COVER PAGE

INSTITUTION: Indiana State University

COLLEGE: College of Technology

DEPARTMENT: Applied Engineering and Technology Management

DEGREE PROGRAM TITLE: **Bachelor of Science in Engineering Technology**

FORM OF RECOGNITION TO BE AWARDED/DEGREE CODE: Bachelor of Science

SUGGESTED CIP Code: 15.000

LOCATION OF PROGRAM/CAMPUS CODE: Terre Haute, IN/ 00180700

PROJECTED DATE OF IMPLEMENTATION: Fall Semester 2011

DATE PROPOSAL WAS APPROVED BY INSTITUTIONAL BOARD OF TRUSTEES: **May 06, 2011**

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SIGNATURE OF AUTHORIZING INSTITUTIONAL OFFICER

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DATE

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DATE RECEIVED BY COMMISSION FOR HIGHER EDUCATION

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COMMISSION ACTION (DATE)

A. ABSTRACT

Bachelor of Science in Engineering Technology
Indiana State University, Terre Haute, Indiana

Objectives:

The Bachelor of Science (B.S.) in engineering technology (E.T.) program is designed to produce graduates whose critical thinking skills and knowledge of various engineering technology principals, disciplines, and equipments, make them highly valued resources/human capital in a wide variety of industries, and highly valued, socially responsible, contributing citizens to the State of Indiana. In addition to a robust core of engineering technology courses, the Bachelor of Science in Engineering Technology (BSET) will include concentrations designed specifically to meet the varied professional goals of students. It is noteworthy that the BSET curriculum is comprised of existing courses within a wide spectrum of technical offerings; no new courses were developed for this program. Furthermore, many of required courses will be available via web-based delivery to facilitate the ease of program completion for working, for time and or place-bound, students. The program will also function as a collegial and academic link between future and existing engineering technology programs within the Indiana State University (ISU) College of Technology; therein facilitating communication and eliminating unnecessary duplication. The program's vision is that students will discover and develop their technical aptitudes, while maturing as ethical responsible citizen-contributors to the state of Indiana, as well as to global society. Academic, personal, and professional development aided by education also benefits the economic and societal development of the State of Indiana.

Clientele to be served:

The B.S. in engineering technology will serve a variety of clientele. One major client segment is the group of students within the Ivy Tech community college system who are currently enrolled in engineering technology and will be seeking the opportunity to continue their education via a four-year institution. Within this population will also be students who are undecided regarding a career choice, but wish to continue studying a broad spectrum of engineering technology courses at the four-year college level, without incurring a significant transfer credit penalty. Another significant segment of this transfer student population, in addition to continuing to study a broad spectrum of engineering technology courses, would like the option of exploring industry specific courses. The B.S. in engineering technology program will also serve those freshmen who enroll at Indiana State University while still undecided about which engineering technology program is a good fit for their aptitudes and career aspirations. It follows, therefore, that the program's clients will include two-year transfer students, technology-oriented freshman who are seeking a program that offers a broad spectrum of courses, two-year institutions that offer engineering technology programs and need a four-year sister institution that offers follow-on course work, and employers/industries that need engineering technology graduates with strong technical credentials and good critical thinking skills.

Curriculum:

The proposed B.S. in engineering technology program is centered on a 36 credit engineering technology program core, which includes course work in mechanical engineering technology, electronic engineering technology, manufacturing, and technology management. In additional to the engineering technology core, students will select one engineering technology concentration from the following choices: automotive engineering technology, electronic engineering technology, computer engineering technology, packaging engineering technology, and mechanical engineering technology. Each concentration is 15 hours. Apart from the University's Foundational Studies requirements, the entire B.S. in engineering technology program is 68 hours.

Employment opportunities:

B.S. in engineering technology program graduates will be welcomed into a number of industries, Graduates will be especially welcomed in work environments where employers require a diversity of technical competencies/experiences. A literature review strongly suggests that graduates are needed in the robotics, automotive and energy related disciplines, which account for a large percentage of Indiana's manufacturing base.

ISU's engineering technologists are typically employed in manufacturing sectors. According to U.S. Department of Labor Bureau of Labor Statistics [1] industrial engineering will experience a 12.6 % employment growth and the projected growth in mechanical engineering employment is 6%. The annual starting salary for mechanical and industrial engineers is over $58,000. While the data reflects employment for engineers, and not engineering technologist, it should be noted that many ISU graduates, especially those who are employed in the manufacturing sectors, have engineering as part of their job title and responsibilities, and according the U.S. Department of Labor Bureau of Labor, graduates of 4-year engineering technology programs are often hired as applied engineers and not technicians.

According to the Wall Street Journal [2] Indiana has seen the largest percentage in job increases due to a surge in manufacturing jobs. Inside Indiana Business [3] reported that according to the Indiana Department of workforce development

> Seasonally-adjusted total non-farm employment in Indiana increased by 22,700 in April. Sectors reporting significant employment increases include: Leisure and Hospitality (8,100), Professional and Business Services (6,500), Manufacturing (5,000), and Trade, Transportation and Utilities (3,500). Sectors reporting significant employment declines include: Private Education and Health Services (-1,800), Construction (-700), and Financial Activities (-500).

While the data outlines employment growth in the Manufacturing, and Trade Transportation and Utilities sectors, by contrast the 2011 Conexeus Indiana Manufacturing and Logistics Report [4] states that

> The state's 'C' grade in Human Capital is a step forward from last year's C-, based on strong enrollment in community college programs and improved high school graduation rates. But Indiana's adult population continues to rank among the least-educated in the nation, leaving Hoosier manufacturing and logistics firms struggling to find qualified applicants for jobs that demand increasingly advanced skills.

The data indicates that Indiana's job market is robust in the areas that will employ engineering technology graduates. These areas continue to show employment growth and according to the 2011 Conexeus Indiana Manufacturing and Logistics Report [4] need qualified applicants.

B. PROGRAM DESCRIPTION

1. Proposed Program and Objectives

Program mission

The mission of the Bachelor of Science in Engineering Technology Program at Indiana State University will be to prepare students for careers in engineering technology. Preparing students will involve the highest standards of pedagogy, inclusive of hands-on laboratory experiences, experiential learning, and community engagement. Program graduates will be well-suited for a broad spectrum of careers within the automotive, packaging, mechanical, and electronics/computer technology industries. These career fields include, but are not limited to, sales, maintenance, engineering technician, test and evaluation, management, manufacturing, and design.

Program objectives

Graduates will be able to:

1. Use critical thinking skills in concert with the latest engineering and technology tool suites, in the application of electronic, mechanical, and related/interdisciplinary technologies;
2. Communicate effectively;
3. Adapt a personal commitment of continuous self-improvement, with the intent of keeping current within their chosen discipline and generating knowledge for the purpose of enhancing the knowledge base within their chosen field;
4. Enhance the effectiveness of team oriented endeavors, by exhibiting the behaviors and leadership skills that serve to maximize team effectiveness;
5. Function ethically and professionally.

Program outcomes

The following student learning outcomes have been adopted from the Technology Accreditation Commission/Accreditation Board for Engineering and Technology criteria for 4-year engineering technology programs. Engineering Technology students by the time of graduation will have:

a. An appropriate mastery of the knowledge, techniques, skills, and modern tools of the student's selected engineering technology discipline;

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

Once the BSET program has experienced a few graduation cycles, the program will seek accreditation from the Accreditation Board for Engineering and Technology's Technology Accreditation Commission (ABET/TAC).

Outcomes assessment:

Each of the following engineering technology programs currently housed within Indiana State University's College of Technology, to include automotive, packaging, mechanical, electronic, and computer engineering technology has robust and functioning outcomes assessment plans. The outcomes assessment for the Bachelor of Science in Engineering Technology program will reside in the outcomes assessment methodologies of the component engineering technology programs. Table 1 summarizes the outcomes of the BSET program and the methods of evaluating those outcomes.

Table 1: Bachelor of Science in Engineering Technology Program Outcomes and Assessment Methods

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

2. Admission Requirements, Anticipated Student Clientele, and Student Financial Support

The B.S. in engineering technology will serve a variety of student populations. For example, within the Ivy Tech community college system is a population of students who are currently enrolled in the engineering technology program and will be seeking the opportunity to continue their education via a four-year institution. Additionally, within this population are students who will be graduating with a 2-year degree in engineering technology, but are undecided regarding a career choice and wish to continue their education with a broad spectrum of engineering technology courses at the four-year level, without incurring a significant transfer credit penalty. The B.S. in engineering technology program is designed to be articulated with its Ivy Tech Community College counterpart with the objectives of minimizing credit loss and making the program more palatable to prospective transfers. The B.S. in engineering technology program will also serve those freshmen who come to Indiana State University and are undecided about which engineering technology program is a good fit for their aptitudes and career aspirations. Table 2 summarizes that the B.S. in engineering technology's clients.

Table 2: Anticipated Bachelor of Science in Engineering Technology Clientele

Ivy Tech students who are currently enrolled in the engineering technology program and will be seeking the opportunity to continue their education via a four-year institution.
Ivy Tech students who are undecided regarding a career choice and wish to continue their education with a broad spectrum of engineering technology courses at the four-year level
Transfer students from two-year institutions that offer engineering technology programs and need a four-year sister institution that offers follow-on coursework
freshmen who come to Indiana State University and are undecided about which engineering technology program is a good fit for their aptitudes and career aspirations
employers/industries that need engineering technology generalists with strong technical credentials and good critical thinking skills.

3. Proposed curriculum

a. Table 3 outlines the proposed BSET curriculum.

Table 3: B.S. in Engineering Technology Curriculum

Course Prefix and Number	Credit hours
Core Courses (36 credits)	
MET 130	2
MET 103	3
MET 333 (MET 329 for MET concentration)	3
MET 405	3
MET 409	3
MET 430	1
ECT 160 (ECT 165 for EET or CET concentration)	3
ECT 231	3

Table 3 (cont.): B.S. in Engineering Technology Curriculum

Course Prefix and Number	Credit hours
ECT 281	3
ECT 437	3
MFG 371	3
MFG 370	3
TMGT 361	3
Choose one of the following engineering technology concentrations:	15
Electronics Engineering Technology Concentration (15 credits):	
ECT 167	
ECT 221	
ECT 232	
ECT 281	
ECT 324	
Mechanical Engineering Technology Concentration (15 credits):	
MET 203	
MET 302	
MET 406	
MET 337	
Elective Courses (3credits) from:	
MET 408	
MET 304	
Packaging Engineering Technology Concentration (15 credits):	
PKG 280	
PKG 380	
Three courses selected from:	
PKG 180	
PKG 482	
PKG 484	
PKG 486	
PKG 489	
Computer Engineering Technology (15 credits):	
ECT 168	
ECT 232	
ECT 303	
ECT 403	
CS 256 (or any higher level structured computer language	

Table 3 (cont.): B.S. in Engineering Technology Curriculum

Course Prefix and Number	Credit hours
course) **Automotive Engineering Technology Concentration** (15 credits): AET 132 AET 233 AET 336 AET 435 AET 436 **Mathematics and Science Requirements;** PHYS 105 PHYS 105L MATH 123 MATH 301 **Directed Foundational Studies;** CHEM 100 CHEM 100L MATH 115 or MET 215	 3 1 3 3 3 1 3
TOTAL HOURS	68

b. Completion of a technical concentration will to allow the students to complete an individualized program of study that will best fit their prior course work, experiences, and goals. Table 4 shows the proposed technical concentrations.

Table 4: B.S. in Engineering Technology Proposed Technical Concentrations

Engineering Technology Concentration	**Courses and Concentrations (all concentrations are 15 credits and all courses are 3 credits)**
Automotive	AET 132 - Theory of Internal combustion Engines 3 credits AET 233 - Engine Systems and Controls 3 credits AET 336 - Engine Fuels and Lubricants 3 credits AET 435 - Engine Thermodynamics 3 credits AET 436 - Diesel Engines 3 credits
Computer	ECT 168 Comp. Design Technology 3 credits ECT 232 Digital Computer Circuits 3 credits ECT 303 Microcontroller Hardware & Software 3 credits ECT 403 Practical Digital Logic Design 3 credits CS 256 C++ (or any higher level structured language) 3 credits
Electronics	ECT 167 - A.C. Circuits and Design 3 credits ECT 221 - Circuit Analysis I 3 credits ECT 232 - Digital Computer Circuits 3 credits ECT 324 - Discrete Transistor Theory and Circuit Design 3 credits CS 256 C++ (or any higher level structured computer language) 3 credits

Table 4 (cont.): B.S. in Engineering Technology Technical Concentrations

Engineering Technology Concentration	**Courses and Concentrations (all concentrations are 15 credits and all courses are 3 credits)**
Mechanical	MET 203 - Introduction to Solid Modeling 3 credits MET 302 - Applied Statics 3 credits MET 406 - Strength of Materials 3 credits MET 337 - Thermo Systems 3 credits **Electives (3 credits)** MET 408 Elements of Machine Design 3 credits MET 304 - Engineering Analysis 3 credits
Packaging	PKG 280 - Packaging Materials and Testing I 3 credits PKG 380 - Packaging Materials and Testing II 3 credits Choose 9 credits from: PKG 180 – Introduction to Package Design 3 credits PKG 482 – Package Development and Analysis 3 credits PKG 484 – Distribution Packaging Design, Analysis and Testing 3 credits PKG 486 – Packaging Machinery Systems 3 credits PKG 489 – Packaging Industry Projects 3 credits

c. Scheduling of course work. Most students in the program will be full-time transfer students using both distance and in-residence participation modes. Based on current engineering technology curriculums and enrollments most core courses should be offered once per year.

4. **Form of Recognition**

a. Students who satisfactorily complete the requirements for this program will be awarded a Bachelor of Science in Engineering Technology.

b. The suggested CIP code for the BSET program is 15.0000.

5. Program Faculty and Administrators

a. Table 5 displays the faculty and administrators most closely associated with the program.

Table 5: Program Faculty and Administrators

Name	Degree	Rank	Specialization	Appointment
ADMINISTRATORS				
Bradford Sims	Ph.D.	Professor and Dean, College of Technology	Construction Management	Tenured
Robert English	Ed.D.	Professor Associate Dean, College of Technology	Electronics Engineering Technology	Tenured
Kara Harris	Ed.D.	Assistant Professor Director of Undergraduate Student Services	Technology Engineering Education	Tenure Track
FACULTY				
M. Affan Badar	Ph.D.	Associate Professor Chairperson, Department of Applied Engineering and Technology Management of AETM	Mechanical Engineering Technology	Tenured
Phillip Cochrane	D.B.A.	Assistant Professor	Automotive Engineering Technology	Tenure Track
Michael A. Hayden	Ph.D.	Professor	Quality	Tenured
Steven McCaskey	Ph.D.	Assistant Professor	Adult Career Education	Special Purpose Faculty
Randell Peters	Ph.D.	Associate Professor	Automotive Engineering Technology	Tenured
Marion Schafer	Ph.D.	Professor	Packaging Engineering Technology	Tenured
Mehran A. Shahhosseini	Ph.D.	Assistant Professor	Mechanical Engineering Technology	Tenure Track
James Smallwood	Ph.D.	Professor	Manufacturing Management	Tenured
Todd E.Alberts	M. S.	Instructor	Mechanical Engineering Technology	Full-time Instructor

6. Needed Learning Resources

Available learning resources at Indiana State University include the Cunningham Memorial Library with its on- and off-campus student-friendly services and extensive collection of hardcopy and Internet-based resources. The library continually ensures a greater amount of relevant materials available on-line. Hard-copy books and other materials are also continually being made more available by booksellers and other vendors (both on-line and fixed-location).

7. Other Program Strengths

a. Flexibility, having technical concentrations to complement student interests and industry needs.

b. Many courses, especially core courses, are available at distance; therein making the program available to more constituents.

Table 6: Degree Majors and Number of Courses Available at a Distance

Majors	Number of Distance Courses
Electronics Engineering Technology	11 courses
Computer Engineering Technology	
Technology Management	8 courses
Mechanical Engineering Technology	12 courses
Automotive Engineering Technology	6 courses
Packaging Engineering Technology	6 courses

c. The faculty of the program has close ties with industry via alums, advisory committee members, and other professional contacts. Most faculty members are officers of professional associations or have other active participation in their associated professional organizations at the local or national levels. For example, the Quality Council of Indiana (QCI), located a few miles from ISU's campus, is the world leader in producing body-of-knowledge material (*Primers*) for professional certifications in quality. QCI, Dr. Hayden, and other faculty work together closely, e.g., a QCI executive is a member of our advisory committee; in addition, QCI personnel and Dr. Hayden are officers of the local professional chapters of the American Society for Quality and the Society of Manufacturing Engineers. Another example is Dr. Schafer who was the first academic in the nation to become a certified packaging professional who remains very active with the International Organization of Packaging Professionals. Most faculty members have similar professional certifications and leadership roles. See the faculty resumes in the appendix for more details.

d. On-campus students and faculty benefit from College of Technology's laboratories and equipment.
e. Off-campus contacts (current students and others) lead to many cooperative endeavors, e.g., co-ops and employment opportunities.

C. Program Rationale

1. Institutional Factors

a. This program will take advantage of ISU's broad offerings of engineering technology majors;
b. This program will leverage the degree-completion philosophy into a win-win scenario for transfer students programs;
c. Students who are undecided regarding a technology major can still progress toward degree completion as ISU offers a broad spectrum of technology studies;
d. Indiana State University is recognized for excellence in experiential learning, community engagement, and cross-constituent collaborations;
e. Community engagement and collaboration is built into the program by virtue of student body characteristics (previously described), and the nature and object of instruction, e.g., research projects, internships, and others already discussed.

2. Student Demand

ISU's Bachelor of Science in Engineering Technology program will be one of several in-state 4 year engineering technology degree alternatives, the others being Purdue and Trine University, for transferring Ivy Tech Community College engineering technology students. Ivy Tech Community College's current enrollment in its engineering technology program is 89 students with a projected enrollment of 150 to 189 students within the next year. Given Ivy Tech Community College's current program expansion and enrollment growth, the anecdotal evidence suggests that a significant student demand exists. ISU recognizes that Purdue has expanded its program, which can be accepted as confirmatory evidence that a significant student demand exists. That being said, ISU's proposed articulation with Ivy Tech Community College's program and its greater variety of program offerings will clearly make ISU's program a viable alternative for transferring students. The method of marketing at the College of Technology and department levels will include, but not be limited to, brochures, targeted mailings, web site, and via networking with professional colleagues.

3. Transferability

There are no unique agreements regarding the transfer of students. Existing protocols for course equivalency evaluation will be followed.

4. Access to Graduate and Professional Programs

The Bachelor of Science in Engineering Technology Program will expose students to be graduate level courses and programs. For example, the Master of Science technology management and the doctor of philosophy in technology management have both informal

and formal conduits of information/interests flow with the undergraduate programs. In addition to classroom discussion, methods of exposure to graduate level courses include working with laboratory assistants, teaching assistants, and tutors. Several projects and student clubs have graduate student membership/participation at some level. Furthermore, since ISU is the crossroads for technologies, students will be exposed to professional programs and organizations such as American Society of Mechanical Engineers (ASME) and the Society of Automotive Engineers (SAE).

5. Demand and Employment Factors

a. **Geographic Region to Be Served.** Although many facets of the B.S. in the engineering technology curriculum will be available via distance to anyone in the world, the majority of students, at least at the outset, will most likely be Indiana residents. Experience with other programs indicates that most students will be from Indiana and the majority of students will be transfers from Ivy Tech Community College, who, as experience suggests, are rooted both personally and professionally in Indiana. Also, there will be continued demand for on-campus completion by local students. Local demand is likely to remain significant because of the industries local to the West-Central part of the State.

b. **Review of Literature.**

The U.S. Department of Labor Bureau of Labor [1] projects a general 5% growth in employments needs from 2008 -2012. ISU engineering technologists generally work in the manufacturing sector, whose employment growth is expected to outpace the other technological areas. Therefore, ISU's program targets an employment sector which is expected to have substantial growth. According to the Occupational Outlook Handbook, 2010-2011 Edition there is also a market for transitioning returning veterans with technical credentials to degreed programs. Many of ISU's faculty are veterans and have been trained in evaluating military credentials. This should make ISU very marketable to returning veterans. Table 7 shows the projected employment and job openings increases.

Table 7: Engineering Occupations in Indiana (2008–2018).

Occupation	Number of Jobs		Employment Increase 2008-2018 (%)	Job openings 2008-2018
	2008	2018		
Environmental Engineers	587	780	32.9	315
Mechanical Engineers	7,769	8,056	3.7	2,282
Industrial Engineers	6,453	7,265	12.6	2,460

c. **Potential Employers.**

Potential employers include those who are involved in designing, producing, or distributing manufactured items. Some graduates will find employment in the robotics and automation areas, which also includes employment in new product research and development. According to Hall, writing for Indy-Partnership [5] and Conexus Indiana [6] Indiana's robotics industry is growing and one factor in this growth has been the availability of college graduates that have an understanding

manufacturing and robotics. Program graduates will also find employment in parallel industries involved with construction, mining, and power generation. Included within the BSET curriculum are technical concentrations which are very adaptable to changing industry or employment forecasts. In addition to the current concentrations which include automotive, packaging, mechanical, electronic, and computer engineering technology, additional concentrations projected to come on line include construction, safety, interior design, and technical education. These concentrations will enable the program to tailor its offerings and the knowledge base of its graduates to a wide ranging spectrum of Indiana industries. Lastly, historically, some engineering technology graduates are hired in the financial, health, insurance, or other less technical industries as subject matter experts in technology.

d. **Independent Needs Analysis.** An independent analysis of supply and demand was not conducted. Per the U.S. Department of Labor Bureau of Labor Statistics:

> "as technology becomes more sophisticated, employers will continue to look for engineering technologist who are skilled in new technology and require little additional training. Even in specialties that are expected to experience job declines there will be job openings "

The Occupational Outlook Handbook, 2010-2011 Edition projects a 5% growth in employments needs from 2008 -2010 [1]; ISU engineering technologists generally work in the manufacturing and related sectors, whose employment growth is expected to outpace the other technological areas. Thus ISU's program targets an employment sector which is expected to have substantial growth. According to the Occupational Outlook Handbook, 2010-2011 Edition there is a market transitioning returning veterans with technical credentials to degreed programs. Many of ISU's faculty are veterans and have been trained in evaluating military credentials. This should make ISU very marketable to returning veterans.

e. **Program Experience.**
ISU has well documented experience with engineering technology and technology management. The bachelor's degree in engineering technology program leverages ISU's extant expertise in the aforementioned areas, and will not require developing new courses.

f. **Expert Opinion.**
As cited earlier, the U.S. Bureau of Labor Statistics estimates that the number of industrial engineering employment opportunities will increase by 12.6 % from 2008 to 2018. Letters of support are forthcoming.

6. Regional, State, and National Factors

The BSET will reside within the College of Technology's Department of Applied Engineering and Technology Management department. The accrediting body will be the Accreditation Board for Engineering and Technology (ABET). Currently there are

two four-year engineering technology programs within the state of Indiana, one at Purdue University and the other at Trine University. There is one two-year engineering technology program at Ivy Tech Community College. As stated on the Ivy Tech Community College website, the engineering technology program is designed with a 4-year transfer option [7]. Currently, the Ivy Tech Community College engineering technology program is offered at 7 campuses with a projected enrollment of 189 by the 2012.

D. Program Implementation and Evaluation

Implementation

The BSET Program will be marketed through by the following means:

1. The web sites of the university, college, and department;
2. Newsletters and alumni publications;
3. Brochures for current ITCC students and made available to other institutions and targeted employers;
4. By current students who broadcast through their social/electronic networks that they satisfied;
5. By successful participation in local and national contests;
6. Status and recognition afforded by accreditation;
7. Networking that is accomplished by the many College of Technology; collaborations with advisory committees, industrial projects, and grants and contracts involving business and industry partners;
8. Professional affiliations of the faculty.

ISU's College of Technology's philosophy of community engagement and experiential learning is an understated marketing factor. Student involvement/success within the context of the Indiana community and business networks generates inquiries and interest in ISU's technology programs. Additional marketing forces are created by the professional certifications and professional involvement of the engineering technology faculty. Involvement is often in the form of leadership and or collaborations.

Evaluation

The engineering technology programs within the College of Technology have functioning outcomes assessment plans. The Bachelor of Science in engineering technology program will use a subset of the existing plans. In addition to outcomes assessment, all College of Technology programs are reviewed periodically for alignment with the ISU College of Technology's, and department's goals and strategic plans. The Bachelor of Science in engineering technology program fits well within the goals and strategic plans of the aforementioned.

1. **Quality and efficiency**

Along with outcomes assessment and normal ISU oversight protocols, the primary measure of the program's quality and efficiency will be via an accrediting body. The Applied Engineering and Technology Management Department program will seek ABET accreditation for the BSET. Prior to ABET accreditation, and since the component engineering technology programs that form the BSET program are either ATMAE or ABET accredited, the BSET program will rely upon the accreditations of its constituent programs to ensure program quality and efficiency.

2. **Appropriateness of Program Offering to institution's identity and mission**

Table 8 summarizes the mission and selected goals of ISU, College of Technology, the Department of Applied Engineering and Technology Management, and B.S. in Engineering Technology program.

Table 8: Appropriateness of the BSET Program to the Institution's Identity and Mission

Mission			
ISU	COT	AETM Department	BSET Program
Indiana State University combines a tradition of strong undergraduate and graduate education with a focus on community and public service. The university integrates teaching, research, and creative activity in an engaging, challenging, and supportive learning environment to prepare productive citizens for Indiana and the world.	The College of Technology provides 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.	Through teaching, research, and service, the creation and development knowledge in AETM fields produce value-added student scholars.	The mission of Bachelor of Science in Engineering Technology is consistent with that of the University at all levels. Using existing resources, this program will continue a tradition of producing value added student scholars, through teaching research and service.

Selected Goals			
ISU	COT	AETM Department	*BSET Program
Increase enrollment and student success. Advance experiential learning Enhance community engagement Diversify revenue through philanthropy, contracts, and grants	Be recognized as a global leader in the preparation of future professionals for careers in technology, and teachers/trainers for industry and education. Continue to increase participation of underrepresented groups in technology careers.	Increase enrollment and student success. Continue leadership in advancing experiential learning and community engagement. Investigate possible programs of promise and distinction within the department.	Enhance students: • Critical thinking skills in the application of electronic, mechanical, and related/interdisciplinary technologies. •

Table 8 (cont): Appropriateness of the BSET Program to the Institution's Identity and Mission

Selected Goals			
ISU	COT	AETM Department	*BSET Program
3. **Av** 4. **Ava** 5. **ilability of similar programs** 1. Nat	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, and 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.	Continue to seek revenue through contracts and grants. Seek to provide mentoring to maintain great faculty and staff.	• Personal commitment of continuous self-improvement, with the intent of keep current within their chosen discipline and generating knowledge for the purpose of enhancing the knowledge base within their chosen field. • Team oriented behaviors and leadership skills that serve to maximize team effectiveness. • Sense of ethical and professional, and socially responsibility

3. **Availability of similar programs**

Nationwide, there are scores of four-year engineering technology programs. These programs are often labeled as general engineering technology programs. Within the state of Indiana only Purdue and Trine Universities offer similar programs.

4. **Personal and social utility**

The Bachelor of Science in engineering technology program will provide students with employment access to a broad spectrum of industries. Students will find job and career satisfaction via: a) the variety of technologies they encounter; b.) the opportunity to be multidisciplinary within the technology spectrum; and c.) having steeper/upwardly mobile career path—project leadership is often the purview of those who can communicate and work within several disciplines. Start-ups often require multi-disciplined personnel who are degreed and also have managerial acumen. This program fulfills those needs and ads to an infrastructure of educated people that attract industry to Indiana**.**

5. Student demand

Student demand is expected to be high. As Ivy Tech Community College's engineering technology programs being producing increasing numbers of engineering technology graduates, enrollment at ISU should also increase. ISU's bachelor of science in engineering technology program will be one of several in-state 4-year engineering technology degree alternatives, the others being Purdue and Trine University, for transferring Ivy Tech Community College students. Ivy Tech Community College's current engineering technology program enrollment is 89 students with a projected enrollment of 150 to 189 students within the next year. Given Ivy Tech Community College's current program expansion and projected enrollment growth, the anecdotal evidence suggests that a significant student demand exists. Consider also that Purdue has expanded its program, which arguably can be accepted as confirmatory evidence that a significant student demand exists. That being said, ISU's proposed articulation with Ivy Tech Community College's program and the greater variety of technical program offerings will clearly make ISU the program of choice for transferring students.

6. Student access

This is a full-time on-campus program which has distance, in-residence, and hybrid course components. The nature of the concentrations is such that accessibility has been maximized within resource limitations.

7. Flexibility of program design

ISU's engineering technology program will be extremely flexible due to the large number of available concentrations and an inherent desire/philosophy that students' should be able to explore their chosen areas of interest. This program will also be suited to the nontraditional or second career student.

8. Market demand

As discussed earlier, given Ivy Tech Community College's current program expansion and enrollment growth, the anecdotal evidence suggests that a significant student demand exists. We must also consider that Purdue has expanded its program, which arguably can be accepted as confirmatory evidence that a significant student demand exists. That being said, ISU's proposed articulation with Ivy Tech Community College's program and the greater variety of program offerings will clearly make ISU the program of choice for transferring students.

9. Inter-institutional and Interdepartmental cooperation

An articulation agreement is currently being developed in consultation with Ivy Tech Community College. Drafts project a block-transfer agreement. It is noteworthy that ISU's program was developed by first examining Ivy Tech Community College's offerings as opposed to developing a program and then requesting that Ivy Tech Community College modify its offerings. ISU's vision for inter-institutional cooperation is that articulations will exist with all institutions offering an accredited associate of science degree.

10. Flexibility of providing instruction

Instruction will be provided using distance, in-class, and hybrid course modes. Hybrid courses have both distance and in-residence elements. A large percentage of courses are offered via distance; those courses will have often have a community engagement requirement wherein the students must interact with both the industry being studied in the context of the local community. Thus the nature and quality of content is not dependent upon the mode of instruction. All College of Technology faculty are familiar with the different learning modes and accommodate them within the course of instruction. Learning assistance is available for students at both the University and College levels.

E. Tabular Information

1. Table 9: Enrollment and Completion Data—see page 21

2. Table 10a and 10b: Cost and Revenue Data—see pages 23 and 24

3. Table 11: New Program Proposal Summary—see page 25

Table 9: Program Enrollments and Completions
Annual Totals by Fiscal Year (Use SIS Definitions)

Campus: Indiana State University
Program: B.S. Engineering Technology
Date: May 24, 2011

	Total Year 1 FY 2011-2012	Total Year 2 FY 2012-2013	Total Year 3 FY 2013-2014	Total Year 4 FY 2014-2015	Total Year 5 FY 2015-2016
A. PROGRAM CREDIT HOURS GENERATED					
1. Existing Courses	225	464	540	675	825
2. New Courses	0	0	0	0	0
TOTAL	225	464	540	675	825
B. FULL-TIME EQUIVALENTS (FTE's)					
1. FTE's generated by Full-Time Students	10	19	22	27	32
2. FTE's generated by Part-Time Students	5	10	14	18	23
TOTAL	15	29	36	45	55
3. On-campus Transfer FTE's	0	0	0	0	0
4. New-to-Campus FTE's	15	29	36	45	55
C. PROGRAM MAJORS (HEADCOUNT)					
1. Full-time students	10	19	22	27	32
2. Part-time students	10	19	27	35	44
TOTAL	20	38	49	62	76

Table 9 continued: Program Enrollments and Completions
Annual Totals by Fiscal Year (Use SIS Definitions)

3. On-campus Transfers	0	0	0	0	0
4. New-to-campus Majors	20	38	49	62	76
5. In State	20	38	49	62	76
6. Out-of-State	0	0	0	0	0
D. PROGRAM COMPLETIONS	0	0	5	12	15

Table 10a: Total Direct Program costs and Sources of Program Revenues

Campus: Indiana State University
Program: B.S. Engineering Technology
Date: May 24, 2011

	Total Year 1 FY 2011-2012		Total Year 2 FY 2012-2013		Total Year 3 FY 2013-2014		Total Year 4 FY 2014-2015		Total Year 5 FY 2015-2016	
	FTE	Cost	FTE	Cost	FTE	Cost	FTE	Cost	FTE	Cost
A. TOTAL DIRECT PROGRAM COSTS										
1. Existing Departmental Faculty Resources	0	$0	0	$0	0	$0	0	$0	0	$0
2. Other Existing Resources		$0		$0		$0		$0		$0
3. Incremental Resources (See Table 2B)		$4,000		$4,000		$4,000		$4,000		$4,000
TOTAL		**$4,000**		**$4,000**		**$4,000**		**$4,000**		**$4,000**

B. SOURCES OF PROGRAM REVENUES	Total Year 1 FY 2011-2012	Total Year 2 FY 2012-2013	Total Year 3 FY 2013-2014	Total Year 4 FY 2014-2015	Total Year 5 FY 2015-2016
1. Reallocation	$0	$0	$0	$0	$0
2. New-to-campus Student Fees	$96,900	$184,110	$224,060	$279,038	$336,192
3. Other (non-state)	$0	$0	$0	$0	$0
4. New State Appropriations:					
a. Enrollment change funding	0	0	0	0	0
b. Other State Funds	0	0	0	0	0
TOTAL	$96,900	$184,110	$224,060	$279,038	$336,192

Table 10b: Total Direct Program Costs and Sources of Program Revenues

Campus: Indiana State University
Program: B.S. Engineering Technology
Date: May 2011

	Total Year 1 FY 2011-2012		Total Year 2 FY 2012-2013		Total Year 3 FY 2013-2014		Total Year 4 FY 2014-2015		Total Year 5 FY 2015-2016	
	FTE	Cost	FTE	Cost	FTE	Cost	FTE	Cost	FTE	Cost
1. PERSONAL SERVICES										
a. Faculty		$0		$0		$0		$0		$0
b. Support Staff		$0		$0		$0		$0		$0
c. Graduate Teaching Assistants		$0		$0		$0		$0		$0
TOTAL		$0		$0		$0		$0		0
2. SUPPLIES AND EQUIPMENT										
a. General Supplies/Equipment		$0		$0		$0		$0		$0
b. Recruiting		$2,000		$2,000		$2,000		$2,000		$2,000
c. Travel		$2,000		$2,000		$2,000		$2,000		$2,000
d. Library/Acquisitions		$0		$0		$0		$0		$0
TOTAL		$4,000		$4,000		$4,000		$4,000		$4,000
3. EQUIPMENT										
a. New Equipment Necessary for Program		$0		$0		$0		$0		$0
b. Routine Replacement		$0		$0		$0		$0		$0
TOTAL										
4. FACILITIES										
5. STUDENT ASSISTANCE										
a. Graduate Fee Scholarships		$0		$0		$0		$0		$0
b. Fellowships		$0		$0		$0		$0		$0
TOTAL		$0		$0		$0		$0		$0
SUM OF ALL INCREMENTAL DIRECT COSTS		$4,000		$4,000		$4,000		$4,000		$4,000

Table 11: New Program Proposal Summary
Date: May 24, 2011

1. Prepared by Institution: Indiana State University
Institution Location: Terre Haute, IN
Program: B.S. Engineering Technology
Proposed CIP Code: 150000

	Total Year 1 FY 2011-2012	Total Year 2 FY 2012-2013	Total Year 3 FY 2013-2014	Total Year 4 FY 2014-2015	Total Year 5 FY 2015-2016
Enrollment Projections (Headcount)					
Full-Time	10	19	22	27	32
Part-Time	10	19	27	35	44
TOTAL	20	38	49	62	76
Enrollment Projections (FTE)					
Full-Time	10	19	22	27	32
Part-Time	5	10	14	18	23
TOTAL	15	29	36	45	55
Degree Completion Projections	0	0	5	12	15
New State Funds Requested (Actual)	$0	$0	$0	$0	$0
New State Funds Requested (Increases)	$0	$0	$0	$0	$0

II. Prepared by CHE

New State Funds to be considered for recommendation (Actual)	$	$	$	$	$
New State Funds to be considered for recommendation (Increases)	$	$	$	$	$

References

1. Employment projections for 2008 - 2018 (http://www.bls.gov/oco/ocos027.htm)
2. Wall Street Journal. June 19th, 2010. *States See Growth in Jobs*) http://online.wsj.com/article/SB10001424052748703438604575315021978987414.html#project%3DJOBSMAP09%26articleTabs%3Darticle)
3. Inside Indiana Business, May 2010, *Indiana Leads Nation in Job Growth,* http://www.insideindianabusiness.com/newsitem.asp?ID=41800)
4. Conexus Indiana (June, 10, 2011, Conexus and Ball State release Manufacturing and Logistics Report Card. http://blog.conexusindiana.com/blog/conexus-indiana-news-and-updates/conexus-and-ball-state-release-2011-manufacturing-and-logistics-report-card)
5. Hall, Joshua. June 28, 2010, *Indiana looks to establish robotics industry,* Indy Partnership, http://blog.indypartnership.com/blog/competing-smarter/indiana-looks-to-establish-robotics-industry
6. Conexus Indiana, June 15th, 2010. *Add robotics to the list of Indiana Manufacturing opportunities* http://www.facebook.com/note.php?note_id=133133120052220
7. Ivy Tech Community College. June 16, 2011. Engineering Technology http://www.ivytech.edu/engineering-technology/

APPENDICES

Appendix A: Program of Study

Bachelor of Science in Engineering Technology (Mechanical Concentration)

Year 1			
FALL SEMESTER		**SPRING SEMESTER**	
Number Course Title	**Credits**	**Number Course Title**	**Credits**
MET 130 Introduction to Engineering and Technology	2	ECT 160 Electronics Fundamentals	3
MET 103 Introduction to Technical Graphics	3	Math 123 Analytic Geometry and Linear Algebra for Engineers	3
Physics 105	3	CHEM 100	3
Physics 105L	1	CHEM 100L	1
MATH 115 College Algebra or MET 215 Graphic Analysis	3	** COMM 101 Introduction to Speech Communications	3
**Eng 101 Freshman Writing I	3	** Eng 105 Freshman Writing II	3
Term Total	**15**	**Term Total**	**16**
Running Total	**15**	**Running Total**	**31**
Year 2			
FALL SEMESTER		**SPRING SEMESTER**	
Number Course Title	**Credits**	**Number Course Title**	**Credits**
ECT 231 Digital Logic	3	ECT 281 Robotic Controls	3
Math 301 Fundamentals and Applications of Calculus	3	MET 302 Applied Statics	3
** Phil 201 Ethics and the Good Life	3	MET 203 Introduction to Solid Modeling	3
** Span 101 Elementary Spanish I	3	** PE 101 & PE 101L Fitness for life	2
** Econ 100	3	** Span 102 Elementary Spanish II	3
		** HIST 102	3
Total Term	**15**	**Total Term**	**17**
Running Total	**46**	**Running Total**	**63**
Year 3			
FALL SEMESTER		**SPRING SEMESTER**	
Number Course Title	**Credits**	**Number Course Title**	**Credits**
MFG 371 Manufacturing Materials and Processes	3	MFG 370 Fundamentals of Manufacturing Materials	3
MET 337 Thermo systems	3	MET 406 Strength of Materials	3
** ENG 305 Advanced Expository Writing	3	**** ENG 346**	3
MET 333 Power Systems or MET 329 Fluid Power Technology	3	**** TMGT 335 Technology and International Development**	3
** ECON 302 Economics of Health and Medical Care	3	**** ENVI 460 Conservation and Sustainability of Natural Resources**	3
Total Term	**15**	**Total Term**	**15**
Running Total	**78**	**Running Total**	**93**
Year 4			
FALL SEMESTER		**SPRING SEMESTER**	
Number Course Title	**Credits**	**Number Course Title**	**Credits**
MET 405 Economic Analysis for Engineers	3	ECT 437 Industrial Computer Systems Management	3
* MET 408 Elements of Machine Design or MET 304 - Engineering Analysis	3	MET 409 Senior Project	**3**
**** ECON 353 Gender and Economics**	**3**	MET 430 Senior Seminar	**1**
TMGT 361 Quality Systems and Tools	**3**	**** COMM 436 Fine and Performing Arts**	**3**
Elective I	**4**	**Elective II**	**3**
Total Term	**16**	**Total Term**	**15**
Running Total	**109**	**Running Total**	**124**

** Foundational Studies

Indiana State University Bachelor of Science in Engineering Technology

February 17, 2011

Dr. Phillip Cochrane,

In support of Indiana State University proposed Engineering Technology (ET) Degree,

This is exciting news for Ivy Tech graduates who are ready to continue their education in the field of Engineering Technology?

Graduates having achieved a significant milestone by obtaining an **Associate's degree from Ivy Tech** now through Indiana State University may have continued opportunity in furthering education by attaining a Bachelor of Science degree in Engineering Technology. Through this seamless transfer of Ivy Tech technology courses, many will be only two years away from a Bachelor's degree.

I see the mission of ISU Engineering Technology program as a degree that will advance and develop tomorrow's leaders, by preparing them for a professional leadership position. This degree will continue to prepare and engage students to become leaders in a variety of industries ranging from business to engineering to manufacturing to professional services which engages a variety of skills. The proposed program blends and integrates individual and group behavior with practical skills and new technologies that will further the learning of an Ivy Tech graduate. The Engineering Technology curriculum proposed will combine management theory with laboratory experiences alongside opportunities on a state, community and national engagement level encompassing real-world work concepts and organizational leadership techniques.

Through the ISU Engineering Technology program, Ivy Tech students will build upon and enhance their previously learned technical skills through a variety of advanced applications from the proposed core technology concentrations. I look forward to our continued working relationship with ISU and the continued opportunity for our graduates to expand their skills through higher learning by furthering their thinking skills in related interdisciplinary technologies with human behavior and leadership philosophy, leadership strategies for quality and productivity, and leading change in organizations.

For Ivy Tech students and others, it is with much enthusiasm and endorsement that I recommend continued support for ISU and its endeavors toward a 4-year degree in Engineering Technology.

I would be glad to address any issue left unanswered. If I can be of additional assistance, I can be reached at my office (812) 246-3301 ext. 4182 or email at llewelle@ivytech.edu.

Sincerely,

Lonnie Lewellen
Dean, School of Technology

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Ph.D. in Industrial Engineering, University of Oklahoma, 2002.
M.S. in Mechanical Engineering, K.F. Univ. of Petrol. and Minerals, 1993.
M.S. in Industrial Engineering, Aligarh Muslim University, 1990.
B.S. in Mechanical Engineering, Aligarh Muslim University, 1988.</td><td>Research Interest:
Coordinate Metrology,
Lean Manufacturing,
Health Care,
Supply Chain,
Energy System Design,
Failure Analysis,
Stochastic Modeling and Reliability</td></tr>
<tr><td colspan="2">Professional Activities and Accomplishments:
ASME (member), IIE (senior member), SME (senior), and ATMAE (professional)
ABET Program Evaluator Training, Apr 2010
Certified Senior Technology Manager (CSTM), ATMAE, Dec 2009</td></tr>
<tr><td colspan="2">Presentations and Publications (Selected)
Badar, M.A., Zhou, M., & Thomson, B. (2010). Application of QFD into the design process of a small job shop. IAJC Int. J. of Modern Engineering, 10(2), 69-75.
Chandler, M., & Badar, M.A. (2009). Effect of Individual Components on System’s Reliability: A Case of Web-Based US Federal Highway Administration Project Recommendation and Approval Software. Emerald Int. J. of Quality & Reliability Mgmt., 26(6), 614-628.
Badar, M.A., Gardner, L., & Sammidi, S.S. (2009). Profit analysis of supply chain ordering strategies. IIE Annual Conference 2009, IERC Track: Engineering Economics, Session: Engr Eco 2.
El Mounayri, H., Badar, M.A., & Rengifo, G.A. (2008). Multi-parameter ANN Model for flat-end milling. CSME, Transactions of the Canadian Soc. for Mech. Engineering, 32(3-4), 523-536.
Pondhe, R., Asare, S.A., Badar, M.A., Zhou, M., & Leach, R. (2006). Applying lean techniques to improve an Emergency Department. Proceed. of the IIE Annual Conference 2006, Session: IERC03 Engineering Management 6, CD-ROM.</td></tr>
<tr><td>Relevant teaching experience:
Fifteen years’ experience teaching undergraduate and graduate courses.</td><td>Industrial Practice:
worked in industry as a mechanical design engineer and manufacturing engineering intern.</td></tr>
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Name: Phillip Cochrane Assistant Professor Department of Applied Engineering and Technology Management	**Office Phone:** 812-237- 3978 **Email:** Pcochrane@indstate.edu
Degrees / Schools: DBA, University of Phoenix MA, Theology Fuller Seminary MBA, University of Montana BSE, Western Michigan University BS, Western Michigan University AAS, SUNY Morrisville	**Research Interest:** Small Work Teams Entrepreneurship

Professional Activities and Accomplishments:

Society of Automotive Engineers
American Society of Engineering Educators

Presentations and Publications (Selected):

2008 Dissertation African American Entrepreneurship in the Underground Economy

Cochrane, P. (2008, June). African American Entrepreneurship in the Underground Economy. *Presentation ASEE 2008 Pittsburgh Annual Conference,* Pittsburgh, PA

Cochrane, P. (2010). Collaborations in Progress Motorsports at ISU. *Proceedings from the 2010 Conference on Industry Education Collaboration*. Palm Springs, CA.

Eversole, B.A.W., Cochrane, P., & Graham, C.M. (2010). Improving student team laboratory performance. *Proceedings from the 2010 Conference on Industry Education Collaboration*. Palm Springs, CA.

Eversole, B.A.W., Cochrane, P., Denton, L., & Graham, C.M. (2010). Using the MBTI as a predictor of student team success. In Graham, C.M. (Ed.) *Proceedings from the 2010 Academy of Human Resource Development Conference*. Bowling Green, OH:AHRD

Cochrane, P. (2010). African-American Entrepreneurial Venues and Social Capital. *Journal of Developmental Entrepreneurship, 15*

Relevant teaching experience: Four years' upper level HS mathematics Fifteen years' university level business, mechanical and automotive technology courses.	**Industrial Practice:** Twenty years' military engineering.

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<tr><td>Name:
Robert E. English, Associate Dean, College of Technology, Professor of Electronics and Computer Engineering Technology</td><td>Office Phone: 812-237-2307

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<tr><td>Degrees / Schools:
Ed.D. in Instructional Systems Technology, Cognate in Industrial Technology, Indiana University, 1992.
M.S. in Industrial Professional Technology, Indiana State University, 1981.
B.S. in Electronics with a minor in Computer Technology, Indiana State University, 1975.</td><td>Research Interest:
Supply Chain
Unmanned Systems
Crisis Leadership
Automation</td></tr>
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Associate Vice President of Academic Affairs, 2003- 2011
Indiana Air National Guard, Lt. Colonel and Commander of the 181st Logistics Readiness Squadron, served for 40 years</td></tr>
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Presented at a two day Moroccan Ministry of Education workshop concerning the development of National Accreditation System in Morocco.
Carnegie Conference for Carnegie Doctoral/Research Intensive Institution – Illinois State University, Bloomington-Normal (July 10 and 11, 2005).</td></tr>
<tr><td>Relevant teaching experience:
Twenty-nine years experience teaching in higher education.</td><td>Industrial Practice:
Manufacturing Engineering Manager for Zenith Radio Corporation in Paris, Illinois.</td></tr>
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Ed.D. in Career and Technical Education, Clemson University, 2004.
M.S. in Technology Education, Indiana State University, 2000.
B.S. in Printing and Industrial Supervision, Indiana State University, 1996.</td><td>Research Interest:
Recruitment and Retention in Technology Programs
Technology and Engineering Education</td></tr>
<tr><td colspan="2">Professional Activities and Accomplishments:
ASEE(member), ITEEA (member), ACTE (member)
Teaching Certification in Technology and Engineering Education, 1998</td></tr>
<tr><td colspan="2">Presentations and Publications (Selected)
Tiala, S. & Harris, K. (Accepted). The right time for recruiting new colleagues'. The Technology and Engineering Teacher.
Kaluf, K. & Harris, K. (2010). Students must understand theory and practice in technology and engineering education. Journal of Industrial Teacher Education. 46(2) Pgs. 125-131.
Veurnick. A., Hamlin, A., Kampe, J., Sorby, S., Blasko, D., Holliday, K., Trich, J., Harris, L., Connolly, P., Sadowski, M., Harris, K., Brus, C., Boyle, L., Study, N., & Knot, T. (2009). Enhancing Visualization Skills-Improving Options and Success (EnViSIONS) of Engineering and Technology Students. Engineering Design Graphics Journal. 73(2) Pgs. 2-17.
Harris, K, Harris, L, & Sadowski, M. (2009). Measuring spatial visualization in pre-service technology and engineering teachers. American Society for Engineering Education Engineering Design Graphics Division Conference Proceedings. On-line retrieval at: http://edge.asee.org/conferences/proceedings/63rdMid/papers/harris_monday.pdf
Harris, K. & Rogers, G. (2008). Soft skills in the technology education classroom. The Technology Teacher. November, Pgs. 19-42
Harris, K. (2008). Recruitment and Retention in Engineering/Technology Teacher Education: Factors that Influence Females. 2008 American Association for Engineering Education Proceedings, P.1-12. On-line retrieval at: http://www.asee.org/conferences/ac2008.proceedings.cd/papers/688_RECRUITMENT_IN_EN_GINEERING_TECHNOLOGY_TE.pdf
Harris, K & Rogers, G. (2008). Preparing Tomorrow's Teachers: Infusing the Standards for Technological Literacy and Engineering Competencies into Technology Teacher Education Programs. Journal of Industrial Teacher Education. 45(5).</td></tr>
<tr><td>Relevant teaching experience:
Five years' experience teaching primary and secondary technology and engineering education and eight years' experience teaching undergraduate and graduate courses.</td><td>Industrial Practice:</td></tr>
</table>

Name: Prof. Michael A. Hayden, Coordinator of MSIT (MSTM) BS and PhD in TM faculty member	**Office Phone:** 812-237- 3359 **Email:** michael.hayden@indstate.edu
Degrees / Schools: PhD in Industrial Education and Technology, Iowa State University, 1989.	**Research Interest:** Management of Technology Quality Workplace Law
Professional Activities and Accomplishments: Several Professional Certifications including: Manufacturing Engineer: Management focus by the Society of Manufacturing Engineers. Certified Quality Engineer by the American Society for Quality. Certified Manager of Quality by the American Society for Quality. PI or Co-PI of several grants. Recent past Chair and continued leadership of the local senior chapters of the American Society for Quality and the Society of Manufacturing Engineers.	
Presentations and Publications (Selected): Hayden, M.A., & Nicoletti, T. (1999). Results of a national survey of technology-based degrees offered at a distance. ISU Winterfest. Hayden, M.A., & Hellmann, J. (1999). How to orient, advise, and mentor distance education and non-traditional students. ISU Winterfest. Hayden, M. A. (1997). Work place legislation impacting Industrial Employees. National Association of Industrial Technology Annual Convention. Atlanta, GA.* Hayden, M. A. (1996). Industrial technologists' and their supervisors' perceptions of industrial technologist duties and job performance. National Association of Industrial Technology Annual Convention. Los Angeles, CA.*	
Relevant teaching experience: Over 20 years' experience teaching graduate courses. Approx. 30 courses taught mostly related to research methods, quality, and the management of technology.	**Industrial Practice:** In addition to consulting, full-time experience in industry as a machinist and drafter.

Name: Randell W. Peters Associate Professor of Automotive Engineering Technology Department of Applied Engineering and Technology Management	**Office Phone:** 812-237-4962 **Email:** rpeters@indstate.edu
Degrees / Schools: PhD in Curriculum Instruction specializing in Industrial Technology Education, Indiana State University, 2005.	**Research Interest:** Automotive Engines Motorsports

Professional Activities and Accomplishments:

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

Executive Board Member, National Association of Industrial Technology (NAIT), 2006 -2010

President, Management Division, National Association of Industrial Technology (NAIT) 2006 – 2008

Indiana State University, Curriculum Academic Affairs Committee, Member, 2006 – 2010, Associate Chair, 2007 – 2009, Chair, 2009 - 2011

Motorsports Certification team member working with the Society of Manufacturing Engineers (SME) to develop certification exams for Motorsports Engineers and Technicians 2006 - 2008

Presentations and Publications (Selected):

Peters, R.W. (2009). Advancing motorsports at Indiana State University. *National Hot Rod Association, Division 3 Track Operators Conference*, Indianapolis, IN.

Peters, R.W. (2008). Automotive management: Understanding perception of potential customers. *National Association of Industrial Technology Conference*, Nashville, IN.

Peters, R.W. (2008). Concept mapping: Does it increase performance on multiple choice testing in technology oriented fields? *National Association of Industrial Technology Conference*, Nashville, IN.

Peters, R.W. (2008). Technology aspects of the Indiana State University motorsports management minor. American Society for Engineering Education, Engineering and Technology Leadership Institute, Indianapolis, IN

Peters, R.W. (2007). Motorsports studies at Indiana State University. *American Society for Engineering Education, Illinois-Indiana Section Conference Spring 2007 Proceedings.*

Peters, R.W. (2006). Assessing the need for a master of science degree in automotive technology management. *American Society for Engineering Education 2006 Illinois-Indiana and North Central Joint Section Conference Proceedings.*

Relevant teaching experience: Eight years of teaching automotive technology and management courses at the bachelor and master's degree levels.	**Industrial Practice:** Fifteen years' service as Technician, Service Manager, Body Shop Manager, and Fixed Ops Director.

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Ph.D.in Curriculum and Instruction, Indiana State University, 2001
M.S. in Industrial Professional Technology, Indiana State University, 1995
B.S. in Packaging Technology, Indiana State University, 1990
B.S. in Civil Engineering, Rose-Hulman Institute of Technology, 1970-73</td><td>Research Interest:
Packaging and its environmental impacts
Accident and damage prevention through proper packaging</td></tr>
<tr><td colspan="2">Professional Activities and Accomplishments:
Certified Packaging Professional - Lifetime
Certified Packaging Laboratory Professional - Lifetime
Member, American Society for Testing of Materials (ASTM)
Member, Association of Technology, Management, and Applied Engineering (ATMAE)
Member, Epsilon Pi Tau (EPT)
Member, Institute of Packaging Professionals (IoPP)
Member, Indiana State Teachers Association (ISTA)</td></tr>
<tr><td colspan="2">Presentations and Publications (Selected):
Schafer, M. D. (in press). Environmental issues of packaging. DES Tech Publications.
Schafer, M. D. (2007). Case studies in packaging: Million dollar solutions. Central Indiana Institute of Packaging Professionals. Indianapolis, IN.
Schafer, M. D. (2004). Trends in petfood packaging. Presentation to petfood industry forum. Hyatt Regency O’Hare. Rosemont, IL.
Schafer, M. D. (2003). Leak detection. Petfood Technology. Mt. Morris, IL: Watt Publishing
Schafer, M. D. (2003). Bundling, case packing and palletizing petfood products. Petfood Technology. Mt. Morris, IL: Watt Publishing.</td></tr>
<tr><td>Relevant teaching experience:
Almost two decades’ experience teaching undergraduate and graduate courses.</td><td>Industrial Practice:
Almost two decades’ industrial experience as a packaging consultant and in various positions.</td></tr>
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D.Eng. in Mechanical Engineering, Lamar University, 1999
M.Sc. in Materials Engineering, Isfahan University of Technology, 1991
B.Sc. in Metallurgical Engineering, Tehran University, 1991</td><td>Research Interest:
Finite Element Modeling and Analysis
Automotive Structural Analysis
Computer Aided Design (CAD)
Manufacturing Processes of Materials
Extraction Metallurgy</td></tr>
<tr><td colspan="2">Professional Activities and Accomplishments:
Member, Society of Automotive Engineers (SAE)
Member, American Society of Mechanical Engineers (ASME)
Member, Society of Manufacturing Engineers (SME) student chapter, Faculty member, 2009
Engineer-in-Training (EIT) Certificate, 1999
Top Ten Faculty Favorites out of 237 faculty members, University of Louisville, 2007</td></tr>
<tr><td colspan="2">Presentations and Publications (Selected):
Shahhosseini, A.M., Prater, G., Osborne, G., Kuo, E., & Mehta, R. (2010). Major compliance joint modeling for automotive body structures. International Journal of Vehicle Systems Modeling and Testing, 5(1).

Shahhosseini, A.M., & Prater, G. (2010). Beam-Like Major Compliant Joint methodology for automotive body structures. ASME International Mechanical Engineering Congress & Exposition, Vancouver, Canada.

Prater, G., Shahhosseini, A.M., Osborne, G., Lone, J., & Zhang, S. (2010). Simulation studies for determining hydraulic hybrid powertrain subframe response characteristics. International Journal of Heavy Vehicle Systems, 17(2).

Kuo, E., Mehta, P., Shahhosseini, A.M., & Prater, G. (December, 2004). Analytical benchmarking of body architectural efficiency (Ford versus Honda Civic). Ford Research and Advanced Engineering Technical Reports, SRR-2004-0207.</td></tr>
<tr><td>Relevant teaching experience:
Twelve years' experience teaching undergraduate and graduate courses.</td><td>Industrial Practice:
Almost five years' industrial experience as a senior research engineer and co-op engineer.</td></tr>
</table>

Name: Bradford L. Sims Professor of Construction Management Dean, of the College of Technology	**Office Phone:** 812-237-3166 **Email:** brad.sims@indstate.edu
Degrees / Schools: Ph.D. in Industrial Technology/Curriculum and Instruction, Purdue University, 1999 M.S. in Building Construction, University of Florida, 1996 B.S. in Building Construction Technology, Purdue University, 1990	**Research Interest:** Lean construction, technology applications in construction, leadership factors in construction

Professional Activities and Accomplishments:

- **Founded and headed the Construction Management undergraduate program at Western Carolina University, growing it from zero majors in 2002 to 400 majors by 2007.**
- **Instituted the complete online Master of Construction Management graduate program (2005), a collaborative degree arranged with the College of Business's very successful online Master of Project Management degree. Grew program to 30 majors (Fall 2008).**
- **Attracted Joe Kimmel from a large national construction executive search firm that provided a $10.4 million endowment for the new School of Construction Management and Technology (2005), representing the largest donation in the history of Western Carolina University.**

Presentations and Publications (Selected):

Ford, G., Patterson, J., & **Sims, B.L.** (2009). How to determine construction project rain delay times using local rainfall databases in Asheville, American Society of Civil Engineering: *Proceedings of the 2009 Construction Research Congress*, North Carolina.

Jensen, D., & **Sims, B.L.** (2008). Restitution: Applying quantum meruit to the construction contracting process. The American Professional Constructor, *Journal of the American Institute of Constructors*, *32*(2), 41-47.

Jensen, D., **Sims, B.L.**, & Mau, R. (2007). The General Indemnity Agreement: Can it also function as a secured transaction? Yes, The American Professional Constructor, *Journal of the American Institute of Constructors*, *32*(1), 16-22.

Sims, B.L., Ferguson, C.W., & Birnberg, H. (2006). Computer graphics history and effects on a current construction management curriculum, The American Professional Constructor, *Journal of the American Institute of Constructors*, *30*(1), 7-10.

Orth, D. L., **Sims, B.L.**, & Alter, K.D. (2003). Improving professionalism in the construction industry, The American Professional Constructor, *Journal of the American Institute of Constructors*, *27*(2), 41-44.

Relevant teaching experience: Almost 15 years' experience teaching undergraduate and graduate courses.	**Industrial Practice:** Besides being the president of constructioneducation.com, full-time experience in industry as a project controls supervisor, cost engineer, and project control engineer.

Name: James E. Smallwood Professor Department of Applied Engineering and Technology Management	**Office Phone:** 812-237-3462 **Email:** jim.smallwood@indstate.edu
Degrees / Schools: PhD in Curriculum and Instruction/Industrial Technology Education, Indiana State University (ISU), 1988 M.S. in Industrial Arts Education, ISU, 1980 B.S. IN Industrial Arts Education, ISU, 1978 B.S. in Law Enforcement, University of Evansville, 1975	**Research Interest:** Automation Distance Learning Manufacturing Technology Education
Professional Activities and Accomplishments: Certified Manufacturing Technologist by the Society of Manufacturing Engineers. Member, ATMAE, Epsilon Pi Tau (Mu Chapter), Sigma Lambda Chi (honorary), Indiana State University	
Presentations and Publications (Selected): Smallwod, J. (2007). A marketing/recruiting strategy for your manufacturing program. *National Association of Industrial Technology National Conference*, Panama City, Florida. Smallwod, J. (2005). Accreditation for an industrial technology program. *Cheng Shiu University (Taiwan) National Conference, Selected Papers.* Smallwod, J. (2000). Developing an in-state regional association. *Tech Directions*, *60*(1). Smallwod, J., & Zargari, A. (2000). The development and delivery of a distance learning (DL) course in industrial technology. *Journal of Industrial Technology*, *16* .	
Relevant teaching experience: Over 20 professional publications on technology related topics and teaching courses associated with distance learning, curriculum, professionalism and manufacturing issues.	**Industrial Practice:** Industrial experience in various manufacturing engineering roles.

<table>
<tr><td>Name:
Mr. Todd E. Alberts
Instructor
Department of Applied Engineering and Technology Management
Mechanical Engineering Technology Program</td><td>Office Phone: 812-237-3357

Email: Todd.Alberts@indstate.edu</td></tr>
<tr><td>Degrees / Schools:
AS, Ivy Tech State College, 1988
MS, Indiana State University, 2007
BS, Indiana State University, 2005</td><td>Research Interest:
Engineering/Design Education
Computer Aided Design
Lean Manufacturing
Engineering Management</td></tr>
<tr><td colspan="2">Professional Activities and Accomplishments:
Instructor, Indiana State University – College of Technology
ASME Student Chapter Faculty Advisor
Member, ASME / ASEE / SAE</td></tr>
<tr><td colspan="2">Presentations and Publications (Selected):
Alberts, T. E. (in press). An experimental evaluation of performance variance for internally threaded geometry related to extended tap wear in low carbon steel. International Journal of Industrial Manufacturing.

Alberts, T. E., Badar, M. A., & El-Mansour, B. (2005).Teaching engineering economics to engineering technology students. Proceedings of the IIE Annual Conference, research track: engineering economics, CD-ROM, Atlanta, GA.

Alberts, T. E. (2006). Managing the human element of the lean manufacturing culture, management track. NAIT National Conference, Cleveland, OH.</td></tr>
<tr><td>Relevant teaching experience:
Lab based hands-on experiential learning based education.</td><td>Industrial Practice:
Seventeen years' real-world industrial experience in various engineering related roles.</td></tr>
</table>

Name: Ming Zhou Professor Department of Applied Engineering and Technology Management	**Office Phone:** 812-237-3983 **Email:** Ming.Zhou@indstate.edu
Degrees / Schools: Ph.D. in Systems and Industrial Engineering, The University of Arizona, 1995 B.S. in Mechanical Engineering, Wuhan Institute of Technology, 1982	**Research Interest:** Knowledge-based simulation modeling for discrete manufacturing systems Pattern and knowledge-based modeling and simulation of logistics and distribution systems Data mining and rule formation with neural networks, knowledge extraction from massive data/database Artificial Intelligence (AI) in the design and control of engineering systems

Professional Activities and Accomplishments:

Member, Institute of Industrial Engineers (IIE), 1994 – present

Member of the Editorial Board, International Journal of Industrial Engineering, 1997 – present

Member of the Editorial Board, Journal of Simulation, 2006 – present

1999, 2001, 2003, 2004, 2005, 2006 Session/track Chairs, 8th and 10th Industrial Engineering Research Conference (IERC99); and Winter Simulation Conferences (WSC).

Since 1996: invited referee for Journal of Computers & Industrial Engineering, IIE Transactions (Design & Manufacturing Systems), IEEE Transactions (Neural Networks), Prentice Hall (Reliability analysis), Reviewers for IERC97, 98, 99, 2000; and WSC04 and 05.

Presentations and Publications (Selected):

Zhou, M., Chen, Z., & Setavoraphan, K. (2005). Conceptual simulation modeling of warehousing operations.*Proceedings, 2005 Winter Simulation Conference*, Orlando, Fl.

Zhou, M., Son, J., & Chen, Z. (2004). Knowledge representations for conceptual simulation modeling.*Proceedings, 2004 Winter Simulation Conference*. Washington D.C.

Zhou, M., & Paik, J. (2004). An application of neural network and genetic algorithm for optimizing food extrusion process parameters. *International Journal of Industrial Engineering*, *11*(2), 132-139.

Zhou, M., & Zhao, C. (2002). An optimization model and multiple matching heuristics for quality planning in manufacturing systems. *Journal of Computers & Industrial Engineering, 42*, 91-101.

Relevant teaching experience: Almost 20 years' experience teaching undergraduate and graduate courses.	**Industrial Practice:** Five years' industrial experience as a project coordinator and engineer.