

**COVER PAGE**

INSTITUTION: Indiana State University

COLLEGE: College of Technology

DEPARTMENT: Built Environment

DEGREE PROGRAM TITLE: Bachelor of Science in Architectural  
Engineering Technology

FORM OF RECOGNITION TO BE AWARDED/

DEGREE CODE: Bachelor of Science

SUGGESTED CIP CODE: 04.0901

LOCATION OF PROGRAM/CAMPUS CODE: Terre Haute, IN

PROJECTED DATE OF IMPLEMENTATION: Fall Semester 2014

DATE PROPOSAL WAS APPROVED BY

INSTITUTIONAL BOARD OF TRUSTEES: 10/10/14

\_\_\_\_\_  
SIGNATURE OF AUTHORIZING  
INSTITUTIONAL OFFICER

\_\_\_\_\_  
DATE

\_\_\_\_\_  
DATE RECEIVED BY COMMISSION FOR  
HIGHER EDUCATION

\_\_\_\_\_  
COMMISSION ACTION (DATE)

## Program Description

### Bachelor of Science in Architectural Engineering Technology (BSArET) Indiana State University (ISU), Terre Haute, Indiana

#### 1. Characteristics of the Program

- a. **Campus(es) Offering Program:**  
Indiana State University, Terre Haute, IN
- b. **Scope of Delivery (Specific Sites or Statewide):**  
Indiana State University, Terre Haute, IN
- c. **Mode of Delivery (Classroom, Blended, or Online):**  
Blended
- d. **Other Delivery Aspects (Co-ops, Internships, Clinicals, Practica, etc.):**  
Summer Internship
- e. **Academic Unit(s) Offering Program:**  
College of Technology

#### 2. Rationale for the Program

##### a. **Institutional Rationale (Alignment with Institutional Mission and Strengths)**

- **Why is the institution proposing this program?**
  - The need for architectural engineering technologists continues to increase as the need for sustainable construction continues to increase. The mission of the BSArET program at ISU is to produce outstanding interdisciplinary architectural engineering technologists that combine the needs of designers and engineers with the needs of society. Students will be educated to extend their knowledge and skills beyond engineering technologies into social, local, regional, national and global concerns.
  - The field of architectural engineering technology is an interdisciplinary field and requires many skills in design and construction. Students will learn about the engineering technological aspects of building design and construction. Their knowledge and skills will allow them to assist architects and engineers in translating their designs into reality. Students will develop these skills through experiential learning emphasized through laboratories, cooperative practice, internships and other community/industry engagements.
  - Building Information Modeling (BIM) is a growing initiative in the industry that enhances the entire lifecycle of buildings from design to construction to post-occupancy. Students in the ArET program will develop learning skills relating to BIM and how they can affectively incorporate it into their profession.
  - The program will prepare BSArET graduates with knowledge of the building; testing, operation, and maintenance of building systems; in addition to the ability to

produce and utilize basic construction documents; and perform basic analysis and design of system components. Students will be prepared to analyze and design building systems; specify project methods and materials; perform cost estimates and analyses; and manage technical activities in support of architectural projects.

- **How is it consistent with the mission of the institution?**
  - The goal of the Architectural Engineering Technology program is to produce graduates that have mastered the combination of philosophy of building design and technology of construction systems and materials. The theme within the program will be experiential learning. Experiential learning will take place through laboratories, studio skills, cooperative practice, internships and other community/industry engagements. In addition the program will increase student demand within engineering professions and respectively expand career opportunities for students within the area of technology.
  - The appropriateness of the BSArET program to the University's mission and goals is centered on continuing the tradition of producing knowledgeable, proficient, valued student scholars through "teaching, research, and creative activity in an engaging, challenging, and supportive learning environment." In addition to the mission and goals of the University, this program seeks to support the goals of the College of Technology. The BSArET Program's goals focus on developing student's critical thinking skills related to architectural engineering, producing professionals that are team-oriented, creative and able to "apply, manage, and evaluate technology ethically and responsibly."
- **How does this program fit into the institution's strategic and/or academic plan?**
  - Goal 1 of the College of Technology Strategic Plan is to increase enrollment and student success. (See Appendix 1) A successful ArET Program will increase student enrollment and success. The Program is designed to prepare graduates for the future.
  - Goal 6 is to enhance alignment of curriculum with real world conditions. The demand for graduates with architectural engineering expertise will increase as the design/construction industry embraces new technologies such as BIM.
- **How does this program build upon the strengths of the institution?**
  - One of the important strengths of the College of Technology is instruction which combines managerial skills with technical skills. The mission of the College is to provide students with programs that use critical thinking, creative problem solving, technical skills, leadership, and management abilities to succeed in the workplace. The College focuses on how to use technology creatively. This is what the ArET Program is designed to do.



## b. State Rationale

- **How does this program address state priorities as reflected in *Reaching Higher, Achieving More*?**
  - *Achieving More* calls for a higher education system that is student-centered, mission-driven, and workforce-aligned. The ArET Program is designed for the student. The Program begins with what the student knows and adds the necessary knowledge and skills. The ArET program is mission driven. It is aligned with the College Strategic Plan (see above). The ArET Program is workforce-aligned. It recognizes the increasing knowledge, skills, and degree attainment needed for lifetime employment to ensure Indiana's economic competitiveness (see below).

## c. Evidence of Labor Market Need

### i. National, State, or Regional Need

- **Is the program serving a national, state, or regional labor market need?**
  - The U.S. Bureau of Labor Statistics (BLS), has projected an increase in demand of architects by 18% prior to 2016. This growth is tied to the construction industry which directly affects the need for architectural engineering technologists. There is an anticipation of strong growth within nonresidential construction connected to increases within commercial construction.
  - The American Institute of Architect's (AIA) Architecture Billing Index (ABI) is a "diffusion index derived from the monthly Work-on-the-Boards survey, conducted by the AIA Economics & Market Research Group. The ABI serves as a leading economic indicator that leads nonresidential construction activity by approximately 9-12 months." The second quarter of 2013 shows positive growth in the ABI. This index can be used as an indicator of levels of production in the architecture, engineering and design sectors.
  - The Engineering Workforce Commission (2010) and the United States Department of Labor, Bureau of Labor Statistics (2011) have identified the following related to architectural engineering.

Employment for architectural engineers is anticipated to continually increase for all related occupations through 2018. Prospective employees with BS degrees will be the most significant source sought for employment. It is anticipated that from 2008-2018 employment opportunities for architects and engineers will increase a mean of 12 percent. The career of architectural engineering technologists is directly related to the demand for engineers and architects. BSArET graduates will



work closely with and/or for architects and engineers and their fluctuation is related to the construction industry which is the direct measuring guide for the profession of architectural engineering.

Job prospects for architectural engineering technologists will be promising. The continual increase within the field will result in increased job openings for replacement and growth. Architectural engineering technologists will be comforted during fluctuations within the construction industry because their education provides them with diverse sets of skills and knowledge.

- According to the Indiana Department of Workforce Development-Research and Analysis, there shall be a continual increase in new jobs within the state of Indiana. Architecture and engineering occupations by 2018 are anticipated to have an annual average of 416 new jobs and a 8.3 percent change in Indiana.

**ii. Preparation for Graduate Programs or Other Benefits**

- **Does the program prepare students for graduate programs or provide other benefits to students besides preparation for entry into the labor market?**
  - The BSArET program will prepare students wishing to pursue graduate degrees at Indiana State University or elsewhere if they desire to continue their education.

**iii. Summary of Indiana DWD and/or U.S. Department of Labor Data**

- **Summarize the evidence of labor market demand for graduates of the program as gleaned from employment projections made by the Indiana Department of Workforce Development and/or the U.S. Department of Labor?**
  - The U.S. Department of Labor does not post any statistics for architectural engineering technologists. The closest job description is “drafter.” (See Appendix 2) Graduates from the ArET Program will have a broader education than a drafter and will be more employable. The U.S. D. of L. web site states, “Because new technology reduces costs, architectural and civil drafters who can master new software programs such as BIM should find opportunities in various industries.” It goes on to state, “Demand for mechanical and electrical and electronic drafters is expected to be notably high in engineering and drafting service firms because of more complex problems associated with new products and manufacturing processes.”

**iv. National, State, or Regional Studies**

- **Summarize any national, state, or regional studies that address the labor market need for the program.**
  - A study conducted by Kihong Ku and Mojtaba Taiebat in 2011 surveyed construction companies and their expectations from university construction graduates in regard to BIM knowledge and skills. The survey found that the majority of the respondents indicated that they want to hire construction graduates who have knowledge of specifying model requirements which involves managing and defining levels of details of models and model validation skills to share models with other participants and also use models provided by others. The respondents indicated that they prefer graduates who have a conceptual understanding and knowledge of BIM tools and processes.
  - A study by Joannides, Olbina, and Issa in 2012 stated, “Upon graduation, students can expect a high demand for BIM skills in the industry as well as a demand for adopting new technologies and processes such as BIM.” (p. 86)
  - See Appendix 3

**v. Surveys of Employers or Students and Analyses of Job Postings**

- **Summarize the results of any surveys of employers or students and analyses of job postings relevant to the program.**
  - Not provided.

**vi. Letters of Support**

- **Summarize, by source, the letters received in support of the program.**
  - Craig Koch, Project Manager, Shiel Sexton Company, Inc.
  - Thomas Whitaker, Superintendent, Hagerman, Inc.
  - Jill Rose, Designer, Rowland Design, Inc.
  - Mike Peterson, Project Manager, C. H. Garmong & Sons, Inc.
  - Devan Dean, Development Coordinator, Heartland Dental Care
  - See Appendix 5

**3. Cost of and Support for the Program**

**a. Costs**

**i. Faculty and Staff**

- **Of the faculty and staff required to offer this program, how many are in place now and how many will need to be added (express both in terms of number of full- and part-time faculty and staff, as well as FTE faculty and staff)?**

- See Appendix 6

**ii. Facilities**

- **Summarize any impact offering this program will have on renovations of existing facilities, requests for new capital projects (including a reference to the institution's capital plan), or the leasing of new space.**
  - The existing facilities can accommodate the proposed program.

**iii. Other Capital Costs (e.g. Equipment)**

- **Summarize any impact offering this program will have on other capital costs, including purchase of equipment needed for the program.**
  - See Appendix 8

**b. Support**

**i. Nature of Support (New, Existing, or Reallocated)**

- **Summarize what reallocation of resources has taken place to support this program.**
  - All courses within the proposed BSArET curriculum are existing courses from programs within the College of Technology at Indiana State University. All of the courses have been offered a minimum of 3 times and a maximum of 6 times within the last 3 years, excluding the Civil Engineering courses which are part of the new B.S. in Civil Engineering Technology curriculum.
- **What programs, if any, have been eliminated or downsized in order to provide resources for this program?**
  - No programs have been eliminated to provide resources for this program.

**ii. Special Fees above Baseline Tuition**

- **Summarize any special fees above baseline tuition that are needed to support this program.**
  - The following courses have fees to cover software and printing costs: CNST 106, CNST 206, CNST 420; IAD 120, IAD 260

**4. Similar and Related Programs**

**a. List of Programs and Degrees Conferred**



**i. Similar Programs at Other Institutions**

**Campuses offering (on-campus or distance education) programs that are similar:**

- Within our region, three (3) bachelors of architectural engineering technology programs exist and two (2) bachelors of architectural engineering programs exist. Each of these programs are 180 minutes or more away from central Indiana. There are no accredited BSAET or BSAE programs in the state of Indiana. Students pursuing an associate's degree within the state of Indiana will be forced to travel outside of the state if they desire to continue their education with a bachelor's degree.

**ii. Related Programs at the Proposing Institution**

- **Construction Management, Interior Architectural Design, and Civil Engineering Technology.**

**b. List of Similar Programs Outside Indiana**

- **If relevant, institutions outside Indiana (in contiguous states, MHEC states, or the nation, depending upon the nature of the proposed program) offering (on-campus or distance education) programs that are similar:**
  - Alfred State College
  - Bluefield State College (ABET Accredited)
  - Pennsylvania State University, Fayette
  - Murray State University
  - State University of New York, Farmingdale (ABET Accredited)
  - University of Hartford
  - University of Southern Mississippi (ABET Accredited)
  - Vermont Technical College

**c. Articulation of Associate/Baccalaureate Programs**

- **For each articulation agreement, indicate how many of the associate degree credits will transfer and apply toward the baccalaureate program.**
  - The BSArET program will serve a variety of clientele. One major clientele segment will be comprised of students within the Ivy Tech community college system. Students that are enrolled in electrical engineering technology, engineering technology, mechanical engineering technology, and pre-engineering will find the BSArET program a great opportunity to continue their education at a four-year institution. Students from Ivy-Tech community college that are undecided but interested in the architectural and engineering aspect of the built environment will find this program a welcoming compliment without significant

transfer penalties. BSArET will accept up to 60 credit hours from Ivy Tech, and will require the remaining credit hours from ISU to graduate (minimum of 60).

**d. Collaboration with Similar or Related Programs on Other Campuses**

- **Indicate any collaborative arrangements in place to support the program.**
  - No collaborative arrangements have been made at this time.

**5. Quality and Other Aspects of the Program**

**a. Credit Hours Required/Time To Completion**

- **Credit hours required for the program and how long a full-time student will need to complete the program**
  - The BSArET program will require 120 undergraduate credit hours including 45 credits of foundational studies. The curriculum is designed to provide students with the philosophical understanding of building design with an applied technical knowledge of engineering systems, construction materials and applications.
  - Students will develop presentation methods and techniques through courses related to freehand drawing, computer-aided drafting, physical models, virtual computer models, and computer imaging. The program will include: 31 credits in Construction Management; 3 credits in Civil Engineering Technology; 9 credits in Interior Architecture Design; 11 credits in Mechanical Engineering Technology; 9 credits in Mathematics; and 8 credits in Physics.

**Construction Courses**

CNST 106	Architectural Graphics	3 credit hours
CNST 111	Construction Materials, Methods, and Equipment	3 credit hours
CNST 201	Construction Contract Docs & Project Delivery	3 credit hours
CNST 206	Residential Design and Construction	3 credit hours
CNST 213	Environmental & Mechanical Systems for Building	3 credit hours
CNST 214	Plan Interpretation and Quantity Take-Off	3 credit hours
CNST 304	Construction Scheduling	3 credit hours
CNST 306	Commercial Design and Construction	3 credit hours
CNST 314	Estimating and Bid Preparation	3 credit hours
CNST 318	Statics and Strength of Materials	3 credit hours
CNST 351	Professional Internship	0 credit hours
CNST 420	Plane Surveying	2 credit hours
CNST 430	Senior Seminar	1 credit hour
CNST 480	Construction Capstone	3 credit hours

**Civil Engineering Technology**

CVET 410	Structural Analysis & Reinforced Concrete Design	3 credit hours
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**Mechanical Engineering Technology**

MET 304	Engineering Analysis	3 credit hours
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**Interior Architecture Design Courses**

IAD 110	Introduction to Interior Design	3 credit hours
IAD 152	Interior Arch. Design Graphics I: Drafting	3 credit hours
IAD 310	Construction and Detailing - Commercial	3 credit hours
IAD 360	Sustainable Practices	3 credit hours

**Mathematics**

MATH 115	College Algebra	3 credit hours
MATH 123	Analytic Geometry	3 credit hours
MATH 301	Fundamentals & Applications of Calculus	3 credit hours

**Physics**

PHYS 105/L	General Physics I and Lab	4 credit hours
PHYS 106/L	General Physics II and Lab	4 credit hours

- Typical program length is 8 semesters for full-time students with 1 summer internship.
- See Appendix 10.

**b. Exceeding the Standard Expectation of Credit Hours**

- **If the associate or baccalaureate degree program exceeds 60 or 120 semester credit hours, respectively, summarize the reason for exceeding this standard expectation.**
  - N/A

**c. Program Competencies or Learning Outcomes**

- **List the significant competencies or learning outcomes that students completing this program are expected to master.**
  - The BSArET program will prepare graduates to enter careers in the planning, design, construction, operation or maintenance aspects of the built environment. The curriculum focuses on the development of technical and managerial skills necessary to excel in multiple aspects of building construction and management. This program will strengthen graduates knowledge of the building design, testing, operation, and maintenance of building systems while increasing their ability to produce and utilize basic construction documents and perform analysis and design of system components. BSArET graduates will be knowledgeable about Building Information Modeling (BIM), an intelligent software that through associated sets of processes is used to produce, communicate, and analyze building models. Graduates will understand the goals of the architect and be prepared to analyze



and design systems; specify project methods and materials; perform cost estimates and analyses; and manage technical activities in support of architectural projects.

- As described in the Accreditation Board of Engineering and Technology-Technology Accreditation Commission (ABET-TAC) criteria for accrediting the BSArET program.
- - Creating, utilizing, and presenting design, construction, and operations documents.
  - Performing economic analyses and cost estimates related to design, construction, and maintenance of building systems in the architectural engineering technical specialties.
  - Selecting appropriate materials and practices for building construction.
  - Applying principles of construction law and ethics in architectural practice.
  - Applying basic technical design concepts to the solution of architectural problems involving architectural history, theory, and design; codes, contracts, and specifications; electrical and mechanical systems, environmental control systems, plumbing and fire protection; site development; structures, material behavior, foundations; construction administration, planning and scheduling.
  - Performing standard analysis and design in at least one recognized technical specialty within architectural engineering technology that is appropriate to the goals of the program.
- Additional objective for BSArET, presently not one listed by ABET-TAC
  - Understand and apply knowledge of Building Information Modeling to all facets applicable to the information flow and lifecycle of architectural engineering.
- Graduates of the BSArET Program will be in accordance with the College of Technology's commitment to preparing them for a wide range of environments and distinguishing itself in producing graduates that are familiar with serving the architectural engineering technology aspects within rural areas and populations.
- BIM is an important tool for architectural engineers. Described broadly as a 3-D digital modeling tool, it is actually an intelligent computer building modeling tool. Infinite amounts of information related to all disciplines (architectural design, structure, mechanical, electrical, plumbing, civil) can be incorporated into the model. Some of the benefits of BIM include: detection of conflicts during design, quantity take-off prior to construction, and sustainable design analysis through energy modeling. The information incorporated in BIM encourages collaboration, enhances information flow through disciplines, and extends building lifecycle. Students in the BSArET program will focus their learning on the depths of BIM

and on understanding how the program can benefit them as interdisciplinary professionals in the built environment. The learning processes related to BIM will include teamwork, collaboration, and experiential learning.

**d. Assessment**

- **Summarize how the institution intends to assess students with respect to mastery of program competencies or learning outcomes.**
  - Indiana State University currently uses Task-Stream to facilitate outcomes assessment. The University also has a full-time assessment coordinator to help and provide guidance. The proposed assessment plan occurs over a 3-year cycle.
  - See Appendix 11

**e. Licensure and Certification**

**Graduates of this program will be prepared to earn the following:**

- **State License:**
  - None
- **National Professional Certifications (including the bodies issuing the certification):**
  - None
- **Third-Party Industry Certifications (including the bodies issuing the certification):**
  - None

**f. Placement of Graduates**

- **Please describe the principle occupations and industries, in which the majority of graduates are expected to find employment.**
  - Opportunities for architectural engineering technologists exist in the areas of planning, design, construction, operation and maintenance. As sustainable design of buildings continues to increase, the demand for architectural engineering technologists continues to increase. BSArET graduates will be able to engage in multiple aspects of building construction and design by having philosophical design skills combined with technical engineering skills. The vast range of skills of architectural engineers will increase their ability to fill numerous career opportunities related to building construction.

- Graduates will find employment in a variety of areas within the facets of building engineering and construction. Employment opportunities will exist with architects and/or engineers who focus their design effort on function and form of building elements. Opportunities will also exist within mechanical, electrical, fire protection or structural engineering companies. Some graduates of the BSArET program may venture out and open private consulting companies. It is anticipated that government agencies such as: Federal Emergency Management Agency, NASA, and the U.S. Army Corps of Engineers will find ISU BSArET graduates highly desirable.
- According to the Occupational Supply Demand System, within the state of Indiana, there are 727 annual openings for careers that graduates from the BSArET program could be applicable for. These careers include estimators, architects, engineering managers, interior designers, drafters, inspectors, sales representatives, technicians, and designers. There exist within the state of Indiana, an opportunity for BSArET graduates to find a career within their areas of interest.
- **If the program is primarily a feeder for graduate programs, please describe the principle kinds of graduate programs, in which the majority of graduates are expected to be admitted.**
  - N/A

**g. Accreditation**

- **Accrediting body from which accreditation will be sought and the timetable for achieving accreditation.**
  - The Accreditation Board for Engineering and Technology (ABET) is the accrediting council architectural engineering programs. ABET provides guidelines related to the following: objectives, outcomes, curriculum, continuous improvement, faculty, facilities, and institutional support for the BSArET program.
  - Accreditation will be sought approximately five years after successful implementation of the Program.
- **Reason for seeking accreditation.**
  - Recognition and legitimacy

**6. Projected Headcount and FTE Enrollments and Degrees Conferred**



- Report headcount and FTE enrollment and degrees conferred data in a manner consistent with the Commission's Student Information System
  - See Appendix 12
- Report a table for each campus or off-campus location at which the program will be offered
  - All BSArET courses will be delivered by Indiana State University through the main campus.
- If the program is offered at more than one campus or off-campus location, a summary table, which reports the total headcount and FTE enrollments and degrees conferred across all locations, should be provided.
  - N/A
- Round the FTE enrollments to the nearest whole number
  - See Appendix 12
- If the program will take more than five years to be fully implemented and to reach steady state, report additional years of projections.
  - N/A
- **Degrees Conferred**
  - Students who complete the program will be awarded a Bachelor of Science in Architectural Engineering Technology (BSArET). The degree awarded is in alignment with the ABET accreditation requirements.
  - The student's diploma will read: Bachelor of Science in Architectural Engineering Technology, Indiana State University, College of Technology, Terre Haute, Indiana.

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## Appendix 1 College of Technology Strategic Plan

### MISSION

Provide students with undergraduate and graduate degree programs that use critical thinking, creative problem solving, technical skills and knowledge, leadership and managerial abilities to enable them with the necessary tools to apply learning in the classroom to workplace solutions.

### VISION

The College of Technology at Indiana State University is nationally recognized for providing a state-of-the-art learning environment in a wide spectrum of applied technology fields. Its graduates are valued for their strong foundation of practical and theoretical knowledge enabling them to be immediately effective in managerial or technological positions in relevant businesses and industry.

#### **Goal 1: Increase enrollment and student success.**

Objective 1: Develop and enhance joint programs with other higher education institutions.

Objective 2: Create and/or enhance articulation agreements.

Objective 3: Use distance education to attract adult and lifelong learners.

Objective 4: Improve coordination of recruiting of high school and community college students.

Objective 5: Increase marketing efforts of Masters and Ph.D. programs.

Objective 6: Collaborate with other ISU colleges to develop or improve industry-related foundational studies, with particular focus on communications, work ethics, and business.

Objective 7: Increase graduation and retention rates by improving tutoring and mentoring, and requirements for student projects and internships.

Objective 8: Work with university advising staff to develop effective centralized and decentralized advising programs.

Objective 9: Develop an enhanced COT program for new student orientation.

Objective 10: Develop predictable and mandatory internships, service learning projects, and capstone projects for all students.

Objective 11: Provide students with techniques or testing that assists them in evaluating their strengths and focusing their educational and career path goals.

Objective 12: Work with campus career center to provide consistent career advice and development.

#### **Goal 2: Enhance external partnerships with industry, alumni and the ISU Foundation institutions to attract funding, provide hands-on experience for students, and facilitate faculty currency in state-of-the-art technologies.**

Objective 1: Organize more frequent Industry Advisory Board meetings – at least quarterly.

Objective 2: Schedule Industry Advisory Board meetings at various industry locations.

Objective 3: Develop consistent roles and expectations of Advisory Boards.

Objective 4: Schedule periodic meetings of a cross-section of Advisory Boards

Objective 5: Increase Advisor participation in fund-raising activities.



Objective 6: Develop more internships and increase participation in student success programs (i.e. mentoring, juries, portfolio advice and development) with Advisory Board Members.

Objective 7: Expand participation in Advisory Boards to influential leaders of relevant industries or businesses.

Objective 8: Increase tracking and communication with alumni.

Objective 9: Increase participation of alumni in College events or activities.

Objective 10: Consult with alumni re: student and workforce development.

Objective 11: Increase collaboration with the ISU Foundation to improve fund-raising.

**Goal 3: Increase recognition and reputation of the College.**

Objective 1: Identify and support centers of excellence capable of regional and national distinction (e.g. PhD in Technology Management, Flight School, UAV Center, FAA-CTI program, etc.)

Objective 2: Work with industry and government agencies on applied research projects.

Objective 3: Develop a comprehensive marketing program.

**Goal 4: Increase the amount and diversity of external funding sources.**

Objective 1: Develop expertise and support for grant writing.

Objective 2: Enlist alumni and advisory board support for fundraising.

Objective 3: Partner with industries to obtain state-of-the-art equipment and technology.

Objective 4: Conduct industry workshops and proficiency exams.

Objective 5: Create certificate programs.

Objective 6: Identify major projects for the next University campaign (e.g. UAV program, flight school, etc.)

**Goal 5: Improve synergy and cohesiveness of the College.**

Objective 1: Clarify and define appropriate faculty workload policies and standards.

Objective 2: Develop new courses that reflect emergent technologies.

Objective 3: Develop a program for updating and renewing laboratory and IT equipment.

Objective 4: Grow enrollment to maintain high quality faculty/student ratio.

Objective 5: Increase participation of adjunct faculty.

Objective 6: Provide opportunities for faculty to work on specific industry projects to expand experience and technology currency.

Objective 7: Develop incentives for faculty research.

Objective 8: Provide orientation programs for all staff.

Objective 9: Provide or increase opportunities for skills development of staff.

Objective 10: Provide or enhance opportunities for career development and advancement of staff.

**Goal 6: Enhance alignment of curriculum with real world conditions.**

Objective 1: Foundational skills - Curriculum development should include student skills and experience in oral presentation, argument, "thinking on feet", technical and expository report writing, and working in groups, and work ethic)

Objective 2: Environmental impacts should be addressed across the entire curriculum.

Objective 3: Other issues of concern to contemporary business and industry that should be addressed in curricula include Life cycle costs, Labor issues, Logistics

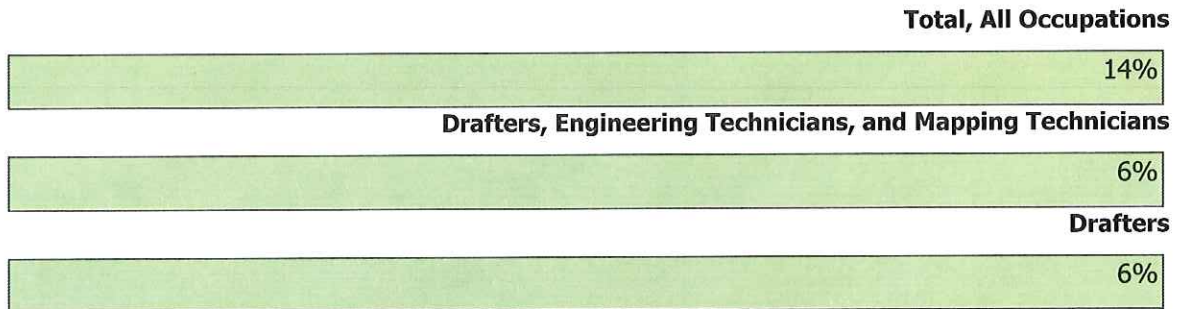


Appendix 2  
Summary of U.S. Department of Labor Market Demand

## Job Outlook: About this section

### Drafters

Percent change in employment, projected 2010-20



Note: All Occupations includes all occupations in the U.S. Economy.

Source: U.S. Bureau of Labor Statistics, Employment Projections program

Overall, employment of all drafters is expected to grow 6 percent from 2010 to 2020, slower than the average for all occupations. However, growth will vary by specialty.

Work from construction projects will likely continue to create demand for architectural and civil drafters, and because this work should be kept in the United States, employment is expected to grow by 3 percent, slower than average growth. Because new technology reduces costs, architectural and civil drafters who can master new software programs, such as BIM and PDM, also should find opportunities in various industries

Employment of mechanical drafters is expected to experience about as fast as average growth, and electronic and electrical drafters is expected to experience slower than average growth from 2010 to 2020. Most of these workers are employed in declining or slow-growing manufacturing industries, offering few opportunities for growth from industry expansion. Demand for mechanical and electrical and electronic drafters is expected to be notably high in engineering and drafting service firms because of more complex problems associated with new products and manufacturing processes.







CADD systems that are easier to use and more powerful than current systems will allow other technical professionals to perform many tasks previously done only by drafters. This development should curb demand for all specialties. Also, some drafting work may be sent to other countries at lower wages.

## Job Prospects





New software, such as PDM and BIM, will require drafters to work in collaboration with other professionals on projects, whether constructing a new building or manufacturing a new product. This new software, however, requires that someone build and maintain large databases. Workers with knowledge of drafting and of the software will be needed to oversee these databases.







Many drafting jobs are in construction and manufacturing, so they are subject to the ups and downs of those industries. Demand for particular drafting specialties varies across the country because jobs depend on the needs of local industries.

<b>Employment projections data for drafters, 2010-20</b>						
<b>Occupational Title</b>	<b>SOC Code</b>	<b>Employment, 2010</b>	<b>Projected Employment, 2020</b>	<b>Change, 2010-20</b>		<b>Employment by Industry</b>
				<b>Percent</b>	<b>Numeric</b>	
SOURCE: U.S. Bureau of Labor Statistics, Employment Projections program						
<b>Drafters</b>	17-3010	205,100	216,500	6	11,400	<a href="#">[XLS]</a>
<b>Architectural and Civil Drafters</b>	17-3011	92,700	95,700	3	3,000	<a href="#">[XLS]</a>
<b>Electrical and Electronics Drafters</b>	17-3012	29,200	30,800	5	1,600	<a href="#">[XLS]</a>
<b>Mechanical Drafters</b>	17-3013	67,400	74,900	11	7,500	<a href="#">[XLS]</a>
<b>Drafters, All Other</b>	17-3019	15,800	15,200	-4	-600	<a href="#">[XLS]</a>





	OCCUPATION	JOB DUTIES	ENTRY-LEVEL EDUCATION 	2010 MEDIAN PAY 
	<a href="#"><u>Architects</u></a>	Architects plan and design buildings and other structures.	Bachelor's degree	\$72,550
	<a href="#"><u>Cartographers and Photogrammetrists</u></a>	Cartographers and photogrammetrists measure, analyze, and interpret geographic information to create maps and charts for political, cultural, educational, and other purposes. Cartographers are general mapmakers, and photogrammetrists are specialized mapmakers who use aerial photographs to create maps.	Bachelor's degree	\$54,510
	<a href="#"><u>Electrical and Electronic Engineering Technicians</u></a>	Electrical and electronic engineering technicians help engineers design and develop computers, communications equipment, medical monitoring devices, navigational equipment, and other electrical and electronic equipment. They often work in product evaluation and testing, using measuring and diagnostic devices to adjust, test, and repair equipment.	Associate's degree	\$56,040
	<a href="#"><u>Electrical and Electronics Engineers</u></a>	Electrical engineers design, develop, test, and supervise the manufacturing of electrical	Bachelor's degree	\$87,180



	OCCUPATION	JOB DUTIES	ENTRY-LEVEL EDUCATION 	2010 MEDIAN PAY 
		<p>equipment such as electric motors, radar and navigation systems, communications systems, and power generation equipment. Electronics engineers design and develop electronic equipment, such as broadcast and communications systems—from portable music players to global positioning systems (GPS).</p>		
	<p><a href="#"><u>Electrical and Electronics Installers and Repairers</u></a></p>	<p>Electrical and electronics installers and repairers install, repair, or replace a variety of electrical equipment in telecommunications, transportation, utilities, and other industries.</p>	<p>Postsecondary non-degree award</p>	<p>\$49,170</p>
	<p><a href="#"><u>Electro-mechanical Technicians</u></a></p>	<p>Electro-mechanical technicians combine knowledge of mechanical technology with knowledge of electrical and electronic circuits. They install, troubleshoot, repair, and upgrade electronic and computer-controlled mechanical systems, such as robotic assembly machines.</p>	<p>Associate's degree</p>	<p>\$49,550</p>

	OCCUPATION	JOB DUTIES	ENTRY-LEVEL EDUCATION 	2010 MEDIAN PAY 
	<p><a href="#"><u>Industrial Designers</u></a></p>	<p>Industrial designers develop the concepts for manufactured products, such as cars, home appliances, and toys. They combine art, business, and engineering to make products that people use every day.</p>	<p>Bachelor's degree</p>	<p>\$58,230</p>
	<p><a href="#"><u>Landscape Architects</u></a></p>	<p>Landscape architects plan and design land areas for parks, recreational facilities, highways, airports, and other properties. Projects include subdivisions and commercial, industrial, and residential sites.</p>	<p>Bachelor's degree</p>	<p>\$62,090</p>
	<p><a href="#"><u>Mechanical Engineering Technicians</u></a></p>	<p>Mechanical engineering technicians help mechanical engineers design, develop, test, and manufacture industrial machinery, consumer products, and other equipment. They may make sketches and rough layouts, record and analyze data, make calculations and estimates, and report their findings.</p>	<p>Associate's degree</p>	<p>\$50,110</p>
	<p><a href="#"><u>Mechanical Engineers</u></a></p>	<p>Mechanical engineering is one of the broadest engineering disciplines. Mechanical engineers design, develop, build, and test mechanical devices, including</p>	<p>Bachelor's degree</p>	<p>\$78,160</p>



	OCCUPATION	JOB DUTIES	ENTRY-LEVEL EDUCATION 	2010 MEDIAN PAY 
	<a href="#"><u>Surveying and Mapping Technicians</u></a>	<p>tools, engines, and machines.</p> <p>Surveying and mapping technicians assist surveyors and cartographers in collecting data and making maps of the earth's surface. Surveying technicians visit sites to take measurements of the land. Mapping technicians use geographic data to create maps.</p>	High school diploma or equivalent	\$37,900
	<a href="#"><u>Surveyors</u></a>	<p>Surveyors establish official land, airspace, and water boundaries. Surveyors work with civil engineers, landscape architects, and urban and regional planners to develop comprehensive design documents.</p>	Bachelor's degree	\$54,880

**SUGGESTED CITATION:**

Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2012-13 Edition*, Drafters, on the Internet at <http://www.bls.gov/ooH/architecture-and-engineering/drafters.htm> (visited March 22, 2013).

**Appendix 3**  
**National, State, or Regional Studies**

BIM Experiences and Expectations: The Constructor's Perspective

Kihong Ku, DDES and Mojtaba Taiebat, M.Sc.

International Journal of Construction Education and Research, 7:175-197, 2011

Implementation of Building Information Modeling into Accredited Programs in Architecture and Construction Education

Maya M. Joannides, Svetlana Olbina, and Raja R. A. Issa

International Journal of Construction Education and Research, 8:83-100, 2012

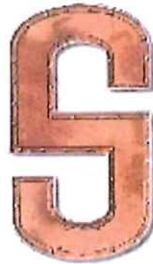
**Appendix 4**

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**Not Applicable**

**Appendix 5**  
**Letters of Support**





22-Jan-13

Mr. Donald (Bo) McNabb  
Dept. of Built Environment  
Indiana State University

**Re: Bachelor of Science in Architectural Engineering Technology**

Bo,

I have been informed that the Department of Built Environment at Indiana State University is planning to offer a Bachelor of Science in Architectural Engineering Technology. I understand that Building Information Modeling (BIM) will be a key component of the coursework.

I'm writing today in support of this endeavor, and I am excited for the opportunities this will present for future students. We are seeing more and more projects utilizing BIM software in an effort to better coordinate their work, increase productivity and minimize costs.

Having a good fundamental understanding of what BIM is, how the model goes together and how to better deliver a project through BIM Coordination would be extremely beneficial. I believe that a new graduate with this skill set will be able to better differentiate themselves and have a leg up on the rest of the competition when looking for their first job.

Please keep me posted on how the program progresses and let me know if I can help in any way. I'm using BIM coordination on my current project and would love to show you how it has helped us.

Hope all is well – Go State!

Sincerely,

A handwritten signature in black ink, appearing to read 'Craig Koch'. The signature is fluid and cursive.

Craig Koch  
Project Manager  
Shiel Sexton

Thomas Whitaker  
Hagerman Inc.  
10315 Allisonville Rd,  
Fishers, IN 46038

Mr. McNabb,

I am writing this letter in response to our conversation concerning the Building Information Modeling (BIM) and its role in the construction industry. I understand that Indiana State University is looking to add this technology to its degree programs.

I applaud the initiative to do so, as I understand there are no other programs in the state that currently offer BIM as career prep for their students. The BIM technology is growing fast in the industry and is becoming one of the most important tools a firm like The Hagerman Group can offer to their clients. BIM helps contractors to use the information to install their MEP systems with minimal conflicts while helping them identify and eliminate conflicts with other trades. Why is this useful to an owner? With coordination complete before starting to install systems, it reduces the amount of RFIs and wait time for answers, helps to keep ceiling heights per the original design, and eliminates large change orders to contractors for rework due to design errors or structure conflicts.

I am currently working on a project in which the owner specifically requested that BIM be used to help reduce cost and stream line the construction schedule. It has done just that. In the competitive construction market we compete in today, it is imperative that our teams be able to provide the latest technologies and services available to help cut costs for the owner and deliver our projects on a fast track schedule. BIM helps us to make this possible and individuals that can use and understand this technology are invaluable to a company's project team.

Graduates that have an understanding of BIM are becoming a hot commodity for firms hiring new talent. These graduates will strengthen their project team and delivery methods, while providing an invaluable cost and time saving technology to the owner. I sincerely hope Indiana State University pushes forward with this initiative. As a constructor, these graduates will help strengthen our teams in the future. As an Alum and graduate from Indiana State's Construction Program, I would be proud to see our University become the first institution to recognize and implement BIM into the graduate programs.

Sincerely,  
Thomas Whitaker,  
Indiana State University Construction Technology Grad '03  
Hagerman Inc. Superintendent



January 27, 2013

Azizi Arrington-Bey  
Assistant Professor  
Interior Architecture Design  
Indiana State University  
College of Technology  
101 North Sixth Street  
Terre Haute, IN 47809

**Re: Letter of Support for the BSArET at Indiana State University**

Dear Ms. Arrington-Bey:

I am pleased to support your initiative for the Bachelor of Science in Architectural Engineering Technology program at Indiana State University. This program is critical to Indiana State University's endeavor to provide relevant college level studies that match the demand in the marketplace.

As sustainable design of building continues to increase, the demand for architectural engineers continues to increase. BSArET graduates will be able to engage in multiple aspects of building construction and design by having philosophical design skills combined with technical engineering skills. The vast range of skills of architectural engineers will increase their ability to fill numerous career opportunities related to building construction. The curriculum set forth for the BSArET degree at Indiana State allows the BSArET graduates to become proficient with skills related to Building Information Modeling (BIM). BIM is an intelligent computer program that creates three-dimensional infrastructural models and a critical component in today's built environment design.

Lastly, I lend my support of the Indiana State BSArET Program because it will serve incoming students within the region wishing to pursue a degree within architectural engineering technology as the only program of its type in the state of Indiana. That will set Indiana State University apart from other regional Universities and Colleges.

Best of luck!  
Sincerely,

Jill Rose  
Designer  
**ROWLAND DESIGN, INC**

Indiana State University Interior Architecture Design Advisory Board



January 29, 2013

Mr. Donald McNabb  
Indiana State University  
Terre Haute, IN 47809

**Re: Support for the Architectural Engineering Technology Degree**

Dear Mr. McNabb,

As a construction professional with over 20 years of experience in the business, I am pleased to provide support for the proposed Architectural Engineering Technology degree at Indiana State University.

Technology has become an integral part of the construction industry and is essential to its continued growth. To be successful, construction professionals must manage labor, material and technology. The more technology can aid the labor and materials side of the business, the more efficient and profitable business can become. Technologies, like BIM, are the future of the construction industry and like all new technologies, needs individuals with knowledge of their operation to maximize their future possibilities.

Currently, in Indiana, there is a great need for individuals with knowledge and expertise in the engineering technology field. If approved, this degree would provide educated individuals with the skills for successful careers and provide the Indiana construction industry with qualified workers that will help ensure continued business growth.

I fully support the development of the Architectural Engineering Technology degree as it will serve the students, the construction industry and the State of Indiana. If I can be of further assistance, please feel free to call.

Best regards,

A handwritten signature in blue ink, appearing to read "Mike Peterson", is written over a light blue horizontal line.

Mike Peterson  
Project Manager  
Garmong Construction Services

C.F. Garmong and Son, Inc.  
3050 Poplar Street  
Terre Haute, Indiana 47803  
Phone (812) 234-3714 Fax (812) 234-1400  
[www.garmong.net](http://www.garmong.net)





February 7<sup>th</sup>, 2013

Dear Bo McNabb,

I would like to express my support for the proposed four year Architectural Engineering Technology degree that Bo and the other Professors are proposing. I have had great success in my career despite the low economic times thanks to the experience and knowledge that I gained from the Professors at Indiana State University in the Construction Management program. However, I would have loved the opportunity to enroll in a program such as what is being proposed when I attended Indiana State.

I believe creating this program will open doors for many future individuals in the state of Indiana to become a part of very successful companies and allow them to achieve dreams and aspirations that they would have never otherwise had without the help of Indiana State. This will in turn continue to help strengthen the construction industry as we continue to turn these economic times around over many years ahead.

Thank you,

**Devan Dean**  
Development Coordinator  
office 217-540-5113 cell 812-201-7610 fax 866-830-9418  
email [ddean@heartlanddentalcare.com](mailto:ddean@heartlanddentalcare.com)  
[www.HeartlandDentalCare.com](http://www.HeartlandDentalCare.com)



## Appendix 6 Faculty & Staff

The table below lists the name, highest academic degree, rank, specialization, and nature of appointment for potential faculty and administration involved in existing courses.

Name	Degree	Rank	Specialization	Appointment
<b>Administration</b>				
Robert English	Ph.D.	Professor and Interim Dean	Electronics Engineering Technology	Full-time
Kara Harris	Ed. D.	Associate Professor and Interim Associate Dean	Technology Education	Full-time
Joe Ashby	Ed. D.	Associate Professor & Interim Director of Undergraduate Academic Student Services	Electronics and Computer Engineering Technology	Full-time
<b>Faculty</b>				
Andrew Phillip Payne	Ph.D.	Associate Professor and Chair, Dept. of Built Environment	Built Environment	Full-time
Lee Ellingson	Ph.D.	Associate Professor and Program Coordinator	Construction Management	Full-time
William Baker	Ph.D.	Assistant Professor	Construction Management	Full-time
Donald McNabb	M.S.	Instructor	Construction Management	Special Purpose
Mary Sterling	M.S.	Associate Professor and Program Coordinator	Interior Architecture Design	Full-time
Azizi Arrington-Bey	M.Arch	Assistant Professor	Interior Architecture Design	Full-time
Joe Eckerle	M.S.	Instructor	Construction Management	Special Purpose
M. Affan Badar	Ph.D.	Associate Professor and Chair, Dept. of Applied Engineering Technology Management	Mechanical Engineering Technology	Full-time
A. Mehran Shahhosseini	Ph.D.	Assistant Professor	Mechanical Engineering Technology	Full-time
Todd E. Alberts	M.S.	Instructor	Mechanical Engineering Technology	Special Purpose

**Appendix 7**

**Not Applicable**

**Appendix 8**  
**Total Direct Program Costs and Sources of Program Revenues**

Campus: Indiana State University  
Program: B.S. in Architectural Engineering  
Technology

Date: December 3, 2013

	Total Year 1 2014-2015		Total Year 2 2015-2016		Total Year 3 2016-2017		Total Year 4 2017-2018		Total Year 5 2018-2019	
	FTE	Cost	FTE	Cost	FTE	Cost	FTE	Cost	FTE	Cost
<b>A. Total Direct Program Costs</b>										
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		\$64,000		\$64,000		\$64,000		\$64,000
<b>TOTAL</b>		<b>\$4,000</b>		<b>\$64,000</b>		<b>\$64,000</b>		<b>\$64,000</b>		<b>\$64,000</b>
<b>B. Sources of Program Revenues</b>										
1. Reallocation		\$0		\$0		\$0		\$0		\$0
2. New-to-campus student fees		\$48,450		\$80,682		\$134,470		\$198,934		\$295,630
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
<b>TOTAL</b>		<b>\$48,450</b>		<b>\$80,682</b>		<b>\$134,470</b>		<b>\$198,934</b>		<b>\$295,630</b>



**Total Direct Program Costs and Sources of Program Revenues**

Campus: Indiana State University  
 Program: B.S. in Architectural Engineering  
 Technology  
 Date: December 3, 2013

	Total Year 1 2014-2015		Total Year 2 2015-2016		Total Year 3 2016-2017		Total Year 4 2017-2018		Total Year 5 2018-2019	
	FTE	Cost	FTE	Cost	FTE	Cost	FTE	Cost	FTE	Cost
<b>1. Personal Services</b>										
a. Faculty	0	\$0	0	\$60,000	0	\$60,000	0	\$60,000	0	\$60,000
b. Support staff	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
c. Graduate teaching assistants	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0
<b>TOTAL</b>	<b>0</b>	<b>\$0</b>	<b>0</b>	<b>\$60,000</b>	<b>0</b>	<b>\$60,000</b>	<b>0</b>	<b>\$60,000</b>	<b>0</b>	<b>\$60,000</b>
<b>2. Supplies and Equipment</b>										
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
<b>TOTAL</b>		<b>\$4,000</b>		<b>\$4,000</b>		<b>\$4,000</b>		<b>\$4,000</b>		<b>\$4,000</b>
<b>3. Equipment</b>										
a. New equipment necessary for program		\$0		\$0		\$0		\$0		\$0
b. Routine replacement		\$0		\$0		\$0		\$0		\$0
<b>TOTAL</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>
<b>4. Facilities</b>										
<b>5. Student Assistance</b>										
a. Graduate fee scholarships		\$0		\$0		\$0		\$0		\$0
b. Fellowships		\$0		\$0		\$0		\$0		\$0
<b>TOTAL</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>		<b>\$0</b>
<b>Sum of All Incremental Direct Costs</b>		<b>\$4,000</b>		<b>\$64,000</b>		<b>\$64,000</b>		<b>\$64,000</b>		<b>\$64,000</b>

**Appendix 9**

**Not Applicable**

**Appendix 10**

**Credit Hours Required/Time To Completion**

**4-Year Plan for Architecture Engineering Technology Cat Year 201405**

120 credits as written

<p><b>Fall</b></p> <p>Cnst 106 Architectural Graphics (3)            Math 115 College Algebra (3)            Eng 101 Freshman Writing I (3)            IAD 110 Intro to Interior Design (3)            IAD 152 IAD Graphics 1: Drafting (3)</p> <p>15</p>	<p><b>Spring</b></p> <p>Cnst 111 Constr Mat, Methods &amp; Equip (3)            Phys 105/L Gen Physics I &amp; Lab (4)            Math 123 Analytic Geometry (3)            Historical Studies (3)            Eng 105 Freshman Writing II (3)</p> <p>16</p>
<p><b>Fall</b></p> <p>Cnst 201 Constr Contract Docs &amp; Proj (3)            Phys 106/L Gen Physics II &amp; Lab (4)            Health and Wellness (3)            Communication (3)            Fine &amp; Performing Arts (3)</p> <p>16</p>	<p><b>Spring</b></p> <p>Cnst 213 Envi &amp; Mech Sys for Bldg (3)            Cnst 206 Residential Design &amp; Cnst (3)            Cnst 214 Plan Interpret &amp; Quantity TO (3)            Cnst 318 Statics &amp; Stren of Materials (3)            Literary Studies (3)</p> <p>15</p>
<p><b>Fall</b></p> <p>Cnst 304 Construction Scheduling (3)            Cnst 314 Estimating &amp; Bid Prep (3)            IAD 310 Cnst &amp; Detailing: Commercial (3)            Math 301 Fund &amp; Applic of Calculus (3)            Ethics &amp; Social Responsibility (3)</p> <p>15</p>	<p><b>Spring</b></p> <p>Cnst 306 Commercial Design &amp; Const (3)            Met 304 Engineering Analysis (3)            IAD 360 Sustainable Practices (3)            Cnst 351 Professional Internship (0)            Junior Composition (3)            Social &amp; Behavioral Studies (3)</p> <p>15</p>
<p><b>Fall</b></p> <p>Cnst 430 Senior Seminar (1)            CVET 410 Struct Analysis &amp; Reinforced            Concrete Des (3)            Cnst 420 Plane Surveying (2)            Non-Native Language (3)            Global Persp &amp; Cultural Diversity (3)            Upper Division Integrative Elective (3)</p> <p>15</p>	<p><b>Spring</b></p> <p>Cnst 480 Construction Capstone (3)            Non-Native Language (3)            Upper Division Integrative Elective (3)            Elective (3)            Elective (1)</p> <p>13</p>

1/30/14

**Appendix 11**  
**Assessment Plan – 3 year cycle**

**Program: Architectural Engineering Technology (ArET)**

**Mission Statement:** The mission of the Architectural Engineering Technology program is to produce graduates that have mastered the combination of philosophy of building design and technology of construction systems and materials. The ArET program will provide skills relating to Building Information Modeling (BIM) which is a growing initiative in the industry that enhances the entire lifecycle of buildings from design to construction to post-occupancy.

**Communication of Outcomes:** Once approved, the department of Built Environment will develop a program website to disseminate all pertinent information regarding assessment objectives and outcomes measurement.

<b>Objective 1: Students will employ concepts of architectural theory and design in a design environment.</b>							
Student Learning Outcomes	Courses/Educational Strategies	Assessment Method(s)	Source(s) of Assessment	Target for Student Achievement	Time of Data Collection	Person(s) Responsible	
1.1 Students will synthesize information and generate multiple concepts and/or multiple design responses to programmatic requirements.	IAD 152-P	Final Project	IAD 152	First round of data will be the baseline.	F2015	Arrington-Bey	
1.2 Students will demonstrate creative thinking and originality through presentation of a variety of ideas, approaches, and concepts.	IAD 110-I, IAD 152-P	Final Project	IAD 152	First round of data will be the baseline.	F2015	Arrington-Bey	



**Objective 2: Students will utilize instruments, methods, software, and techniques that are appropriate to produce A/E documents and presentations**

2.1 Students will produce competent contract documents including coordinated drawings, schedules, and specifications appropriate to project size and scope, and sufficiently extensive to show how design solutions and interior construction are related.	IAD 152-I, IAD 310-P	Final Project	IAD 310	First round of data will be the baseline.	S2017	Sterling
2.2 Students will deliver effective presentations concerning complete project delivery.	COMM 101-I, CNST 480-P, IAD 152-I, IAD 310-P	Presentations, Final Project	CNST 480	First round of data will be the baseline.	S2016	McNabb
2.3 Students will write technical business letters and reports using professional English.	ENG 107-I, CNST 351-P,	HW, Final Report	CNST 351	First round of data will be the baseline.	F2016	McNabb
2.4 Students will identify detail hierarchies, scale, and content.	CNST 106-I, CNST 214-P, IAD 310-I	Exam	CNST 214	First round of data will be the baseline.	S2017, F2015	McNabb

**Objective 3:** Students will utilize measuring methods that are appropriate for field, office, or laboratory

3.1 Students will effectively apply the elements and principles of design to two-dimensional design solutions.	IAD 152-I, IAD 310-P	HW	IAD 310	First round of data will be the baseline.	F2015	Sterling
3.2 Students will effectively apply the elements and principles of design to three-dimensional design solutions.	IAD 152-I, IAD 310-P	HW	IAD 310	First round of data will be the baseline.	F2015	Sterling
3.3 Students will demonstrate layout and alignment control using surveying equipment.	CNST 420-I, CNST 420-P	HW	CNST 420	First round of data will be the baseline.	F2018	Eckerle
3.4 Students will use surveying skills to organize and develop a site.	CNST 420-I, CNST 480-R	HW	CNST 480	First round of data will be the baseline.	S2015, S2019	McNabb
3.5 Students will analyze static forces in structures.	CNST 318-I	HW, Exam	CNST 318	First round of data will be the baseline.	F2015, F2019	Eckerle
3.6 Students will apply soil mechanics to excavations and foundations.	CNST 318-I	HW	CNST 318	First round of data will be the baseline.	F2016	Eckerle

**Objective 4:** Students will apply fundamental computational methods and elementary analytical techniques in sub-disciplines related to architectural engineering

4.1 Students will analyze heat flow through wall assemblies.	CNST 213-I	HW, Exam	CNST 213	First round of data will be the baseline.	S2018	Ellingson
4.2 Students will solve problems using trigonometry as it relates to surveying.	CNST 420-P	HW	CNST 420	First round of data will be the baseline.	F2014, F2018	Eckerle

**Objective 5:** Students will perform economic analyses and cost estimates related to design, construction, and maintenance of building systems

5.1 Students will create quantity takeoffs for residential and commercial projects.	CNST 214-I, CNST 314-R	HW	CNST 314	First round of data will be the baseline.	S2016	McNabb
5.2 Students will identify and apply labor and equipment productivity factors.	CNST 111-I, CNST 314-R	Exam	CNST 314	First round of data will be the baseline.	F2016	McNabb
5.3 Students will identify and estimate direct and indirect job costs.	CNST 314-I, CNST 480-R	Final Project	CNST 480	First round of data will be the baseline.	F2017	McNabb
5.4 Students will use estimating software applications to prepare and submit construction bids.	CNST 314-P, CNST 450-R	HW	CNST 450	First round of data will be the baseline.	F2014, F2018	McNabb
5.5 Students will explain capital equipment depreciation and how this is used by construction companies.	CNST 111-P	HW, Test	CNST 111	First round of data will be the baseline.	S2016	Ellingson
5.6 Students will estimate project cash flow and identify payment processes and the affects of time value of money.	CNST 330-R	HW	CNST 330	First round of data will be the baseline.	F2016	Ellingson



**Objective 6: Students will select appropriate materials and practices for building construction**

	IAD 310-P	Final Project	IAD 310	First round of data will be the baseline.	F2015	Sterling
6.1 Students will demonstrate typical fabrication and installation methods for specified materials and products.						
6.2 Students will demonstrate basic principles of civil engineering in CAD.	CVET 410-I	HW	CVET 410	First round of data will be the baseline.	S2017	Badar
6.3 Students will apply the NEC for proper installations of electrical systems.	ECT 369-P	HW, Exam	ECT 369	First round of data will be the baseline.	F2017	Malooley
6.4 Students will demonstrate how the LEED rating system is applied to buildings.	CNST 306-P	HW	CNST 306	First round of data will be the baseline.	S2015, S2019	Ellingson
6.5 Students will compare the composition and properties of building materials.	CNST 111-I, CNST 306-R	HW	CNST 306	First round of data will be the baseline.	F2015, F2019	Ellingson
6.6 Students will understand construction terms, units of measurement, material grade stamps, actual and nominal sizes of materials, and define tolerances.	CNST 111-I, CNST 306-R, IAD 310-P	HW, Exam	CNST 306	First round of data will be the baseline.	S2016	Eckerle
6.7 Students will apply conformance references established by testing laboratories to building construction practices.	CNST 111-I, CNST 306-R	HW	CNST 306	First round of data will be the baseline.	S2017	Ellingson
6.8 Students will apply the IBC and IRC building code manuals and standards.	CNST 306-P, IAD 310-P	Exam, Final Project	CNST 306, IAD 310	First round of data will be the baseline.	F2015, F2019	Ellingson, Sterling

**Objective 7: Students will apply principles of building codes, regulations, and ethics in architectural practice**

7.1 Students will apply appropriate federal, state/provincial, and local codes.	IAD 310-P	Final project	IAD 310	First round of data will be the baseline.	F2015	Sterling
7.2 Students will apply appropriate standards and accessibility guidelines.	IAD 310-P	Final project	IAD 310	First round of data will be the baseline.	F2015	Sterling
7.3 Explain why bid shopping is unethical.	CNST 201-R,	Exam	CNST 201	First round of data will be the baseline.	S2017	Ellingson
7.4 Explain why front-end loading is unethical.	CNST 201-R	HW, Exam	CNST 201	First round of data will be the baseline.	S2017	Ellingson

**Appendix 12**  
**Program Enrollments and Completions -- Annual Totals by Fiscal Year (Use SIS Definitions)**

Campus: Indiana State University  
 Program: B.S. in Architectural Engineering Technology  
 Date: December 3, 2013

	Total Year 1 2014-2015	Total Year 2 2015-2016	Total Year 3 2016-2017	Total Year 4 2017-2018	Total Year 5 2018-2019
<b>A. Program Credit Hours Generated</b>					
1. Existing courses	112.5	180	270	399	592.5
2. New courses	0	0	90	138	210
<b>TOTAL</b>	112.5	180	360	537	802.5
<b>B. Full-Time Equivalents (FTE's)</b>					
1. FTE's generated by full-time students	5	9	15	23	35
2. FTE's generated by part-time students	2.5	3	5	6	7.5
<b>TOTAL</b>	7.5	12	20	29	42.5
<b>3. On-campus transfer FTE's</b>					
4. New-to-campus FTE's	0	0	0	0	0
<b>TOTAL</b>	7.5	12	20	29	42.5
<b>C. Program Majors (headcount)</b>					
1. Full-time students	5	9	15	23	35
2. Part-time students	5	6	10	12	15
<b>TOTAL</b>	10	15	25	35	50
<b>3. On-campus transfers</b>					
4. New-to-campus majors	0	0	0	0	0
<b>TOTAL</b>	10	15	25	35	50
<b>5. In-state</b>					
6. Out-of-state	0	0	0	0	0
<b>TOTAL</b>	0	0	0	0	0
<b>D. Program Completions</b>					
				3	7

Appendix 13  
New Program Proposal Summary

**I. Prepared by Institution: Indiana State University**

Institution Location: Terre Haute, Indiana  
 Program: B.S. in Architectural Engineering Technology  
 Date: February 19, 2013

	Total Year 1 2014-2015	Total Year 2 2015-2016	Total Year 3 2016-2017	Total Year 4 2017-2018	Total Year 5 2018-2019
<b>1. Enrollment Projections (headcount)</b>					
Full-time	5	9	15	23	35
Part-time	5	6	10	12	15
<b>TOTAL</b>	10	15	25	35	50
<b>2. Enrollment Projections (FTE)</b>					
Full-time	5	9	15	23	35
Part-time	2.5	3	5	6	7.5
<b>TOTAL</b>	7.5	12	20	29	42.5
<b>3. Degree Completion Projections</b>	0	0	0	3	7
<b>4. New State Funds Requested (actual)</b>	\$0	\$0	\$0	\$0	\$0
<b>5. New State Funds Requested (increases)</b>	\$0	\$0	\$0	\$0	\$0
<b>II. Prepared by CHE</b>					
<b>1. New State funds to be considered for recommendation (actual)</b>	\$	\$	\$	\$	\$
<b>2. New State funds to be considered for recommendation (increases)</b>	\$	\$	\$	\$	\$