advisor or the Registrar's Office may be contacted for assistance in interpreting this report. This audit is not your academic transcript and it is not official notification of completion of degree or certificate requirements. Please contact the Registrar's Office regarding this degree audit report, your official degree/certificate completion status, or to obtain a copy of your academic transcript.

https://dw-app-002.indstate.edu/IRISLink.cgi 3/3

Figure 1.3

Additional advising tools include the degree maps and departmental suggested four-year plan. The degree map is a guide sheet that lets students know what courses they should take in which semester, see Figure 1.4. The departmental four-year plan, shown in Figure 1.5, mimic's the degree map and includes information on pre-requisites and spring or fall only courses.

Mechanical Engineering Technology
College of Technology
Degree Path – 2015-2016

Fall 1	Credits	Success Marker
MET 103	3	Critical Course
MET 130	3	Critical Course
ECT 160	3	
ENG 101	3	
FS HLTH	3	
MAJR MINEL	1	Minor or Elective
Total Hours	15	

Notes: **This program has the following GPA requirements: 2.00 overall GPA.**
A Maple score of 21 or higher or MATH 115 must be taken within the first year.

Spring 1	Credits	Success Marker
MET 203	3	Critical Course
FS HIST	3	
FS FPA	3	
FS COMM	3	
ENG 105	3	
Total Hours	15	

Fall 2	Credits	Success Marker
PHYS 105	3	Critical Course
PHYS 105L	3	Critical Course
MAJR ELECM	3	Major Specific Elective
MFG 370	3	
FS NNL	3	
MATH 123 or MATH 131	3-4	Critical Course
Total Hours	16-17	

Spring 2	Credits	Success Marker
CHEM 105	3	Critical Course
CHEM 105L	1	Critical Course
MET 302	3	
ECT 281	3	
FS NNL	3	
MATH 129 or MATH 131	3-4	Critical Course
Total Hours	16-17	

Fall 3	Credits	Success Marker
MET 306	3	
MET 329	3	
MFG 371	3	
FS JRCMP	3	
FS GPCD	3	
Total Hours	15	

Spring 3	Credits	Success Marker
MET 304	3	Critical Course
MET 403	3	Critical Course
MET 405	3	
FS LS	3	
FS UDIE	3	
Total Hours	15	

Fall 4	Credits	Success Marker
MET 404	3	Critical Course
MET 406	3	Critical Course
MET 413	3	Critical Course
TMGT 361	3	Critical Course
FS UDIE	3	
Total Hours	15	

Spring 4	Credits	Success Marker
MET 408	3	Critical Course
MET 409	3	Critical Course
MAJR ELECG	3	
FS ESR	3	
FS SBS	3	
Total Hours	15	

Indiana State University's priority date for filing the FAFSA is March 1. Students entering in Fall 2013 or later must earn 30 credit hours each academic year in order to maximize financial aid from the state of Indiana. Details about how to apply for financial aid, eligibility criteria, and awarding rules are available online at http://www.indstate.edu/finaid/apply.htm . Students may view their specific financial aid file by logging into the MyISU Student Portal, at https://isuportal.indstate.edu.

Program Description & Career Resources: Mechanical Engineering Technology -
http://www.indstate.edu/academics/majors/met.htm

Figure: 1.4: Degree Map

BS in MET: Sample 8-semester roll-out*

Total hours = 120 with NNL1, NNL2, ENG 101 and 105

Fall 1	Credits	Success Marker	Spring 1	Credits	Success Marker
MET 103	3	Critical by Fall 2	**MET 203** (MET 103)	3	Critical by Spring 2
MET 130	2	Critical now	HS	3	
ECT 160	3		FPA	3	
ENG 101	3		COMM 101	3	
Health & Wellness	3		ENG 105	3	
Maple 21 or Appropriate MATH*			Maple 21 or Appropriate MATH*		
Total	**14**		**Total**	**15**	
Fall 2	**Credits**	**Success Marker**	**Spring 2**	**Credits**	**Success Marker**
PHYS 105 & 105L	4	Critical by Spring 2	**CHEM 105 & 105L**	4	Critical by Fall 3
Technical Elective	3		MET 302 (PHYS 105 & MATH 115 or MET 215)	3	
MATH 123* or MATH 131 spring	3 or **0**	123 - Critical now 131 - Critical SP 2	**MATH 131 (4)* or MATH 129 (3)**	4	Critical by now
MFG 370	3		ECT 281	3	
NNL1	3		NNL2	3	
Free Elective as needed	1				
Total	**14**		**Total**	**17**	
Fall 3	**Credits**	**Success Marker**	**Spring 3**	**Credits**	**Success Marker**
MET 306 (MATH 115 or MET 215)	3		MET 304 (MATH 129 or MATH 131)	3	Spring Only
MET 329	3		MET 403 (MET 203)	3	Spring Only
MFG 371	3		MET 405 (Junior and MATH 115 or MET 215)	3	
Junior Composition	3		LS	3	
GPCD	3		UDIE1	3	
Total	**15**		**Total**	**15**	
Fall 4	**Credits**	**Success Marker**	**Spring 4**	**Credits**	**Success Marker**
MET 404	3	Critical - Fall Only	**MET 408** (MET 306 and MET 406)	3	Critical
MET 406 (MET 302)	3	Critical - Fall Only	**MET 409** (Senior and 400-level design class)	3	Critical
MET 413 (Junior and MET 203)	3	Critical - Fall Only	Free Elective as needed	3	
TMGT 361	3	Critical - Fall Only	ESR	3	
UDIE2	3		SBS	3	
Total	**15**		**Total**	**15**	

*MATH 115 equivalency is expected by semester 3

120	**Total Hours**

Figure 1.5: Departmental Four year plan

General Advising Policy. It is recommended that students to arrange advisement meeting with their advisor at least once per semester to review their academic progress and discuss plans for subsequent semesters during the first two years of study. The advisor will evaluate the student's up-to-date information in MySAM (Degree Works) (ISU previously used DARS) and grades from the previous semester to see student data to help with advising. The meeting is to take place prior to registering for classes each semester. A PIN number which changes each semester for each student is used to control the registration permission process. The advisor issues the PIN number upon meeting with the student for advising. The approval is also indispensable when students decide to add or drop courses from their schedule.

New Student Orientation. All new first-time, full-time freshmen, transfer, and international students are required to attend New Student Orientation coordinated by the Office of New Student Transition Programs to register for their first semester of coursework. Any freshman who fails to attend this program will not be allowed to register for classes before attending the orientation program and completing a consultation with Student Financial Aid. During this orientation program the freshmen will have the first experience of academic advising. Incoming freshmen will meet with University College staff and advisors, College of Technology staff including the Associate Dean and have a one-on-one session with an academic advisor to introduce important advising tools such as the university catalog, program guide sheet, and the Degree Works™ (MySAM) academic report. Advisors will assist in developing a first semester schedule, based on their ACT/SAT score and placement results. Additionally students learn to search, add or drop courses online.

Mentoring. It has been part of the department's culture for faculty to have an "open-door" policy for student visits. The primary role of mentoring encompasses general non-curriculum related guidance to student concerns on transition to college, employment perspective, and professional development, etc. Although there is no structured system for these activities, our department prides itself in creating an informal and comfortable social atmosphere in which students can routinely communicate with faculty outside classrooms.

E. Work in Lieu of Courses

ADVANCED AND PRIOR LEARNING CREDIT

Indiana State University offers opportunities for students to earn credit toward a degree for knowledge they have already acquired. Through these opportunities, students can earn up to 63 credit hours towards the baccalaureate degree and 25 percent of an undergraduate certificate. Students should discuss the applicability of the options below with their advisor:

- Advanced Placement (AP) Examinations
- College-Level Examination Program (CLEP)

- Dantes Standardized Subject Tests (DSST)
- Departmental Exams/Assessment of Prior Learning
- Dual Credit
- Excelisior College Examinations
- International Baccalaureate (IB)
- Non-Native (Foreign) Language Placement Exam

Credit earned this way counts toward graduation requirements, but does not count towards resident credit. Students cannot receive credit of this type for courses for which they have already received credit. Additional information about all of these programs can be found on the University Testing website.

F. Graduation Requirements

A Bachelor of Science in Mechanical Engineering Technology (MET) is awarded upon completion of the program curriculum and the university requirements. The university requirements are detailed in the undergraduate catalog supplied to the visiting team. A brief summary follows.

1. Students must apply for graduation two semesters before their planned graduation date. Any change in the application, once it is filed, is the responsibility of the student. If requirements are not met, a change in the date of graduation must be made and is the responsibility of the student.
2. Earn a minimum of 120 credits, excluding any duplicate course credits.
3. Students may not graduate with an incomplete on their record when the incomplete was assigned for any semester or term after spring 2007.
4. Complete at least 30 credits enrolled at Indiana State University, of which at least nine must be at the 300-400 level.
5. Complete a minimum of 45 credit hours of course work in 300 and 400-level courses.
6. Complete the Foundational Studies Program (see below for more details).
7. Earn a minimum cumulative grade point average of 2.0. Note: Certain programs require a higher minimum grade point average. Consult the relevant sections of this Catalog for individual degree program information.

Those candidates who are free of all University obligations and who are designated as having completed degree requirements are issued the corresponding diploma and the transcript through the Office of Registration and Records. After graduation, if the student desires to pursue a second degree, he/she must be readmitted.

G. Transcripts of Recent Graduates

Six transcripts will be provided to the visiting team indicative of MET graduates.

CRITERION 2. PROGRAM EDUCATIONAL OBJECTIVES

A. Mission Statement

University

Indiana State 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.

ISU Vision Statement. Inspired by a shared commitment to improving our communities, Indiana State University will be known nationally for academic, cultural, and research opportunities designed to ensure the success of its people and their work.

Indiana **Integrity**
We demonstrate integrity through honesty, civility, and fairness.

State **Scholarship**
We value high standards for learning, teaching and inquiry.

T **Transforming**
We foster personal growth within an environment in which every individual matters.

R **Responsibility**
We uphold the responsibility of university citizenship.

E **Education**
We provide a well-rounded education that integrates professional preparation and study in the arts and sciences with co-curricular involvement.

E **Embrace Diversity**
We embrace the diversity of individuals, ideas, and expressions.

S **Stewardship**
We exercise stewardship of our global community.

Values statement.
The mission and values statement are published at the following URL:
http://cms.indstate.edu/about

College of Technology

MISSION

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.

CORE VALUES
The study of technology is an essential part of our cultural heritage and of a university education.

High quality, state-of-the-art programs and the embracing of future technologies are highly valued.

The College of Technology faculty value experiential instruction using modern laboratories to develop knowledge and skill.

The College of Technology is a student-centered academic unit (i.e., high quality teaching and advising as well as meeting individual needs of students is central for all). The College of Technology is dedicated to identifying, enhancing, and rewarding faculty and student excellence in scholarship (all forms) and service, and is committed to excellence, in general.

Based upon these core values, the College of Technology commits itself to fulfilling the mission and goals.

GOALS

- Be recognized as a global leader in the preparation of future professionals for careers in technology, teachers/trainers for industry and education.
- Continue to increase participation of underrepresented groups in technology careers.
- Develop critical thinking, problem solving, and communication skills through the use of practical experiences.
- Provide the knowledge and skills to prepare people to create, understand, apply, manage, and evaluate technology ethically and responsibly.
- Contribute to the areas of state economic development, technology transfer professional development and community service.
- Extend partnerships with schools, businesses, industry, and other agencies through co-op programs, internships, research and development projects to expand access to higher education and better prepare our future workforce.
- Evaluate, refine, and enhance all academic programs to assure a sound basis for lifelong learning and living in a multi-cultural and interdependent world
- Maintain a concern for future developments; be known for innovativeness; and participate in the search and application of new technologies.

The COT mission statement is also published in university catalog and on-line at http://technology.indstate.edu/about/values.htm

Mechanical Engineering Technology

Vision

The Mechanical Engineering Technology degree program will be a leader in integrating teaching, research, and creative activity in an engaging, challenging, and supportive

learning environment preparing productive citizens for Indiana and the world.

Mission

The mission of the Mechanical Engineering Technology (MET) degree program at Indiana State University is to prepare graduates with knowledge, problem solving ability, and hands-on skills in a state-of-the-art MET education..

Guiding Principles (we will)

- Inculcate high standards for learning, teaching, and inquiry
- Provide a well-rounded education that integrates professional preparation and study in the arts and sciences with co-curricular involvement
- Demonstrate integrity through honesty, civility, and fairness
- Embrace the diversity of individuals, ideas, and expressions
- Foster personal growth within an environment in which every individual matters
- Uphold the responsibility of University citizenship
- Exercise stewardship of our global community

Program Goals:

- Develop and maintain student enrollment and retention strategies responsive to industry
- Develop and maintain a modern laboratory equipment suite
- Develop and maintain a curriculum that addresses both student and industry needs
- Develop and maintain enriching community engagement and outreach programs and activities
- Develop and maintain clear, consistent, and concise faculty development strategies to ensure world class packaging faculty

Program Description

The Mechanical Engineering Technology (MET) degree program awards a Bachelor of Science (BS) degree to successful students through a four-year curriculum.

The MET program prepares graduates to enter careers in the design, installation, manufacturing, testing, evaluation, technical sales, or maintenance of mechanical systems or processes.

The American Society of Mechanical Engineers (ASME) is the lead professional society used in addition to ETAC of ABET for developing program criteria, guiding program relevance, and making continuous improvement.

B. Program Educational Objectives

The five educational objectives of the MET program are:

1. Apply disciplinary reasoning, critical thinking, and hands-on skills to identify, analyze and solve problems. (**Technology**).
2. Communicate effectively in both oral and written form to articulate technical knowledge, ideas, and proposals (**Communication**)
3. Consider professional, ethical and social responsibility of engineering technology practices. (**Global Responsibility**).
4. Perform effectively, think independently and work collaboratively in a team environment in a membership or leadership role (**Management &/or Teamwork**).
5. Actively participate in professional development, including continuous self-improvement and lifelong learning (**Lifelong Learning**).

The educational objectives are published on the university online catalog: http://catalog.indstate.edu/preview_entity.php?catoid=24&ent_oid=1249&returnto=618

C. Consistency of the Program Educational Objectives with the Mission of the Institution

The Indiana State University Mission Statement speaks to "prepare(ing) productive citizens for Indiana and the world." The College of Technology Mission Statement declares that it will (through degree programs such as this one) "serve the technology needs of the State, the nation, and the international community."

The program's educational objectives correlate well with these mission statements. These statements share the common educational values - graduating professionally competent students who can serve both as leaders and competent team members under different circumstances, and understand the impact of their work both to themselves and society as a whole.

Our educational objectives incorporate these values in that:

- Objectives 1 (Technology) and 2 (Communication) reflect the program's commitment to providing quality undergraduate education in both technical and liberal (ISU foundational) studies.
- Objective 3 (Global Responsibility) fulfills program's contribution to society and the state of Indiana in particular, by advancing students' awareness on the social and environmental implications of their careers.
- Objectives 4 (Managerial &/or Teamwork) address program's emphasis on our students' team-work mentality in professional, community and public service.
- Objective 5 (Lifelong Learning) represents the program's commitment to our graduates' long-term productivity in their future careers.

D. Program Constituencies

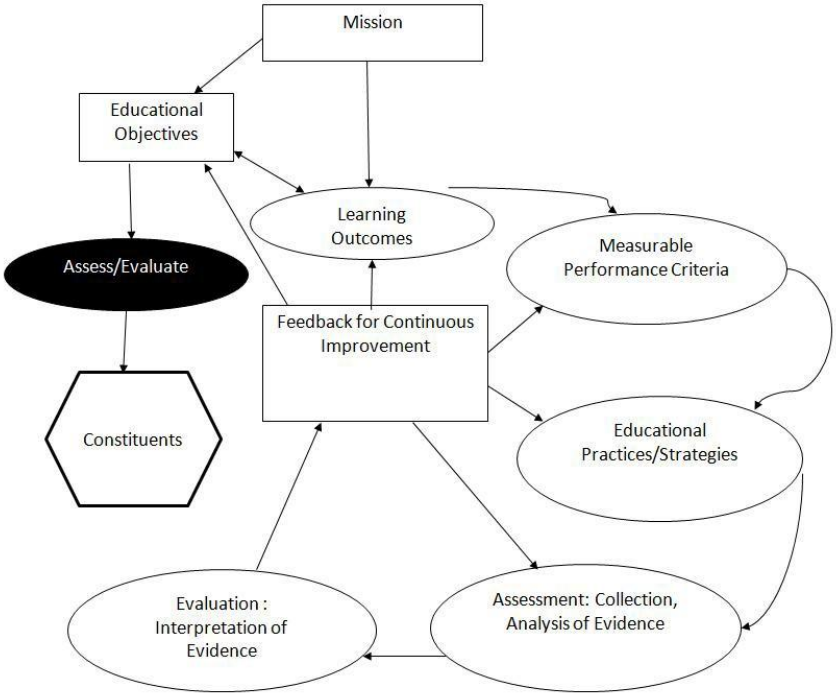
We identify the following stakeholders to be the constituencies with respect to program educational objectives and student outcomes. Each group has special interests in these stated goals:

Students of program. The students expect themselves to become technically competent, professionally and socially responsible individuals after earning a bachelor degree from the program.
Alumni. The alumni expect a continued high quality educational program as their career and reputation are associated with the quality of their alma mater.
Faculty. The faculty are expected to fulfill their educational responsibility in leading the students in the learning process, and periodically evaluating and adjusting if necessary the teaching pedagogy pertinent to achieving the educational objectives.
Industrial Advisory Board (IAB). This selective and highly involved group of individuals expect to see the program yield quality graduates that meet industry needs.
Employers of graduates. This group expects to hire fresh employees who are technically competent, productive, self-motivated learners, team members, and have excellent communication skills.

E. Process for Review of the Program Educational Objectives

Reviewing or evaluating the educational objectives involves identifying areas that warrant improving; then develop practical strategies for achieving such improvement, and ultimately implementing and monitoring whether or not these strategies have successfully accomplished their intent. Changing educational objectives is a serious academic issue; it therefore needs to be approached in a prudent and proactive manner. We also understand given the limited resources we have in the program, i.e., active faculty, administrative support and the like, the evaluation should grow gradually in terms of complexity and completeness.

The process for evaluating the educational objectives begins with data collection by the program and individual faculty. The data are then assessed. The program coordinator or department chair leads this effort, and is responsible for reporting the compiled results to the faculty and industrial advisory board. Currently we have a three-year review cycle to assure any change to be implemented is in response to a consistent trend and not an aberration. At the end of the second year, program faculty will identify the components that need to be strengthened, included, or removed from objectives based on the feedback from the three surveys. The key question that needs to be answered in the process is: are the objectives meeting the needs of our constituents? The third year will initiate the revision process if necessary: program faculty will be responsible for developing a draft with proper language; advisory board's opinions and suggested modifications will be solicited during annual board meeting. The approval of final language rests in the department faculty hands. The program will publish any changes to the program mission and educational objectives online, in the undergraduate catalog and any other outlets that directly interface with constituencies.


Mission
Educational Objectives
Learning Outcomes
Measurable Performance Criteria
Assess/Evaluate
Feedback for Continuous Improvement
Constituents
Educational Practices/Strategies
Evaluation : Interpretation of Evidence
Assessment: Collection, Analysis of Evidence

CRITERION 3. STUDENT OUTCOMES

A. Process for the Establishment and Revision of the Student Outcomes

The student outcomes represent the foundation of knowledge and skills for graduates to maintain competence and achieve professional success upon graduation. These outcomes are developed and approved by department and program faculty. The faculty are responsible for collecting, reviewing, and interpreting information. The outcomes assessment results are discussed at the program faculty meetings, where issues regarding student outcomes are identified and viable strategies are developed. Any changes in the process are also discussed, changes proposed and a change process executed by the faculty.

B. Student Outcomes

The following list constitutes the student outcomes for the Mechanical Engineering Technology program. The a-k outcomes are aligned with ABET requirements and the l-p outcomes are aligned with the requirements of the American Society of Mechanical Engineers for similarly named programs. The identifiers in brackets allows for mapping on to the educational objectives. The educational objectives and the learning outcomes are published in the online catalog under the AETM Department information located at http://catalog.indstate.edu/preview_entity.php?catoid=24&ent_oid=1249&returnto=618

a. (1.1)An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities
b. (1.2) An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies
c. (1.3) An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes
d. (1.4) An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives
e. (4.1) An ability to function effectively as a member or leader on a technical team
f. (1.5) An ability to identify, analyze, and solve broadly-defined engineering technology problems
g. (2.1) An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature
h. (5.1) An understanding of the need for and an ability to engage in self-directed continuing professional development
i. (3.1) An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity
j. (3.2) A knowledge of the impact of engineering technology solutions in a societal and global context
k. (5.2) A commitment to quality, timeliness, and continuous improvement.
l. (1.6) Develop, simulate, and analyze mechanical components/systems using computer-aided design and analysis tools.

m. (1.7) An ability to understand and apply engineering mechanics/sciences to identify, inspect, and analyze mechanical parts, assemblies and processes for solutions to machine/mechanical design and analysis problems.
n. (1.8) An ability to select appropriate materials, evaluate design alternatives, and manage design work/processes.
o. (1.9) An ability to identify proper manufacturing processes meeting the tolerancing requirements to the solution of manufacturing problems.
p. (1.10) An ability to demonstrate integrated knowledge related to MET discipline

C. Relationship of Student Outcomes to Program Educational Objectives

The relationship is expounded below as the student outcomes are integrated with the corresponding program educational objectives. The letter designations reflecting ETAC of ABET (*a-k*) general requirements and the four specific outcomes required by the ASME (*l-p*) are also kept to show where each requirement is embedded in which program objective.

1. Apply disciplinary reasoning, critical thinking, and hands-on skills to identify, analyze and solve problems. (**Technology**).
    a. (1.1)An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities
    b. (1.2)An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies
    c. (1.3)An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes
    d. (1.4)An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives
    f. (1.5)An ability to identify, analyze, and solve broadly-defined engineering technology problems
    l. (1.6) Develop, simulate, and analyze mechanical components/systems using computer-aided design and analysis tools.
    m. (1.7) An ability to understand and apply engineering mechanics/sciences to identify, inspect, and analyze mechanical parts, assemblies and processes for solutions to machine/mechanical design and analysis problems.
    n. (1.8) An ability to select appropriate materials, evaluate design alternatives, and manage design work/processes.
    o. (1.9) An ability to identify proper manufacturing processes meeting the tolerancing requirements to the solution of manufacturing problems.
    p. (1.10) An ability to demonstrate integrated knowledge related to MET discipline
2. Communicate effectively in both oral and written form to articulate technical knowledge, ideas, and proposals (**Communication**)

    g. (2.1) An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature

3. Consider professional, ethical and social responsibility of engineering technology practices. (**Global Responsibility**).
    i. (3.1) An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity
    j. (3.2) A knowledge of the impact of engineering technology solutions in a societal and global context
4. Perform effectively, think independently and work collaboratively in a team environment in a membership or leadership role (**Management &/or Teamwork**).
    e. (4.1) An ability to function effectively as a member or leader on a technical team
5. Actively participate in professional development, including continuous self-improvement and lifelong learning (**Lifelong Learning**).
    h. (5.1) An understanding of the need for and an ability to engage in self-directed continuing professional development
    k. (5.2) A commitment to quality, timeliness, and continuous improvement.

CRITERION 4. CONTINUOUS IMPROVEMENT

A. Student Outcomes

A continual assessment process is used that addresses each of student learning outcomes over a three year period. The data collection which is the start of the assessment process, occurs in the spring of the year noted in the following table and may include the fall and spring classes as appropriate. Not every student learning outcome is assessed every year.

For the Mechanical Engineering Technology program, the current sixteen learning outcomes are assessed in groups of first four, and then six in the remaining two years, which allows for all sixteen to be addressed on the three year cycle.

The following table 4.A.1 depicts the program objective, the learning outcome, the main measure to be used with the expected level of attainment and identifies the person responsible for maintaining the files. Table 4.A.2 then displays the course mapping to the outcomes. The outcomes are labeled and organized to easily identify the program objective and the ABET criteria.

The MET program has recently changed its learning outcomes and educational objectives to align with similar programs in the AETM department thereby streamlining the process for continual assessment. The table indicating the current assessment process is listed in the following pages.

The tables mentioned above reflect the new assessment plans. The exams have been administered in the spring 2015 semester. The data has not yet been received by the department chair. It is anticipated that the data will be received, analyzed and discussed by faculty and advisory committee before the visiting teams arrives.

1. Apply disciplinary reasoning, critical thinking, and hands-on skills to identify, analyze and solve problems. **(Technology).**				
Student Learning Outcomes	**Assessment Method(s)**	**Source(s) of Assessment**	**Target for Student Achievement**	**Time of Data Collection**
(1.1)An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities	ATMAE Cert Exam, Exit Survey	MET 409 for exams and graduating seniors for survey	ATMAE - 70% of students = 70% target competencies // Survey 90% avg 4.0 (LKT 1-5 scale)	Spring 2016 and then every three years
(1.2) An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies	ATMAE Cert Exam, Exit Survey	MET 409 for exams and graduating seniors for survey	ATMAE - 70% of students = 70% target competencies // Survey 90% avg 4.0 (LKT 1-5 scale)	Spring 2017 and then every three years
(1.3) An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes	ATMAE Cert Exam, Exit Survey	MET 409 for exams and graduating seniors for survey	ATMAE - 70% of students = 70% target competencies // Survey 90% avg 4.0 (LKT 1-5 scale)	Spring 2017 and then every three years
(1.4) An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives	ATMAE Cert Exam, Exit Survey	MET 409 for exams and graduating seniors for survey	ATMAE - 70% of students = 70% target competencies // Survey 90% avg 4.0 (LKT 1-5 scale)	Spring 2015 and then every three years
(1.5) An ability to identify, analyze, and solve broadly-defined engineering technology problems	ATMAE Cert Exam, Exit Survey	MET 409 for exams and graduating seniors for survey	ATMAE - 70% of students = 70% target competencies // Survey 90% avg 4.0 (LKT 1-5 scale)	Spring 2016 and then every three years

1. Apply disciplinary reasoning, critical thinking, and hands-on skills to identify, analyze and solve problems. **(Technology).**				
Student Learning Outcomes	**Assessment Method(s)**	**Source(s) of Assessment**	**Target for Student Achievement**	**Time of Data Collection**
(1.6) Develop, simulate, and analyze mechanical components/systems using computer-aided design and analysis tools.	ATMAE Cert Exam, Exit Survey	MET 409 for exams and graduating seniors for survey	ATMAE - 70% of students = 70% target competencies // Survey 90% avg 4.0 (LKT 1-5 scale)	Spring 2016 and then every three years
(1.7) An ability to understand and apply engineering mechanics/sciences to identify, inspect, and analyze mechanical parts, assemblies and processes for solutions to machine/mechanical design and analysis problems.	ATMAE Cert Exam, Exit Survey	MET 409 for exams and graduating seniors for survey	ATMAE - 70% of students = 70% target competencies // Survey 90% avg 4.0 (LKT 1-5 scale)	Spring 2017 and then every three years
(1.8) An ability to select appropriate materials, evaluate design alternatives, and manage design work/processes	ATMAE Cert Exam, Exit Survey	MET 409 for exams and graduating seniors for survey	ATMAE - 70% of students = 70% target competencies // Survey 90% avg 4.0 (LKT 1-5 scale)	Spring 2017 and then every three years
(1.9) An ability to identify proper manufacturing processes meeting the tolerancing requirements to the solution of manufacturing problems.	ATMAE Cert Exam, Exit Survey	MET 409 for exams and graduating seniors for survey	ATMAE - 70% of students = 70% target competencies // Survey 90% avg 4.0 (LKT 1-5 scale)	Spring 2015 and then every three years
(1.10) An ability to demonstrate integrated knowledge related to MET discipline	ATMAE Cert Exam, Exit Survey	MET 409 for exams and graduating seniors for survey	ATMAE - 70% of students = 70% target competencies // Survey 90% avg 4.0 (LKT 1-5 scale)	Spring 2016 and then every three years

2. Communicate effectively in both oral and written form to articulate technical knowledge, ideas, and proposals **(Communication)**				
Student Learning Outcomes	**Assessment Method(s)**	**Source(s) of Assessment**	**Target for Student Achievement**	**Time of Data Collection**
(2.1) An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature	Rubric on writing project // rubric on presentation project	MET 409 projects	70% of students - avg 3.0 (1-4 scale)	Spring 2017 and then every three years
3. Consider professional, ethical and social responsibility of engineering technology practices. **(Global Responsibility).**				
Student Learning Outcomes	**Assessment Method(s)**	**Source(s) of Assessment**	**Target for Student Achievement**	**Time of Data Collection**
(3.1) An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity	ATMAE Cert Exam, Exit Survey	MET 409 for exams and graduating seniors for survey	ATMAE - 70% of students = 70% target competencies // Survey 90% avg 4.0 (LKT 1-5 scale)	Spring 2015 and then every three years
(3.2) A knowledge of the impact of engineering technology solutions in a societal and global context	ATMAE Cert Exam, Exit Survey	MET 409 for exams and graduating seniors for survey	ATMAE - 70% of students = 70% target competencies // Survey 90% avg 4.0 (LKT 1-5 scale)	Spring 2015 and then every three years

4. Perform effectively, think independently and work collaboratively in a team environment in a membership or leadership role **(Management &/or Teamwork).**				
Student Learning Outcomes	**Assessment Method(s)**	**Source(s) of Assessment**	**Target for Student Achievement**	**Time of Data Collection**
(4.1) An ability to function effectively as a member or leader on a technical team	ATMAE Cert Exam, Exit Survey, Rubric on project	MET 409 for exams // graduating seniors for survey // PKG 486 team project	ATMAE - 70% of students = 70% target competencies // Survey 90% avg 4.0 (LKT 1-5 scale) // 70% score 70% - rubric	Spring 2016 and then every three years
5. Actively participate in professional development, including continuous self-improvement and lifelong learning **(Lifelong Learning).**				
Student Learning Outcomes	**Assessment Method(s)**	**Source(s) of Assessment**	**Target for Student Achievement**	**Time of Data Collection**
(5.1) An understanding of the need for and an ability to engage in self-directed continuing professional development	ATMAE Cert Exam // Exit Survey // # of majors in IoPP	MET 409 for exams // graduating seniors for survey	ATMAE - 70% of students = 70% target competencies // Survey 90% avg 4.0 (LKT 1-5 scale) // 70% will be national IoPP member	Spring 2017 and then every three years
(5.2) A commitment to quality, timeliness, and continuous improvement.	ATMAE Cert Exam // Exit Survey // Rubric on project	MET 409 for exams // graduating seniors for survey // PKG 486 team project	ATMAE - 70% of students = 70% target competencies // Survey 90% avg 4.0 (LKT 1-5 scale) // 70% score 70% - rubric	Spring 2016 and then every three years

Table 4.A.1. Assessment Plan

				Technical										Comm-unication
Prefix	Number	Hrs	Course Title	An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities	An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies;	An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes	An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives	An ability to identify, analyze, and solve broadly-defined engineering technology problems	An ability to develop, simulate, and analyze mechanical components/systems using computer-aided design and analysis tools	An ability to understand and apply engineering mechanics/sciences to identify, inspect, and analyze mechanical parts, assemblies and processes for solutions to machine/mechanical design and analysis problems.	An ability to select appropriate materials, evaluate design alternatives, and manage design work/processes	An ability to identify proper manufacturing processes meeting the tolerancing requirements to the solution of manufacturing problems	An ability to demonstrate integrated knowledge related to MET discipline	An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature
				1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	2.1
Required MET Courses				a.	b.	c.	d.	f.	l.	m.	n.	o.	p.	g.
MET	103	3	Technical Graphics	I I			I	I	I			I		I
MET	130	2	Intro to Eng and Tech	P				I						I
MET	203	3	Intro to Solid Modeling	I			I I	I	I					P
MET	302	3	Applied Statics	I I	P		R	I						
MET	304	3	Engr. Analysis (Dynamics)	P	P	P	I	I						R
MET	306	3	Applied Mechanisms	R	P	I		I						R
MET	329	3	Fluid Power Technology	R	P	P	P							
MET	403	3	Advanced CAD concepts	R		R	R	R	P		R			R
MET	404	3	Engr. Design & Mgt.	P				R			P			P
MET	405	3	Econ. Analy. For Engr. & Tech.	R			P	R						R
MET	406	3	Strength of Materials	P	R	P	R	P			P			
MET	408	3	Elements of Machine Design	P	P	P	P	R						R
MET	409	3	Senior Project					R			R		R	P
MET	413	3	Appl. & Gaging of GD&T			R						R		P
Supporting Courses														
ECT	160	3	Fund. Of Electronics	I										
ECT	281	3	Intro to Automation	I										
MFG	370	3	Fund. of Mach. Tool Proc.	P		P						P		
MFG	371	3	Mfg. Processes & Materials	P		P						P		
TMGT	361	3	Quality Systems and Tools		P	P				P	I	P		
Required 3 Semester Hours (Select one)														
MET	299	3	CAD Fundamental	P			I	I	I			I	P	I
MET	337		Thermo Systems	P									P	
MET	351		Coop. Industrial Practice	P									P	
MET	407		Tools and Die Design	P									P	
Composition														
		3	Freshman Composition											
		3	Freshman Composition											
		3	Junior Composition	I										P
Communication														
		3												
Quantitative Literacy or Mathematics														
MATH	131	4	or MATH 123 and 301		I									

				Global Responsibility		Management or Team Work	Life-Long Learning	
Prefix	Number	Hrs	Course Title	An understanding of and a commitment to address professional and ethical responsibilities including a respect	A knowledge of the impact of engineering technology solutions in a societal and global	An ability to function effectively as a member or leader on a	An understanding of the need for and an ability to engage in self-directed continuing professional	A commitment to quality, timeliness, and continuous
				3.1	3.2	4.1	5.1	5.2
Required MET Courses				i.	j.	e.	h.	k.
MET	103	3	Technical Graphics					I
MET	130	2	Intro to Eng and Tech	I	I	P	I	I
MET	203	3	Intro to Solid Modeling					I
MET	302	3	Applied Statics			R		R
MET	304	3	Engr. Analysis (Dynamics)	I	I	R		R
MET	306	3	Applied Mechanisms	R	R	P	R	R
MET	329	3	Fluid Power Technology					
MET	403	3	Advanced CAD concepts					P
MET	404	3	Engr. Design & Mgt.	R				R
MET	405	3	Econ. Analy. For Engr. & Tech.	I		P		R
MET	406	3	Strength of Materials			P		
MET	408	3	Elements of Machine Design	R	R	R	R	R
MET	409	3	Senior Project			R		R
Supporting Courses								
ECT	160	3	Fund. Of Electronics					
ECT	281	3	Intro to Automation					
MFG	370	3	Fund. of Mach. Tool Proc.					
MFG	371	3	Mfg. Processes & Materials					
TMGT	361	3	Quality Systems and Tools				P	P
Required 3 Semester Hours (Select one)								
MET	299	3	CAD Fundamental					I
MET	337		Thermo Systems					
MET	351		Coop. Industrial Practice					
MET	407		Tools and Die Design					
Composition								
		3	Freshman Composition					
		3	Freshman Composition					
		3	Junior Composition					
Communication								
		3						
Quantitative Literacy or Mathematics								
MATH	131	4	or MATH 123 and 301					

Level of Intensity to which the Objective is met in the course
I = Introductory the Objective is introduced and or mildly included in the course
P = Proficient the objective is explored to a great extent
R = Reinforced the student is expected to have some understanding of the objective and the objective is further explored and expanded

Table 4.A.2. Curriculum Map to Learning Outcomes

The following few pages represent assessment findings and action plans for the program. The complete plans will be provided in the resource room for the visiting team.

ASSESSMENT FINDING AND ACTION PLAN

Indiana State University – College of Technology
Department of Applied Engineering and Technology Management

Program: BS in Mechanical Engineering Technology

Rubrics to measure Performance Criteria and Establish Benchmarks

Following rubrics on a scale of 1 to 5 was developed:
5 = very satisfied – The student is able to do this successfully without any problem.
4 = satisfactorily – The student is able to do this with minor problem.
3 = average – The student may be able to do this, but would have some problem with it.
2 = poorly – The student has major problem with it.
1 = very dissatisfied – The student is unable to do this.

Performance Criteria to Measure Outcomes in Fall 2012 and Spring 2013

1. Can describe the necessary assumptions in designing mechanical systems [LO: a]
2. Can identify/compute force, moment, stress, factor of safety [LO: a]
3. Can select and apply your knowledge of mathematics, science, engineering, and technology to engineering technology problems [LO: b]
4. Can interpret the results of an experiment [LO: c]
5. Can suggest necessary changes to be made to improve the results obtained from an experiment [LO: c]
6. Can conduct experiments (e.g. tension testing for stress- strain, hardness, fluid, electronics, thermo, etc.) [LO: c]
7. Can function effectively on teams [LO: e]
8. Can design linkages, cams, gears, beams, shafts, and other machine elements [LO: f]
9. Can solve close-ended (analysis) problems [LO: f]
10. Can prepare technical reports, or oral presentations [LO: g]
11. Can make engineering drawings [LO: g]
12. Can understand professional and ethical and social responsibilities [LO: i]
13. Have knowledge of diversity and the impact of engineering technology solutions in a societal and global context [LO:j]
14. Can submit homeworks/projects and take exams on time [LO: k]
15. Do feedback from homeworks and exams help you improve [LO: k]
16. Can develop CAD models [PO: 1]
17. Can analyze CAD models for stress and material strength [PO: 1]
18. Can analyze CAD models for cost, production consideration, etc. [PO: 1,5]
19. Can select proper materials for your design [PO: 2]
20. Can identify and inspect tolerances in mechanical parts and assemblies [PO: 3]
21. Can manage design work or processes [PO: 4]

22. Can produce a part from a CAD model or an engineering drawing [PO: 5]
23. Can estimate cost and manage engineering projects [PO: 6]
24. Can recognize the need and analyze or plan the requirement for system's control and integration [PO: 7]

Student Survey

Table 1. Coverage of Outcomes by Courses, Assessment Tools, Benchmarks, and Actions for Improvement (Fall 2012) – 53 responses to the survey. Average needed score on the survey = 60%

Outcome Question	Course(s)	Assessment Tool	Benchmark (Average score on survey)	Action(s) for Improvement
19 [PO: 2]	MET 406, MFG 371/225	Student survey	76.98%	Good: No action
20 [PO: 3]	MET 103, 413	Student survey	78.87%	Good: No action

Table 2. Coverage of Outcomes by Courses, Assessment Tools, Benchmarks, and Actions for Improvement (Spring 2013) – 40 responses to the survey. Average needed score on the survey = 60%

Outcome Question	Course(s)	Assessment Tool	Benchmark (Average score on survey)	Action(s) for Improvement
7 [LO: e]	MET 130, 404, 405, 409, 413	Student survey	79.50%	Good: No action
8 [LO: f]	MET 302, 306, 351, 404, 405, 406, 408, 409	Student survey	67.00%	Good: No action
9 [LO: f]	MET 302, 306, 351, 404, 405, 406, 408, 409	Student survey	72.50%	Good: No action
16 [PO: 1]	MET 203, 403	Student survey	74.00%	Good: No action
17 [PO: 1]	MET 203, 403	Student survey	66.50%	Good: No action
18 [PO: 1,5]	MET 203, 403	Student survey	65.00%	Good: No action

Faculty Survey

Table 3. Coverage of Outcomes by Courses, Assessment Tools, Benchmarks,

and Actions for Improvement (Fall 2012) – 3 responses to the survey.
Average needed score on the survey = 60%

Outcome Question	Course(s)	Assessment Tool	Benchmark (Average score on survey)	Action(s) for Improvement
19 [PO: 2]	MET 406, MFG 371/225	Faculty survey	60.00%	Good: No action
20 [PO: 3]	MET 103, 413	Faculty survey	86.67%	Good: No action

Table 4. Coverage of Outcomes by Courses, Assessment Tools, Benchmarks, and Actions for Improvement (Spring 2013) – 3 responses to the survey.
Average needed score on the survey = 60%

Outcome Question	Course(s)	Assessment Tool	Benchmark (Average score on survey)	Action(s) for Improvement
7 [LO: e]	MET 130, 404, 405, 409, 413	Faculty survey	93.33%	Good: No action
8 [LO: f]	MET 302, 306, 351, 404, 405, 406, 408, 409	Faculty survey	86.67%	Good: No action
9 [LO: f]	MET 302, 306, 351, 404, 405, 406, 408, 409	Faculty survey	93.33%	Good: No action
16 [PO: 1]	MET 203, 403	Faculty survey	100.00%	Good: No action
17 [PO: 1]	MET 203, 403	Faculty survey	60.00%	Good: No action
18 [PO: 1,5]	MET 203, 403	Faculty survey	80.00%	Good: No action

Student Work

Student work samples from MET 403, 405, 406, 408, 409 and 413 are collected and the quality of the samples is satisfactory, based on the rubric created for each course (Tables 5 and 6). Tables 5 and 6 show analysis rubric for assignments/projects and report rubric for senior project, respectively.

Syllabus of each course is enclosed to this document. Course grading rubric is shown in each course syllabus. The grading rubric is different for each course, because each course has different objective and student learning outcome.

Table 5: Analysis Rubric (for assignments/projects requiring a process formulation to get results - MET 403, 405, 406, 408, 413)

	Poor	Acceptable	Excellent
Identify and Formulate the Problem	Demonstrates little or no understanding of what information and assumptions are needed to perform the analysis. Approach is not directed to the objective of the analysis. Unable to organize the analysis.	Demonstrates some uncertainty in what information and assumptions are relevant to the analysis. Approach appears somewhat unfocused, but essentially effective. Information gathering is somewhat unorganized, but relevant.	Clearly Identifies relevant known properties and appropriate assumptions. Focuses the analysis on the desired result. Gathers information in an appropriate form.
Score	**1**	**3**	**5**
Analysis Method	Unable to identify effective solution methods, or employs methods that are inappropriate to the analysis.	Methods selected result in a cumbersome analysis with unnecessary work, but are essentially effective.	Employs an optimum method that efficiently leads to the desired results.
Score	**1**	**3**	**5**
Application of Analysis Method/ Results	No results are obtained, or major errors are present.	Some errors in the application and calculations are present, but they are minor in nature.	Analysis is carried out correctly. Results are correct. Units are correctly used.
Score	**1**	**3**	**5**
Interpretation of Results	No discussion or interpretation was provided, although the results clearly required some critical review.	Some discussion of the results is present, but not in a critical manner appropriate to the analysis.	Results are critically reviewed for accuracy and meaning in a manner appropriate to the analysis.
Score	**1**	**3**	**5**

Table 6: Report Rubric (for Senior Project in Industrial Technology - MET 409)

	Poor	Acceptable	Excellent
Research/ Design Content	Limited research/design development with undeveloped ideas or few details, weak supporting evidence.	Some depth of research/design development with sufficient details, adequate supporting evidence.	Excellent depth of research/design development with clear details, specific and thorough supporting evidence.

Score	1	3	5
Research/ Design Problem Formulation	Incomplete definition and description of the research/design project, serious deficiencies in use and application of engineering principles, incomplete understanding of design factors and constraints.	Somewhat complete definition and description of the research/design project, sufficient use and application of engineering principles. Sufficient understanding of the design factors and constraints.	Excellent definition and description of the research/design project, correct use and application of the engineering principles. Excellent understanding of the design factors and constraints.
Score	**1**	**3**	**5**
Results, Conclusions, and Recommend-ations	Missed results or poorly stated them, conclusions are unsupported, no or basic recommendations.	Results, conclusions, and recommendations are sufficiently stated.	Results and conclusions are clear and relevant. Recommendations reflect good understanding of the project.
Score	**1**	**3**	**5**
Computer-Aided Tools, Figures, Tables	Minimal application and use of computer-aided tools and graphics, undocumented figures and tables.	Computer-aided tools were sufficiently used to present/develop research/design project, figures and tables were sufficiently provided.	Computer-aided tools were effectively used to present/develop research/design project, figures and tables were completely provided.
Score	**1**	**3**	**5**
Report Format/ Mechanics	Significant deficiencies in formatting, wording, spelling, grammar, or punctuation. Writing lacks sentence variety.	Adequate report formatting and usage of wording, grammar, and punctuation. Some sentence variety.	Excellent formatting, word usage, spelling, grammar and punctuation. Wide variety of sentence structure.
Score	**1**	**3**	**5**

B. Continuous Improvement

The continuous improvement process and departmental restructuring has led to some changes in the Mechanical Engineering Technology program which culminated in a curriculum change which was formally approved through the curriculum approval process in May 2015 effective with the Fall 2015 Semester incoming freshmen. The changes are best understood by reviewing the following table 4.B.1.

OLD				NEW			
Science and Math Required Courses:				Science and Math Required Courses:			
Course		Hrs	Title	Course		Hrs	Title
MATH	115	3	OR MET 215 (3)	MATH	131	4	or MATH 123 and 301
MATH	123	3	Analytic Geometry and Trig				
MATH	301	3	Fund. & Appl of Calculus				
PHYS	105	3	General Physics I	PHYS	105	3	General Physics I
PHYS	105L	1	General Physics I Lab	PHYS	105L	1	General Physics I Lab
CHEM	100	3	Chemistry & Society	CHEM	105	3	General Chemistry I
CHEM	100L	1	Chemistry & Society Lab	CHEM	105L	1	General Chemistry I Lab
MET	103	3	Technical Graphics	MET	103	3	Technical Graphics
MET	130	2	Intro to Engr. & Tech.	MET	130	2	Intro to Engr. & Tech.
MET	203	3	Intro to Solid Modeling	MET	203	3	Intro to Solid Modeling
MET	302	3	Applied Statics	MET	302	3	Applied Statics
MET	304	3	Engr. Analysis (Dynamics)	MET	304	3	Engr. Analysis (Dynamics)
MET	306	3	Applied Mechanisms	MET	306	3	Applied Mechanisms
MET	329	3	Fluid Power Technology	MET	329	3	Fluid Power Technology
MET	403	3	Advanced CAD concepts	MET	403	3	Advanced CAD concepts
MET	404	3	Engr. Design & Mgt.	MET	404	3	Engr. Design & Mgt.
MET	405	3	Econ. Analy. For Engr. & Tech.	MET	405	3	Econ. Analy. For Engr. & Tech.
MET	406	3	Strength of Materials	MET	406	3	Strength of Materials
MET	408	3	Elements of Machine Design	MET	408	3	Elements of Machine Design
MET	409	3	Senior Project	MET	409	3	Senior Project
MET	413	3	Appl. & Gaging of GD&T	MET	413	3	Appl. & Gaging of GD&T
MET	430	1	Senior Seminar				
ECT	160	3	Fund. Of Electronics	ECT	160	3	Fund. Of Electronics
ECT	281	3	Intro to Automation	ECT	281	3	Intro to Automation
MFG	370	3	Fund. of Mach. Tool Proc.	MFG	370	3	Fund. of Mach. Tool Proc.
MFG	371	3	Mfg. Processes & Materials	MFG	371	3	Mfg. Processes & Materials
				TMGT	361	3	Quality Systems and Tools
Technical: 3 hrs from the following:				Technical: 3 hrs from the following:			
MET	299	3	CAD Fundamental	MET	299	3	CAD Fundamental
MET	337		Thermo Systems	MET	337		Thermo Systems
MET	351		Coop. Industrial Practice	MET	351		Coop. Industrial Practice
MET	407		Tools and Die Design	MET	407		Tools and Die Design
Other courses approved by MET advisor				Other courses approved by MET advisor			
Management: 3 hrs from the following:							
MGT	301	3	Survey of Management				
TMGT	361		Quality Systems and Tools				
TMGT	471		Production Plan & Control I				
TMGT	478		Indust. Organ. & Functions				
TMGT	492		Industrial Supervision				
		77				71	

Table 4.B.1. Side-by-side Curriculum Changes

Essentially, the MET program curriculum remains unchanged except for the new math and science requirements and the removal of management course elective.

C. Additional Information

Copies of the assessment instruments and materials referenced in 4.A. and 4.B will be available for review at the time of the visit. Other information such as minutes from meetings where the assessment results were evaluated and where recommendations for action were made could also be included.

CRITERION 5. CURRICULUM

A. Program Curriculum

Table 5-1 describes the plan of study for students in the MET major, along with average section enrollments over the two years. All course work in the MET major is delivered in the semester format. There are no options in the program.

Figures 1.4 and 1.5 details the MET major 4 year plan of recommended courses per semester. Figure 1.5 details the pre-requisites for the courses and which courses are offered spring or fall only.

Table 4.A.1 shows how the MET curriculum aligns with the program educational objectives.

Table 4.A.2 details how the MET curriculum aligns with the student outcomes and corresponding educational objectives. As shown, each major course contributes to the development of learning toward the desired student learning outcomes. Most MET major courses contain a lab component which drives educational achievement toward the upper levels of Bloom's Taxonomy, namely application, analysis and synthesis. The Industrial Advisory Board has made it clear many times that they expect our graduates to be not only technically competent and effective in communication skills, but to be able to perform problem solving at these higher levels.

The MET major courses, along with certain foundational studies courses, have a prerequisite structure. It is important that the learning of fundamentals must be sound before more advanced educational topics can be presented. In MET major course that have prerequisites, some component of review and reinforcement of previous course fundamentals is delivered at the beginning of the course. The prerequisite structure path diagram for MET major courses is detailed in the four-year plan Figure 1.5.

The capstone course for the MET major is PKG 489. The course requires the MET student to conceptualize, design, build, debug, analyze, document and present a technical project that must align to the technology and the defined outcomes for the program.

An internship or cooperative experience is highly encouraged and is a requirement of the MET major. The College of Technology has a staff person assigned to the development of internship opportunities for COT majors. Also the ISU Career Center is fully engaged in developing and overseeing internship opportunities for all majors, including those in MET. A three credit course, MET 351 allows students with internships to gain credit.

All requested materials will be made available to the on-site evaluation team. Most of the material will be referenced to course numbers and titles. Every attempt will be made to assist in the on-site review process.

B. Course Syllabi

The syllabi are displayed in Appendix A.

C. Advisory Committee

Industrial Advisory Board Meeting
Agenda
Friday; April 24, 2013; 9:00 am – 1:00 pm

Attendees:

Affan Badar; Todd Alberts; Mehran Shahhosseini – MET Faculty/ISU
Jianren Rong – Program Chair, Design Tech - Ivy Tech Community College
Mak Koie – Emeritus Professor of ISU
Tom Newsom – Sony DADC
Greg stewart – Unison Engine Components
Gary Oxford – Bemis
Marc Ponsot – A P Machine & Tool Inc.
Mary McCarter – Kellogg
Justin Bargo – Watchfire *Signs*
Larry Parvin – Great Dane Trailers
Michael Westerfield – Taghleef Industries

Agenda:

Chair's welcome
State of the MET program
Update on ABET Accreditation
Assessment status of the MET program
Recommendations
Other topics
Industry news/information exchange among board members
Lunch (12:00 – 1:00 pm)
Adjournment

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Table 5-1 Curriculum

Mechanical Engineering Technology effective 2015-2016 academic year

Course (Department, Number, Title) List all courses in the program by term starting with first term of the first year and ending with the last term of the final year.	Indicate Whether Course is Required, Elective, or a Selective Elective by an R, an E or an SE[2]	*Curricular Area (Credit Hours)*				Last Two Terms the Course was Offered: Year and, Semester, or Quarter	Average Section Enrollment for the Last Two Terms the Course was Offered[1]
		Math & Basic Sciences	Discipline Specific Topics	General Education	Other		
MET 103 – Introduction to Technical Graphics with CAD	R		*3*			*Fall 2014 Spring 2015*	*24*
MET 130 – Introduction to Engineering and Technology	R		*2*			*Fall 2013 Fall 2014*	*35*
ECT 160 – Electronic Fundamentals	R		*3*			*Fall 2014 Spring 2015*	*27*
Health and Wellness (category of Foundational Studies)	R			*3*		*Fall 2014 Spring 2015*	*40*
ENG 101 – Freshman Writing (or ENG 107 or other appropriate placement) (category of Foundational Studies)	R			*3*		*Fall 2014 Spring 2015*	*25*
Appropriate Math placement score or course leading to MATH 123 or MATH 131	R	0-3				*N/A*	*N/A*
MET 203 – Intro to Solid Modeling	R		*3*			*Fall 2014 Spring 2015*	*24*
History (category of Foundational Studies)	R			*3*		*Fall 2014 Spring 2015*	*35*
Fine and Performing Arts (category of Foundational Studies)	R			*3*		*Fall 2014 Spring 2015*	*40 25-75*

Course	Indicate Whether	*Curricular Area (Credit Hours)*					
Communication (category of Foundational Studies)	R			*3*		*Fall 2014* *Spring 2015*	*25*
ENG 105 – Freshman Writing II (or elective depending on placement) (category of Foundational Studies)	R			*0-3*		*Fall 2014* *Spring 2015*	*25*
Appropriate Math placement score or course leading to MATH 123 or MATH 131	R	0-3				*N/A*	*N/A*
PHYS 105 – General Physics I	R	3				*Fall 2014* *Spring 2015*	*60* *50-90*
PHYS 105L – General Physics I Laboratory	R	1				*Fall 2014* *Spring 2015*	*25*
Technical Elective – MET 299 – CADD Fundamentals MET 337 – Thermo Systems, MET 351 – Cooperative Industrial Practice, MET 407 – Tool and Die Design	SE		*3*			*Fall 2014* *Spring 2015*	*20*
MATH 123 – Analytic Geometry and Trigonometry	R	0-3				*Fall 2014* *Spring 2015*	*27*
MFG 370 – Fundamentals of Manufacturing Processes	R		*3*			*Fall 2014* *Spring 2015*	*20*
Non-native Language (unless already has 2 years of High School credit with C average) (category of Foundational Studies)	R			*0-3*		*Fall 2014* *Spring 2015*	*30*
Free elective as needed	E				*1-5*	*Fall 2014* *Spring 2015*	*N/A*
CHEM 105 – General Chemistry I	R	3				*Fall 2014* *Spring 2015*	*40*
CHEM 105L – General Chemistry I Laboratory	R	1				*Fall 2014* *Spring 2015*	*23*
MET 302 – Applied Statics	R		*3*			*Spring 2014* *Spring 2015*	*27*
MATH 129 – Fundamentals and Applications of Calculus –or-	R	3-4				*Fall 2014*	*28*

Course	Indicate Whether	*Curricular Area (Credit Hours)*					
MATH 131 – Calculus						*Spring 2015*	
ECT 281 – Intro to Automation	R		*3*			*Fall 2014* *Spring 2015*	*20*
Non-native Language	R			*0-3*		*Fall 2014* *Spring 2015*	*30*
MET 306 – Applied Mechanisms	R		*3*			*Fall 2013* *Fall 2014*	*28*
MET 329 – Fluid Power Technology	R		*3*			*Fall 2014* *Spring 2015*	*25*
MFG 371 – Manufacturing Processes and Materials	R		*3*			*Fall 2014* *Spring 2015*	*20*
Junior Composition (category of Foundational Studies)	R			*3*		*Fall 2014* *Spring 2015*	*25*
Global Perspectives and Cultural Diversity (category of Foundational Studies)	R			*3*		*Fall 2014* *Spring 2015*	*40*
MET 304 – Engineering Analysis	R		*3*			*Spring 2014* *Spring 2015*	*20*
MET 403 – Advanced CADD Concepts	R		*3*			*Spring 2014* *Spring 2015*	*24*
MET 405 – Economic Analysis for Engineering and Technology	R		*3*			*Spring 2014* *Spring 2015*	*22*
Upper Division Integrative Elective (category of Foundational Studies)	R			*3*		*Spring 2015* *Summer 15*	*35*
Literary Studies (category of Foundational Studies)	R			*3*		*Fall 2014* *Spring 2015*	*26*
MET 404 – Engineering Management	R		*3*			*Fall 2013* *Fall 2014*	*25*
MET 406 – Strength of Materials	R		*3*			*Fall 2014* *Spring 2015*	*20*

Course	Indicate Whether	*Curricular Area (Credit Hours)*					
MET 413 – Applications & Gaging of GD&T	R		*3*			*Fall 2013* *Fall 2014*	*25*
TMGT 361 – Quality Systems and Ts	R		*3*			*Spring 2013* *Fall 2014*	*37*
Upper Division Integrative Elective (category of Foundational Studies)	R			*3*		*Fall 2014* *Spring 2015*	*35*
MET 408 – Elements of Machine Design	R		*3*			*Spring 2014* *Spring 2015*	*30*
MET 409 – Senior Project	R		*3*			*Spring 2014* *Spring 2015*	*24*
Free Elective as needed	E				*3*	*Fall 2014* *Spring 2015*	*N/A*
Ethics and Social Responsibility (category of Foundational Studies)	R			*3*		*Fall 2014* *Spring 2015*	*45* *35-130*
Social and Behavioral Studies (category of Foundational Studies)	R			*3*		*Fall 2014* *Spring 2015*	*40* *25-150*
Add rows as needed to show all courses in the curriculum.							
OVERALL TOTAL CREDIT HOURS FOR THE DEGREE	120						
PERCENT OF TOTAL		*12-14+ CH ~12%*	*56 CH – ~47%*	*36-45 CH ~30-37%*	*7-19 CH ~6-16%*		

1. For courses that include multiple elements (lecture, laboratory, recitation, etc.), indicate the average enrollment in each element.
2. Required courses are required of all students in the program, elective courses are optional for students, and selected electives are courses where students must take one or more courses from a specified group.

Instructional materials and student work verifying compliance with ABET criteria for the categories indicated above will be required during the campus visit.

CRITERION 6. FACULTY

A. Faculty Qualifications

Currently, all faculty members listed in table 6.1 have some level of expertise within the curriculum requirements of the MET program. The significant increase in enrollment in the MET major now estimated to surpass 300 by the Fall 2015 semester demands a rollout of courses such that more than the primary MET faculty must teach more than a normal load within the MET major courses. We continue to strive to maintain enrollment in the courses to less than 30 students per section, especially in lab intensive courses allowing for more achievement of student learning outcomes. The course enrollment is maintained near 28 students per course as depicted in table 5.1.

The faculty in the AETM department shares diversity in background, race, ethnicity and experience. The regular full-time workload includes teaching, scholarly activities, and service. All tenured faculty members have terminal degrees in fields that relate to the nine BS degree programs delivered in the AETM department.

Likewise, the instructors and adjunct faculty possess a mix of BS and MS degrees that align with the degree programs. The teaching of the faculty as a whole is well received by our students as evidenced by the students' evaluations each semester. Faculty resumes can be found in Appendix B. The credentials for the faculty directly associated with the delivery of the MET program and AETM in general are detailed in Table 6-1.

B. Faculty Workload

Table 6-2 shows the Faculty Workload Summary. The teaching assignments are designed to accommodate individual interests and skills, while maintaining accountability and a reasonable level of balance. This flexibility in the teaching load distribution is possible because our faculty can teach comfortably several of the courses in our curriculum, across multiple majors in our curriculum in some cases.

Essentially, tenure-track faculty are on a 4-4 load meaning they are to teach four sections of three credit courses each semester. Multi-year contract faculty are expected to teach five three credit courses each semester. The difference being that tenure-track faculty have the expectation of scholarship and research in addition to the teaching load. In addition, the university targets are for each department to average near a 22:1 student to faculty ratio.

C. Faculty Size

There are several full-time faculty members (tenured or tenure-track) directly associated with the MET program. Mehran Shahhosseini, an associate professor, serves as the coordinator who represents the program to external entities. Other AETM Department faculty members teach the technical core or elective courses required in the program. All department faculty members share the responsibility of teaching, advising and service pertinent to the program.

The number of full-time faculty is sufficient to accommodate the current level of teaching, student-faculty interaction, service activities, professional development and communications with industrial partners. Table 6.1 shows the rank and educational background of AETM program faculty, where two-page C.V.'s are included in Appendix B.

Each student in the MET major has an assigned advisor, typically evenly distributed to Todd Alberts, Mehran Shahhosseini, and Affan Badar. Advising is ultimately the responsibility of all department faculty members, thus depending on availability and scheduling, MET majors may meet with other than their assigned advisor.

With extreme growth in the Mechanical Engineering Technology and in the new Civil Engineering Technology programs over the last few years, the size of the AETM faculty has been strained. Many faculty have taken on overloads of courses to provide for the ability to keep up with student needs to graduate in four years.

The overall department faculty FTE allotment for the upcoming 2015-2016 year is 16.5 which includes a mix of tenure and tenure-track faculty with multi-year faculty, and course lecturers. The projected needs for upcoming year, as registrations of new students take place, indicates a need for 18.3 FTE of faculty.

In response to this need, and the current numbers of faculty in the department, the Dean and Provost have authorized addition multi-year faculty searches. The department is currently seeking three new full-time faculty for courses throughout the department.

D. Professional Development

The highlights of the professional development activities for the key MET faculty and all other AETM department faculty can be found in the Appendix B in the resumes. MET faculty members provide significant service to the administrative, research, and educational objectives of the university, as well as the community. The MET faculty members are involved in a number of professional development activities, including: organizing and serving as key-note speakers in domestic and international professional conferences, serving as technical society program committee members, serving as peer-reviewers for professional journals, and serving in appointed or elected leaders in professional societies.

E. Authority and Responsibility of Faculty

The MET program faculty has the primary authority and responsibility for 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, accreditation bodies and the State of Indiana Higher Education guidelines. Before proposing a new development or revision, program faculty seek and consider input from the students, graduates, employers, Industry Advisory Board (IAB) members and accreditation bodies. The college dean also advises on program educational objectives, outcomes, and curriculum issues, with an eye to state government and university administration requirements.

Table 6-1. Faculty Qualifications

Mechanical Engineering Technology – Entire AETM Department is listed

Faculty Name	Highest Degree Earned- Field and Year	Rank [1]	Type of Academic Appointment [2]	FT or PT [3]	Years of Experience			Professional Registration/ Certification	Level of Activity [4] H, M, or L		
					Govt./Ind. Practice	Teaching	This Institution		Professional Organizations	Professional Development	Consulting/summer work in industry
Todd Alberts	MS – Technology Management – 2007	I	NTT	FT	17	7	7		H	M	L
M. Affan Badar	PhD – Industrial Engineering – 2002	P	T	FT	2	12	12	CSTM	H	H	L
Mark Clauss	MS – Industrial Technology – 1986	O	NTT	FT	22	8	6		L	L	L
Phillip Cochrane	DBA – Business Administration - 2008	ASC	T	FT	22	20	9	CTM	M	M	L
Michael Hayden	PhD – Industrial Education and Technology -1989	P	T	FT	3	31	19	CMQ/OE, CQE, CSSGB, CMfgE/T	H	H	L
Kristina Lawyer	MS – Engineering – 2012	AST	TT	FT	2	2	2		M	H	L
Alister McLeod	PhD – Industrial Technology - 2009	AST	TT	FT	1	6	4		L	M	L
Randell Peters - Chair	PhD – Curriculum Instruction / Industrial Technology Education – 2005	ASC	T	FT	20	13	12	A.S.E. -23 CSTM	L	H	H
Marion Schafer	PhD – Curriculum Instruction / Industrial Technology Education –	P	T	FT	18	23	21	CPP, CPLP	M	L	M
A. Mehran Shahhosseini	Deng – Mechanical Engineering - 1999	ASC	T	FT	5	25	6	EIT	L	H	M
James Smallwood	PhD – Curriculum Instruction /	P	T	FT	5	27	13	CMT by	H	M	H

	Industrial Technology Education - 1988							SME			
Michael Williamson	PhD – Engineering Science – 2014	AST	TT	FT	2	2	2	EIT	H	H	L

Instructions: Complete table for each member of the faculty in the program. Add additional rows or use additional sheets if necessary. Updated information is to be provided at the time of the visit.

1. Code: P = Professor ASC = Associate Professor AST = Assistant Professor I = Instructor A = Adjunct O = Other
2. Code: TT = Tenure Track T = Tenured NTT = Non Tenure Track
3. At the institution
4. The level of activity, high, medium or low, should reflect an average over the year prior to the visit plus the two previous years.

Table 6-2. Faculty Workload Summary

Mechanical Engineering Technology

Faculty Member (name)	PT or FT[1]	Classes Taught (Course No./Credit Hrs.) Term and Year[2]	Program Activity Distribution[3]			% of Time Devoted to the Program[5]
			Teaching	Research or Scholarship	Other[4]	
Todd Alberts	FT	Fall 2014 – MET 103/3, 130/2 (3), 203/3 (2) Spring 2015 – MET 203/3 (2), 403/3 (2), 409/3 (3)	100	0	0	100
M. Affan Badar	FT	Fall 2014 – MET 612/3 Spring 2015 – MET 405/3 & 505/3	10	10	80 Int ASC Dean	10
Mark Clauss	FT	Fall 2014 – MFG 225/3, 370/3, 371/3 (2) Spring 2015 – MFG 370/3, 371/3 (2)	20	0	80	20
Phillip Cochrane	FT	Fall 2014 – AET 477/3 & 577/3, 493/3, MET 329/3 (2), MET 404/3, 406/3 Spring 2015 – AET 433/3 & 533/3, MET 329/3 (2), MET 333/3	80	20	0	30
Michael Hayden	FT	Fall 2014 – COT 703/3, TMGT 361/3, 429/3 & 529/3, 603/3, 607/3 Spring 2015 – COT 703/3, TMGT 421/3 (2), 461/3 & 561/3, 463/3 & 563/3	80	20	0	10
Kristina Lawyer	FT	Fall 2014 – AET 132/3, AET 436/3, MET 215/3, 406/3, 413/3 & 513/3 (2) Spring 2015 – AET – 132/3, 233/3, 239/3, 336/3, 435/3, MET 215/3	100	0	0	20
Alister McLeod	FT	Fall 2014 – TMGT 195/3, TMGT 471 & 571/3 (2), TMGT 478 & 578/3 Spring 2015 – TMGT 471 & 571/3 (2), TMGT 478 & 578/3 (2)	80	20	0	0
Randell Peters	FT	Fall 2014 – AET 330/3 (2)	40	10	50 Dpt	10

		Spring 2015 – AET 330/3, MET 430/1, TMGT 430/1			Chair	
Marion Schafer	FT	Spring 2015 – PKG 380/3, PKG 381/3 (2), PKG 489&589/3, TMGT 697/3 Fall 2014 – PKG 280/3, PKG 381/3 (2), PKG 482/3, PKG 489/3, TMGT 697/3	80	20	0	0
A. Mehran Shahhosseini	FT	Spring 2015 – COT 700/0, MET 408/3 (2), MET 633/3 Fall 2014 – COT 710/1, COT 711/2, MET 404&504/3, MET 408/3. MET 490/3, MET 610/3	40	10	50 Int PhD Director	40
James Smallwood	FT	Fall 2014 – MET 351/3 (2), TMGT 351/3, 492/3, 601/3 Spring 2015 – MET 351/3 (2), PKG 381/3, TMGT 351, 491/3 & 591/3, 492/3	80	20	0	20
Michael Williamson	FT	Fall 2014 – CVET 401/3, CVET 410/3, MET 103/3 (2), MET 406/3, PKG 381/3 Spring 2015 – CVET 411/3, CVET 420/3, MET 103/3, MET 304/3 (2), PKG 381/3	100	0	0	40

1. FT = Full Time Faculty or PT = Part Time Faculty, at the institution
2. For the academic year for which the Self-Study Report is being prepared.
3. Program activity distribution should be in percent of effort in the program and should total 100%.
4. Indicate sabbatical leave, etc., under "Other."
5. Out of the total time employed at the institution.

CRITERION 7. FACILITIES

A. Offices, Classrooms and Laboratories

1. Offices

The MET program together with AETM Department is housed in the John T. Myers Technology Center. The College of Technology building infrastructure consists of the Myers Technology Center (TC) and the Technology Annex (TA) building. The TC building was erected in 1997 and has received regular hardware upgrades to incorporate state-of-the-art instructional facilities as well as student work and lounge areas.

The Department office complex is located on the second floor of the Myers Technology Center. All MET faculty members have offices in Suite TC201, close to the class rooms, labs, and meeting rooms. The Suite is currently filled to capacity with nine tenure track faculty and one multi-year faculty member. Other office spaces in the Technology Annex and the Technology Center are being utilized for additional faculty and graduate assistants.

2. Classrooms

The College of Technology has an auditorium or theater-like classroom that seats 100 students on the first floor of the Myers Technology Building. There is also an atrium to hold large social gatherings. The AETM Department has one meeting/conference room. In addition, the College of Technology has three meeting rooms and two breakout rooms.

Some of the AETM department primary classrooms also function as laboratories, which allow students to continue on lab experiments in the same room when the lecture session of the class is delivered. All classrooms are equipped with PC's with network access, educational software required for courses taught in the room, and teaching apparatus including an audio/visual cabinet with master control, VCR/DVD player, and audio amplifier. Most rooms have installed overhead projectors, and powered projector screens. Each room also has multiple equipment/documentation cabinets to store lab tools and related lab test equipment and materials.

Classroom physical dimensions are sufficient to accommodate up to 30 seats, which is the nominal capacity for class size. The layout is designed to facilitate student interaction and collaboration on labs.

Room TC201 and TC 217 is the primary teaching room for core MET courses. The TC 217 classroom/laboratory has CADD work stations and drawing tables a seating capacity of 24 students.

3. Laboratories

The lab equipment specific to the MET program is housed in the classrooms as listed in the preceding section of this document.

Table 7.A.1 shows the department room numbers and typical course assignments to each.

Room	Lab Specialization	MET Major Courses Taught
TC 202	MET Classroom	MET 302, 304, 306, 405, 406, 413
TC 217	CADD Lab	MET 103, 203, 299, 403, 409
TC 024	Power Systems and Thermo Lab	MET 333, MET 337
TC 025	Metals Classroom	MET 333, 337, MFG 225, 370, 371
TC 022 & 023	Metals Lab	MFG 225, 370, 371,
TA 143	Fluid Power Lab	MET 329
TA 137	Automotive Classroom	MET 130, 404, 408

Table 7.A.1 AETM Department MET program specific labs and Classrooms

B. Computing Resources

ISU maintains approximately 130 technology enhanced classrooms, 6 public labs and 49 discipline specific computer labs. An increasing number of the technology enhanced classrooms serve also 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.

Figure 7.B.1 lists the university computer resources and their availability.

A number of application, operating system and support software applications are available to students and faculty at no cost. The list detailing this software and its availability can be found at http://prodinteract.indstate.edu/pls/prod/hwzkswdl.P_DisplaySW .

The computers in each classroom receive regular upgrades and maintenance support from the Office of Information Technology (OIT) which serves as the central resource for the computing infrastructure at ISU. One major OIT program currently being implemented in the transition to the Windows 7 operating systems to abate the security issues involved with Windows XP. OIT also support a 24/7 help line and extended hours help desk, when students can faculty can receive lap top or other PC troubleshooting and repair assistance bother with hardware and software issues.

The computers located in the course specific labs are generally available during normal class times, when faculty or staff is available. With the advent of laptop computer for every student, the need for off hour computer labs has been eliminated.

The laptops furnished to students come loaded with a variety of software tools, including the Microsoft Office suite. For the MET major, any required special application software is made available on PCs in the specific classrooms. For unique application software or

Room	Reservable	Student Workstations	Model	Projector	Sound	Microphone	Sympodium	Instructor Station	Laptop Capable	Smartboard	Scanner	Lab Printer	Blu-ray/ DVD/VCR
DH 326-Communications Lab	Yes	22	Intel iMac	Yes	Yes	No	No	Yes	No	No	No	No	
FD 123-Trading Lab	Yes	48	Dell Optiplex GX990	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Blu-ray
FA 112-Public Mac Lab	Yes	23	Intel iMac	Yes	Yes	No	No	Yes	No	No	Yes	No	
RO A107-Language Lab	Yes	17	Lenovo Thinkcentre M92p	Yes	Yes	No	No	Yes	Yes	No	No	Yes	DVD/VCR
TA 237-Architectural	Yes	24	Dell Precision T3600	Yes	Yes	No	No	Yes	Yes	No	No	Yes	DVD/VCR
TC 005-Aviation	Yes	24	Lenovo Thinkcentre M92p	Yes	Yes	No	No	Yes	No	Yes	No	No	VCR
TC 217-CAD	Yes	25	Dell Precision T3600	Yes	Yes	No	No	Yes	No	No	No	Yes	
TC 306-Computer Hardware	Yes	12	Dell Optiplex GX260	No	No	No	No	No	No	No	No	No	
TC 308-Solid State Lab	Yes	12	Dell Optiplex GX270	Yes	Yes	No	No	No	Yes	No	No	No	
TC 315-PLD Lab	Yes	12	Dell Optiplex GX280	Yes	No	No	No	Yes	No	No	No	No	
UH 008O-Multimedia Lab	Yes	18	Dell Precision T3400	Yes	Yes	No	No	Yes	Yes	No	No	No	VCR
A-C54-Athletics	No	6	3 Lenovo M93p/3 HP Slim Towers	No	No	No	No	No	No	No	No	No	
A-C62-Athletics	No	7	Lenovo Thinkcentre M92p	No	No	No	No	No	No	No	No	No	
A-C63-Kinesiology	No	13	Dell Precision T3400	No	No	No	No	No	No	No	No	No	
A-C65-Kinesiology	No	13	Lenovo Thinkcentre M93p	Yes	Yes	No	No	Yes	No	No	No	No	
AEC 130-Academic Enrichment	No	6	Lenovo Thinkcentre M92p	No	No	No	No	No	No	No	No	No	
FA 208-Art Grad Cluster	No	14	Intel iMac / G5	No	No	No	No	No	No	No	No	Yes	
FA 212-Art Design Studio	No	34	Intel iMac / G5	Yes	No	No	No	Yes	No	No	Yes	Yes	
FH 130-Photography	No	6	Intel iMac	No	No	No	No	No	No	No	Yes	Yes	
RO A007-Computer Science	No	14	Dell Optiplex GX980	No	No	No	No	No	No	No	No	No	
RO A009-Ivy Tech Math	No	22	Lenovo Thinkcentre M55	No	No	No	No	Yes	No	No	No	No	
RO A015 Unix CS Lab	No	16	Lenovo Thinkcentre M92p	No	No	No	No	No	No	No	No	No	
RO A017-Math/CS	No	41	Dell Optiplex GX990	No	No	No	No	No	No	No	No	No	
S 009-Chemistry	No	14	Dell Optiplex GX980	Yes	No	No	No	No	Yes	No	No	Yes	
S 013-Chemistry	No	14	Dell Optiplex GX980	Yes	No	No	No	No	Yes	No	No	Yes	
S 051J-Chemistry Research	No	8	Dell Optiplex GX980/990	No	No	No	No	No	No	No	No	Yes	
S 058-Chemistry	No	14	Dell Optiplex GX980	Yes	No	No	No	No	Yes	No	No	Yes	
S 105-Physics	No	17	Dell Optiplex GX980	Yes	Yes	No	No	Yes	No	No	No	Yes	VCR
S 109-Physics	No	13	Dell Optiplex GX980	No	No	No	No	No	No	No	No	Yes	
S 133-Physics Grad Lab	No	6	Dell Optiplex GX980	No	No	No	No	No	No	No	No	No	
S 158-Geology	No	14	Dell Precision T3400	Yes	Yes	No	No	Yes	Yes	No	No	Yes	VCR
S 160-Geology	No	10	Dell Precision T3400	No	No	No	No	No	No	No	No	Yes	
S 215-Biology	No	15	Toshiba Satellite L55-A5168 Laptops	Yes	Yes	No	No	No	No	No	No	Yes	
S 236-Biology	No	8	Acer Aspire 5750-6664 Laptops	Yes	Yes	No	No	Yes	No	No	No	Yes	
S 240-Biology	No	15	Toshiba Satellite L55-A5168 Laptops	Yes	No	No	No	Yes	No	No	No	Yes	
S 262-Biology	No	14	Toshiba Satellite L55-A5168 Laptops	Yes	Yes	No	No	Yes	No	No	No	No	
TA 127-Power Systems	No	6	Lenovo ThinkCentre M92p	No	No	No	No	No	No	No	No	No	
TA 246-Interior Design	No	19	Dell Precision T3600	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	DVD/VCR
TC 108-Robotics Lab	No	12	Dell Optiplex GX755/280	No	No	No	No	No	No	No	No	Yes	
TC 113-Packaging Lab	No	7	Dell Precision T3400	No	No	No	No	No	No	No	No	Yes	
TC 114-SIMCO	No	19	Lenovo Thinkstation S30	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	
TC 305-Digital/IT	No	12	Custom Computer Kits	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	DVD/VCR
TC 307-Transistor Lab	No	4	Dell Optiplex GX270	Yes	Yes	No	No	Yes	Yes	No	No	No	
TC 311-PLC Lab	No	9	Dell Optiplex GX270	No	No	No	No	Yes	No	No	No	No	
TC 312-Wet Process Lab	No	13	Dell Optiplex GX270/280/HP	No	No	No	No	No	No	No	No	No	
WC 129-Call Center	No	14	Dell Optiplex GX755/760 Lenovo M92p	No	No	No	No	No	No	No	No	No	

Reservable: This indicates whether a computer lab is also set up to function as a classroom and does not have any other restrictions that would prevent reservations by others.
Projector: Marks whether or not there is an overhead projector installed in the room for use with an instructor station and/or laptop capable substitution.
Sound: This specifies if there are speakers equiped to an instructor station and/or laptop capable substitution for audio playback from the computer or other equipment hooked up to the instructor station.
Microphone: This specifies if there is a microphone equiped to an instructor station for uses such as recording classes through Tegrity.
Sympodium: This is an interactive display monitor that can be manipulated with the attached pen. Good for making on screen notes.
Instuctor Station: A computer equiped station, usually in the front of the room, that is connected to other equipment such as projector, speakers, microphones, etc where available.
Laptop Capable: This designation means that a laptop can be hooked up to a monitor, projector, and speakers provided those features are installed in the lab.
Smartboard: Interactive board, illuminated by a projector, that can be manipulated by finger touch or electronic pens.
Scanner: A flatbed scanner which can be used to scan paper documents to the computer for an electronic copy.
Lab Printer: All labs are equiped with the capabilities to print to the student printing system here at ISU. The Lab Printer column designates which labs have a printer set up specifically for those labs.
Blu-ray/DVD/VCR: Indicates if there is a Blu-ray, DVD, or VCR player capable of playing through a projector.

other computing infrastructure needs, the AETM department and the College of Technology have budget lines for such, as well as the support of OIT in special cases.

Figure 7.B.1 University Computer Resources

C. Guidance

There exist a number of resources to assist students in the MET major regarding the use of the tools, equipment, computing resources, and laboratories. Incoming freshmen receive seminar information on the availability of computing resources and the OIT help desk, provided as part of new student orientation. The availability, location and policies

related to computer use and associated resources is also discussed in the MET major's freshman orientation course, MET 130.

Detailed and specific guidance on the use of packaging specific tools and equipment is provided in each course in the MET major. Many of the MET courses have student lab assistances to supplement the presence of the course instructor during lab exercises. The use of cardboard cutting machines, shaker tables, and various other packaging testing equipment related to the specific MET courses is treated in the lecture component of the course and exercised in the lab component.

D. Maintenance and Upgrading of Facilities

The allocation of general computing resources is managed by the Office of Information Technology. This includes lab PC hardware and general software. The management of application software specific to the MET major is handled by the department. Department budget line items exist for equipment which can include computer software.

Department faculty members as a whole (coordinated by the department chair) manage the specific needs for maintaining and upgrading of MET major class tools, equipment and laboratory facilities. A path exists to request specific funds for such activity from the College of Technology and the university. For issues related to computer software, the OIT also has paths for funding requests.

E. Library Services

The university library has a faculty liaison for the College of Technology who serves as a direct interface between the library and the COT. An annual budget line item is allocated from which the department can request specific books, databases and other library resources. Most ISU library functions, including access to research databases are available on-line to ISU students and faculty.

F. Overall Comments on Facilities

All major courses in the MET program are delivered in the Myers Technology Center and the Technology Annex. The required mathematics, science and foundational studies courses are delivered on the ISU campus. Overall, the quantity of space available to the program, for both teaching and administrative needs, is adequate.

CRITERION 8. INSTITUTIONAL SUPPORT

A. Leadership

The university administration has and continues to encourage growth and enrollment in the MET program and the AETM department. Likewise, support exists for accreditation and the assessment and continuous improvement processes.

The administration, from ISU president, to the College of Technology and the department, has been very supportive of the direction the MET program is headed. President Bradley has frequently inquired about the preparation of accreditation process. The dean allocated funds to support MET faculty representatives to attend ABET workshops on program assessment. Associate dean, who is the coordinator for all accreditation efforts, direct his office to help furnish data on faculty, enrollment, and transfer students etc. The department also provided both personnel (office assistant and part-time worker during summer), and consulting (An expert in ABET accreditation was invited to campus for consultation) support.

MET is one of the nine academic programs, undergraduate and graduate level, housed within the AETM Department. The department chair works closely with MET faculty to balance work load, and to provide administrative support for program development in recruiting and articulation. The program is headed by one coordinator, whose regular duties include, but are limited to calling program faculty meetings and receiving prospective students. The faculty jointly make recommendations to the department on curriculum issues.

B. Program Budget and Financial Support

1. The MET program budget requirements are developed by faculty and the department chair, then reviewed and prioritized in terms of the total department needs by the department faculty as a whole. The annual College of Technology budget available is allocated by the university administration and the Dean of the College of Technology along with department chairs distributes some recurring and most all one-time fund allocations. Each department receives an annual equipment budget. During the past four years this has been supplemented by one-time allocations to the college by the university administration.

   Additionally the college, via the efforts of the dean and the university foundation, works to procure outside funding from business, industry and alumni donors. These funds often come earmarked to special projects or needs, but some are more general and made available for critical needs in departments and programs.

2. Faculty teaching support is made available from graduate teaching assistants, student workers and tutors. Funding for graduate assistants is made available from the College of Graduate studies. Graduate teaching assistant numbers are included in the department and college FTE budget, thus are limited. An annual student worker budget is allocated to the department. An annual one-time allocation for additional student worker funds is made available at the beginning of each school year.

3. A process exists for requesting one-time or special budget allocations for equipment and facilities. The request originates in the department and required review and approval by the

college and the administration. This process/policy also applies to requesting student lab or class fees for individual courses.

4. To date the students in the MET program have been able to achieve the outcomes set forth in the assessment process. As budgets continue to be reduced, new sources of funding by the university, the college and the department must be found if the quality of the MET and all other degree programs is to be maintained. Overall quality is tied to budgets to some degree that is difficult to define. Certainly the past and continuing budget cuts are impacting the potential for increased quality and our ability to maintain current levels.

C. Staffing

The AETM Department has one administrative assistant who has been a staff member at ISU for more than 25 years. The Department typically receives three graduate assistants to aid faculty with teaching and scholarship activities.

The level (numbers) of administrative, instructional, and technical staff continues to see the pressure of budget constraints. Department staffing is controlled by an FTE budget that is assigned by the administration. There is some means for mitigation at the college level, based on the overall college FTE budget allocation.

The university has instituted salary increases for faculty and staff in recent school years toward achieving compensation parity with similar sized institution across the country.

D. Faculty Hiring and Retention

1. Need determination and requests for new faculty positions originates in the department. The granting of permission for faculty hires is awarded by the administration, with input from the college Dean, based on department FTE funding results.

2. As described previously, salary increases have in recent history been granted across the faculty and staff in the university. The retention of new tenure-track faculty is supported by a new faculty orientation program that includes start-up funds for research and travel.

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/docs/305%20FacultyApptPromotionanTenurePolicies.pdf#305.1. 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 AETM department, the starting salary of a new assistant professor is in the range of $70,000. When an offer is made, the candidate can negotiate with the Dean around this figure. Once a faculty member has joined the university, the salary is increased generally by 1% to 5% annually. At the time of promotion, the university provides a 10% increase in base salary from assistant to associate or associate to 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.

- Faculty benefits
  The ISU faculty benefits are posted at http://www.indstate.edu/humres/staff-benefits/ . 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.

E. Support of Faculty Professional Development

Professional development support predominately comes in the format of travel funds. Faculty members are encouraged to make presentations at professional meetings and/or attend professional workshops. The travel funds for the department are very limited. In instances of International travel, limited travel grants are available from the Center for Global Engagement at ISU.

The university's Center for Instructional Research and Technology organizes teaching and faculty workshops aimed at faculty development.

Each tenured/tenure-track faculty member is evaluated in terms of teaching, scholarship, and service. Tenure-track faculty members are evaluated by the department and the college annually. Tenured faculty members are evaluated by department peers every two years

PROGRAM CRITERIA

Please refer to the information detailed in Criterion 2 and 3 of this report

APPENDICES

Appendix A – Course Syllabi

Please use the following format for the course syllabi (2 pages maximum in Times New Roman 12 point font)

1. Course number and name

2. Credits and contact hours

3. Instructor's or course coordinator's name

4. Text book, title, author, and year
    a. other supplemental materials

5. Specific course information
    a. brief description of the content of the course (catalog description)
    b. prerequisites or co-requisites
    c. indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

6. Specific goals for the course
    a. specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.
    b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.

7. Brief list of topics to be covered

MET 103 Intro to Technical Graphics with CAD

Course credits: 3 credits – 4hrs contact per week – delivery mode: face-to-face

Instructor: Mr. Todd Alberts

Required Textbook: Technical Drawing by Giesecke – 14th Edition, Prentice-Hall, ISBN-13: 978-0-13-509049-7

Required Materials for Lab Drawing:

- ☐ Compass
- ☐ 30/60/90 Degree Triangle – 6”
- ☐ 45/45/90 Degree Triangle – 6”
- ☐ 2H & H Pencils (.7mm or .5mm mechanical pencils are preferred)
- ☐ 12” Engineering Scales or Rulers (Metric & English Mechanical Scales)
- ☐ 1/4” Engineering Paper Pad
- ☐ Erasers
- ☐ Masking Tape or Tape Dots
- ☐ Calculator
- ☐ Circle Templates - 1/16” to ≈ 2” (Metric & English)
- ☐ Eraser Shield
- ☐ Sanding Pad

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.

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 disciplinary reasoning, critical thinking, and hands-on skills to identify, analyze and solve problems. (**Technology**) [EO1].
2. Communicate effectively in both oral and written form to articulate technical knowledge, ideas, and proposals (**Communication**) [EO2].
3. Perform effectively, think independently and work collaboratively in a team environment in a membership or leadership role (**Management &/or Teamwork**) [EO4].
4. Actively participate in professional development, including continuous self-improvement and lifelong learning (**Lifelong Learning**) [EO5].

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

1. An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities [LO:a]
2. An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives [LO:d]
3. An ability to identify, analyze, and solve broadly-defined engineering technology problems [LO:f]

4. An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature [LO:g]
5. A commitment to quality, timeliness, and continuous improvement [LO:k]
6. An ability to develop, simulate, and analyze mechanical components/systems using computer-aided design and analysis tools [LO:l]
7. An ability to identify proper manufacturing processes meeting the tolerancing requirements to the solution of manufacturing problems [LO:o]

Brief list of topics to be covered

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%

Assignments:
All assignments are due one 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, PowerPoint, etc.) with your name, class and 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.

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.

Criteria for Grading and Evaluating of Work:
All material will be graded on the values of workmanship, attention to detail, clarity, accuracy, conformance to industry and ANSI Y14.5 standards, speed, legibility, and neatness. This will be used for drawings, assignments, and tests in both conventional drafting as well as CAD.

MET 130 Intro to Engineering and Technology

Course credits: 2 credits – 2hrs contact per week – delivery mode: face-to-face

Instructor: Todd E. Alberts

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.

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. As well, additional topics and classroom seminars will be conducted related to the freshman transition and special topics that will aid you in your academic career.

Prerequisites or co-requisites: none

Required course in AET, CVET, ET, MET, MFET, PET, & TMGT Majors

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 disciplinary reasoning, critical thinking, and hands-on skills to identify, analyze and solve problems. (**Technology**) [EO1].
2. Communicate effectively in both oral and written form to articulate technical knowledge, ideas, and proposals (**Communication**) [EO2].
3. Consider professional, ethical and social responsibility of engineering technology practices. (**Global Responsibility**) [EO3].
4. Perform effectively, think independently and work collaboratively in a team environment in a membership or leadership role (**Management &/or Teamwork**) [EO4].

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

1. An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities [LO:a]
2. An ability to function effectively as a member or leader on a technical team [LO:e]
3. An ability to identify, analyze, and solve broadly-defined engineering technology problems [LO:f]
4. An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature [LO:g]
5. An understanding of the need for and an ability to engage in self-directed continuing professional development [LO:h]

6. An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity [LO:i]
7. A knowledge of the impact of engineering technology solutions in a societal and global context [LO:j]
8. A commitment to quality, timeliness, and continuous improvement [LO:k]

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.

MET 203 Introduction to Solid Modeling

Course credits: 3 credits – 6hrs contact per week – delivery mode: face-to-face

Instructor: Todd E. Alberts

Textbook: Pro-Engineer Wildfire 5.0 Tutorial by Roger Toogood, SDC Publications, (ISBN: 9781585035359)

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

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 disciplinary reasoning, critical thinking, and hands-on skills to identify, analyze and solve problems. (**Technology**) [EO1].
2. Communicate effectively in both oral and written form to articulate technical knowledge, ideas, and proposals (**Communication**) [EO2].
3. Actively participate in professional development, including continuous self-improvement and lifelong learning (**Lifelong Learning**) [EO5].

Prerequisites or co-requisites: MET 103

Required course in the MET Major

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

1. An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities [LO:a]
2. An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives [LO:d]
3. An ability to identify, analyze, and solve broadly-defined engineering technology problems [LO:f]
4. An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature [LO:g]
5. A commitment to quality, timeliness, and continuous improvement [LO:k]
6. An ability to develop, simulate, and analyze mechanical components/systems using computer-aided design and analysis tools [LO:l]

Brief list of topics to be covered

1. Design Concepts
2. Feature based modeling & design
3. Parametric modeling
4. Solid modeling techniques

5. Part modeling
6. Assembly models
7. Engineering Drawings

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, page number from textbook, 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.

Criteria for Grading and Evaluating of Work:

All material will be graded on the values of dimensional accuracy, structure of modeling techniques, logical order of parent child relationships, use of proper modeling constraints, dimensional schemes for sketching, and proper assembly constraints.

Academic Integrity:

ISU's policy on academic integrity is outlined in the Code of Student Conduct. Students are expected to conduct themselves in accordance with all regulations outlined in the Code. The handbook is distributed to all students and is also available electronically: http://www.indstate.edu/sjp/code.htm

Excerpt from the ISU Code of Student Conduct:

"Because academic integrity is a cornerstone of the University's commitment to the principles of free inquiry, students are responsible for learning and upholding professional standards in research, writing, assessment, and ethics. In the academic community the high value of honesty mandates a corresponding intolerance of dishonesty. Written or other work which students submit must be the product of their own efforts and must be consistent with appropriate standards of professional ethics. Academic dishonesty, which includes cheating, plagiarism, and other forms of dishonest or unethical behavior, is prohibited." A list of behaviors that constitute academic dishonesty appears below.

Final Exam

MET 299 CAD Fundamentals
(3 credits)

Instructor: Todd E. Alberts

Textbook: Tutorial Guide to AutoCAD 2011 by Shawna Lockhart
SDC Publications = ISBN #9781585036011

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.

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 disciplinary reasoning, critical thinking, and hands-on skills to identify, analyze and solve problems. (Technology) [EO1].
2. Communicate effectively in both oral and written form to articulate technical knowledge, ideas, and proposals (Communication) [EO2].
3. Perform effectively, think independently and work collaboratively in a team environment in a membership or leadership role (Management &/or Teamwork) [EO4].
4. Actively participate in professional development, including continuous self-improvement and lifelong learning (Lifelong Learning) [EO5].

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

1. An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities [LO:a]
2. An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives [LO:d]
3. An ability to identify, analyze, and solve broadly-defined engineering technology problems [LO:f]
4. An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature [LO:g]
5. A commitment to quality, timeliness, and continuous improvement [LO:k]
6. An ability to develop, simulate, and analyze mechanical components/systems using computer-aided design and analysis tools [LO:l]
7. An ability to identify proper manufacturing processes meeting the tolerancing requirements to the solution of manufacturing problems [LO:o]
8. An ability to demonstrate integrated knowledge related to MET discipline[LO:p]

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:

1. Assignments & Drawings	20%
2. Quizzes & Tests	20%
3. Project	50%
4. Attendance/Participation	10%

Grading Scale:

A+ = 93 – 100%	A = 90 – 92.9%	
B+ = 87 – 89.9%	B = 83 – 86.9%	B- = 80 – 82.9%
C+ = 77 – 79.9%	C = 73 – 76.9%	C- = 70 – 72.9%
D+ = 67 – 69.9%	D = 63 – 66.9%	D- = 60 – 62.9%
F = 0 – 59.9%		

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, page number from textbook, 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.

MET 302 Applied Statics

Course credits: 3 credits – 3hrs contact per week – delivery mode(s) distance, hybrid, and face-to-face

Instructor: Dr. M. Affan Badar

Textbook: R.C. Hibbeler, *Engineering Mechanics: Statics*, 12th edn, Prentice Hall (Pearson). ISBN 0136077900 **or** R.C. Hibbeler, *Engineering Mechanics: Combined Statics & Dynamics*, 12th edn, Prentice Hall (Pearson). ISBN 0138149291. The second book can be used for both MET302 and 304.

Course Description: Resultants and equilibrium, force systems, reactions, moments, couples, trusses, frames, sheaves, pulleys, and friction. Graphic and analytic methods.

Prerequisites or co-requisites: PHYS 105 and MATH 115 or MET 215

Required course in CVET, ET, & MET majors

Objectives of this course: 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 disciplinary reasoning, critical thinking, and hands-on skills to identify, analyze and solve problems. (**Technology**) [EO1].
2. Communicate effectively in both oral and written form to articulate technical knowledge, ideas, and proposals (**Communication**) [EO2].
3. Perform effectively, think independently and work collaboratively in a team environment in a membership or leadership role (**Management &/or Teamwork**) [EO4].
4. Actively participate in professional development, including continuous self-improvement and lifelong learning (**Lifelong Learning**) [EO5].

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

1. An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities [LO:a]
2. An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies [LO:b]
3. An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives [LO:d]
4. An ability to function effectively as a member or leader on a technical team [LO:e]

5. An ability to identify, analyze, and solve broadly-defined engineering technology problems [LO:f]
6. A commitment to quality, timeliness, and continuous improvement [LO:k]

Brief list of topics to be covered

Class #	Date	Topic	Due		
			Quiz	HW	Project
1	Jan 10	Ch 1 – General Principles	1		
2	Jan 12	Ch 2 – Force Vectors	2		
3	Jan 17	Ch 2 – Force Vectors	3		Worksheet 1
4	Jan 19	Ch 3 – Equilibrium of a Particle	4	1	
5	Jan 24	Ch 3 – Equilibrium of a Particle	5		
6	Jan 26	Ch 3 – Equilibrium of a Particle	6		Worksheet 2
7	Jan 31	Ch 4 – Force System Resultants	7		
8	Feb 2	Ch 4 – Force System Resultants	8	2	
9	Feb 7	Ch 4 – Force System Resultants	9		Worksheet 3
10	Feb 9	Exam 1 (Ch 1-4)	10		
11	Feb 14	Ch 5 – Equilibrium of a Rigid Body	11		
12	Feb 16	Ch 5 – Equilibrium of a Rigid Body	12	3	Worksheet 4
13	Feb 21	Ch 5 – Equilibrium of a Rigid Body	13		
14	Feb 23	Ch 6 – Structural Analysis	14		
15	Feb 28	Ch 6 – Structural Analysis	15		Worksheet 5
16	Mar 1	Ch 7 – Internal Forces	16	4	
17	Mar 13	Ch 7 – Internal Forces	17		
18	Mar 15	Ch 8 – Friction	18		Worksheet 6
19	Mar 20	Ch 8 - Friction	19		
20	Mar 22	Exam 2 (Ch 5-8)	20	5	
21	Mar 27	Ch 9 – Center of Gravity and Centroid	21		Worksheet 7
22	Mar 29	Ch 9 – Center of Gravity and Centroid	22		
23	Apr 3	Ch 9 – Center of Gravity and Centroid	23		
24	Apr 5	Ch 10 – Moments of Inertia	24	6	Worksheet 8
25	Apr 10	Ch 10 – Moments of Inertia	25		
26	Apr 12	Ch 10 – Moments of Inertia	26		
27	Apr 17	Ch 11 – Virtual Work	27		Presentation
28	Apr 19	Ch 11 – Virtual Work	28	7	
29	Apr 24	Ch 11 – Virtual Work	29		
30	Apr 26	Exam 3 (Ch 9-11)	30		Report
Final	May 1	Everything!		8	

MET 304 – Engineering Analysis

Course credits: 3 credits – 4hrs contact per week – delivery mode(s) distance, hybrid, and face-to-face

Instructor: Dr. A. Mehran Shahhosseini,

Textbook: *Engineering Mechanics-Dynamics*, by R. C. Hibbeler, Prentice Hall, 13th edition, 2012. or *Engineering Mechanics-Combined Statics & Dynamics*, by R. C. Hibbeler, Prentice Hall, 13th edition, 2012.

Material needed: Textbook, calculator with Trig function capability, and engineering pad (5 squares/inch) for sketching/plotting.

Course Description: Introduction to the analysis of engineering problems including dynamics using calculus based methods. Emphasis is given to the understanding of basic concepts and principles as well as the application of related analysis in mechanical and manufacturing engineering.

Prerequisites or co-requisites: MATH 129 or MATH 131

Required course in the MET Major

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

1. To develop an understanding of the fundamentals and principles Engineering Mechanics: Statics and Dynamics of particles, and rigid bodies in two and three dimensions including: kinematics and kinetics of particles and rigid bodies in 2D and 3D motion, Rotations, Translations, Oscillations.
2. Learn to solve equilibrium of Rigid Bodies including the calculations of Moment of Force, Inertia Moments of Solid Bodies, and basic structural Analysis, and be able to determine the requirement for the equilibrium of particles and solid bodies.
3. To develop the ability to apply Newtonian mechanics to model and predict the responses of simple dynamical system (particle and rigid body) subjected to applied forces.
4. To learn the basics of Oscillations and different possibilities for Vibrations of mechanical Systems.

Program Educational Outcomes to ABET Criterion Index:

An engineering technology program must demonstrate that graduates have:

1. An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities [LO:a]
2. An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies [LO:b]
3. An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes [LO:c]
4. An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives [LO:d]

5. An ability to function effectively as a member or leader on a technical team [LO:e]
6. An ability to identify, analyze, and solve broadly-defined engineering technology problems [LO:f]
7. An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature[LO:g]
8. An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity [LO:i]
9. A knowledge of the impact of engineering technology solutions in a societal and global context [LO:j]
10. A commitment to quality, timeliness, and continuous improvement [LO:k]

Ethics: Representation of another person's work as your own is a serious breach of professional ethics, and the instructor reserves the right to apply a suitable penalty for such infractions, including, but not limited to a failing grade for the course. External sources for design ideas, design specifications, calculations, etc., must be properly attributed.

Attendance: Daily attendance and preparation are essential. You are responsible for all content and assignments (or changes to assignments) presented in class. Be punctual and participate actively on blackboard. Be sure to bring book, and notes to every class.

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.

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

MET 306 - Applied Mechanisms

Course credits: 3 credits – 4hrs contact per week **–** delivery mode(s) distance, hybrid, and face-to-face

Instructor: Dr. A. Mehran Shahhosseini,

Textbook: *Machines and Mechanisms: Applied Kinematic Analysis*, 4th Ed., David H. Myszka, 2011.

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

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: Analysis of motion, displacement, velocities, accelerations, friction wheels, instant centers, gears, belts, chains, linkages, and connectors.

Prerequisite: MATH115 or MET215

Required course in MET major

Student Learning Outcomes:

An engineering technology program must demonstrate that graduates have:

1. An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities [LO:a]
2. An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies [LO:b]
3. An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes [LO:c]
4. An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives [LO:d]
5. An ability to function effectively as a member or leader on a technical team [LO:e]
6. An ability to identify, analyze, and solve broadly-defined engineering technology problems [LO:f]
7. An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature [LO:g]
8. An understanding of the need for and an ability to engage in self-directed continuing professional development [LO:h]

9. An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity [LO:i]
10. A knowledge of the impact of engineering technology solutions in a societal and global context [LO:j]
11. A commitment to quality, timeliness, and continuous improvement [LO:k].

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

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

MET 329 – Fluid Power Technology

Course credits: 3 credits – 4hrs contact per week – delivery mode: face-to-face

Instructor: Dr. Phillip Cochrane

Texts: Fluid Power with Applications 7th ed Anthony Esposito. Industrial fluid power Volume 1: Basic text on hydraulics, air, & vacuum for industrial and mobile applications. 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

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

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

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.

Prerequisites: none

Required course in AET, CVET, ET, MET, MFET, PET, & TMGT Majors

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

a. An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities [LO:a]
b. An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies [LO:b]
c. An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes [LO:c]

Brief list of topics to be covered

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
FA Chapters 2 & 3 Physical Properties of Hydraulic Fluids & Energy and Power in Hydraulic Systems

IFP Chapter 1 Fluid Power Principles
FA Chapter 4: Frictional Losses in Hydraulic Pipelines

IFP
FA Chapter 5 Hydraulic Pumps

IFP Chapter 5 Air and Hydraulic Pumps
FA Chapter 6 Hydraulic Cylinders

IFP Chapter 2 Fluid Power Cylinders
FA Chapter 7 Hydraulic Motors

IFP
FA Chapter 8 Hydraulic Valves

IFP Chapter 3 & 4 Control Valves 2 –way and 3-way & Directional Control Valves, 4 way and 5-way
FA Chapter 9 Hydraulic Circuit Design and Analyses

IFP Appendix A Design Calculations and Appendix B Fluid Power Design Data
FA Chapters 10 & 11 Hydraulic Conductors and Fittings & ancillary devices

IFP Chapter 6 Other Fluid Power Components
FA Chapter 12 Maintenance of Hydraulic Systems

IFP Appendix C Troubleshooting Procedures
FA Chapter 13 Pneumatics Air Preparation and components

IFP Review Chapter 5 Air and Hydraulic Pumps

Begin Laboratory Exercises

MET 351-Professional Internship

Instructor: Dr. Jim Smallwood –

COURSE DESCRIPTION

Coordinated work experience in industry and a comprehensive written report of the experience. Students are required to involve the ISU Career Center in this experience. Course may be taken twice for a maximum of 6 credits.

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

1. An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities [LO:a]
2. An ability to demonstrate integrated knowledge related to MET discipline[LO:p]

COURSE REQUIREMENTS:

I. Maintain a daily journal while on the co-op assignment. Journal entries may be short but they must contain enough detail to clearly communicate what was actually done on the job; e.g., "completed fuel injector replacement for time study" -- not "worked in time study." The first half of the journal must be submitted along with the midterm report and the last half of the journal must be submitted with the final report. Summer co-op students are to maintain the journal for the entire summer.

II. Maintain a weekly record of hours worked in areas or at specific tasks. The weekly work record must be submitted along with the daily journal and the report.

III. Submit to your professor, a midterm report (see attached format), the daily journal and weekly record for the first half of the co-op period. **(Due dates on second page.)**

IV. In the last week of the semester, submit to your professor a final report, daily journal, and weekly record for the last half of the co-op period. See the attached outline for the format to be followed for the final report. **(Due dates on second page.)**

V. Standards for written work:

A. Daily Journal -- may be handwritten if done neatly.

B. Midterm Report -- must be typewritten, double spaced, and "easy to read". The report should be three pages in length.

C. Final Report -- must be typewritten, double spaced and "easy to read". The report should be three pages in length.

D. Evaluation -- The course grade will be based, in part, on the quality of the written reports submitted. Reports must not have misspelled words, should be well organized, and written in a professional manner. Incomplete grades will be given ONLY in cases of extraordinary circumstances. Under no condition will an incomplete grade be given unless the student has prior approval by the professor! Deduction in grade for late papers.

Please include information in the daily journal and the midterm and final reports about how you and/or the company 1) Apply knowledge of safety principles in the workplace, 2) recognize the importance of lifelong learning and 3) integrate ethics in all dealings.

VI. Dates materials should be received by professor:

DUE DATE	***MATERIALS***
March 1st (Midterm materials)	Copy of daily journal (through previous week) Copy of weekly work record (through previous week) Midterm report
April 25th (Final materials)	Copy of daily journal (last half of co-op period) Copy of weekly work record (last half of co-op period) Final report

FORMAT FOR MET 351 MIDTERM REPORT

COVER PAGE

Course, co-op experience (1st, 2nd, etc.), professor, date, co-op employer, co-op employer address, dates of co-op enrollment (current semester); your name, phone number(s) at co-op job or residence while on co-op, address while on co-op and home address.

TEXT

Background Information: Company, products, size, location, number of co-op positions, company philosophy or procedures regarding co-op. If this is a second or third co-op experience with this company, this section should be limited to 1/2 page.

Work Assignment: Discuss in detail your internship assignments for the period from the beginning to midterm. If possible, project what you expect to be doing for the remainder of your co-op experience with this company, relate your current assignments to those of your previous co-op(s).

Summary: Relate your own assessment of your success on the job. Note areas in which you feel you can make a greater contribution to the company. Discuss how you plan to alter (or enhance) your approach to effect accomplishment in the areas you noted in which you believe you can be more successful.

FORMAT FOR MET 351 FINAL REPORT

COVER PAGE

Course, co-op experience (1st, 2nd, etc.), professor, date, co-op employer, co-op employer address, dates of co-op enrollment (current semester); your name, phone number(s) at co-op job or residence while on co-op, address while on co-op, and home address.

TEXT

Historical and Background Information: Your experience with the company, company philosophy of business, company philosophy regarding co-op, company product(s), size, career opportunities with company. If this is a 2nd or 3rd co-op experience with this company, relate to your overall experience rather than just the current term.

Summary of Experience for This Co-op Period: Review your assignments for the entire work period. Note those areas or specific job assignments which were especially helpful and, in your opinion, excellent learning experiences. Tell about the assignments which were the "most fun" and exciting. Point out areas of work which you disliked or found to be boring.

Reactions and Comments: What would you do differently if you had the opportunity to do this co-op period over? If this is a 2nd or 3rd co-op with this company, reflect upon your total co-op experience and make suggestions that you have for the company which would, in your opinion, improve the experience. State steps the University should take or requirements which should be modified to improve the co-op experience.

Summary: This section is up to you.

Daily Journal (SAMPLE)

DATE

I arrived on the job site at 7:00 a.m. and met with John Jones, Superintendent, to discuss the scheduled concrete placements for the day. Approximately 48 cubic yards of 4000 psi, normal weight, air entrained concrete was placed in two sets of piers located at the DDP unit. The DDP unit is the major construction area at the Johnson Feed Mine. Two sets of five compressive strength cylinders were cast for the placement. All concrete was tested for temperature consistency and air content. M. W. Post is very strict when it comes to concrete placement. An example would be: if water is added to the concrete once it has arrived on site, the drum must turn a minimum of 30 revolutions to ensure entire load has been mixed thoroughly. This is expected of me as an ATEC representative to know the number of turns the drum has completed. This company does a very poor job of placing concrete. They are very slow and very unpredictable. All of the concrete placed today was done with a pump truck. The slump was to be 5 1/2 inches or better before going through the pump. It will more than likely gain an inch through the pump. Approximately 248 cubic yards of the same mix were placed at a footer pad 3 feet thick. Three sets of five compressive strength cylinders were cast for this concrete. All of the same other tests were performed. I departed the site at 7:00 p.m.

DATE

I arrived on site at 7:00 a.m. Field density tests were performed at Water Treatment Plant tanks. Final compaction was achieved. There is one more of the four tanks that still needs to be formed. Approximately 112 cubic yards of 4000 psi, normal weight, air entrained concrete

were placed. Two sets of five compressive strength cylinders were cast. The concrete was tested for temperature, consistency, and air content. This was a very exciting pour today. First, the specifications called for 3000 mix. They are pouring a 4000 mix and wetting it down a lot so they can drag it a long way easily. They are using their vibrator to pull the concrete around which is a mistake. Second, one of the form walls blew out because they didn't watch their rate of placement. The top of this column pad is on the concrete line, on the side where the formwork blew out, the bottom is out about 8 inches. One truck got stuck and another broke his drive shaft. I dumped a full wheelbarrow of concrete, about 400 pounds of it, but my tests were made and Memorial Day weekend has arrived.

Weekly Journal (SAMPLE)

Week 1 1/14-1/18	Printing 10 hrs. Masking negatives 2 hrs. Masking & making plates 2 hrs. Cutting 1 hr. Delivering 1 hr. Cleaned & filed plates 1 hr. Cleaned press 1 hr. Miscellaneous duties 2 hrs.
Week 2 1/21-1/25	Printing 10 hrs. Making negatives 2 hrs. Masking & making plates 2 hrs. Cutting 1 hr. Delivering 1 hr. Cleaned & filed plates 1 hr. Cleaned press 1 hr. Miscellaneous duties 2 hrs.
Week 3 1/28-2/1	Collating 8 hrs. Printing 5 hrs. Folding 2 hrs. Making negatives 1 hr. Delivering 1 hr. Masking & making plates 1 hr. Cleaned press 1 hr. Miscellaneous duties 1 hr.
Week 4 2/4-2/8	Printing 9 hrs. Masking & making plates 3 hrs. Making negatives 2 hrs. Cleaned & filed plates 2 hrs. Paper inventory 1 hr. Cleaned press 1 hr. Miscellaneous duties 1 hr.
Week 5 2/11-2/15	Printed 10 hrs. Cleaned & filed plates 2 hrs. Made negatives 2 hrs.

Masking & making plates 2 hrs.
Cleaned press 2 hrs.
Delivering 1 hr.
Miscellaneous duties 1 hr.

Week 6 2/18-2/22

Printed 8 hrs.
Cleaned press 3 hrs.
Making negatives 2 hrs.
Masking & making plates 2 hrs.
Cleaned & filed plates 2 hrs.
Delivering 1 hr.
Miscellaneous duties 1 hr.

MET 403 Advanced CAD Concepts

Course credits: 3 credits – 4hrs contact per week – delivery mode(s) distance, hybrid, and face-to-face

Instructor: Mr. Todd E. Alberts

Required Textbook: Pro/ENGINEER Mechanica Wildfire 5.0 Tutorial (Structure/Thermal) by Roger Toogood, SDC Publications, (ISBN: 978-1-58503-536-6)

Suggested Textbook: Pro/ENGINEER WildFire 5.0 Tutorial and MultiMedia CD by Roger Toogood SDC Publications, (ISBN: 978-1-58503-535-9)

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

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.

Prerequisites or co-requisites: MET 203

Required course in MET majors

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.

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

1. Apply disciplinary reasoning, critical thinking, and hands-on skills to identify, analyze and solve problems. (**Technology**) [EO1].
2. Communicate effectively in both oral and written form to articulate technical knowledge, ideas, and proposals (**Communication**) [EO2].
3. Perform effectively, think independently and work collaboratively in a team environment in a membership or leadership role (**Management &/or Teamwork**) [EO4].
4. Actively participate in professional development, including continuous self-improvement and lifelong learning (**Lifelong Learning**) [EO5].

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

1. An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities [LO:a]
2. An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes [LO:c]
3. An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives [LO:d]
4. An ability to identify, analyze, and solve broadly-defined engineering technology problems [LO:f]
5. An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature [LO:g]
6. A commitment to quality, timeliness, and continuous improvement [LO:k]
7. An ability to develop, simulate, and analyze mechanical components/systems using computer-aided design and analysis tools [LO:l]
8. An ability to select appropriate materials, evaluate design alternatives, and manage design work/processes [LO:n]

Brief list of topics to be covered

(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

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.

MET 404/504 – Engineering Design and Management (3 credit hours)

Course credits: 3 credits – 4hrs contact per week – delivery mode(s) distance, hybrid, and face-to-face

Instructor: Dr. A. Mehran Shahhosseini,

Textbook/Workbook: Fundamentals of Engineering Design, 2nd Ed., by B. Hyman, 2003. You can purchase the textbook through ISU Bookstore: http://indiana-state.bkstore.com/

References: Some handouts may be distributed during the semester. Also check out ISU Cunningham Memorial Library - http://library.indstate.edu

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, engineering ethics, and decision making in engineering design and management.

Prerequisite: Junior status, having a general understanding of engineering technology and technical design or at instructor's consent.

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

1. An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities [LO:a]
2. An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives [LO:d]
3. An ability to identify, analyze, and solve broadly-defined engineering technology problems [LO:f]
4. An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature [LO:g]
5. An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity [LO:i]
6. A commitment to quality, timeliness, and continuous improvement [LO:k]
7. An ability to select appropriate materials, evaluate design alternatives, and manage design work/processes [LO:n]

Brief list of topics to be covered

1. Introduction to engineering design
2. Problem definition/formulation
3. Information and communication
4. Professional/social context
5. Concept generation

6. Project planning
7. Engineering economics
8. Design decision-making

Assessment of outcomes:

The course outcomes will be assessed through collected assignments, design projects, and exams. Every student is required to participate in a group 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 a project report.

Criteria for evaluating the assignments/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

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.

Ensure that your final answers are easily distinguished if they are analytical solutions.

MET 405-Economic Analysis for Engineering and Technology,
3 Cr Hr

Instructor: Dr. M. Affan Badar

Textbook: D.G. Newnan, J.P. Lavelle, and T.G. Eschenbach, *Engineering Economic Analysis*, 12th edn, Oxford Univ. Press, Inc., New York, NY, 2014, ISBN: 9780199339273.
Materials needed: Textbook, calculator with math function capability, computer literacy in MS Word & Excel, and internet access.

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 for MET 405: MATH 115 or MET 215; junior standing
Pre-requisite for MET 505: Graduate standing

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 disciplinary reasoning, critical thinking, and hands-on skills to identify, analyze and solve problems. (Technology) [EO1].
2. Communicate effectively in both oral and written form to articulate technical knowledge, ideas, and proposals (Communication) [EO2].
3. Consider professional, ethical and social responsibility of engineering technology practices. (Global Responsibility) [EO3].
4. Perform effectively, think independently and work collaboratively in a team environment in a membership or leadership role (Management &/or Teamwork) [EO4].
5. Actively participate in professional development, including continuous self-improvement and lifelong learning (Lifelong Learning) [EO5].

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

1. Have an appropriate mastery of the knowledge, techniques, skills, and modern tools of the MET discipline. [LO:a]
2. Have an ability to function effectively on teams. [LO:e]
3. Have an ability to identify, analyze and solve technical (close-ended analysis and open-ended design) problems. [LO:f]
4. Have an ability to communicate effectively through written reports or oral presentations.[LO:g]
5. An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity [LO:i]
6. Have a commitment to quality, timeliness, and continuous improvement. [LO:k]

Additional outcomes:

1. Use economic analysis concepts: time value of money with reference to interest rate, compounding, cash flow diagrams, and inflation for technology investments.
2. Use financial functions of spreadsheets (Excel).
3. Compare alternatives including replacement pertaining to the technology field.
4. Perform break-even analysis for manufacturing/service industries.
5. Determine economic purchase and production quantities and select between make and buy options.
6. Estimate depreciation of machines.
7. Evaluate after-tax income or profit of technology investments.

Groups: Undergraduate and graduate students are required to make separate groups, 3 members per group, to do group work like project mentioned below. Students will form groups by themselves. For group work, submit only one report per group. However, the cover page must include info on the course, task, group members, date of submission, and a peer-evaluation describing the contribution (specific work and overall effort) of each member in the group.

Project: All students are required to do project in groups. A final project report will be due April 22. 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 (if applicable). Cite all the references as necessary in the body (text) of the report. If necessary, presentation on the project may be scheduled during the study week. For distance students, e-submission of the presentation file will be okay.

Undergraduate students' project will involve the application of economic analysis and decision-making in a real-world case. A case will be assigned by the instructor.

Graduate students' project will have two parts: a real-world case as required for the undergraduates and a term paper on an engineering economic topic. An extensive search of the related literature is required for the term paper. The term paper should contain a minimum of 10 references, and the references must be cited in the body of the paper.

Exams: Two exams during the semester and a final exam will be given. Exams to on-campus students will be given during class in TC 114 (see the class time at the beginning of the syllabus). Distance students are required to get the exam proctored. Proctor cannot be relative or personal friend. You can take the exam at work while being proctored by your supervisor or at a testing center for a fee (ISU testing center may be free), or you can arrange at a church, library, etc. Note that it's student's responsibility to find a proctor or proctoring place. You can use a video camera to record yourself in lieu of a proctor and submit the video file with the exam. Distance students may also need to arrange for time-off and internet access to take the exam on specified date and time. Distance students will be allowed to take the exam with the on-campus students to avoid the hassle of finding a proctor.

In exams, if the highest obtained by student(s) falls below the maximum points allowed, then the highest grade will be considered as the maximum allowed. No make-up exam will be given.

Course Contents:

Chapter	Topics
1	Introduction: Economic analysis in E&T and decision making
2	E&T costs, break-even, cost & benefit estimating, Cash flow diagrams
3	Time value of money, simple interest, compound interest, repaying a loan, equivalence,
	Discrete compounding: single payment compound amount or FW, PW
	Nominal and effective interest,
	Continuous compounding,
4	Uniform (equal) series, sinking fund, capital recovery,
	Uniform (arithmetic) gradient, geometric gradient,
	MS Excel (Spreadsheets) financial functions
5	Present worth analysis: equal, unequal (LCM or select a period), infinite lives (capitalized cost), Bond, Spreadsheets and PW
---Exam 1 (date/time is given before) ---	
6	Annual equivalent analysis: equal, unequal, and infinite lives
	Loan repayments, Spreadsheets
7	Rate of return analysis: MARR, IRR (limited to cash flows yielding single value)
	Spreadsheets
8	Incremental analysis
9	Analysis using FW, benefit-cost ratio, payback period,
	Sensitivity and break-even analysis
---Exam 2 (date/time is given before) ------	
-(not in Textbook)-	Economic order quantity, economic production quantity, make or buy decision
11	Depreciation: SL, SOYD, DB, DB switching to SL, MACRS, UOP
	Depletion: cost method, % method
12	Income tax rates, interest & taxes, depreciation & taxes, investment tax credit,
	after-tax cash flows
If time permits:	
13	Replacement analysis, defender, challenger, sunk cost, outsider viewpoint, economic (minimum cost) life.
14	Inflation, market interest rate, inflation-free (real) interest rate,
	actual (then-current) dollar, constant (real) dollar, equivalence involving inflation
---Final (date/time is given before; will include topics covered after Exam 1) ------	

MET 406 – STRENGTH OF MATERIALS

Course credits: 3 credits – 4hrs contact per week – delivery mode(s) distance, hybrid, and face-to-face

Instructor: Dr. A. Mehran Shahhosseini,

Textbook: "Applied Strength of Materials," by R.L. Mott, 5th edition, ISBN 978-0132368490. Access to the internet.

Word processing software. Scientific calculator. Engineering computation pads.

Course Description: Centroids, moment 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.

Prerequisites or co-requisites: MET 302

Required course in CVET, ET, & MET majors

Program Educational Objectives: The course will help prepare students, who (after graduation) can:

1. Apply disciplinary reasoning, critical thinking, and hands-on skills to identify, analyze and solve problems. (Technology) [EO1].
2. Communicate effectively in both oral and written form to articulate technical knowledge, ideas, and proposals (Communication) [EO2].
3. Consider professional, ethical and social responsibility of engineering technology practices. (Global Responsibility) [EO3].
4. Perform effectively, think independently and work collaboratively in a team environment in a membership or leadership role (Management &/or Teamwork) [EO4].
5. Actively participate in professional development, including continuous self-improvement and lifelong learning (Lifelong Learning) [EO5].

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

1. An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities [LO:a]
2. An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies [LO:b]
3. An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes [LO:c]
4. An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives [LO:d]
5. An ability to function effectively as a member or leader on a technical team [LO:e]
6. An ability to identify, analyze, and solve broadly-defined engineering technology problems [LO:f]
7. An ability to select appropriate materials, evaluate design alternatives, and manage

design work/processes [LO:n]

Brief list of topics to be covered

Wk	Day, Date	Topic(s) Covered	Tasks/Readings	Due
1	**M, Aug.**	No class	Get the text!	
	W, Aug.	Basic Concepts	Ch. 1	
2	**M, Aug.**	Design Properties of Materials	Ch. 2	Quiz 1 (before
	W, Aug.	Design Properties of Materials		
3	**M, Sep. 1**	No class		Quiz 2 (before
	W, Sep. 3	Direct Stress & Design	Ch. 3	
4	**M, Sep. 8**	Direct Stress & Design		Quiz 3 (before
	W, Sep. 10	Axial Deformation		Homework 1
5	**M, Sep. 15**	Axial Deformation		Quiz 4 (before
	W, Sep. 17	Thermal Stress		
6	**M, Sep. 22**	Thermal Stress		Quiz 5 (before
	W, Sep. 24	No class	Go to the career fair!	
7	**M, Sep. 29**	Exam Review		
	W, Oct. 1	Exam 1		Homework 2
8	**M, Oct. 6**	Torsional Stress & Deformation	Ch. 4	Quiz 6 (before
	W, Oct. 8	Torsional Stress & Deformation		
9	**M, Oct. 13**	Torsional Stress & Deformation		Quiz 7 (before
	W, Oct. 15	Centroids & Moments of Inertia	Ch. 6	
10	**M, Oct. 20**	Centroids & Moments of Inertia		Quiz 8 (before
	W, Oct. 22	Shear Forces & Moments in	Ch. 5	
11	**M, Oct. 27**	Shear Forces & Moments in		Quiz 9 (before
	W, Oct. 29	Shear Forces & Moments in		Homework 3
12	**M, Nov. 3**	Bending Stress	Ch. 7	Quiz 10 (before
	W, Nov. 5	Bending Stress		
13	**M, Nov.**	Bending Stress		Quiz 11 (before
	W, Nov.	Shear Stress in Beams	Ch. 8	
14	**M, Nov.**	Exam Review		
	W, Nov.	Exam 2		Homework 4
15	**M, Dec. 1**	Course Review		Project
	W, Dec. 3	Course Review		

MET 408 – Elements of Machine Design

Course credits: 3 credits – 4hrs contact per week – delivery mode(s) distance, hybrid, and face-to-face

Instructor: Dr. A. Mehran Shahhosseini,

Textbook: ***Machine Elements in Mechanical Design***, Robert L. Mott, 5th ed., Pearson Education Inc., Upper Saddle River, New Jersey, 2013.

Reference: ***Applied strength of materials***, 5th ed. By R. L. Mott.
You will need a pocket calculator with Trig. Function capability.

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. Prerequisite MET306, and MET406 or equivalents.

Prerequisites or co-requisites: MET 306 and MET 406

Required course in ET & MET majors

Course Objectives: Students who successfully complete MET408 will be able to:

1. Develop and analyze technical solutions for mechanical assemblies, capable to efficiently perform a specific task.
2. Identify loading of machine elements and perform stress and deformation calculations to design safe machines and machine parts.
3. Judiciously select the material for machine parts considering operating conditions and cost effectiveness.
4. Consider environmental impacts of the design and take measures to avoid environment deterioration.
5. Use computers to produce Technical Drawings necessary for manufacturing and assembly.
6. Develop creativity, communication skills, and ability to work in teams.

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

1. An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities [LO:a]
2. An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies [LO:b]
3. An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes [LO:c]
4. An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives [LO:d]
5. An ability to function effectively as a member or leader on a technical team [LO:e]
6. An ability to identify, analyze, and solve broadly-defined engineering technology problems [LO:f]
7. An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature[LO:g]

8. An understanding of the need for and an ability to engage in self-directed continuing professional development [LO:h]
9. An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity [LO:i]
10. A knowledge of the impact of engineering technology solutions in a societal and global context [LO:j]
11. A commitment to quality, timeliness, and continuous improvement [LO:k]

Brief list of topics to be covered

(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) Shaft design

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. Please send e-mails with ISU address.

Ethics: Representation of another person's work as your own is a serious breach of professional ethics, and the instructor reserves the right to apply a suitable penalty for such infractions, including, but not limited to a failing grade for the course. External sources for design ideas, design specifications, calculations, etc., must be properly attributed.

Material needed: Textbook, calculator, and engineering pad for assignments. *Students cannot use their laptop, cell or smart phone inside the classroom; in case of any violation, I will ask the student to leave the classroom and I consider him* ***absent*** *for that session.*

MET 409 Senior Project in Industrial Technology

Course credits: 3 credits – 4hrs contact per week – delivery mode(s) distance, hybrid, and face-to-face

Instructor: Mr. Todd E. Alberts

Required Textbook: None

References: Several handouts will be given during the semester and some sources will be made available through the Blackboard website. Students are encouraged to use all of their previous textbooks are resources to sound decision making and referencing of materials.

Course 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.

Prerequisites or co-requisites: Senior standing and (completion of a 400-level design course in the student's major or instructor's consent).

Required course in CVET, ET, & MET majors

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

1. Apply disciplinary reasoning, critical thinking, and hands-on skills to identify, analyze and solve problems. (Technology) [EO1].
2. Communicate effectively in both oral and written form to articulate technical knowledge, ideas, and proposals (Communication) [EO2].
3. Consider professional, ethical and social responsibility of engineering technology practices. (Global Responsibility) [EO3].
4. Perform effectively, think independently and work collaboratively in a team environment in a membership or leadership role (Management &/or Teamwork) [EO4].
5. Actively participate in professional development, including continuous self-improvement and lifelong learning (Lifelong Learning) [EO5].

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

1. An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities [LO:a]
2. An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives [LO:d]
3. An ability to function effectively as a member or leader on a technical team [LO:e]
4. An ability to identify, analyze, and solve broadly-defined engineering technology problems [LO:f]
5. An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature [LO:g]
6. A commitment to quality, timeliness, and continuous improvement [LO:k]
7. An ability to select appropriate materials, evaluate design alternatives, and manage design work/processes [LO:n]
8. An ability to demonstrate integrated knowledge related to MET discipline[LO:p]

Brief list of topics to be covered

Final Design Portfolio:

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 mechanical system/component or mechanism (linkage, gear-drive, cam-follower, belt-drive, or chain-drive) including bearings, seals, etc. for a specific application
- Design or improve a device/system
- Design involving renewable energy
- 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 (lean and six sigma), and reliability
- Packaging
- Automotive
- Logistics and supply chain

Elements of the Final Design Project Portfolio (as applicable):

(1) 1 Page Executive Summary of Project
(2) Background Information and Subject Research
(3) Project Objectives
(4) Project Constraints
(5) Design Specifications & Criteria
(6) Project Schedule
    - GAANT Chart
    - Critical Path Analysis
(7) Project Methodology to Achieve Objectives
    - Problem Identification & Needs Assessment
    - Design Concepts and Ideas
    - Design Synthesis
    - Modeling and Prototyping
        - Kinematic Analysis
        - FEA Stress Analysis
    - Production of Detail and Assembly Drawings
    - Bill of Materials
    - Vendor / Supplier Information
(8) Implementation Plan
    - Budget & Economic Analysis
    - Risk Analysis
(9) Evaluation Criteria to judge meeting objectives with final design
(10) Project Notebooks
(11) Project Presentation Poster
(12) Peer Evaluations

MET 413/513 – Applications and Gaging of Geometric Dimensioning & Tolerancing

Course credits: 3 credits – 4hrs contact per week – delivery mode(s) distance, hybrid, and face-to-face

Instructor: Dr. M. Affan Badar

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, memory stick, and CAD software for drawings.

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.

Program Educational Objectives: The course will prepare student, who can:

1. Communicate effectively in both oral and written form to articulate technical knowledge, ideas, and proposals (Communication) [EO2].
2. Consider professional, ethical and social responsibility of engineering technology practices. (Global Responsibility) [EO3].
3. Perform effectively, think independently and work collaboratively in a team environment in a membership or leadership role (Management &/or Teamwork) [EO4].
4. Actively participate in professional development, including continuous self-improvement and lifelong learning (Lifelong Learning) [EO5].

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

1. An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities [LO:a]
2. An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes [LO:c]
3. An ability to function effectively as a member or leader on a technical team [LO:e]

4. An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature [LO:g]
5. An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity [LO:i]
6. A commitment to quality, timeliness, and continuous improvement [LO:k]
7. An ability to identify proper manufacturing processes meeting the tolerancing requirements to the solution of manufacturing problems [LO:o]

Brief list of topics to be covered

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

Groups: Students are required to make groups, 3 members per group to do group work. For group work, submit only one report per group. However the cover page must include info on the course, task, group members, date of submission, and a peer-evaluation describing the contribution (specific work and overall effort) of each member in the group.

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. 28. The report will consist of a title page, abstract, introduction, application/usage, method how to determine/inspect, figure/table if any, conclusion, references, etc. If you opt for a term paper, it should contain a minimum of 8 references, and the references must be cited in the body of the paper. For a project report, cite 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. Test 1 is scheduled for Sep 26, Test 2 for Nov 7, and the final for Dec. 12. All exams will be given at class time starting 3:30 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.

TMGT 361 – Quality Systems and Tools

Course credits: 3 credits – 3hrs contact per week – delivery mode(s) distance, hybrid, and face-to-face

Instructor: Dr. Mike Hayden, CMQ/OE, CQE, CSSGB, CMfgE, gPa

Required Text Books: CQPA (Certified Quality Process Analyst) Primer and CQPA Bound Solution Text. Both of the above are available from the Quality Council of Indiana
http://www.qualitycouncil.com/default.htm
602 West Paris Avenue
West Terre Haute, IN 47885
Voice: 812-533-4215
800-660-4215
Fax: 812-533-4216
e-mail**:**Information@qualitycouncil.com

Course Description: History, philosophy, tools, processes, and systems of quality.

Course Info: This course (a) is required by several COT majors, (b) is required by the Lean Six Sigma Minor and Concentration, and (c) is taken by students in a variety of majors as an elective.

Prerequisites or co-requisites: none

Required course in AET, CVET, ET, MET, MFET, PET, & TMGT Majors

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

1. An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies [LO:b]
2. An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes [LO:c]
3. An understanding of the need for and an ability to engage in self-directed continuing professional development [LO:h]
4. A commitment to quality, timeliness, and continuous improvement [LO:k]
5. An ability to understand and apply engineering mechanics/sciences to identify, inspect, and analyze mechanical parts, assemblies and processes for solutions to machine/mechanical design and analysis problems [LO:m]
6. An ability to select appropriate materials, evaluate design alternatives, and manage design work/processes [LO:n]
7. An ability to identify proper manufacturing processes meeting the tolerancing requirements to the solution of manufacturing problems [LO:o]
8. The student will be able to perform a variety of technical activities the student is likely to manage.
9. The student will be able to communicate effectively in the technical environment.
10. The student will demonstrate the ability to solve problems individually and as a member of a team.
11. The student will demonstrate the ability to make management related decisions.
12. The student will demonstrate appropriate professional and ethical behavior.

Course Objectives: In essence, the course objectives are to understand, select, use, and evaluate the body of knowledge (BOK) for ASQ's (The American Society for Quality) Quality Process Analyst Certification (CQPA). That certification is an entry-level certification that mostly covers part of the more advanced Quality Engineer certification but also has basic content common to many of the advanced certifications, e.g., Quality Auditor, Black Belt, or Reliability Engineer. The CQPA Primer chapters (which mirror ASQ's CQPA BOK) follow.

Brief list of topics to be covered

Chapter	Content
II. Quality Concepts	Quality Planning, Cost Of Quality, Standards/Requirements, Documentation Systems, Audits, Tools
III. Teams and Training	Types Of Teams, Team Building Activities, Roles & Responsibilities, Training
IV. Problem Solving and Improvement	Continuous Improvement Models, Six Sigma, Lean, Project Management, Basic Tools, Management Tools, Taguchi Concepts
V. Data Collection and Analysis	Data Statistics and Distributions, Probability, Reliability, Measurement scales
VI. Sampling And Measurement	Sampling, OC Curves, Rational Subgrouping, Measurement System Analysis
VII. SPC and Statistical Analysis	Control Charts, Pre-Control Techniques, Process Capability, Hypothesis Testing, Confidence Intervals, Z Test, T Test, Analysis Of Variance, F Test, Regression & Correlation, Design Of Experiments
VIII. Customers & Suppliers	Internal & External Customers, Customer Satisfaction, Supplier Management, Product/Process Approval Systems
IX. Corrective and Preventative Action	Correction, Prevention, Mistake Proofing, FMEA

Quizzes: There will be a quiz related to the content of each major unit in the textbook.

Assignments: There will be an assignment related to each major unit in the textbook. There are four assignments related to unit VII (SPC and statistics).

Final Exam: The final exam will be composed of quiz-like questions. See the Assignments area of the course site for more info about quizzes, assignments, and the final exam.

Certification: The textbook is the best-selling study aid to prepare for ASQ's CQPA exam. The exams are administered by ASQ at local sites in early June and December and at selected National ASQ meetings. See ASQ's web site for more info. Neither joining ASQ nor taking the CQPA exam is tied to the course. However, both are encouraged. If a student can pass the quizzes and final in this course with an 80% or better success rate, they should be able to easily pass the CQPA exam because the exam is comprised of items similar to the quizzes.

MFG 371: Manufacturing Materials and Processes

Course credits: 3 credits – 4hrs contact per week – delivery mode: face-to-face

Instructor: Mr. Mark J. Clauss

Required Student Materials

- ☐ **Textbook:** DeGarmo's Materials and Processes in Manufacturing,11th edition
- ☐ **Safety glasses**, lnstuctor-approved
- ☐ **Calculator** (basic math functions)
- ☐ **Work gloves** suitable for welding,
- ☐ Shop coat or apron ***(optional)***

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.

Prerequisites or co-requisites: none

Required course in ET, MET, & MFET majors and selected elective in AET, PET, & TMGT Majors

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

1. An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities [LO:a]
2. An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes [LO:c]
3. An ability to identify proper manufacturing processes meeting the tolerancing requirements to the solution of manufacturing problems [LO:o]

Objectives:

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.

Brief list of topics to be covered

A. Introduction to Manufacturing Materials and Processes
   1. Metallic materials used in manufacturing
   2. Overview of common manufacturing processes
   3. Common products manufactured from metal
B. Nature of Metals and Alloys
   1. Metallurgy defined
   2. Chemical terminology
   3. Atomic structure and bonding
   4. Deformation of metals, strain hardening
   5. Cold working, hot working, recrystallization
   6. Alloy types
C. Ferrous Metals and Alloys
   1. Manufacture of iron and steel
   2. Elements, carbon content and effects on steel
   3. Nomenclature of steel and chemical classification
   4. Numbering systems and alloying categories
D. Nonferrous Metals and Alloys
   1. Alloy categories
   2. Physical and mechanical properties
E. Properties of Metals
   1. Physical properties
   2. Mechanical properties
   3. Mechanical testing methods
F. Joining Processes
   1. Introduction to welding processes
   2. Welding basics, common concerns
G. Gas Flame Processes
   1. Oxy-acetylene welding and cutting processes
   2. Brazing and soldering processes
H. Electric Welding Processes
   1. Shielded metal arc welding
   2. Gas metal arc welding
   3. Gas tungsten arc welding
   4. Resistance welding
   5. Related processes
I. Electric Cutting Processes
   1. Plasma arc, manual and CNC
   2. Carbon arc
J. Casting Processes
   1. Introduction and fundamentals
   2. Expendable mold casting processes
   3. Multiple use mold casting processes
   4. Continuous casting

Laboratory Assignments

- Tensile testing exercise, 4 different material samples to be tested
- Oxy-acetylene flange weld, thin gage material
- Oxy-acetylene bead weld with filler, 1/8-inch material
- Oxy-acetylene butt weld joint with filler, 1/8-inch material
- Oxy-acetylene cutting, 1/4-inch material
- Manual plasma arc cutting, 1/4-inch material
- Shielded metal arc welding, 4 welding electrodes, 1/4-inch material
- Acetylene torch soldering, mild steel
- Resistance spot welding, mild steel
- Gas metal arc welding,.023 wire, thin gage material
- Gas metal arc welding,.035 or .045 wire, 1/4-inch material
- Gas tungsten arc welding, 16 gage aluminum
- Foundry casting,aluminum
- Computer Numerical Control (CNC) plasma cutting, mild steel
- Sheet metal layout, cutting,forming and assembly, 26 gage galvanized steel

MFG 370: Fundamental Manufacturing Processes—Machining

Course credits: 3 credits – 4hrs contact per week – delivery mode: face-to-face

Instructor: Mr. Mark J. Clauss

Required Student Materials

- **Textbook:** DeGarmo's Materials and Processes in Manufacturing, J.T. Black and Ronald E. Kosher, 10th edition
- **Safety Glasses** with side shields - Shop Coat ***(optional)***- Calculator ***(optional)***

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.

Prerequisites or co-requisites: none

Required course in ET, MET, & MFET majors and selected elective in AET, PET, & TMGT Majors

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

4. An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline to broadly-defined engineering technology activities [LO:a]
5. An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes [LO:c]
6. An ability to identify proper manufacturing processes meeting the tolerancing requirements to the solution of manufacturing problems [LO:o]

Objectives

1. Use appropriate terminology to 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.

Brief list of topics to be covered

A. Introduction to Machining/Material Removal
B. Basic Machining, Chip Forming Processes
    a. Turning
    b. Milling
    c. Drilling
    d. Sawing
    e. Broaching
    f. Shaping/planning
    g. Grinding
C. Variables in Machining - Speeds and Feeds
    a. Turning
    b. Milling
    c. Drilling
    d. Sawing
D. Material Removal Rates and Horsepower Requirements
    a. Specific power per material type, other conditions
E. Cutting Tools for Machining
    a. Cutting tool materials
    b. Tool geometry and tool life/failure
    c. Cutting fluids
F. Measurement and Inspection
    a. Attribute vs. variable
    b. Standards of measurement
    c. Dimensional vs. geometric tolerancing
    d. Measuring instruments
    e. Measuring methods
G. Turning, Boring and Related Processes
    a. Introduction and fundamentals
    b. Lathe design, terminology, and operations
    c. Boring machines
    d. Screw machines, automatic chucking, CNC
    e. Work holding for turning
H. Milling and Machining Centers
    a. Introduction and fundamentals of milling
    b. Milling tools and cutters
    c. Milling machines
    d. Work holding methods
    e. Milling operations
I. 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
J. Thread Production
    a. Introduction, thread basics, and nomenclature
    b. Producing external threads
    c. Producing internal threads
K. 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
L. Shaping, Planning, Broaching, Sawing, Filing
    a. Introduction to each process
    b. Cutting tool types
    c. Machine types and processes
M. Work Holding Devices
    a. Principles of work holding
    b. Location and clamping
    c. Types of jigs and fixtures
    d. Multiple clamping or chucking
N. CNC Machining
    a. Introduction
    b. Turning centers
    c. Machining centers
    d. Ultra high speed machining centers
O. Non-traditional Machining
    a. Electrical discharge machining
    b. Ram type and wire type
    c. Chemical
    d. Mechanical
    e. Thermal
P. Gear Manufacturing
    a. Theory and nomenclature
    b. Gear types
    c. Gear manufacturing methods

ECT 281

Introduction to Robotics & Automation

Instructor: Prof. Oscar Rodríguez, EdS.

Course Description:

ECT 281 provides an introduction to the principles of industrial robotics and automation. Subject areas covered are: (a) the program design, control, operation, and programming of robots with an emphasis in industrial situations and applications; (b) the program design and programming of embedded microprocessor controllers used to interface equipment and systems with robots, and (c) the development of networked Human-Machine Interfaces to link human operators to automated control systems.

Required Texts & Materials:

Note: There are <u>NO</u> texts that must be purchased through the Bookstore.

1. <u>Robotics Lab Manuals:</u>
   Robotics Training Manual for RV-M Series Mitsubishi Robots (3 parts)
   Robotics Training Manual for RV-1A/2AJ Series Mitsubishi Robots (3 parts)

2. <u>Controls Lab Manuals:</u>
   Micrologix 1200 - Programming Guide: Rockwell Automation.
   RSLogix 500 – Getting Results Guide: Rockwell Automation.
   RSView32 - Getting Results Guide: Rockwell Automation.
   RSView32 – User's Guide: Rockwell Automation.
   RSLynx – Getting Results Guide: Rockwell Software.

3. Lecture notes and Lab assignments in PDF will be posted on Blackboard in the "TABS" sections of the site. Students may follow along on their laptops during lecture, or print out a hard copy of the notes and bring to class. MOST of the questions for the Midterm and Final examination will be drawn from the lecture notes, though some questions will be drawn from the other materials and lab experiences as well.

4. USB compatible storage device to save laboratory programs in progress.

Course Objectives:

Upon successful completion of ECT 281 students will know, or be able to do, the following:

1. Know the fundamental principles of an automated manufacturing process
2. Understand the design, operation, and utilization of robots in industry.
3. Understanding of terminology associated with industrial robotic systems.
4. Have a basic knowledge of robotic system components, end of arm tooling, and sensors.
5. Develop the ability to program industrial robots using teach pendants and personal computer software.
6. Have a basic understanding of how robots are interfaced with automated systems by use of programmable logic controllers and human-machine interfaces.
7. Be able to plan, program, load and debug basic programmable logic controller programs.
8. Be able to configure a PC/peripheral device network to allow a computer using a Human-machine interface to independently operate an automated system.

9. Be able to plan, program, load and debug a Human-machine interface program.
10. Understand how network communications are used to link controls in an automated system

Outcomes Assessment Methods & Scale:

Midterm Examination:	25%
Final Examination:	25%
Laboratory Projects:	50%

Grade scale will follow University standard.

Attendance Policy:
Attendance will be taken every class meeting, either by roll call, or a sign-up sheet. Students who incur excessive absences (20% of scheduled class meetings) will have their final course grade reduced by one grade scale in addition to any penalties from missed assignments or quizzes.

The ONLY exception is you were absent while officially representing University, and documentation is provided.

If you are absent, it is your responsibility to find out what took place during your absence and be prepared for the next class meeting. "I wasn't here on 'whenever,' is not an excuse.

If you missed a lab assignment then you must arrange with the T.A. to see if you can make up the lab. Missed pop quizzes may not be made up. Labs may not be submitted after the due date has passed for that lab.

Lab Policy: For the purpose of personal and equipment protection this class requires: 1) Wearing Safety Glasses at all times exceptions provided for those with prescription glasses. 2) Maintain equipment and accessories in order after use, and 3) NO FOOD allowed in the lab, you can have a drink ONLY if covered with cap or lid. This includes leaving equipment turned-off and manuals in order as well as cleaning the work area after use.
The purpose of laboratory experiments is to provide students with experiential learning activities, and to reinforce concepts presented in the lecture. As there are not enough robots for all students to work independently, students will perform robot programming labs in groups of 2 students for the 'M' robots, and 3 students for 'A' & 'S' robots. All PLC & HMI programming labs will be performed in groups of 2 students only. Students are expected to bring any problems with equipment to the immediate attention of the instructor or the T.A.. Lab groups must demonstrate their programs and have either the Instructor or the T.A. sign off on the form that the program ran as expected to submit the lab. Submitted labs must include a print out of the program code used with comments to explain the operation of the program. **Incomplete or unsigned Lab submissions will not receive credit for a grade**. Labs submitted after the due date (See the Blackboard site for final due dates) will not be accepted.

ECT 160
ELECTRONIC FUNDAMENTALS

Instructor: Prof. Oscar A. Rodriguez, EDS.

Course Description

ECT 160 ***Electronic Fundamentals*** is a three (3) credit hour course which provides an introductory study of electronics. Coverage includes basic principles of electronics, the operation of components, and the fundamental laws of circuit operation. A series of hands-on labs are utilized to reinforce lecture and theory throughout the course. Prerequisite: students must have math proficiency in algebra for this course; and proficiency using a scientific calculator.

Required Text and Course Materials

1. Textbook: Mitchel E. Schultz, Grob's Basic Electronics, McGraw Hill, Eleventh Edition.
ISBN: 978-0-07-351085-9
2. Scientific Calculator *(Know how to use it, Instructor will not provide training on calculators).*

Each student is responsible for bringing their own text, calculator, 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 Class Schedule).

Course Objectives and Methods

This course includes theory, technical information, and laboratory experiences to provide an overview of basic electronics. Activities include: 1) class lectures with PowerPoint; 2) problem solving assignments; 3) lab assignments; 4) video presentations (TBD); and 5) chapter tests. Reading assignments accompany each topic/chapter; and most also have problem exercises. Laboratory activities will be utilized to reinforce electronics theory.

The student successfully completing ECT 160 will know, or be able to do, the following:

- Define the fundamental electrical/electronic quantities including: charge, voltage (DC and AC), current, conductance, resistance, power, frequency, wavelength, period, magnetism, inductance, capacitance, reactance, and impedance; and know the unit of measure associated with each.
- Understand the operating principles of, and identify basic electronic components including: insulators, conductors, DC and AC power sources, resistors, potentiometers, fuses, switches, inductors, transformers, capacitors, diodes, transistors, and (if time permits) integrated circuits.
- Know, and be able to apply the fundamental laws, theories, and formulas of electronics to mathematically analyze circuits prior to construction, and accurately predict circuit operation, including: Ohm's Law, Kirchhoff's Laws, the power law, the law of electrostatic charges, etc.
- Read and understand at a basic level, schematic diagrams for electronic circuits.
- Build basic electronic circuits from schematic diagrams using a 'breadboard' and common electronic components.
- Be able to perform basic circuit analysis to determine: current flow, voltage drop, power dissipation, and/or resistance for the circuits, or any part of the circuit.

- Have a fundamental knowledge of the setup and usage of common electronic test equipment such as the digital multimeter, DC power supply, AC function generator, and oscilloscope.
- Have a fundamental knowledge of the operating principles of discrete semiconductor electronic devices, including: diodes and transistors.
- If time permits, be exposed to the operating principles of integrated circuits used in digital computer circuits and their use in computer technology.

Lab Policy

The purpose of laboratory experiments is to provide each student with practical, hands-on experiences 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 be asked to work in groups of two or three. ECT and CET majors will be given first priority to perform labs individually, whenever possible, as this course provides basic circuit building and analysis skills these students will need for practically all of the remaining courses in their electronics program.

Students are individually responsible for bringing laboratory components on lab days indicated in the Course Schedule, even if you share a lab kit with a classmate. Laboratory Report sheets will be available on the course web site prior to each lab. **No** food or drinks are allowed in the classroom during laboratory activities.

Evaluation Method
Homework Assignments
Laboratory Assignments
Exam 1
Exam 2
Exam 3
Final Exam

There will be extra credit offered during this course – do your best work the first time. There will be no make-up exams, except in *extreme* circumstances, at the Instructor's discretion (see below). There will be no opportunity to make up labs, except at the discretion of the Instructor or Lab Assistant.

Outcomes Assessment Scale

Grades are based on a point system. Each test/assignment is worth a given number of points and your final grade will be calculated by dividing total points earned by total points possible; then converted to a letter grade based on the scale below:

90 - 100%	85 - 89%	80 - 84%	75 - 79%	70 - 74%	65 - 69%	60 - 64%	< 60%
A	B+	B	C+	C	D+	D	F

If you are very close to the next higher grade, the Instructor *may* take into consideration attendance, class participation, the timeliness, neatness, and completeness of the problem-solving assignments, and/or other factors.

MATH 123

Analytic Geometry and Trigonometry

Text: Analytic Geometry 7th Edition by Fuller and Tarwater
ISBN-10: 0201134845 ISBN-13: 9870201134841

Instructor: Charles Roberts Office: Root Hall A-126 Telephone: 237-2134

Office Hours: MWF 10:00-10:50 am and by appointment

Catalog Description: Two and three dimensional analytic geometry using rectangular, polar, cylindrical, and spherical coordinates. The study of lines, planes, conic sections, and vectors and applications. Topics in trigonometry including right angle trigonometry, general triangles, and applications.

Prerequisites: A grade of C or better in MA 115 or appropriate placement examination score.

Ten sections of material on trigonometry will be available to you on blackboard. You may access this material as follows: 1. Go to the Indiana State web site: http://indstate.edu/ 2. Click on the "Blackboard" link 3. Enter your Username and Password. Then click on "Login" 4. The first time you open Blackboard, you will see the "Welcome" screen Just click on "I'll do it later" 5. In the "My courses" list, click on the name of this course 6. Inside the course, click on the "Content" button. 7. Choose a file you wish to read or download.

In trigonometry there will be an

HOUR EXAM OVER SECTIONS 6.1 AND 6.2

HOUR EXAM OVER SECTIONS 6.3 AND 6.4

HOUR EXAM OVER SECTIONS 7.1, 7.3, 7.4 AND 7.5

HOUR EXAM OVER SECTIONS 8.1 AND 8.2

Material from chapters 1, 2, 3, 4, 7, 8, 9, and 10 of the Analytic Geometry text will be covered. There will be an

HOUR EXAM OVER CHAPTERS 1 AND 2

HOUR EXAM OVER CHAPTERS 3 AND 4

HOUR EXAM OVER CHAPTER 7

FINAL EXAM OVER CHAPTERS 8, 9 AND 10

All exams are in class, closed book, and closed notes. You may use a calculator of your choice; but you may not use a computer (laptop), ipad, or cell phone.

The final exam is on Wednesday, May 6, from 8:00 to 9:50am.

Grade Calculation During the Semester: At any time during the semester, your grade is determined from the Percent to Grade Table below by calculating the total number of points you have received on the in-class exams divided by the total number of points on the exams expressed as a percent. For example, if you scored 37 points out of a possible 50 points on the first in-class exam and you scored 45 points out of a possible 55 points on the second in-class exam, then your percent is [(37+45)/(50+55)] x 100% = 78.09% and your grade after two in-class exams is B-.

Percent to Grade Table

93%-100%	A
88%-92.9%	A-
84%-87.9%	B+
80%-83.9%	B
76%-79.9%	B-
72%-75.9%	C+
68%-71.9%	C
64%-67.9%	C-
60%-63.9%	D+
56%-59.9%	D
52%-55.9%	D-
Less than 52%	F

No make-up exam will be given for any in-class exam after that exam has been returned to the class.

MATH 301 – to be MATH 129

Fundamentals and Applications of Calculus

Instructor: Henjin Chi

Course Introduction

Catalog Description: Inequalities, polynomial functions, logs, and exponentials. Differential and integral calculus and applications. For students in social sciences, business, and other applied areas.

The purpose of the course is to introduce you to basic ideas in calculus and how to apply calculus to areas such as business, social science, and technology.

I have structured the course around modules. Each module will build on previous modules and your previous mathematics coursework. You will need to complete a module prior to beginning the subsequent module. Modules will be subdivided into lessons.

Prerequisites Appropriate placement exam score, MATH 115, MATH 201, or equivalent.

Learning Objectives

By the end of this course, you will be able to:

- Interpret a function from an algebraic, numerical, graphical, and verbal perspective.
- Evaluate and interpret limits of functions from their graphs and/or equations.
- Analyze and apply the notions of continuity and differentiability to algebraic, exponential, and logarithmic functions.
- Compute and analyze definite and indefinite integrals.
- Solve applied problems with derivatives.
- Solve applied problems with integrals.

Textbooks

Required Text: Calculus for Business, Economics, Life Sciences & Social Sciences 13/e by Raymond Barnett , Michael Ziegler and Karl Byleen. Boston, Pearson (ISBN 978-0-321-86983-8)

Course Policies

1. My goal is for you to excel in this class and to develop the skills necessary to succeed in your chosen career. 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 carefully read assignments and the feedback returned to you, to note evaluation comments made to the entire class regarding assignments returned. You cannot meet the objectives of this course by being a passive learner. As the semester progresses, you should be able to implement several ideas to improve your performance. Also, you are expected to ask questions and or/schedule individual appointments to clarify evaluations or other aspects of the course not clear to you.

2. Time-management is crucial in this courses. Typical 3-credit-hour courses meet 2.5 hours every week, and you are expected to spend 2-3 times that on activities outside the classroom. Therefore, in general you should spend a total of 7.5-10 hours per week.

3. Turn in all work on time. Work turned in after the posted due date and time is considered late. Late work on assignments will be penalized 20% for each day late. Late work on quizzes and exams will not be accepted unless you are experiencing extraordinary situation and notify instructor immediately.

4. Be courteous and respectful to your classmates and to me. Please refer to the ISU Code of

Student Conduct.

a. Maintain a formal, respectful, civil, professional tone with all course communications, including but not limited to blog posts, discussion boards, and emails. Avoid derogatory language, obscenity, and hate speech.

Conferences and Individual Help

I will be available via Office Hour and/or individual appointments. After class discussion is encouraged.

You are also strongly encouraged to take advantage of ISU's Math & Writing Center. The Math &

Writing Center offers face-to-face and online one-on-one mathematics tutoring assistance for all Indiana State students. Current hours of operation and additional services can be found at their website: http://libguides.indstate.edu/writing.

Attendance and CommunicationPolicy

Attending class is required. There will be 5% of your final grade as Bonus added to your final grade for those student that has perfect attendance. If you miss more than four classes, you will be getting F grade automatically. All execused absence must contact instructor ahead of time and get permission. In case of emergency, contact instructor ASAP by email or phone call to the office.

Grades

The following scale will be used to determine your course grade:

A+	97-100%	C	73-76%
A	93-96%	C-	70-72%
A-	90-92%	D+	67-69%
B+	87-89%	D	63-66%
B	83-86%	D-	60-62%
B-	80-82%	F	59% or below
C+	77-79%		

The work you do this semester will be weighted as follows:

MATH 131
Calculus I
Date: January 13, 2015 Updates/corrections will be dated and emailed to the student.

(1) General Course and Instructor Information.
(2) Attendance and Absence(s).
(3) Homework.
(4) Quizzes.
(5) Exams.
(6) Grading and End Of Semester.
(7) Email.
(8) Miscellaneous; Important Dates.
(9) Detailed List Of Topics Covered.

(1) General Course and Instructor Information.

Instructor: Dr. Robert A. Johnson
Textbook: Calculus, Larson & Edwards; 10th edition; available at ISU Campus Bookstore
Prerequisites: Algebra I, Algebra II, Geometry, Trigonometry (high school curriculum)
Calculators: Bring a scientific calculator to each class. Cell phones and laptops are not allowed.
Office: Root Hall A-118 x2144 robert.johnson@indstate.edu
Office Hours: 8:00 – 8:55 MWF
Academic Honesty: Read the ISU Code Of Student Conduct at https://web.indstate.edu/sjp/docs/code.pdf.
Visitors: Only students officially registered for the course may attend any regularly scheduled meeting of the class. No other individuals may be in the classroom while the class is meeting.

(2) Attendance and Absence(s).

It is essential, and a university requirement, that you attend each of the 58+1 meetings of this class. Good attendance is considered to be four or fewer absences during the semester. If you miss more than four classes, the conditions marked with asterisks will not be applied to your work.

When you miss a class, you are required to have an arrangement with another student in the class to obtain
(1) Lecture notes, (2) homework assignments, and (3) handouts, so that you can be **fully prepared** for the next class. This is essential to your success in the course. Do not return to class unprepared.

(3) Homework.

Homework is regularly assigned, and homework questions are answered at the next class meeting.
Approach each assigned homework problem as follows.

1. Try to solve the problem "cold." Check the book's answer and compare your solution to the detailed solution given at http**://www.CalcChat.com** . If you are stuck on the problem, then:

2. Look through the day's class notes and the relevant textbook material. Class lectures, your notes, and the textbook will contain examples that closely resemble most assigned homework problems.

Treat these examples as homework problems and solve them first. If you can't readily work out an example from the lecture, how can you solve a similar problem in the homework?

(4) Quizzes.

Numerous in-class quizzes are given during the term. Make-up quizzes are not offered. *To compensate for unavoidable absences, the two lowest quiz marks are dropped.* Each quiz counts from 1.2% to 1.8% in the final average.

(5) Exams --- Must Be Taken At Indicated Time

Exam I (midterm) – **Friday, March 13**
Exam II (all-topics final) – **Wednesday, May 6, 8:00 a.m.**

If the class average on an exam is lower than expected, the scores will be renormalized. The exams carry the weight not assigned to quizzes, with the second exam more heavily weighted than the first exam. The final exam is not returned, but kept on file for six weeks after the exam date, then discarded.

(6) Grading and End Of Semester.

The final average is converted to a grade level according to the following table:

99.00 – 100.00	A +	88.00 – 90.99	B +	77.00 – 79.99	C +	66.00 – 68.49	D +
93.50 – 98.99	A	82.50 – 87.99	B	71.00 – 76.99	C	62.00 – 65.99	D
91.00 – 93.49	A –	80.00 – 82.49	B –	68.50 – 70.99	C –	60.00 – 61.99	D –
00.00 – 59.99	F						

Students whose work substantially improves over the term may have their final grade moved up one or two levels, depending on the amount of improvement.

Detailed grading records are kept on file for six **weeks after** the date of the final exam. Students with concerns about a grade must speak with the instructor in person during this time period.

(7) Email.

If you email me about something covered in the syllabus, I save time and refer you to the syllabus. Do not rely on email for matters of any importance. Ten to twenty percent of emails students claim to send me I never receive. Email is not secure and not reliable. In fact, the university expressly forbids faculty from discussing confidential student information (test scores, grades, etc.) by email.

(8) Miscellaneous; Important Dates.

Quizzes and Exams: There are two good reasons to save your quizzes and Exam I:

1. The quizzes and Exam I provide you with a thorough overview of the course material and an excellent body of work to study for the final exam.

2. You may calculate your course average T at any time: Find the average score of the quizzes you have taken. Multiply that average by 10 and call that Q. Before Exam I, Q is T. After Exam I, calculate T as the average of Q and Exam I. See item 6 to convert T to a letter grade.

Tutoring: Help with algebra, trig and calculus from the Peer Assistant and staff tutors is available at the

Tutoring Center in Cunningham Library. Contact the Center for hours.

Interim Grades Available After: Tuesday, February 24, 2015
Drop Deadline: Monday, March 30, 2015
Final Grades Available: Wednesday, May 13, 2015

(9) Detailed List Of Topics Covered.

The semester is 15 weeks in length. Below is a description of topics covered in the course. Topics may be dropped or expanded due to time factors.

1. a. inequalities, interval notation, the domain and range of a function
   b. review of functions, graphs and trigonometry occurs throughout the course
2. limits:
   a. techniques for evaluating limits, such as tables, algebra, graphs, trigonometric identities
   b. two-sided and one-sided limits, infinite and non-existent limits
3. continuity of a function
4. lines, slope, tangent lines, motivation and definition of the derivative
5. techniques for evaluating derivatives, including the power rule, the coefficient rule, the sum/difference rule and the product rule
6. the quotient rule, the derivatives of the trigonometric functions, the chain rule
7. higher order derivatives and derivative notations
8. derivative as a rate of change; applications: velocity, acceleration
9. implicit differentiation
10. related rates
11. Rolle's Theorem, Mean Value Theorem
12. graphing and analysis of functions using the derivative --- includes maximum and minimum values of functions, monotonicity, asymptotic behavior, concavity, points of inflection, accurate graphs; the first and second derivative tests
13. limits at infinity
14. use of derivatives to solve optimization problems
15. Newton's method for approximating roots of functions
16. antiderivatives, the indefinite integral
17. u-substitution

18. definite integrals, the definite integral as area or net area
19. approximating sums, including Riemann sums, the trapezoidal rule and Simpson's rule
20. Fundamental Theorem of Calculus, differentiation of integrals
21. differentiation and integration related to logarithms, the natural logarithm

CHEM 105

Instructor: L. Rosenhein

Introduction
Welcome to this first-semester, introductory course in general chemistry. The only prerequisite is an adequate knowledge of algebra, which is defined for this course as: a math SAT of at least 510 or an ACT score of at least 21; *or* a Maple TA score of at least 12; *or* completion of Math 035 (or 99) or a higher numbered math course, not including 102. Most people in this course have had some high school chemistry, however, and that is certainly an advantage. While we start "at the beginning," there is a lot of material to cover and the pace may seem fast.

Students who feel that their background is deficient in some way should find that the resources for remedying this are available; but this will require extra work. Because of the differences in the types of students who enroll in this course, it is difficult to state how much work outside of class is necessary, but six hours per week would, I think, be an *average* number; you might need more or less. The best results are obtained when studying is done on a regular (daily or at least every-other-day) basis. If you use this studying time effectively, you can do well in chemistry.

Please note: Enrollment in General Chemistry II, CHEM 106, will require a grade of C or better in 105.

Chemistry is often called the "central science," because it is used in so many disciplines. It is important in understanding biology, materials science, energy production, and the environment, to give a few examples. Chemical principles themselves are based on the laws of physics. We'll find that many properties of matter can be understood on the basis of relatively simple concepts.. We stress problem-solving in this course, partly because chemistry is often an applied science, and also because it can enhance your understanding of the principles. This can be satisfying, and even enjoyable, once you attain sufficient mastery of the subject.

Materials

- *Text:* Zumdahl and Zumdahl, *Chemistry,* 9th ed. The same text will be used next semester in Chem 106. The Bookstore now sells the text as an *unbound* version, which lowers the cost to you and may be more convenient.
- *Electronic homework:* At the ISU bookstore, new copies of the textbook should come packaged with access to OWL, an on-line tutorial and homework system which we will use, and includes access to a web version of the text which may be convenient as you are using OWL. If you have bought a copy of the text elsewhere, you will need to obtain OWL directly from the publisher:.
  http://www.cengagebrain.com/shop/isbn/978-1-285-18545-3
  (This link is specific for the OWL version we are using.)
- *Calculator:* doesn't have to be fancy, but should be capable of displaying powers of 10 and should have log functions and square root. In Chemistry 106 you will need a yx function. For tests, you must have your own calculator—no sharing allowed. **Only** calculators—not PDAs, cellphones, etc—will be allowed in exams.
- You must be concurrently enrolled in CHEM 105L, which is a separate course, and have the manual, goggles, lock, etc. that are required there (by the second lab period). The lab

DOES meet during the first week.

Preparatory Chemistry
Beginning this fall, we are offering a preparatory chemistry course, CHEM 101 (3 credit hours; MWF 12:00—12:50), for students who feel they don't have the science or science-math background to do well in Chemistry 105. The purpose of this course is to give students who need it a background that will help them when they take CHEM 105 in a later semester. Although the course begins its classes on Aug. 20, you may switch into this course up to Sept. 19. You will need to drop both CHEM 105 and CHEM 105L; there is no lab with CHEM 101. We recommend: (1) making a decision as to whether you will be better off starting with CHEM 101 as early as possible in the semester, and (2) discussing whether to make this change with both me and your advisor first.

Attendance
I expect attendance in class every day. I do not formally take roll but I know who is usually there and who is not. It should be noted that students who regularly miss classes tend to get low grades. Take my word for it—don't learn it the hard way. If you do miss a class for whatever reason, it is your responsibility to find out what happened and to catch up. By the way, the word *attend* has a meaning beyond presence: it means listening with an active mind.

We meet on Monday, Wednesday and Friday for regular lectures, and also on Tuesday at 9:30 am in room S-12 for problem-solving workshops. Attendance at the workshops is ***required***; they are intended to be done in groups and cannot be made up later.

Syllabus
We will cover material in this course corresponding to chapters 1-9 of the text with certain (relatively minor) additions and deletions along the way. Detailed syllabi will be provided for the lectures from exam to exam; these contain daily lecture topics, reading, and problem assignments, as well as the dates of quizzes and exams and homework due dates.

Workshops
On Tuesdays, we will have group problem-solving sessions. Worksheets will be handed out at that time, so the only way to prepare is to keep up with the material. The questions may deal with recently-covered material, or might look ahead to develop topics that are to come. I may also put some questions of a review nature on them, since I expect you to retain what you have learned in this course! Each group will turn in one copy of the completed worksheet and will get a group grade. Then each group member will be given a short quiz, as a check for individual learning. Your score will be a combination of the group and individual scores.

Office hours
Use me! I have two scheduled office hours on Monday at 10:00 am and Thursday at 11:00 am, and you are also welcome to make appointments for other times, or to just catch me at in my office if l'm free. You are also welcome to contact me by e-mail.

Recommended stµdy procedure
- Read relevant sections of text—before lecture, if possible. Give particular attention to the worked-out examples in the text. As a guide to what to focus on when you read, I invite you

to refer to the "Roadmaps" I have given for each lecture in the web syllabus. Just click on the date of each lecture and you will be taken to the roadmap.
- Do relevant OWL assignments. Make sure you are not just doing rote work to get points. You should always ask yourself whether you really understand the solution method.
- Remember that besides the assignments for credit, there are usually additional questions you may use for practice.
- Complete the homework assignment of problems from the end of the chapter. (Answers to questions whose numbers are in color are given in the back of the text, starting p. A39.)

We will have quizzes about once a week.
- You should analyze any mistakes you made on quizzes so that you will be sure not to make them again on the hour exams, which count much more.
- I hope we will have a Supplemental Instructor who will give some help sessions. Make use of this. The times will be announced.
- There is also a Chemistry-Physics Help Center in room S-115, whose ***tentative*** hours are (check the course web site for any changes):
  9:00—11:50 daily 3:00—4:50 MTWR
- If you wish to see exams I gave in previous semesters, you can follow the Exams link in the web home page.
- Also, get enough sleep! There is good scientific evidence showing that sleep is linked to long-term learning.

Grading
There are several components:
- *Homework:* OWL is divided into sections, which are assigned by lecture. As you complete these, the scores will be available to me. See separate handout for more details. (10%)
- *Workshops:* Group assignments and quizzes (15%).
- *Quizzes:* There will be short weekly quizzes (10%).
- *Exams:* There will be four, in-class, hour exams (48%). (The first exam will be on Sept. 12 and I anticipate others on Oct. 10, Oct. 31, and Nov. 21.)
- *Final Exam:* There will be a comprehensive final exam on Wed., Dec. 10 at 1:00 pm (17%).

The final letter grade will be determined as indicated by the percentages with each component, but individual factors such as increasing or decreasing grades throughout the semester may also be taken into account for people near borderlines.
The following scale indicates how I interpret numerical exam grades in general

I use the following grading scale:

		B+	77 – 82	C+	60 – 67	D+	47—50		
A	85 – 100	B	70 – 77	C	55 – 60	D	40—47	F	< 40
A-	82—85	B-	67 – 70	C-	50 – 55	D-	< 40		

While not set in stone, I try to stay very close to the exam grade scale when assigning final grades.

Missed tests

If quizzes or exams are missed for a *legitimate* reason, you should report to me as soon as you are able. It may be possible to make up a quiz. However, ***no*** late or make-up exams will be given (this will be handled on an individual basis; plan to have written verification).

Dropping the course
The last day to drop a course is Oct. 28.

It is to your advantage to make a decision earlier than that, however, so that you either make a commitment to this course or are able to put your full efforts into your other courses. Note that if you drop the lecture, you *must* drop the lab as well.

. . . *[?]* experiment before attempting the pre-lab. Pre-labs will be worth one point (in addition to the 15 for a typical lab report). Especially poor prelab efforts will result in deduction of this point. Repeated deficiencies may result in even greater deductions.

Laboratory results are to be recorded directly as they are obtained in your report sheets, in the appropriate space for the data. Mistakes may be corrected by crossing out a number with a single line and rewriting. (Calculations and calculated results may be done in pencil.)

Take some care to record data to the appropriate number of significant figures, that is, as many as the equipment allows. To record fewer is a mistake since you lose accuracy.

Each student works independently, except for certain experiments using computer-assisted data collection, which will be done in pairs. The data you report must be your own; anything else is considered cheating and will be graded accordingly.

For the write-up
In general, the written report need be no more than what is specifically asked for in the report section. A **sample** calculation should be shown—clearly—for any numerical result. In writing up the lab, I expect that you will re-read the lab where necessary, following directions and performing calculations as described in the lab. Be sure to understand the purpose of the calculations as you do them. Penalties for incorrect calculations are high—you are wasting your time doing an experiment if you interpret it wrongly! Express answers to the proper number of significant figures--this also affects the grade. (See Zumdahl, pp. 15-18. Re-read once a week if necessary!)

Remember above all that the primary function of any report is to *communicate*; that is, someone else must be able to understand what you did and how you obtained your results.

While it is perfectly fine to get help if you need it in writing up a lab, the work for calculations and questions must be principally your own.

Labs are due the week following their completion, at the **start** of the lab period. Credit lost for late labs depends on the lateness, but is significant in any case. Late labs will be accepted only up until the time of the corresponding lab exam, but will not be accepted at all during the last week of class.

Separate pages of lab reports should be stapled.

Labs submitted in which the write-up is of below acceptable quality will be returned ungraded for further work. These may be re-submitted but will have the lateness penalty.

Ask me for help with anything you have trouble with!

Purpose: The following are some of the things we hope you will learn by taking this course: carrying out of basic chemical laboratory techniques; safe handling of chemicals; illustration and enhancement of your understanding of chemical principles from lecture; application of the scientific method and treatment of data. . . and hopefully, that chemistry can be fun to do!

You must also be enrolled in Chemistry 105. You cannot expect to do all right in this course if you are failing or not attending the lecture. If you drop the lecture, you must drop this course as well.

Required Materials
Manual: *General Chemistry I, Tenth Ed ;* wraparound goggles, lock.

Web site
Eventually I will have a website for posting a syllabus and grades here:
http://carbon.indstate.edu/rosenhein/105L/fall14/home.htm Expectations and

Guidelines for Success

In class
Attendance is required. Labs missed for a legitimate reason must be made up: check with me first, as soon as you are able. *(I will expect a valid. written excuse).* Course grades decrease one notch for every lab not done. No more than two labs may be made up. You are still responsible for turning in the lab report that was due as soon as possible.

Safety rules must be followed. Goggles are worn at all times.

Read the experiment before class, and prepare any questions you may have about it. When there is a prelab it should be completed and turned in at the start of the lab period. Read the

Exams
The purpose of the lab mid-term and final is to make sure you really understand what the experiments we do are trying to teach you. The best way to do well on the exams is to come well-prepared for the labs; to ask questions where there are things you don't understand; to give the lab reports your full attention; and to make sure you understand the reason anything was marked wrong on the reports.

For the exams, you do not need to memorize lab procedures, but I would recommend reviewing the labs you have done and reminding yourself of the reasons for various procedures. The exams will consist of some short answer questions, and calculations. Numerical problems will be very similar to calculations done in the lab reports. You should make sure you can do any of these calculations. Also make sure you are able to answer the types of questions at the end of the lab reports.

Check-out
Once you are assigned a drawer, you are responsible for its contents until you check out. You will start with a full set of equipment and will be expected to return the same, replacing anything that is broken or lost.

If you drop the course or withdraw from the university, you must still check out your drawer or you will be billed a $10 check-out fee. Check out under these circumstances must be done during a meeting of the class, preferably as soon as possible. I will not check out people at other times.

CHEM 105L

General Chemistry I Laboratory:
Fall Semester 2014

Laboratory Schedule: Thursday 2:00-4:50 pm
Prelab Location: S-018
Lab Location: Section 005; S-013: Section 006; S017

Staff: Instructor: Prof. Stephen F. Wolf
Office: Science Building, Room 051K
Office Phone: 812.237.2236
Office Hours: MWF 10-12, or by appointment
Email: wolf@indstate.edu

Course Description: Chemistry 105L is the first semester laboratory course for Chemistry 105.

Prerequisites: Successful completion of, or current enrollment in Chemistry 105.

Course Credit: 1 credit hour

Course Material and Equipment:

- Lab Manual: General Chemistry Laboratory I, 10th edition, Chemistry 105L.
- Calculator: You will need a calculator with the capacity for square roots, logarithms (log and ln), exponentiation, and exponents (e^x, 10^x, y^x) for lab reports and exams.
- Safety glasses
- Lock

Always come to lab prepared with your lab manual, calculator, pens and/or pencils. All writing in the lab book must be legible and should be in ink. Mistakes should be corrected by crossing out the error with a single line and rewriting. Calculations may be done in pencil.

Prelab and Lab Reports: Prelabs reports are due at the ***beginning of class*** on the day that the Experiment is scheduled and ***will not be accepted late***. Prelab reports will count for 20% of your Lab Report grade. Lab reports are due at the ***beginning of class*** on the scheduled due date, typically one week after the Experiment has been completed. Reports ***up to three days*** late will be accepted for partial credit. However, these late reports will not be accepted ***unless*** there are extenuating circumstances.

Attendance: Attendance is required. Students who are in good health are expected to attend all scheduled laboratory sessions. However, if you are ill and potentially contagious, please do not attend laboratory. You will be given opportunities to make up material missed due to legitimate illness. If you know ahead of time that you will not be able to attend a laboratory, please inform me before the absence occurs and as soon as possible. In cases of last minute emergencies, please inform me as soon as you are reasonably able. You must attend all of the Prelab discussion prior to working in the Lab. These discussions begin promptly at the beginning of the scheduled class time. Students who miss the Prelab discussion will not be allowed to begin the experiment until they demonstrate a thorough understanding of the background and procedure for the Experiment my means of a written or oral Quiz.

Missed Labs: Laboratories can be made up only when there is a legitimate reason for missing the lab and with consent of the instructor. Laboratories missed for legitimate reasons must be made up during one of the Chemistry 105L sections offered later in the week (although you will need the instructor's preapproval). If this occurs your Lab Report will still be due the day of your next scheduled laboratory. No more than two labs may be made up during the semester unless there are extenuating circumstances.

Success in Chemistry 105L: Success in Chemistry 105L will require a significant effort on your behalf. *Most of this effort is simply preparation*. Depending on how much Chemistry you have previously taken, you may need to spend as much 2 or more hours of work *in preparation* for each laboratory. There are several steps that you can take to help insure your successful completion of Chemistry 105L.

- Read the assigned experiment prior to the laboratory session.
- Complete the prelab by at least the day before the scheduled experiment. If you have any questions about the material I have office hours the morning before lab (although I will **not** be available the two hours before lab).
- Complete the lab report as soon as possible after the laboratory while it is still fresh in your mind.
- Utilize the Department's Chemistry Help Center in S115.
- Ask questions!

If you have any questions, please do not hesitate to ask me before, during, or after laboratories. Please feel free to stop by my office during office hours or schedule an appointment if you prefer.

Safety: Always follow the Laboratory Safety Rules specified in your General Chemistry Laboratory Manual. Eye protection must be worn at all times. Appropriate clothing is required to

work in the lab. All chemical spills need to be cleaned up immediately. Before leaving the laboratory at the end of each session, be sure to return all equipment and chemicals to their proper place and clean you bench top.

Grading: Your laboratory grade will be based 50% on Lab Reports and 50% mid term/final exams. Your final letter grade will be based on the total percentage of points obtained from these sources of credit as follows:

Letter Grade	Percent Score
A+	Score $\geq$ 96%
A	92% $\leq$ Score < 96%
A-	88% $\leq$ Score < 92%
B+	84% $\leq$ Score < 88%
B	80% $\leq$ Score < 84%
B-	76% $\leq$ Score < 80%
C+	72% $\leq$ Score < 76%
C	68% $\leq$ Score < 72%
C-	64% $\leq$ Score < 68%
D+	60% $\leq$ Score < 64%
D	56% $\leq$ Score < 60%
D-	52% $\leq$ Score < 56%
F	Score < 52%

This letter grade assignment scale ***may be*** modified at the end of the semester on a percentile basis at the instructor's discretion. This correction is ***typically*** based on the 98th percentile grade for the class with a maximum of a 4% correction. The letter grade assignment scale listed above represents therefore, upper-limits for the final grade assignment scale. A final grade of "A+" can only be earned
if your final percent score exceeds 96%.

*Missing **three** or more scheduled lab periods or failure to hand in **three** or more lab reports may result in a failing grade. Lab reports will only be accepted if you have performed the actual lab work.*

Laboratory Experiment Schedule

Date	Experiment	Report Due
Aug 21	Laboratory Check-in and Safety	
Aug 28	Exp 1: Some Basic Techniques: Graphing and Significant Figures	
Sep 04	Exp 2: Recovery of Pure Metals from an Alloy	Exp 1
Sep 11	Exp 2: continued	
Sep 18	Exp 3: A Cycle of Reactions Involving Copper	Exp 2
Sep 25	Exp 4: Atomic Theory of Matter	Exp 3
Oct 02	Exp 5: Preparation of Potassium Trisoxalatoferrate(III) Trihydrate	Exp 4
Oct 09	Mid Term Exam	
Oct 16	Exp 6: Analysis of Trisoxalatoferrate(III) for Oxalate Content	Exp 5

Oct 23	Exp 12: Some Chemical Reactions	Exp 6
Oct 30	Exp 7-8: Simple Gas Laws and Determination of the Molar Mass of a Volatile Liquid	Exp 12
Nov 06	Exp 9: Molar Volume of Nitrogen	Exp 7-8
Nov 13	Exp 13: Thermochemistry	Exp 9
Nov 20	Exp 13: continued	
Nov 27	Fall Break	
Dec 04	Final Exam	Exp 13

Physics 105
INDIANA STATE UNIVERSITY
Department of Chemistry and Physics
Fall 2014

INSTRUCTOR: Dr. Valentina French
OFFICE: S-165F
OFFICE PHONE: (812) 237-2272
OFFICE HOURS: MW 3:15 – 4:15 p.m., TuF 12:00 – 12:50 p.m., and by appointment
EMAIL: Valentina.French@indstate.edu
CLASS TIME: MWF 11:00 – 11:50 a.m.
LOCATION: S- 138
CREDIT: 3 semester hours
TEXT: D.C. Giancoli: Physics-Principles with Applications, volume I with Mastering Physics, 7th edition, publisher: Pearson (ISBN: 9780321928894)
LABORATORY: **Concurrent enrollment in 105L is part of the course requirement (unless PHYS 105L has already been successfully completed)**

You will need a Mastering Physics access code in order to do online homework. If you have a textbook without a code you can purchase an access code at the following web address: http://www.masteringphysics.com
Please be sure that you purchase a registration code for Giancoli: Physics-Priciples with Applications, 7th edition.
The course ID is: **PHYSICS105FRENCHFALL2014**

Purpose and objectives: This course constitutes the first semester of General Physics, an algebra-based introductory Physics course. Proficiency in college algebra is an essential requirement for this course (successful completion of MATH 115 or MET 215 is required). **Each student needs to bring a scientific calculator to class every day.**

The course will feature lectures, discussions, demonstrations, 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: 300 points

Two one-hour exams worth *100 points each*. The first exam will be during the week of September 15th, and the second during the week of October 20th (the exact dates will be announced in class). ***Please note that Tuesday, October 28th is the last day to drop a class.***
Final exam: *100 points*. The final exam will be on Friday, December 12th, at 10:00 a.m., according to the University Final Exam Schedule.
Review sessions will be scheduled before each exam.

2. HOMEWORK: **130 points**

There will be homework assignments for each chapter covered. . The homework will be done online at the following address: http://www.masteringphysics.com
The course ID is: **PHYSICS105FRENCHFALL2014**
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. Late homework will be penalized by 10% per day. 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 130 points.

3. COURSE OUTLINE:

Week 1: Ch. 1 Introduction, Measurements (sections1-8) Week
2-3: Ch .2 Kinematics in one-dimension (sections 1-8)
Week 4-5: Ch. 3 Vectors, Projectile Motion (sections 1-6) **Exam 1**
Week 6-7: Ch. 4 Newton's Laws of Motion (sections 1-8)
Week 8-9: Ch. 5 Circular Motion, Gravitation (sections1-3, 5-7)
Week 10: Ch. 6 Work and Energy (sections 1-4) **Exam 2**
Week 11: Ch. 6 Work and Energy (sections 5-10)
Week 12: Ch. 7 Linear Momentum (sections 1-6) Week
13-14: Ch. 8 Rotational Motion (sections 1-8)
November 24-28 Thanksgiving Break
Week 15: Ch. 9 Static Equilibrium (sections 1-4)

Physics 105L

INDIANA STATE UNIVERSITY
DEPARTMENT OF CHEMISTRY &
PHYSICS Fall 2014

INSTRUCTOR:	Dr. Valentina A. French
OFFICE:	S-165F
OFFICE PHONE:	(812) 237-2272
E-MAIL:	Valentina.French@indstate.edu
OFFICE HOURS:	MW 3:15 - 4:15 p.m., TuF 12:00 – 12:50 p.m., and by appointment
CREDIT:	1 semester credit hour
LABORATORY TEXT:	Physics 105 Laboratory Manual; Indiana State University Department of Chemistry & Physics, 2014.
LABORATORY TIME AND LOCATION:	Tu 2:00 - 3:50 p.m., S-105

Purpose and objectives: 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 complement the classroom lectures by giving hands-on experience for the concepts covered in the lectures.

Laboratory Work

You will perform one laboratory experiment/exercise each week and work in groups of two. Every student is required to write a report on each lab experiment/exercise performed (one report per group is also acceptable, provided both group members make equal contributions to the report). *Only students who were present at the lab session and performed the lab experiment/exercise may submit a report.* The report is due at the following lab session. No late reports will be accepted. Detailed instructions on writing the lab reports are given for each experiment in the report directions file on Blackboard. The reports will be graded and returned to you at the following lab session. The grading will be done on a zero to 50-point scale. *15% of your grade will be based on individual participation during the lab experiment/exercise. Failure to write and submit a report will result in a score of 7.5 points (i.e.,15% of the 50 points possible for the report), if your participation during the lab exercise was satisfactory.*
Note: all comments and essay answers to questions in the lab report need to be typed. Failure to do so will result in zero credit for those questions. Only calculations, equations and diagrams may be written by hand.
Students are expected to prepare for each lab by reading that day's lab exercise from the lab manual before coming to the lab. There will be a quiz at the beginning of each lab session. Each quiz is worth 10 points. The questions on the quiz will cover the exercise that you will perform that day as well as the previous lab report that is due that day. A maximum of ten minutes will be allocated to the quiz. Being late to the lab will result in missing the quiz. There will be no

exceptions to this rule.

There will be no make-up labs. At the end of the semester the lowest lab and quiz scores will be dropped. Total course points: **720 points**
Lab reports: 600 points (12 labs, 50 points each)
Quizzes: 120 points (12 quizzes, 10 points each)
The letter grades will be assigned according to the following scale:
99-100% = **A+**; 93-98% = **A**; 90-92% = **A-**; 87-89% = **B+;** 83-86% = **B**; 80-82% = **B-**; 77-79% = **C+**; 73-76% = **C;** 70-72% = **C-**; 67-69% = **D+**; 63-66% = **D**; 60-62% = **D-**.

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/sci/docs/CodeConduct.pdf

Physics 105 Lab Schedule

Date	Lab Title
8/26	Experiment 1: Introduction to the Physics Laboratory
9/2	Experiment 2: Data Collection and Analysis
9/9	Experiment 3: Motion Studies
9/16	Experiment 4: Vector Addition of Forces
9/23	Experiment 5: Projectile Motion
9/30	Experiment 6: Atwood's Machine
10/7	Experiment 7: Friction
10/14	Experiment 8: Hooke's Law
10/21	Experiment 9: Centripetal Force
10/28	Experiment 10: The Pendulum
11/4	Experiment 11: Conservation of Mechanical Energy
11/11	Experiment 12: Momentum and Collisions
11/18	Experiment 13: Torque
11/25	Thanksgiving Break
12/2	Study week – no labs

Appendix B – Faculty Vitae

Alberts , Todd E.

Education – degree, discipline, institution, year

- Indiana State University (ISU), Terre Haute, IN. MS Industrial Technology, 2007.
- ISU, BS Mechanical Technology, 2005.
- Ivy Tech State College, Terre Haute, IN. AS Computer Aided Design & Manufacturing. 1998.

Academic experience – institution, rank, title (chair, coordinator, etc. if appropriate), when (ex. 1990-1995), full time or part time

- Indiana State University (ISU), Terre Haute, IN. Instructor, Mechanical Engineering Technology, 2007 – Present.

Non-academic experience – company or entity, title, brief description of position, when (ex. 1993-1999), full time or part time

- Pfizer Pharmaceuticals, Terre Haute, IN 47802 . Project Engineer - Facilities Engineering Dept, 2002 – 2003.
- Jones Tool and Machine Inc., Terre Haute, IN. Project Engineer / Coordinator, 1998 – 2002.
- Alcoa Inc., Closure Systems International Division, Crawfordsville, IN. Sr. Mechanical Designer, 1993 – 1997.
- Machine Tool Service Inc., Terre Haute, IN. Mechanical Designer/Drafter, 1988 – 1993.

Certifications or professional registrations

- Pursuing professional status as Certified Manufacturing Technologist (SME)

Current membership in professional organizations

- American Society of Mechanical Engineers
- American Society for Engineering Education
- American Design Drafting Association
- Association of Technology Management and Applied Engineering

Honors and awards

- Faculty Advisor for ISU American Society of Mechanical Engineers (ASME) Student Chapter – voted Student Organization of the Year 2014-15.

Service activities (within and outside of the institution)

- MET Faculty member assigned for all program recruiting activities which have resulted in program enrollment growth over previous 6 years from 67 to 244 students in the MET program.
- Faculty Advisor for ISU American Society of Mechanical Engineers (ASME) Student Chapter

- MET faculty responsible for student recruiting events, admissions, transfer, and student orientation, industry relations for internships and potential student positions upon graduation.

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- T. E. Alberts and P. Polastri. (2013) Developing A Globalized and Sustainable Mindset in 21St Century Engineering Students. *Proceedings of the World Congress of Engineering Education WCEE 2013*
- M. Affan Badar, Sree Akkineni, A. Mehran Shahhosseini, Todd E. Alberts; Effect of globalization on U.S. manufacturing in terms of trade balance. *International Journal of Agile Manufacturing*, *12*(1), 13-17.

Briefly list the most recent professional development activities.

Presentations – Invited Guest Speaker

- T. Alberts, "*Engineering Technology in AETM Department"*, Indiana State University LEAP Career Exploration Night, Terre Haute, IN, July 23, 2014
- T. Alberts, "*Passport to College Success"*, Indiana State University Fall Welcome Speaker Series, Terre Haute, IN, August 18, 2014
- T. Alberts, "*Experiences from Successful Advisors"*, Indiana State University, Faculty Center for Teaching Excellence Speaker Series, Terre Haute, IN, September 25, 2014
- T. Alberts, "*Passport to College Success"*, Indiana State University Fall Welcome Speaker Series, Terre Haute, IN, August 19, 2013
- T. Alberts, "*How is That Made?*, Indiana State University LEAP Career Exploration Night, Terre Haute, IN, July 24, 2013

Additional Engineering Related Career Training

- Pursuing professional status as Certified Manufacturing Technologist (SME)
- Geometric Dimensioning & Tolerancing Y14.5
- Engineering Ergonomics
- Root Cause Analysis
- Failure Modes Effects Analysis (FMEA)

Badar, M. Affan

Education - degree, discipline, institution, year

- University of Oklahoma, Tula OK. Ph.D. Industrial Engineering, 2002.
- King Fahd University of Petroleum & Minerals, Saudi Arabia. M.S. Mechanical Engineering, 1993.
- Aligarh Muslim University (AMU), India. M.Sc. Industrial Engineering, 1990.
- AMU. B.Sc. (Honors) Mechanical Engineering, 1988.

Academic experience–institution, rank, title (chair, coordinator, etc. if appropriate), full time or part time

- Indiana State University, Terre Haute, IN.
  - Professor, Applied Engineering & Technology Management (AETM), 2012–Present. Associate Professor, 2008–2012. Assistant Professor, 2002–2008.
  - Interim Associate Dean, College of Technology, 2014–2015.
  - Department Chairperson, AETM, 2010–2014.
- Purdue School of Engineering & Technology, IUPUI, Indianapolis, IN.
  - Associate Faculty, Mechanical Engineering and Logistics Systems Management & Engineering, 2006–2009.

Non-academic experience–company or entity, title, brief description of position, when, full time or part time

- York International. Manufacturing Engineering Intern, 1999-2000.
- Weatherford Artificial Lift Systems. Design Engineer, 1998-1999.

Certifications or professional registrations

- ABET Program Evaluator, 2010-Present.
- ATMAE Certified Senior Technology Manager (CSTM), 2009

Current membership in professional organizations

- American Society of Mechanical Engineers (ASME)
- Association of Technology, Management, and Applied Engineering (ATMAE)
- Institute of International Education (IIE)
- SME (formerly Society of Manufacturing Engineers)

Honors and awards

- Alpha Pi Mu (IE Honor Society),
- Epsilon Pi Tau (ITEEA Honor Society). Received EPT Warner Professional Practice Award for Region 3, 2015

Service activities (within and outside of the institution)

- ABET Program Evaluator (PEV), since 2010 (Note: ABET has harmonized the accreditation criteria and procedures across the four commissions)
- Programs evaluated and visited: Southern Poly SU, Oct 2014; Bogor Agricultural U (Indonesia), Oct 2012; Missouri Southern SU, Sep 2011; U of Dayton, Oct 2010

- Prepared an AACSB eligibility application for a school of management in India, Mar 2015
- VP, Manufacturing Division, ATMAE, 2014-16; 2012-14
- Operations Mgmt Committee (Board of Governors), Jahangirabad Inst. of Tech (India), since Dec 2014
- Review panelist, ASEE/Dept of Defense (DoD) SMART Scholarship Evaluation Panel, Feb 2014
- Editor-in-Chief, Sciknow J. of Manufact & Design Sc, since 2014
- Editor, SAGE/Hindawi journal, Advances in Mechanical Engineering, since Feb 2013

Briefly list the most important publications and presentations from the past five years–title, co-authors if any, where published and/or presented, date of publication or presentation

- M.A. Badar, 2014, "Student solar power," Chap 4 vignette in *Engr Econ Analy*, e12, D.G. Newnan, J.P. Lavelle, and T.G. Eschenbach, Oxford Univ Press, New York, NY
- M.A. Badar, 2014, "Lean Manufacturing Cell," Chap 16 in *Handbook of Industrial and Systems Engineering*, e2, A.B. Badiru (ed.), pp. 291-297, CRC Press, Taylor & Francis Group, Boca Raton, FL, (Ch 18 in e1, 2006)
- M. Al-Odeh, A. McLeod, and M.A. Badar, "Value stream mapping: Recreating an industrial environment in an educational setting," IAJC *Technology Interface Int. J.*(accepted). Also in *Proceed. of the 2014 IAJC/ISAM Joint Int. Conf.*, ISBN: 978-1-60643-379-9, paper #028 (Sep 25-27, 2014).
- M.E. Odigie (student), J.A. Cantrell (student), and M.A. Badar, "Roller-type thrust bearing reliability analysis with Minitab," *NED Univ. J. of Research – App Sc*, XI, 4, 1-14 (2014).
- M. Al-Odeh (student), C. Bell (student), and M.A. Badar, "Data integration to extend product data management systems to predict product lifecycle," Al-Falah *Global Sci-Tech*, 6, 1, 1-11 (2014).

Briefly list the most recent professional development activities.

- M.A. Badar (Keynote speaker), Impact of ISO 9001 certification on US firms financial performance, Int. Conf. on Advancements in Mech. Eng'g (ICAME 2014), Al-Falah U., Faridabad (India), Aug 8, 2014.
- E.K. Aba and M.A. Badar, "Financial impact of ISO 9000 and ISO 14000 certifications," ATMAE 2014 Conf., Management track, Nov 19-22, St. Louis, MO.
- E.K. Aba (student) and M.A. Badar, "Impact of ISO 9001 certification on United States companies' financial performance," ATMAE 2013 Conf., Management track, Nov 20-23, New Orleans, LA.
- P. Cochrane and M.A. Badar, "Customize laboratory using microcontroller for new Automotive Technology Education," ATMAE 2013 Conf., Teaching Innovations track, Nov 20-23, New Orleans, LA.

Clauss, Mark J.

Education

Indiana State University, Terre Haute, IN Master of Science—May, 1986 Major: Industrial Technology Education G.P.A.-3.45

Indiana State University, Terre Haute, IN Bachelor of Science—December, 1983 Major: Industrial Technology Education G.P.A. Overall-3.00, G.P.A. Major-3.58

John Adams High School, South Bend, IN, Diploma May, 1979

Academic Experience

Mechanical Technologist and Lab Instructor, College of Technology, Indiana State University, April 30, 2010 to present

Mechanical Technologist, School of Technology, Indiana State University, February 1, 1988 to April, 2010

Adjunct Faculty Member: Department of Manufacturing and Construction Technology, Indiana State University January, 1987-May, 1987

Director of Training: Gunite Division of Kelsey Hayes Co., Elkhart, IN, May, 1984-January, 1985, May, 1985-August, 1985

Graduate Assistant: Dept. of Industrial Technology Education, Indiana State University, January, 1985-May, 1985

Supervised Teaching: September 8-December 17, 1982, John Adams High School, South Bend, IN

Part Time Employment: Laboratory Assistant, Dept. of Manufacturing and Construction Technology, Indiana State University, 1979-1983

Summer Employment: Service Technician, Outboard Motors, Thorpe's Marine Inc., South Bend, IN Summers 1980, 1981, 1982, 1983

Professional Memberships

Society of Manufacturing Engineers Member,

Honors and Awards

Indiana Industrial Education Association, Scholarship, 1979-1980

Indiana Industrial Education Association, First Place Prize in Materials and Processes, 1978 Conference, French Lick, IN

Mechanix Illustrated Monthly Golden Hammer Award, runner-up 1978

National Honor Society

Honors Assembly, Outstanding Achievement in Industrial Arts, John Adams High School, 1979 Chester Taylor Scholarship Award—Epsilon Pi Tau, 1986

Cochrane, Phillip

Education – degree, discipline, institution, year

- University of Phoenix, D.B.A. [Doctor of Business Administration], 2008. Dissertation: African American Entrepreneurship in the Underground Economy.
- Fuller Theological Seminary , M.A. Theology, 1993.
- University of Montana ,M.B.A. Business Administration, 1990.
- Western Michigan University (WMU), B.S.E., Mechanical, 1980.
- WMU, B.S. Automotive Engineering Technology, 1979.
- SUNY – Morrisville, A.A.S., Automotive Technology, 1972.

Academic experience – institution, rank, title (chair, coordinator, etc. if appropriate), when, full time or part time

- Indiana State University
  - Associate Professor, Applied Engineering & Technology Management department (Automotive Engineering Technology and Mechanical Engineering Technology), 2006-Present.
  - Coordinator for Bachelor of Engineering Technology Program, 2013-Present.
- Morrisville State College
  - Program Director for 4-year Automotive Programs, 2001-2006. Prepare budgets. Coordinate with faculty. Develop four-year curriculum programs. Develop courseware. Oversee articulation agreements. Teach upper-level courses.
- Dayton Public Schools
  - Mathematics Instructor/Department Chair, 1995-2001.
- Central State University (CSU)
  - Adjunct business faculty, 1996-1997.

Non-academic experience – company or entity, title, brief description of position, when, full time or part time.

- United Stated Air Force
- Project Manager / Engineer / Technician, 1972-1994.
  Directed personnel changes and conducted interviews. Wrote recommendations for hiring and retention. Authored quarterly appraisals and award recommendations. Integrated the activities of 100 project personnel. Developed project plans and budgets. Developed alternatives and proactive strategies. Met cost, performance and delivery milestones. Managed subcontractors.

Certifications or professional registrations

- Certified Technology Manager (2014)
- Licensed Pilot (1981)

Current membership in professional organizations

- Society of Automotive Engineers (SAE)
- American Society of Engineering Educators (ASEE)
- Aircraft Owners and Pilots Association

Honors and awards

Service activities (within and outside of the institution)

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- Cochrane, P. (2012) *Incorporating experiential learning and community engagement within an OL learning environment.* Presentation, 2012 ATMAE conference, Nashville, TN.
- Cochrane, P., Eversole, B. (2012) *Student laboratory team performance as related to team size.* Journal of Technology management and applied Engineering. 28(4) Ann Arbor, MI.
- Cochrane, P. (2011) *Motorsports laboratories for technology and entrepreneurial education.* Presentation, ASEE CEIC 2011. San Antonio, TX.
- McClure, M.R., Shahhosseini, A.M., Alberts, T., & Cochrane, P. (2011) *Effects of joint preparation angle of single-vee butt-welds on the tensile strength of ASTM A36 carbon steel.* IMECE2001-63757. Proceedings ASME IMECE2001, Denver. CO.

Briefly list the most recent professional development activities.

- Cochrane, P. (2014). *Computer-based automotive scan tools.* Proceedings, from the 2014 ATMAE conference, "Technology—Tomorrow's Gateway," St. Louis, MO.
- Cochrane, P. (2014) *Tangents as a normal way of teaching.* Proceedings from the 2014 ATMAE conference, "Technology—Tomorrow's Gateway," St. Louis, MO.
- Cochrane, P., Badar, M.A., & Lin, Y. (2013) *Customize laboratory using microcontroller for new automotive technology education.* Presentation, 2013 ATMAE conference, "Developing the Future Workforce," New Orleans, LA.

Hayden, Michael A.

Education – degree, discipline, institution, year

- Iowa State University. Ph.D. Industrial Education and Technology, 1989. Dissertation: The development and validation of a test of industrial technological literacy.
- Eastern Illinois University. M.S. Technology Education, 1984.
- Eastern Illinois University. B.S. Career Occupations, 1983. Obtained 6-12 Industrial Arts teaching certificate and vocational certification.
- Danville Area Community College, Danville, IL. A.A.S. Machine Tool Technology., 1981.

Academic experience – institution, rank, title (chair, coordinator, etc. if appropriate), when, full time or part time

- Indiana State University, Terre Haute, IN. Professor (tenured), Department of Applied Engineering & Technology Management, Graduate faculty, 1996-Present.
- Mississippi State University. Associate Professor (tenured), Department of Technology and Education, Graduate faculty, 1991-1996.
- University of Southern Colorado, Assistant Professor, Department of Industrial Technology, 1989-1991.
- Iowa State University: Teaching Assistant, Department of Industrial Education and Technology, 1986-1989.
- Danville Area Community College, Danville, IL, Instructor. 1985-1986.
- Vermilion Occupation Technical Education Center, Danville, IL, Instructor, 1984-1985.

Non-academic experience – company or entity, title, brief description of position, when, full time or part time

- Berkeley-Davis Inc., Danville, IL. Summer 1985: Drafter. Performed design and detail drafting related to automated welding machines.
- Bohn Heat Transfer, Danville, IL. Aug. 1981-Apr. 1982: Drafter - refrigeration and air conditioning equipment drawings, including electrical.
- ESCO, Danville, IL. Oct. 1978-May 1980: Machine Operator.
- Famaco. Tilton, IL. Sep.-Oct. 1978: Machine operator.

Certifications or professional registrations

- Certified Manufacturing Engineer (CMfgE) with the focus area of Management by the Society of Manufacturing Engineers (SME).
- Certified Manufacturing Technologist (CMfgT) by SME.
- Certified Quality Engineer (CQE) by the American Society for Quality (ASQ).
- Certified Manager of Quality/Organizational Excellence (CQM) by ASQ.
- Certified Six Sigma Green Belt (CSSGB) by ASQ.
- Teaching certificate, Illinois, type 9 (6-12).

Current membership in professional organizations

- American Society for Quality (ASQ)
- American Society for Engineering Education (ASEE)
- Associate of Technology, Manufacturing, and Applied Engineering (ATMAE)
- Epsilon Pi Tau (EPT) Honor Society (Laureate member)
- SAE International (formerly Society of Automotive Engineers)

Honors and awards

- EPT Laureate Citation. Awarded October 1998. Epsilon Pi Tau is the International Honorary for Professions in Technology.
- NAIT Outstanding Regional Director Award. Awarded October 2007 by the National Association of Industrial Technology.

Service activities (within and outside of the institution)

- Coordinator of the Minor and Certificate programs in Lean Six Sigma. 2011 to present.
- M.S. Technology Management Coordinator. 1996-1997, 2009-Present.
- 2012-2014: Chair of the Wabash Valley ASQ chapter. Have been Chair and Vice Chair several times; have been an officer since 2005.
- 2012-2014: Secretary of the SME Wabash Valley chapter. Have been Chair and Vice Chair several times; have been an officer since 2005.

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- Aba, E. K., & Hayden M.A. (2013). Variation and its relationships to quality. Quality Progress, ASQ.

Briefly list the most recent professional development activities.

- Peters, R. & Hayden, M. (2014). Marketing Students to Industry: Much more than a Field Trip. ATMAE Annual Convention. St. Louis, MO.*****
- Peters, R. & Hayden, M. (2014). Closing the Loop: Assessment Plans Utilizing Certification Exams Provide Efficient Results for Curriculum Validation or Change. ATMAE Annual Convention. St. Louis, MO.*
- McLeod, A. & Hayden, M. (2013). Pedagogical Underpinnings of Material Science in Engineering Technology. ATMAE Annual Convention. New Orleans, LA.*****
- Peters, R. & Hayden, M. (2013). Coordinating Multiple Program Assessments: The Use of ATMAE Certification Exams in College-Wide Program Assessment. ATMAE Annual Convention. New Orleans, LA.*****

Lawyer, Kristina

Education – degree, discipline, institution, year

- Michigan Technological University (MTU), Houghton, MI. Ph.D. Mechanical Engineering, 2015 (expected). Dissertation: Incorporation of Higher Carbon Number Alcohols in Gasoline Blends for Application in Spark-Ignition Engines. National Science Foundation IGERT Fellowship.
- MTU. M.S. Mechanical Engineering, May 2012. Topic: The effects of service learning in sustainability engineering education
- Rose-Hulman Institute of Technology (RHIT), Terre Haute, IN. B.S. Mechanical Engineering, 2008.

Academic experience – institution, rank, title (chair, coordinator, etc. if appropriate), when, full time or part time

- Indiana State University (ISU), Terre Haute, IN. Instructor, Applied Engineering. & Technology Management dept, Aug 2013-Present. (Automotive Engineering Technology and Mechanical Engineering Technology classes.)
- Argonne National Laboratory, Argonne, IL. Research Appointee, Jan-Jly 2013.
- (Working in the Center for Transportation Research within the Energy Systems Division)
- ISU, Adjunct faculty, Applied Engineering. & Technology Management dept, Jan-Apr 2012. (Distance learning section of Applied Statics.)
- MTU (Advanced Internal Combustion Engines research team) and Argonne National Laboratory (Energy Systems Division). Contractor, Oct 2011-Dec 2012.
- MTU (Civil and Environmental Engineering Dept). Graduate Research Assistant, Aug 2009-Dec 2010.
- MTU Engineering Learning Center. Head Coach, Aug 2009-Oct 2011. ’09 to October ‘11

Non-academic experience – company or entity, title, brief description of position, when (ex. 1993-1999), full time or part time

- Peerless Pump, Indianapolis, IN. Summer Engineering Intern, May 2008-Aug 2008. Updated component drawings and optimized manufacturing processes.
- McKinney Corporation, Lafayette, IN. Summer Intern, June 2007-Aug 2007. Managed shop activities, assisted in fabrication of chassis and parts, conducted experiments to resolve part failure, and developed a database to aid in the chassis-building process.
- RHIT ChallengeX, Terre Haute, IN. Engine & Emissions Team Leader, Overall Team Leader, May 2006-May 2008. Supervised engine and emissions research, collected engine data, operated dynamometer and open ECU, presented technical information to sponsors, utilized model-based calibration for engine modeling, designed and built new sway bar for senior design project, managed team operations.
- MTU. Summer Youth Programs, Mar 2011-Aug 2011. Developed and taught Motorsports course to middle school and high school students, and Engineering the Human Body course to high school students.
- MTU. EcoCAR Hybrid Vehicle Design Competition, Aug 2008-May 2009. Advised team on technical and leadership issues, taught MATLAB/Simulink classes, and attended workshops.

Certifications or professional registrations

Current membership in professional organizations

- American Society for Engineering Education (ASEE)
- American Society of Mechanical Engineers (ASME)
- SAE International (formerly Society of Automotive Engineers)
- Society of Women Engineers (SWE)

Honors and awards

- Recognized as having a positive influence on freshman students by the Indiana State University College of Technology in the fall of 2014
- Recipient of the *2012 Graduate Mechanical Engineering Woman of Promise Award* from the MTU Presidential Council of Alumnae
- Recipient of a National Science Foundation IGERT Fellowship

Service activities (within and outside of the institution)

Advisor for student organizations:

- Team Sycamore Racing (TSR)
- Society of Automotive Engineers (SAE)
- [ISU] Sycamores Billiards Club

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- McCormick, M., Lawyer, K., Wiggins, J., et al. (2014). Sustainable Engineering Assessment using Rubric-Based Analysis of Challenge Question Responses. *ASCE's Journal of Professional Issues in Engineering Education and Practice.*
- Wallner, T., Ickes, A., Lawyer, K. (2013). Meeting RFS2 targets with an E10/E15-like fuel – experimental and analytical assessment of higher alcohols in multi-component blends with gasoline. *SAE International Journal of Fuels and Lubricants.*
- Wallner, T., Ickes, A., Lawyer, K. (2013). Assessment of Combustion Characteristics of Higher Alcohols in a Direct Injection Spark Ignition Engine. *ASME ICEF Conference*, 19180.
- Lawyer, K., Ickes, A., Wallner, T. (2013). Blend Ratio Optimization of Fuels Containing Gasoline Blendstock, Ethanol, and Higher Alcohols (C3-C6): Part I – Methodology and Scenario Definition. *SAE World Congress*, 2013-01-1144.
- Lawyer, K., Ickes, A., Wallner, T. (2013). Blend Ratio Optimization of Fuels Containing Gasoline Blendstock, Ethanol, and Higher Alcohols (C3-C6): Part II – Optimum Blend Properties and Target Value Effects. *SAE World Congress*, 2013-01-1126.

Briefly list the most recent professional development activities.

McLeod, Alister

Education – degree, discipline, institution, year

- Purdue University, West Lafayette, IN. Ph.D. Industrial Technology, 2009
- Purdue, M.S. Industrial/Electrical Technology, 2005
- North Carolina Agricultural & Technical State University (NCATSU). B.S. Electronics Engineering Technology, 2003

Academic experience – institution, rank, title (chair, coordinator, etc. if appropriate), when (ex. 1990-1995), full time or part time

- Indiana State University, Terre Haute, IN. Assistant Professor, Aug 2011-Present
- South Carolina State University, Department of Electronic Engineering Technology. Adjunct Professor, Aug 2010 – July 2011
- Aiken Technical College, Department of Electronic Engineering Technology. Instructor, Jun 2010 – July 2011
- American Public University System, Department of Transportation and Logistics Management. Adjunct Professor, May 2010 – July 2011
- Purdue, Department of Industrial Technology. Graduate Lecturer, Aug 2006 - Dec 2009
- Purdue, Department of Mechanical Engineering Technology. Research Assistant, Jan 2004 -May 2004
- Purdue, Department of Electrical Engineering Technology. Teaching Assistant, Aug 2003 -May 2004
- NCATSU, Student Support Services. Academic Tutor, Aug 2001 -May 2003

Non-academic experience – company or entity, title, brief description of position, when (ex. 1993-1999), full time or part time

- M4Sciences, Production Systems. Research Process Engineer, Oct 2008-May 2009.
- Alcoa Minerals of Jamaica, Industrial Relations Department. Intern, Summer 2001.

Certifications or professional registrations

- Certification for using Collaborative Tools to Deliver Online Lessons, American Public University, August 2010
- Certification for Project Lead the Way Digital Electronics, University of South Carolina, July 2010
- Education Certificate for participation in the Photovoltaic Power Systems: Solar and the National Electric Code, State of South Carolina, July 2010
- Certification for the S7- 1200 PLC, Siemens Industry Inc., June 2010

Current membership in professional organizations

- American Society for Engineering Education (ASEE)
- American Society of Transportation and Logistics (AST&L)
- Council of Supply Chain Management Professionals (CSCMP)
- Society of Manufacturing Engineers (SME)
- Surface Mount Technology Association (SMTA)

Honors and awards

- Purdue University, Outstanding Teaching Award, Spring 2008
- NCATSU School of Technology, Outstanding Student, Spring 2003

Service activities (within and outside of the institution)

Reviewer, Technology Interface Journal (2009).
Reviewer, Conference Proceeding, ASEE 2009 Annual Conference and Exposition

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

Briefly list the most recent professional development activities.

Peters, Randell W.

Education/Degrees

Ph.D., Curriculum & Instruction/Industrial Technology Education, Indiana State University, 2005

M.S., Industrial Technology Education, Indiana State University, 2003

B.S., Industrial Vocational Technology Technical Area, Indiana State University, 2001

Academic Experience

Indiana State University, Terre Haute, IN, August 2003 to present, full-time

AETM Department Chair – August 2015 – present

Interim AETM Department Chair – August 2014 – August 2015

1st Sabbatical – Spring 2014 semester

Faculty Fellow – Assessment and Accreditation – January 2013 – January 2014

Tenured/Promoted – Associate Professor of Automotive Engineering Technology – August, 2010

Tenure-track – Assistant Professor, Coordinator, Automotive Technology Management Program, Since August, 2004

Instructor, Automotive Technology Management Program, 2003 – 2004

IVY Tech State College, Indianapolis, IN, 2002 – 2003, full-time

Instructor, Automotive Service Technology Program

Non-Academic Experience

Managing Partner, PJ Promotions LLC, dba Crossroads Dragway, Terre Haute, IN, NHRA Member - 1/8 mile Drag Racing facility, March 2009 – Present.

- Responsible for maintenance of all aspects of the facility, sponsor relations, publications, articles, flyers, website content, hiring, and training employees

Automotive Technician, Jacks and Jacks Motors, Rockville, IN, Dec 2001- Aug 2002

Body Shop Manager, Mike's Motor Co. Inc., Clinton, Indiana, Jan 2001- Dec 2001

Chrysler Systems Coordinator, Mike's Motor Co. Inc., Clinton, IN, Jan 2001 – Dec 2001

Fixed Operations Director, Mike's Motor Co. Inc., Clinton, Indiana, Sep 2000 – Dec 2001

Automotive Technician, Jacks and Jacks Motors, Rockville, IN, Oct 1994-Sep 2000

Automotive Driveability Technician, Hubler Chevrolet, Indianapolis, IN, Mar 1989-Jul 1994

Aviation Maintenance Administration, US Navy, Apr 1984-Apr 1989

Certifications

Certified - Bronze Level SFI Technical Inspector for National Hot Rod Association – since 2009

Certified Senior Technology Manager/Industrial Technologist, by ATMAE – Since 2004

Certified – National Institute for Automotive Service Excellence – 21 specific areas – since 1988

Professional Memberships

American Society of Mechanical Engineers, member, since 2013

American Society for Engineering Education, member, since 2005

Society of Automotive Engineers, member grade, since 2003

National Association of Industrial Technology now the Association of Technology, Management and Applied Engineering, since 2003

Honors/Awards

ISU Distinguished Service Award – 2013

Outstanding Industrial Technology Professor Award from the National Association of Industrial Technology - 2008

Service Activities

President, University Division, Association of Technology, Management, and Applied Engineering (ATMAE), November 2009 – November 2011

Accreditation Team Member for NAIT/ATMAE, serving as visiting team member 2005 – 2007 and as visiting team chair in 2010, 2011, 2013 – 2015.

ISU Curriculum Academic Affairs Committee: Member, 2006 – 2011, Associate Chair, 2007 – 2009, Chair, 2009 – 2011, Member Spring 2013

Significant Publications Presentations in the last 5 years

Hayden, M.A., Peters, R.W. (under review). "Material Topics in Engineering and Technical Programs."

Peters, R.W., Hayden, M. (under review,). "Analysis of Reaction Times in E.T. Bracket Racing."

Peters, R.W., Hayden, M.A. (2014, November). Marketing Students to Industry: Much More than a Field Trip. Association of Technology, Management, and Applied Engineering Conference, St. Louis, MO.

Peters, R.W., Hayden, M.A. (2014, November). Closing the Loop: Assessment Plans Utilizing Certification Exams Provide Efficient Results for Curriculum Validation or Change. Association of Technology, Management, and Applied Engineering Conference, St. Louis, MO.

Young, J.A., Bodey, K.J., Harder, J.T., and Peters, R.W. (2013, December). "An Examination of Personality Traits of Motorsports Management Students," ICHPER-SD Journal of Research.

Hayden, M.A. & Peters, R.W. (2013, November). Coordinating Multiple Program Assessment: The use of ATMAE Certification Exams in College-Wide Program Assessment. Association of Technology, Management, and Applied Engineering Conference, New Orleans, LA.

Peters, R.W. (2013, November). Developing Tomorrows Workforce through Blending Engineering Technology with Gen Ed: The Story Behind the Survey of Motorsports. Association of Technology, Management, and Applied Engineering Conference, New Orleans, LA.

Most Recent Professional Development Activities

Manage/operate a drag racing facility, since 2009,

Recertified in SFI Bronze Level Technical Inspector for NHRA, Spring 2015

Recertified in Automotive Service Excellence, 21 categories, Fall 2014

Attended and presented – ATMAE Conference in St. Louis, MO, November 2014

Attended and presented – ATMAE Conference in New Orleans, LA, November 2013

Attended – ATMAE Conference in Nashville, TN, November, 2012

Schafer, Marion D. Schafer

Education – degree, discipline, institution, year

- Indiana State University (ISU), Terre Haute, IN. Ph.D. Curriculum & Instruction,
- ISU, M.S. Industrial Professional Technology.
- ISU, B.S. Packaging Technology.

Academic experience – institution, rank, title (chair, coordinator, etc. if appropriate), when (ex. 1990-1995), full time or part time

- Developed Bachelor of Applied Science in Technology degree for College of Technology. 2013.
- Professor (tenured), Applied Engineering & Technology Management dept, 2011-Present. Director, Indiana Packaging R & D Center. Coordinator of B.S. in Packaging Engineering Technology. Associate Professor, 2006-2011. Dept Chairperson, 2002-2006. Assistant Professor, 1997-2002.
- University of Wisconsin—Stout. Assistant Professor, Technology Department, College of Technology, Engineering and Management, 1995-1997.
- ISU, Graduate Fellow, School of Technology, 1994-1995.
- ISU, Instructor of Packaging Technology, 1992-1994.

Non-academic experience – company or entity, title, brief description of position, when (ex. 1993-1999), full time or part time

- Owner MDS Packaging Consultants, 2008-present. Providing consulting services concerning packaging, handling, loading, securement, package system design, and package system testing.
- Pillsbury Company, January 1974-September 1992. Duties included compounding and packaging of food products, warehousing, receiving and shipping, equipment maintenance, quality lab testing, and training of personnel.

Certifications or professional registrations

- Certified Packaging Laboratory Professional (CPLP), International Safe Transit Association (ISTA), 2007 (lifetime status).
- Certified Packaging Professional (CPP), Institute of Packaging Professionals (IoPP), 2009 (lifetime status).

Current membership in professional organizations

- American Society for Testing and Materials (ASTM)
- Association of Technology, Management, and Applied Engineering (ATMAE)
- Institute of Packaging Professionals (IoPP)
- International Safe Transit Association (ISTA)

Honors and awards

- Epsilon Pi Tau (honorary society), member 1988-present.

Service activities (within and outside of the institution)

- Consulting as Expert in Legal Cases
  - Expert opinion on improper loading of large tires on flatbed semi-trailer, 139th District Court, Hidalgo County, Texas. (2013)
  - Expert opinion on improper loading and securement of live animal cages, Birmingham, AL. (2013)
  - Expert opinion on improper loading of machinery on flatbed semi-trailer. Circuit Court of St. Clair County, AL, Ashville Division. (2010)
  - Expert opinion on unit load securement of bagged powders. Tippecanoe Superior Court 2, Lafayette, IN. (2010)
  - Other cases from 2005 to Present.
- Schafer, M. D. Project Director. Esko Graphics. Contract proposal to develop corrugated box design templates to coordinate with existing box manufacturing equipment. Total project $38,000/year in-kind donation of Artios CAD software updates. 2004-2014.

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- Schafer, M.D. and Smallwood, J. (2012) *Sustainable Packaging Alternatives*. ATMAE 2012 Conference, Nashville TN.
- Schafer, M.D. and Aba, E.K. (2012) *An Investigation of the Awareness of Recycling Services at Student Family Housing Units*. ATMAE 2012 Conference, Nashville, TN.
- Scontrino, P. and Schafer, M.D. (2012) *HRD Practitioners as Change Agents within the Sustainability Strategic Domain*. 2012 AHRD conference.
- Al-Odeh, M. and Schafer, M.D. (2011) *Manufacturing Opportunities in Jordan*. IIE 2011 Conference, Orlando, FL.

Briefly list the most recent professional development activities.

Shahhosseini, A. Mehran

Education – degree, discipline, institution, year

- Lamar University, Beaumont TX. D.Engr. Mechanical Engineering, 1999.
- Isfahan University of Technology, M.S. Materials Engineering, 1991.
- Tehran University, B.S. Metallurgical Engineering, 1988.

Academic experience – institution, rank, title (chair, coordinator, etc. if appropriate), when, full time or part time

- Indiana State University (ISU), Terre Haute, IN. Associate Professor, 2014-Present. Tenure-Track Assistant Professor, August 2009.
- University of Louisville, Louisville, KY. Research Assistant Professor, 2001-2009. Post-Doctorate Research Associate, 2000-2001.

Non-academic experience – company or entity, title, brief description of position, when, full time or part time

- Ford Motor Company, Scientific Research Laboratory, Dearborn, MI. Feb 2001-Nov 2002.
- Arak Machine Manufacturing Plant, Arak, Iran. Senior Research Engineer. Oct 1989-Aug 1994.
- Pars Metal Casting Plant, Tehran, Iran. Co-op Engineer. Jly-Sep 1987.
- Steel Profile Manufacturing Plant, Tehran, Iran. Co-op Engineer. Jly-Sep 1986.

Certifications or professional registrations

- Engineer-in-Training (EIT) Certificate, Texas, 1999

Current membership in professional organizations

- American Society of Mechanical Engineers (ASME)
- Association of Technology, Management, and Applied Engineering (ATMAE)
- SAE International (formerly Society of Automotive Engineers)

Honors and awards

Service activities (within and outside of the institution)

- ISU. Interim Director of the PhD in Technology Management Program, 2014-Present.
- Reviewed submissions for the following journals:
- SAE Technical Papers
- International Journal of Heavy Vehicle Systems
- Reviewed proposal submissions for California Energy Commission, Energy Innovations Small Grant (EISG) Program

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- Shahhosseini, A.M., Friesel, E.W., Richardson, B., "General Business Model for Product Modularity," International Journal of Data Analysis Techniques and Strategies, accepted and will be published in October 2015.
- Friesel, E.W., Shahhosseini, A.M., Richardson, B., "Spectrum of Modularity: Characterizing Degree of System Modularity for Performance and Value Comparison," International Journal of Product Development, accepted for peer review in October 2014.
- Badar, M.A., Akkineni, S.N., Shahhosseini, A.M., and Alberts, T., "Effect of Globalization on US Manufacturing in Terms of Trade Balance," International Journal of Agile Manufacturing, Vol. 12, Issue 1, 2012.

Briefly list the most recent professional development activities.

- Shahhosseini, A.M., Ye, H., Maughan, G., and Foster, T., "Implementation of Similarity Flooding Algorithm to Solve Engineering Problems Using Diagnostic Skills Training Technique," *ASME International Mechanical Engineering Congress & Exposition*, Montreal, Canada, November 14-20, 2014, accepted with honors, presented by Foster, T.
- Shahhosseini, A.M., Foster, T., Maughan, G., and Ye, H., "Implementation of Similarity Flooding Algorithm in Advancing Diagnostic Skills Training in the Undergraduate Technology and Engineering Curriculum," *New Learning Technologies Conference*, Orlando, FL, March 4-7, 2014, presented.
- Shahhosseini, A.M., Srinivasan, M., "Micro-macro modeling of continuous cast steel to simulate the effect of casting velocity and pouring temperature on copper segregation," *ASME International Mechanical Engineering Congress & Exposition*, Houston, TX, November 9-15, 2012, presented.
- Friesel, E.W. and Shahhosseini, A.M., "Using modularity and cross-enterprise technologies in large organizations to achieve cost savings and improved performance through innovative system integration," *ATMAE Conference*, Nashville, Tennessee, November 14-17, 2012, presented by Friesel, E.W.

Smallwood, James E., Jr.

Education: degree, discipline, institution, year

- Indiana State University (ISU), Terre Haute, Indiana, Ph.D. Curriculum and Instruction/Industrial Technology Education, August, 1988. Dissertation: "Curricular Implications for Technology Education Based on Validated Worker Characteristics for Industrial Participative Management as Identified by Selected Industrial Personnel"
- ISU, M.S. Industrial Arts Education, August 1980.
- ISU, B.S. Industrial Arts Education, May 1978.
- University of Evansville, Evansville, Indiana, B.S. Law Enforcement, May 1975.

Academic experience: institution, rank, title (chair, coordinator, etc. if appropriate), time period, full- or part-time

- Indiana State University, Professor of Applied Engineering and Technology Management, August, 2010 – Present. Professor and Chair, Department of Technology Management, 2002 – 2010, formerly Department of Manufacturing and Construction Technology. Tenured Fall 2003. Also Interim Chair, Department of Industrial Technology Education, 2006-07.
- Morehead State University, Professor, Dept. of Industrial Education and Technology: Teaching Area - Robotics, Manufacturing (CAM, CNC), 1988 - 2002. Promoted to Associate Professor Fall, 1992. Tenured Fall 1993. Promoted to Professor Fall 1998.
- Indiana State University, Graduate Fellowship, Dept. of Industrial Technology Education and Dept. of Secondary Education, 1985 - 1988.
- Greater Jasper Consolidated School Corporation, Jasper, Indiana, Industrial Arts Instructor for grades 6-8, 1978 - 1985. Tenured 1983.

Non-academic experience: company or entity, title, brief description of position, time period, full- or part- time

- Design Draftsman, North American Products, Inc., Jaspe IN. Design carbide tip cutters, Summers and part-time April 1981 - May 1985.
- Hoosier Energy Rural Cooperative, Inc., Merom Generating Station, Merom IN. Assisted in the development of training materials for power plant operation, 1986.

Certifications or professional registrations

- Certified Manufacturing Technologist, Society of Manufacturing Engineers, 1989. Re-Certified in 1992, 1995, 1998, 2001, 2004, 2007, 2010 and 2013.

Current membership in professional organizations

- Association of Technology, Management and Applied Engineering (ATMAE)
- Society of Manufacturing Engineers (SME)
- Epsilon Pi Tau (honorary), Indiana State University
- Sigma Lambda Chi (honorary), Indiana State University

Honors and awards – past 3 years

- Granted Sabbatical Leave of Absence, Indiana State University, Fall 2015.
- Caleb Mills Distinguished Teaching Award, Indiana State University, Spring 2013.

Service activities (within and outside of the institution) - past 3 years

- Served as editor of The CTE Journal, Spring, 2013-Present.
- Appointed to the Caleb Mills Distinguished Teaching Award Committee, 2013-2015.
- Appointed to the Faculty Employee Benefits Committee, 2013-2015.
- Served as lead faculty member for the B.S. Technology Management program, Fall, 2010 - Summer, 2014.
- Served on ISU Professional Internship Advisory Board, Fall, 2013 - Present.
- Served as an external reviewer for Ball State University for a faculty promotion from Associate to Full Professor, Fall 2013.
- Reviewer of manuscripts for Tech Directions Journal, 2012 - Present.

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation – past 5 years

- McLeod, A. and Smallwood, J., Robotic Cell Usage in Industry: The Rebirth of a Frontier for Manufacturing Engineering Education, *American Society for Engineering Education, Selected Papers,* AC 2012-4777, June, 2012.
- Al-Odeh, M. and Smallwood, J., Sustainable Supply Chain Management: Literature Review, Trends, and Framework, *International Journal of Computational Engineering & Management (IJCEM),* Vol. 15 Issue 1, January 2012
- Nickolich, D., Feldhaus, C., Cotton, S., Smallwood, J., & Barrett II, A., Perceived Life Satisfaction of Workplace Specialist I Faculty and Mentors Participating in a First-Year STEM Teacher Training Project. *The Journal of Technology Studies*, Volume XXXVI, Issue 2, Fall, 2010.

Briefly list the most recent professional development activities – past 3 years

- Indiana Association of Career and Technical Education (IACTE) Directors, Nashville, IN., "The Workplace Specialist I Program and STEM Grant," Co-Presenters: Dr. Ed Lazaros, Dr. Sam Cotton, June, 2015.
- Faculty Center for Teaching Excellence, Indiana State University, "10 for 10: Mornings in May," May, 2015.
- IACTE Directors, Indianapolis, IN., "The status of the Indiana Education Roundtable STEM Grant," Co-Presenter: Dr. Charles Feldhaus, October, 2014.
- IACTE, Indianapolis, In., "Revising the Indiana Workplace Specialist I Teacher Training Program," Co-Presenters: Dr. Charles Feldhaus, Dr. Sam Cotton, Dr. Ed Lazaros, Mr. Bill Kovach, September, 2014.
- Association of Technology, Management and Applied Engineering (ATMAE), New Orleans, LA. "Various techniques for incorporating audio/video lectures into your online and hybrid courses," Co-Presenter: Dr. Alister McLeod, November, 2013.

Williamson, Michael R.

Education – degree, discipline, institution, year

- Southern Illinois University,Carbondale, IL. Ph.D. Engineering Science, May 2014. Specialty in Transportation Engineering.
- Southern Illinois University, Edwardsville, IL. M.S. Civil Engineering, Aug 2011. Specialty in Transportation Engineering.
- Southern Illinois University, Edwardsville, IL. B.S. Civil Engineering, Dec 2010. Specialty in Transportation Engineering.
- Lake Land College, Mattoon, IL. A.S. Pre Engineering, May 2008.

Academic experience – institution, rank, title (chair, coordinator, etc. if appropriate), when (ex. 1990-1995), full time or part time

- Indiana State University, Terre Haute, IN. Instructor, Civil Engineering, January 2014-Present
- Southern Illinois University, Edwardsville, IL. Adjunct Professor, Aug 2014-Present.
- Southern Illinois University, Edwardsville, IL. Graduate Research Assistant, Oct 2009-May 2014.
- Southern Illinois University,Edwardsville, IL. Graduate Teaching Assistant, Aug 2011-May 2014.

Non-academic experience – company or entity, title, brief description of position, when (ex. 1993-1999), full time or part time

- Crawford, Bunte, Brammeier (CBB) Traffic and Transportation Engineers, Saint Louis, MO. Intern (part-time), March 2011-March 2012
- City of St. Louis Department of Streets, St. Louis, MO. Intern, Jun 2010-Mar 2011.
- Transportation Institute, Carbondale, IL. Summer Mentoring Program, Summer 2009, 2010, 2011.

Certifications or professional registrations

- Engineer-in-Training (EIT) certification (NCEES).

Current membership in professional organizations

- American Society of Civil Engineers
- Institute of Transportation Engineers

Honors and awards

- AASHTO Research Advisory Committee (RAC) top Sweet 16 High Value Research projects 2015: "Development of a Traffic Incident Management Operational and Training Guide - Phase II"
- Illinois Center for Transportation's (ICT) "High Impact Project Award": 2012
- Institute of Transportation Engineers Student Research Poster Competition winner 2011
- Department of Civil Engineering SIUE Outstanding Graduate Student Award 2010-2011
- Institute of Transportation Engineers Student Research Poster Competition winner 2010

Service activities (within and outside of the institution)

- American Society of Civil Engineers (ASCE) Faculty Advisor: ISU Chapter 2014-Present
- Institute of Transportation Engineers (ITE): SIUE Chapter President 2009-2012

- Ancient Free and Accepted Masons: Lodge Officer 2010-2013
- Heart Shrine Club: Parade Chair 2012-2014
- Grand Lodge State of Illinois Ancient Free and Accepted Masons: Planning Committee Member

Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

- **Williamson, Michael, Jalayer, M., Zhou, H. (2014) "A Sensitivity Analysis of Crash Modification Factors of Access Management Techniques in Highway Safety Manual". Access Management Theories and Practices (Published by American Society of Civil Engineers).**
- **Williamson, Michael, Fries, R., (2014) "Effectiveness of Radar Speed Signs in a University Environment". Accepted for Publication in the ITE Journal.**
- **Williamson, Michael**, (2014) "The Quantitative Impacts of Access Points". *MOVITE Journal*, Fall Journal.

Briefly list the most recent professional development activities.

- **Williamson, Michael,** Zhou, H., Fries, R. "Development of Crash Modification Factors for Different Driveway Types Defined In the Highway Safety Manual". TRB's 11th National Access Management Conference 2015.
- **Williamson, Michael,** Fries, R. "Long Term Effectiveness of Radar Speed Signs in a University Environment". *ITE Midwestern District Annual Conference/Spring MOVITE*, Branson, Mo, June 2015.
- **Williamson, Michael,** "Poisson Regression Modeling Approach to Access Management in the Form of Driveway Safety". 63rd Annual Traffic Engineering and Safety (TES) Conference, Champaign, IL
- **Williamson, Michael**, "The Quantitative Impacts of Access Points". MOVITE Annual Fall Meeting Lincoln, Nebraska September 17-19, 2014.
- **Williamson, Michael**, Jalayer, M., Zhou, H. "A Sensitivity Analysis of Crash Modification Factors of Access Management Techniques in Highway Safety Manual". 2nd International Conference on Access Management. (Accepted for publication by ASCE 2014).
- **Williamson, Michael,** Fries, R. "Effectiveness of Radar Speed Signs in a University Environment". Transport Chicago, Chicago, Illinois, June 2014.
- **Williamson, Michael, Zhou H., "A Study of Safety Impacts of Different Types of Driveways and Their Density". The Ninth International Conference on Traffic & Transportation Studies. (Accepted for publication 2014).**

Appendix C – Equipment

Stratasys – fortus 250 rapid prototype machine

Appendix D – Institutional Summary

Programs are requested to provide the following information.

1. The Institution

Indiana State University
200 N Seventh Street
Terre Haute, IN 47809-1902

Chief Executive Officer:
President, Dr. Daniel J. Bradley

Department Chair: Applied Engineering and Technology Management Department
Dr. Randell Peters, Associate Professor

ACCREDITATIONS

HIGHER LEARNING COMMISSION (HLC) OF THE NORTH CENTRAL ASSOCIATION OF COLLEGES AND SCHOOLS (NCA) ACCREDITATION

Indiana State University has been accredited by the Higher Learning Commission (HLC) of the North Central Association of Colleges and Schools (NCA) since 1915. The accreditation process has two primary goals: to ensure the quality of institutions of higher education and to promote continuous improvement.

ISU was last reviewed in 2010. The next comprehensive evaluation will occur in 2020-2021.

To view ISU's Statement of Affiliation Status on the HLC web site, click on the image below.

The Higher Learning Commission
230 South LaSalle Street, Suite 7-500, Chicago, Illinois 60604-1411
Phone: 800.621.7440 / 312.263.0456 . Fax: 312.263.7462 . info@hlcommission.org

Department/Program	Accreditation Agency	Links to Documents	Next Site Visit/Review	Accreditation Contacts
Indiana State University	The Higher Learning Commission of the North Central Association	Documents	2020-2021	
All educator licensure programs and related school programs	Indiana Department of Education and National Council for the Accreditation of Teacher Education	Documents	Fall 2019	Dr. Denise Collins
College of Arts & Sciences				
Art	National Association of Schools of Art and Design	Documents	2013-2014	Dr. William Ganis
Music	National Association of Schools of Music	Documents	2018-2019	Dr. Paul Bro
Psychology, Psy.D. (Clinical Psychology)	American Psychological Association	Documents	2016	Dr. Virgil Sheets
Scott College of Business				
	AACSB International-The Association to Advance Collegiate Schools of Business	Documents	2014-15	Dr. Brien Smith
Bayh College of Education				
All educator licensure programs and related school programs	Indiana Department of Education and National Council for the Accreditation of Teacher Education	Documents	Fall 2019	Dr. Denise Collins
Clinical Mental Health Counseling, M.S. and School Counseling,	Council for Accreditation of Counseling and Related Educational Programs	Documents	March 2017	Dr. Tonya Balch

M.Ed.	(CACREP)			
Communication Disorders/Speech-Language Pathology	Council on Academic Accreditation of the American Speech-Language-Hearing Association	Documents	Spring 2017	Dr. Vicki Hammen
Counseling Psychology, Ph.D.	American Psychological Association	Documents	2015 (accredited, inactive)	
School Psychology, Ph.D.	American Psychological Association (National Association of School Psychologists in concert with APA for the Ph.D.)	Documents	2019	Dr. Leah Nellis
School Psychology, Ed.S.	National Association of School Psychologists	Documents	2020	Dr. Carrie Ball
College of Health and Human Services				
Athletic Training B.S.	Commission on Accreditation of Athletic Training Education (CAATE)	Documents	2020-2021	Dr. Marie Pickerill
Athletic Training M.S.	Commission on Accreditation of Athletic Training Education (CAATE)	Documents	2012-2013	Dr. Lindsey Eberman
Dietetics, B.S. and M.S.	Accreditation Council for Education in Nutrition and Dietetics	Documents	2016	Dr. Eliezer Bermudez
Doctor of Nursing Practice	Accreditation Commission for Education in Nursing (ACEN)	Documents	Fall 2017	Dr. Lea Hall
Doctor of Physical Therapy	Commission on Accreditation in Physical Therapy Education (CAPTE)	Documents	Fall 2017	Dr. Howell Tapley
Exercise Science, B.S.	National Strength and Conditioning Association (NSCA)	Documents	May 2014	Dr. John Pommier

Human Development and Family Studies, B.S.	American Association of Family and Consumer Sciences	Documents	2013	Dr. Eliezer Bermudez
Nursing, B.S.	Accreditation Commission for Education in Nursing (ACEN) and Indiana State Board of Nursing (ISBN)	Documents	Spring 2022	Dr. Lea Hall
Nursing, Accelerated Second Degree, B.S.	Accreditation Commission for Education in Nursing (ACEN) and Indiana State Board of Nursing (ISBN)	Documents	Spring 2022	Dr. Lea Hall
Nursing, Continuing Education	American Nurses Credentialing Center (ANCC) of the American Nurses Association	Documents		Dr. Lea Hall
Nursing, M.S.	Accreditation Commission for Education in Nursing (ACEN)	Documents	Fall 2019	Dr. Lea Hall
Occupational Therapy, MSOT	Accreditation Council for Occupational Therapy Education (ACOTE)	Documents	Candidacy Status 2014	Dr. Jeanne Sowers
Physician Assistant Program, MSPAS	Accreditation Review Commission on Education for the Physician Assistant (ARC-PA)	Documents	September 2020	Dr. Russel Coutinho
Social Work, BSW	Council on Social Work Education (CSWE)	Documents	2016	Dr. Paul DuongTran
Social Work, MSW	Council on Social Work Education (CSWE)	Documents	Candidacy Status	Dr. Paul DuongTran
Sport Management, B.S.	The North American Society for Sport	Documents	2014	Dr. John Pommier

	Management			
College of Technology				
Advanced Manufacturing Management, B.S.	The Association of Technology, Management and Applied Engineering (ATMAE)	Documents	2016	Dr. M. Affan Badar
Automotive Engineering Technology, B.S.	ATMAE	Documents	2016	Dr. M. Affan Badar
Computer Engineering Technology, B.S.	ATMAE Engineering Technology Accreditation Commission of ABET	Documents	2016 2015-16	Dr. Joe Ashbyor Dr. Yuetong Lin
Construction Management, B.S.	American Council for Construction Education	Documents	2018	Dr. Lee Ellingson
Electronics Engineering Technology, B.S.	ATMAE	Documents	2016	Dr. Joe Ashby
Occupational Safety Management, M.S.	ATMAE	Documents	2016	Dr. Ernest Sheldon
Interior Architecture Design Program, B.S.	Council for Interior Design Accreditation National Kitchen & Bath Association	Documents	2017 2017	Ms. Mary C. Sterling
Mechanical Engineering Technology, B.S.	Engineering Technology Accreditation Commission of ABET	Documents	2016	Dr. M. Affan Badar
Packaging Engineering Technology, B.S.	ATMAE	Documents	2016	Dr. M. Affan Badar
Safety Management, B.S.	ATMAE	Documents	2016	Dr. Ernest Sheldon
Technology Management, B.S.	ATMAE	Documents	2016	Dr. M. Affan Badar

http://www.indstate.edu/accreditation/

2. Type of Control

STATE OF INDIANA AUTHORIZATION

Indiana State University was established in 1865 by the Indiana General Assembly as the Indiana State Normal School. In 1929, it was renamed Indiana State Teachers College, and in 1961 was renamed Indiana State College. Finally, in 1965, the Indiana General Assembly renamed the institution as Indiana State University. The Indiana Commission of Higher Education has approved the programs offered through the Doctoral Level at Indiana State University and reviews all programs and makes recommendations to the Indiana General Assembly and Governor regarding the funding and disposition of those programs.

Indiana State University is an Indiana institution of higher education under the general control of a board of trustees, known and designated as the Indiana State University Board of Trustees. Other state boards, offices and agencies exercise certain statutory controls and have specified duties and responsibilities pertaining to the operation of the University. The Board of Trustees bylaws are located in Section 225 and the Board policies and procedures are located in Section 226 of the Handbook.

3. Educational Unit

Describe the educational unit in which the program is located including the administrative chain of responsibility from the individual responsible for the program to the chief executive officer of the institution. Include names and titles. An organization chart may be included.

While the faculty plural has primary authority over the curriculum, the responsibility of administering the faculty wishes falls first to the department chair.

The MET Program is coordinated by Dr. Mehran Shahhosseini and is housed in the Department of Applied Engineering and Technology Management along with seven other undergraduate programs and one master's degree program

Bachelor of Science degrees in:

1. Automotive Engineering Technology
2. Civil Engineering Technology
3. Engineering Technology with concentrations in Automotive, Mechanical, Electrical, Computer, and Packaging
4. Manufacturing Engineering Technology
5. Mechanical Engineering Technology
6. Packaging Engineering Technology
7. Technology and Engineering Education
8. Technology Management

Master of Science degree in:

9. Technology Management

The AETM Department is one of six units reporting to the Dean of the College of Technology.

Departments within the College of Technology

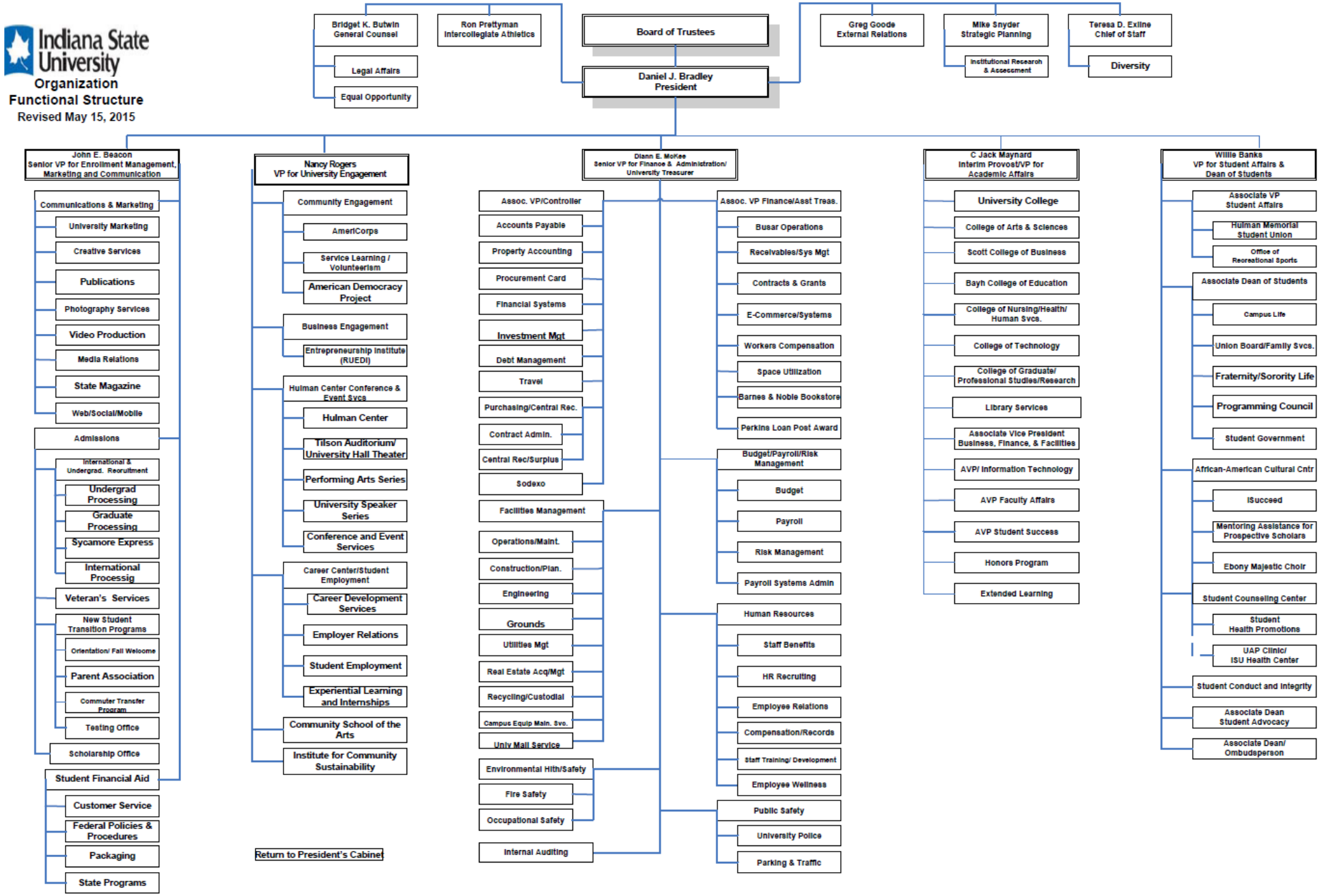
1. AETM
2. Aviation
3. Built
4. ECET – Electronics & Computer Engineering Technology
5. HRDPT – Human Resources Development and Performance Training
6. Air Force/Army ROTC

Robert English is the Dean of the College of Technology

Troy Allen is the Associate Dean focusing on curriculum, assessment and accreditation

Kara Harris is the Associate Dean focusing on undergraduate student services

The College of Technology Dean reports to the Provost and Vice President for Academic Affairs. The Interim Provost is Jack Maynard. The organizational chart on the next page includes completes the administrative structure of the university.


Indiana State University
Organization
Functional Structure
Revised May 15, 2015
Bridget K. Butwin
General Counsel
Legal Affairs
Equal Opportunity
Ron Prettyman
Intercollegiate Athletics
Board of Trustees
Daniel J. Bradley
President
Greg Goode
External Relations
Mike Snyder
Strategic Planning
Institutional Research & Assessment
Teresa D. Exline
Chief of Staff
Diversity
John E. Beacon
Senior VP for Enrollment Management, Marketing and Communication
Communications & Marketing
University Marketing
Creative Services
Publications
Photography Services
Video Production
Media Relations
State Magazine
Web/Social/Mobile
Admissions
International & Undergrad. Recruitment
Undergrad Processing
Graduate Processing
Sycamore Express
International Processig
Veteran's Services
New Student Transition Programs
Orientation/ Fall Welcome
Parent Association
Commuter Transfer Program
Testing Office
Scholarship Office
Student Financial Aid
Customer Service
Federal Policies & Procedures
Packaging
State Programs
Nancy Rogers
VP for University Engagement
Community Engagement
AmeriCorps
Service Learning / Volunteerism
American Democracy Project
Business Engagement
Entrepreneurship Institute (RUEDI)
Hulman Center Conference & Event Svcs
Hulman Center
Tilson Auditorium/ University Hall Theater
Performing Arts Series
University Speaker Series
Conference and Event Services
Career Center/Student Employment
Career Development Services
Employer Relations
Student Employment
Experiential Learning and Internships
Community School of the Arts
Institute for Community Sustainability
Return to President's Cabinet
Diann E. McKee
Senior VP for Finance & Administration/ University Treasurer
Assoc. VP/Controller
Accounts Payable
Property Accounting
Procurement Card
Financial Systems
Investment Mgt
Debt Management
Travel
Purchasing/Central Rec.
Contract Admin.
Central Rec/Surplus
Sodexo
Facilities Management
Operations/Maint.
Construction/Plan.
Engineering
Grounds
Utilities Mgt
Real Estate Acq/Mgt
Recycling/Custodial
Campus Equip Main. Svc.
Univ Mail Service
Environmental Hlth/Safety
Fire Safety
Occupational Safety
Internal Auditing
Assoc. VP Finance/Asst Treas.
Busar Operations
Receivables/Sys Mgt
Contracts & Grants
E-Commerce/Systems
Workers Compensation
Space Utilization
Barnes & Noble Bookstore
Perkins Loan Post Award
Budget/Payroll/Risk Management
Budget
Payroll
Risk Management
Payroll Systems Admin
Human Resources
Staff Benefits
HR Recruiting
Employee Relations
Compensation/Records
Staff Training/ Development
Employee Wellness
Public Safety
University Police
Parking & Traffic
C Jack Maynard
Interim Provost/VP for Academic Affairs
University College
College of Arts & Sciences
Scott College of Business
Bayh College of Education
College of Nursing/Health/ Human Svcs.
College of Technology
College of Graduate/ Professional Studies/Research
Library Services
Associate Vice President Business, Finance, & Facilities
AVP/ Information Technology
AVP Faculty Affairs
AVP Student Success
Honors Program
Extended Learning
Willie Banks
VP for Student Affairs & Dean of Students
Associate VP Student Affairs
Hulman Memorial Student Union
Office of Recreational Sports
Associate Dean of Students
Campus Life
Union Board/Family Svcs.
Fraternity/Sorority Life
Programming Council
Student Government
African-American Cultural Cntr
ISucceed
Mentoring Assistance for Prospective Scholars
Ebony Majestic Choir
Student Counseling Center
Student Health Promotions
UAP Clinic/ ISU Health Center
Student Conduct and Integrity
Associate Dean Student Advocacy
Associate Dean/ Ombudsperson

4. Academic Support Units

For supporting courses within the College of Technology

Electronics

Dr. Joe Ashby, Chairperson
Department of Electronics and Computer Engineering Technology
College: Technology 2010
Joe.Ashby@indstate.edu

Foundational Studies

Dr. Andrew Payne, Chairperson
Department of Built Environment
College: Technology 2013
Andrew.Payne@indstate.edu

Dr. Cynthia L. Crowder, Chairperson
Department of Human Resource Development and Performance Technologies
College: Technology 2010
Cindy.Crowder@indstate.edu

For supporting courses within Physics and Chemistry

Dr. Eric Glendening, Chairperson
Department of Chemistry and Physics
College: Arts and Sciences 2007
Eric.Glendening@indstate.edu

For supporting courses within Mathematics

Dr. Elizabeth M. Brown (Arvana Edwards)
Department of Mathematics and Computer Science
College: Arts and Sciences 2014
Liz.Brown@indstate.edu

For Foundational Studies courses, students have options to choose a variety of courses meeting the particular foundational studies category requirements. Virtually every one of the unit on campus have at least one foundational study course that a student could take.

5. *Non-academic Support Units*

Ms. Valentine Muyumba, Chairperson
Department of Technical Services
College: Library Services 2009
Valentine.Muyumba@indstate.edu

Mr. Stephen A. Patton, Chairperson
Department of Library Systems
College: Library Services 2013
Stephen.Patton@indstate.edu

Mr. Brian Bunnett, Chairperson
Department of Public Services
College: Library Services 2013
Brian.Bunnett@indstate.edu

Ms. Cinda May, Chairperson
Department of Special Collections
College: Library Services 2008
Cinda.May@indstate.edu

6. *Credit Unit*

At ISU one semester credit normally represents one class hour or two laboratory contact hours per week for 15 weeks. One academic year normally represents at least 28 weeks of classes, exclusive of final examinations.

Indiana State University's Curriculum Approval Process (CAPs) manual provides the following guidance for course credits.

Federal Credit Hour Definition: A credit hour is an amount of work represented in intended learning outcomes and verified by evidence of student achievement that is an institutionally established equivalency that reasonably approximates not less than:

(1) one hour of classroom or direct faculty instruction and a minimum of 2 hours of out of-class student work each week for approximately fifteen weeks for one semester or 16 trimester of credit, or ten to twelve weeks for one quarter hour of credit, or the equivalent amount of work over a different period of time; or
(2) at least an equivalent amount of work as required in paragraph (1) of this definition for other activities as established by an institution, including laboratory work, internships, practica, studio work, and other academic work leading toward the award of credit hours

7. *Tables*

Complete the following tables for the program undergoing evaluation.

Table D-1. Program Enrollment and Degree Data

Mechanical Engineering Technology

	Academic Year		Figures are from MET-E632 program Enrollment Year					Total Undergrad	Total Grad	Degrees Awarded first number is for MET E632 next is for all MET programs (before 2010)			
			1st	2nd	3rd	4th	5th			Associates	Bachelors	Masters	Doctorates
Current Year	2014	FT	9	27	78	69	50	233	N/A	N/A	46/47	N/A	N/A
		PT	4	7	10	12	12	45	N/A				
1	2013	FT	22	38	87	54		201	N/A	N/A	26/33	N/A	N/A
		PT	8	10	13	9		40	N/A				
2	2012	FT	35	53	49			137	N/A	N/A	16/31	N/A	N/A
		PT	7	5	7			20	N/A				
3	2011	FT	48	50				98	N/A	N/A	5/15	N/A	N/A
		PT	7	6				13	N/A				
4	2010	FT							N/A	N/A		N/A	N/A
		PT							N/A				

Each time a curriculum has changes, a new code is assigned. The data above is reflective of the changes made in 2010 to the MET program.
Give official fall term enrollment figures (head count) for the current and preceding four academic years and undergraduate and graduate degrees conferred during each of those years. The "current" year means the academic year preceding the on-site visit.

FT--full time
PT--part time

Table D-2. Personnel

Mechanical Engineering Technology

Year[1]: Fall 2014

	HEAD COUNT		FTE[2]
	FT	PT	
Administrative[2]		1	.5
Faculty (tenure-track)[3]	9		4.5
Other Faculty (excluding student Assistants)	1		1.0
Student Teaching Assistants[4]	3		3.0
Technicians/Specialists			
Office/Clerical Employees	1		
Others[5]			

Report data for the 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. 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.

3. For faculty members, 1 FTE equals what your institution defines as a full-time load

4. 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.

5. Specify any other category considered appropriate, or leave blank.

Signature Attesting to Compliance

By signing below, I attest to the following:

That _____ (*Name of the program(s)*) has conducted an honest assessment of compliance and has provided a complete and accurate disclosure of timely information regarding compliance with ABET's *Criteria for Accrediting Engineering Technology Programs* to include the General Criteria and any applicable Program Criteria, and the ABET *Accreditation Policy and Procedure Manual.*

_____

Dean's Name (As indicated on the RFE)

_____ _____

Signature **Date**