Senate Reference No. 09-23

To: IPFW Senate

From: Cheryl Sorge, Chair
Curriculum Review Subcommittee

Date: March 26, 2010

Re: Proposal for the Bachelor of Science with a Major in Information Technology (IT)

The Curriculum Review Subcommittee supports the proposal for the Bachelor of Science with a Major in Information Technology (IT), and finds that the proposal requires no Senate review.

Senate Reference No. 09-23

Bachelor of Science
With a Major in Information Technology (IT)
To be offered at IPFW

INSTITUTION:	Indiana University - Purdue University Fort Wayne
COLLEGE:	College of Engineering, Technology, and Computer Science
DEPARTMENT:	Computer and Electrical Engineering Technology & Information Systems and Technology (CEIT)
DEGREE PROGRAM TITLE:	Bachelor of Science with a Major in Information Technology
FORM OF RECOGNITION/ DEGREE CODE:	Bachelor of Science/IT
SUGGESTED CIP CODE:	110401
LOCATION OF PROGRAM/ CAMPUS CODE:	IPFW / 1812
PROJECTED DATE OF IMPLEMENTATION:	August, 2010

DATE PROPOSAL WAS APPROVED BY INSTITUTIONAL BOARD OF TRUSTEES: _____

_____
Signature of Authorizing Institutional Officer

_____
Date

_____
Date Received by Commission for Higher Education

_____
Commission Action Date

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A. ABSTRACT

Bachelor of Science with a Major in Information Technology (IT)
Offered at Indiana University-Purdue University Fort Wayne (IPFW)
September 10, 2009

Objectives: This program will prepare graduates for a career in the area of information technology. The program focuses on producing graduates with the skills and knowledge to effectively plan, design, develop, integrate, manage, and/or maintain information and communication technologies in a wide range of technical domains to meet organizational, enterprise, and societal needs.

Clientele to be Served: The program is intended to serve undergraduate students who may attend on either a full-time or part-time basis. Students who will be attracted to the program will include:

- High school graduates or undecided students who choose to pursue a career in information technology;
- Current engineering technology students who are pursuing an engineering technology degree at IPFW;
- Students currently enrolled in other programs who desire a career in the area of information technology;
- A.S. Graduates of other Purdue statewide locations or other institutions such as Vincennes or Ivy Tech Community College offering programs that provide a similar background;
- Individuals currently employed in related positions who desire to further their education.

Curriculum:
The proposed degree has a major area of concentration of enterprise IT infrastructure, communications and networking, and IT Project Integration. The major areas of the degree are shown in the following table.

Information Technology B.S. Degree	**Credit Hours**
Mathematics & Science Requirements	17 hours
IT Technical Core	47 hours
Supporting Course	9 hours
Specialty Electives (minor discipline)	24 hours
*General Education Areas III, IV, and V	12 hours
English and Technical Writing Requirements	9 hours
Communication Requirements	6 hours
Total	**124 hours**

Employment Possibilities:
Graduates of the program will have excellent career opportunities in many areas involving network and communication systems (voice, data, and video), mobile and telecommunications systems, computer system analysis, computer system management and administration, database development and administration, Web application development, computer system securities, enterprise application and information integration, and other emerging IT areas. This demand applies not only to the northeastern Indiana area but also to the state and national market. Nationally, the U.S Bureau of Labor Statistics maintains a table of the 30 occupations with the fastest employment growth, 2008-2009, (http://www.bls.gov/news.release/ooh.t01.htm). According to these statistics, there are three major occupation categories (computer software engineers, applications; computer system analysts; network systems and data communications analyst) for which graduates of this IT program may compete.

B. PROGRAM DESCRIPTION

1. Proposed Program and its Objectives

a. Proposed Program

This proposal is for a Bachelor of Science with a major in Information Technology (IT) program to be offered by the Department of Computer and Electrical Engineering Technology & Information Systems and Technology (CEIT) in the College of Engineering, Technology, and Computer Science at IPFW. The program focuses on enterprise IT infrastructure, IT project integration, and networking and communication systems, areas of great interest to industry and students nationwide, including northeastern Indiana. The proposed degree is consistent with the mission and scope of IPFW to play an important role in the cultural and economic life of northeastern Indiana, to develop and retrain the workforce, and to respond to changes in the economy. It will also prepare students for graduate degree opportunities on the IPFW campus in the area of M.S. in Technology (IT and Advanced Computer Applications), and similar programs offered by other universities.

b. Objectives

The main objective of the IT program is to prepare graduates who are seeking careers in designing, developing, programming, and implementing information technology based systems, with an emphasis on network and communication systems (voice, data, and video), mobile and telecommunications systems, computer system & application management and administration, Web application development, computer system securities, and enterprise application and information integration.

Additional related objectives are to:

- Provide the IT community with the technically trained manpower base to support business and commerce in the Northeast Indiana community;
- Provide an educational center for retraining of workers with needed IT skills;
- Fill a need for trained professionals in the hospital, insurance, banking, defense, manufacturing, information technology, computer networking, and telecommunication industries.

2. Admission Requirements and Anticipated Student Clientele

a. Admission requirements

IPFW requirements for admission are listed in the IPFW 2009-2010 Bulletin for Undergraduate Programs at http://bulletin.ipfw.edu/content.php?catoid=13&navoid=329#Admission.

b. Prerequisite course work or degrees

There is no prerequisite course work other than admission to the program.

c. Meeting the needs of specific student clienteles

The proposed Bachelor of Science with a major in Information Technology degree program will attract students who desire to pursue a career in enterprise IT infrastructure, IT project integration, and communications and networking. The program is designed to meet the needs of technically inclined individuals, both those who are recent high school graduates and those who work in the field and wish to upgrade their skills. The program will be offered for daytime full-time students, evening part-time students, and some courses will be offered via distance education.

The Information Technology bachelor's degree program at IPFW is compatible with the IUPUI and Purdue Calumet associate degree in Computer Information Technology, and with other Computer and Information Technology programs in the Purdue Statewide Technology Program.

Articulation agreements are currently in place between IPFW and Ivy Tech Community College with respect to Ivy Tech ELT and CIS courses and their transfer to IPFW ECET and CS courses. The IPFW-IVY Tech equivalencies and transfer agreement is located at the following IPFW website and at the Indiana Core Transfer Library: http://www.ipfw.edu/admissions/credits/ivy-tech.shtml. The transfer agreement will be extended to include additional new courses within the proposed program. It will also provide a similar transfer path, as found with Purdue Calumet and Indiana Institute of Technology, for IVY Tech students with an A.A.S. in Computer Information Technology wishing to enter the B.S. IT program at IPFW.

d. Enrollment limitations

Enrollments will be limited according to available resources. However, it is not anticipated that enrollment limits will be required during the first five years. If limitations are required, students will be admitted on a competitive basis as established by academic credentials.

3. The Proposed Curriculum

a. Requirements

The curriculum described below provides a technical education in the area of Enterprise IT. It introduces the fundamentals of IT, electrical systems, and programming applications. It also introduces the discrete computational structures, computer systems, operating systems, IT systems, Web systems, networking, and databases. The specialization area can be tailored to the needs of students and completed through approved technical electives and the IT senior project I and II. Other required courses provide mathematical and communication skills, and sufficient knowledge of the enterprise business and service environment to perform effectively in the workplace. The semester hour breakdown by area is shown in the following table.

Information Technology B.S. Degree	**Credit Hours**
Mathematics & Science Requirements	16 hours
IT Technical Core	48 hours
Supporting Course	9 hours
Technical Electives (minor discipline)	24 hours
*General Education Areas III, IV, and V	12 hours
English and Technical Writing Requirements	9 hours
Communication Requirements	6 hours
Total	**124 hours**

*General Education is an IPFW requirement, with pertinent areas defined as:

Area I: Linguistic and Numerical Foundations (Satisfied by MA 153, COM 114 and ENGW 131)
Area II: Physical and Natural Sciences (Satisfied by PHYS 218 and CHEM 111)
Area III: The Individual, Culture, and Society (Satisfied by OLS 252 and 3 elective credit)
Area IV: Humanistic Thought (Satisfied by 6 elective credit)
Area VI: Inquiry and Analysis (Satisfied by CS 306)
Area V: Creative and Artistic Expression (Satisfied by 3 elective credit)

b. Sample Program

The plan-of-study for the proposed Bachelor of Science with a major in Information Technology is shown below.

Semester 1		**Semester 2**	
3cr	**ITC 110 Information Technology Fundamentals**	**3cr**	**ITC 131 Programming Fundamentals II**
3cr	**ITC 130 Programming Fundamentals I**	**4cr**	**ITC 145 Electrical Fundamentals**
3cr	**COM 114 Fund. of Speech Communication**	**3cr**	**ITC 170 Discrete Computing Structures**
3cr	**MA 153 Algebra and Trigonometry I**	**3cr**	**MA 154 Algebra and Trigonometry II**
3cr	**ENGW 131 Elementary Composition I**	**3cr**	**Gen Ed Elective (Area III)**
15cr		***16cr***	

Semester 3		**Semester 4**	
4cr	**ITC 220 Computer Systems**	**3cr**	**ITC 210 Information Technology Systems**
3cr	**ITC 230 Computer Operating Systems**	**3cr**	**ITC 250 Web Systems**
3cr	**OLS 252 Human Relations in Organization**	**4cr**	**PHYS 218 General Physics I**
3cr	**Gen Ed Elective (Area IV)**	**3cr**	**ENGW 234 Technical Report Writing**
3cr	**Approved Technical Elective***	**3cr**	**Approved Technical Elective***
16cr		***16cr***	

Semester 5		**Semester 6**	
4cr	**ITC 330 Networking**	**3cr**	**ITC 370 Human Computer Interaction**
3cr	**ITC 350 Databases**	**3cr**	**ITC 380 Project Integration**
3cr	**STAT 301 Elementary Statistics**	**3cr**	**CS 306 Computers in Society**
3cr	**CHEM 111 General Chemistry**	**3cr**	**COMxxx Advanced Communication**
3cr	**Approved Technical Electives***	**3cr**	**Approved Technical Electives***
16cr		***15cr***	

Semester 7		**Semester 8**	
3cr	**ITC 410 Information Assurance & Security**	**3cr**	**ENGW 421 Technical Writing Projects**
1cr	**ITC 480 IT Senior Project I**	**2cr**	**ITC 481 IT Senior Project II**
3cr	**CPET 470 Technology Project Management**	**3cr**	**Gen Ed Elect (Area V)**
3cr	**Gen Ed Elective (Area IV)**	**3cr**	**Approved Technical Elective***
3cr	**Approved Technical Elective***	**3cr**	**Approved Technical Elective***
3cr	**Approved Technical Elective***		
16cr		***14cr***	

<Total Credit Hours for B.S. Degree - 124 cr. hrs>

***Approved Technical Electives**

CPET 213 Web-Based analysis and Design
CPET 281 Local Area Networks and Management
CPET 355 Data Communications and Networking
CPET 364 Networking Security
CPET 384 Wide Area Network Design
CPET 493 Wireless Networking
CPET 494 Java Programming Applications
CPET 495 Web Engineering and Design
CPET 499 Topics in Computer Networking
ECET 234 PC Systems
ECET 434 PC Systems II
ECET 382 C++ Object Oriented Programming for Industrial Applications

4. Form of Recognition

a. Degree to be awarded

Upon successful completion of the degree requirements, students will be awarded the Bachelor of Science (B.S.) degree with the major field of study in Information Technology

b. CIP Code

The suggested CIP code for the program is 110401

c. Program, organizational, and site information on diploma

The Bachelor degree diploma will have the following information:

Be It Known That the Trustees of
PURDUE UNIVERSITY
Upon Nomination of the Faculty of the
College of Engineering, Technology, and Computer Science
Have Granted To
---------- (student's name)
The Degree of
Bachelor of Science

In Recognition of the Fulfillment of the
Requirements of that Degree
Awarded at Fort Wayne in the State of Indiana
---------- (date)

Signature of Chairman of Trustees **SEAL** Signature of Purdue University President

5. Program Faculty and Administrators

As a result of departmental unit reorganization within the college of ETCS, the proposed program will be staffed by ten faculty members: three from the Information Systems program, and seven from the Computer and Electrical Engineering Technology program, within the CEIT department. Initially, no additional resources are needed to implement this new program. The faculty and administrators directly involved with the program include:

<u>Computer and Electrical Engineering Technology Faculty</u>

Gary Steffen, M.S.C.S
Chair, Department of Computer and Electrical Engineering Technology & Information Systems and Technology (CEIT)
College of Engineering, Technology, and Computer Science

Hal Broberg, Ph.D., P.E. Associate Professor of Electrical and Computer Engineering Technology

Peter Goodmann, M.S.E., P.E.
Assistant Professor of Electrical and Computer Engineering Technology

Iskandar Hack, M.S.E., P.E.
Associate Professor of Electrical and Computer Engineering Technology

Tom Laverghetta, M.S.E., P.E.
Professor of Electrical and Computer Engineering Technology

Paul I. Lin, M.S.C.S, M.S.E.E., P.E.
Professor of Electrical and Computer Engineering Technology

Hongli Luo, Ph.D.
Assistant Professor of Computer Engineering Technology

Information System Faculty

Robert A. Barrett, M.S.B.A. (Purdue voluntary partial retirement)
Professor of Information Systems

Michelle Parker, M.S. Continuing Lecturer

Robert Sanders, M.A. (Purdue voluntary partial retirement)
Continuing Lecturer

b. New Faculty members required to implement the program

No additional faculty members are needed at this time. An additional IT faculty member will be needed once the program demonstrates healthy growth and seeks program accreditation from the Accreditation Board for Engineering and Technology (ABET). While ABET does not offer a specific number of faculty needed for an accredited IT program, it does state that there should be enough full-time faculty members to provide continuity, oversight, and stability, to cover the curriculum reasonably, and to allow an appropriate mix of teaching, professional development, scholarly activities, and service for each faculty member (http://www.abet.org/forms.shtml).

6. Needed Learning Resources

a. Availability of equipment and facilities that directly support the program

The Information Technology program will primarily use facilities of the CEIT department, which currently has laboratories that are equipped with computer stations and networking equipment. These laboratories will support the courses. In addition, all of the laboratories are part of the college's network and have access to a suite of licensed software. IPFW also has many open student laboratories that are part of a campus-wide Intranet and that support all non-specialized courses on campus.

Library resources (including licensed databases, electronic or print journal subscriptions, reference materials, and circulating books, along with electronic reserves and document delivery services) are adequately covered by existing collections. The continued ability to keep pace with rising material costs and licensing fees, however, will require incremental increases to the library budget. Librarian and library staff support for faculty or students seeking research consulting and information services are provided at a basic level.

b. Potential unmet resources that will prohibit the offering of a high quality program
The nature and frequency of technological advances require that computer-based facilities and software be upgraded on an ongoing basis. This includes up-to-date computers with additional memory, faster processors, and higher capacity storage devices along with modern electronic instrumentation, network and network analysis equipment. This is a continuing challenge for all CEIT programs. These programs include the A.S. and B.S Electrical Engineering Technology, B.S. Computer Engineering Technology and A.S. and B.S Information Systems degrees.

7. Other Program Strengths

a. Features defining the character of the proposed program that make it distinctive
The proposed IT program will provide an integrated educational experience that develops the ability of graduates to apply pertinent IT knowledge and skills for career opportunities in the fields of network and communication systems (voice, data, and video), mobile and telecommunication systems, computer system management and administration, database development and administration, Web application development, computer system securities, enterprise application and information integration, and other emerging areas in the IT field that meet organizational, enterprise, and societal needs.

Another feature of the proposed IT program is that it will also prepare students for graduate degree opportunities on the IPFW campus in the area of M.S. in Technology (IT and Advanced Computer Applications), and similar programs offered by other universities.

b. Anticipated collaborative arrangements with other parties
This IT B.S. program is compatible with the CIT B.S. program (networking option; and standard option allowing students to build their own concentration areas) at IUPUI, the CIT B.S. program (Networking track) at Purdue Calumet, and the CIT B.S. program (Networking Engineering Technology area) at Purdue, West Lafayette. The proposed degree program will maintain a close relationship and undertake cooperative endeavors whenever possible with other CIT programs in the Purdue system. Articulation agreements for transfer credit from Ivy Tech Community College in their CIT (Computer Information Technology) and CIS (Computer Information Systems) areas will be expanded and closely monitored to ensure that accreditation requirements are met. Furthermore, an IT faculty committee within the CEIT department will be formed to study and develop special requirements and policies for accepting Ivy Tech Community College associate degree graduates to enter the Junior year of the B.S. IT program at IPFW.

C. Program Rationale

1. Institutional Factors

a. Proposed program's compatibility with the institution's mission
The mission of Indiana University-Purdue University Fort Wayne (IPFW) is to offer a broad range of high-quality undergraduate, graduate, and continuing education programs that meet regional needs; to support excellence in teaching and learning; to advance and share knowledge through research and creative endeavor; and to work with the community to develop intellectual, cultural, economic, and human resources. The proposed B.S. program in Information Technology advances this university mission. It will prepare the university to meet demands from industry, to serve the northeast Indiana region and to expand areas in which the College of Engineering, Technology, and Computer Science (ETCS) is ready for future trends.

b. Planning process which has resulted in the development of this new program

The planning process was initiated during Fall 2006 through the IT Task Force, established by the Dean of the College of Engineering, Technology, and Computer Science (ETCS), with three faculty members representing the Computer Science department and another three representing the department of Electrical and Computer Engineering Technology (ECET). The Computing Curricula 2005: Information Technology Volume (http://www.acm.org/education/education/curric_vols/IT_October_2005.pdf), which outlines a set of recommendations for B.S. programs in IT, was referenced to develop the proposed IT program. The proposed baccalaureate degree in IT requires a total of 124 credit-hours combining core technical requirements (48 cr. hrs), advanced technical electives (24 cr. hrs for a specialized concentration developed in conjunction with a faculty advisor), mathematic & science courses (16 cr. hrs), English & technical writing (9 cr. hrs), communication (6 cr. hrs), general education Area III, IV & V courses (12 cr. hrs), and additional support requirements (9 cr. hrs) to prepare students for a professional IT career in modern society.

IT is an emerging field that has similarity and distinction with other existing computer-related disciplines. It is important to understand clearly the definitions of IT compared with other related fields of study to develop an effective IT curriculum. The joint task force for Computing Curricula 2005, organized by the Association for Computing Machinery (ACM), already studied and discussed characteristics of five major computing disciplines: Computer Engineering, Computer Engineering Technology, Computer Science, Information Systems, and Information Technology. In an effort to improve the understanding of each of these subject areas, the compiled descriptions about them, based on the ACM Computing Curricula 2005 report (http://www.acm.org/education/curric_vols/CC2005-March06Final.pdf) along with the Computer Engineering Technology area, based on the Accreditation Board for Engineering and Technology (ABET) criteria, are listed below.

Computer Science spans a wide range, from its theoretical and algorithmic foundations to cutting-edge developments in robotics, computer vision, intelligent systems, bioinformatics, and other exciting areas. Computer scientists design and develop all types of software from systems infrastructure (operating systems, network programs, etc.) to application technologies (web, databases, graphics, etc.). They develop new approaches, supervise other programmers, and keep them aware of new approaches. Computer scientists should be prepared to work in a broad range of positions involving tasks from theoretical work to software development.

Computer Engineering is concerned with the design and construction of computers and computer-based systems. Its curriculum focuses on the theories, principles, and practices of traditional electrical engineering and mathematics and applies them to the problems of designing computers and computer-based devices. Computer engineering students study the design of digital hardware systems including communications systems, computers, and devices that contain computers. They study software development, focusing on software for digital devices and their interfaces with users and other devices. Computer engineering study may emphasize hardware more than software or there may be a balanced emphasis. Currently, a dominant area within computer engineering is embedded systems, the development of devices that have software and hardware embedded in them.

Computer Engineering Technology programs prepare graduates with the technical and managerial skills necessary to enter careers in the design, application, installation, operation, and/or maintenance of computer systems. Graduates of associate degree programs typically have strengths in the building, testing, operation, and maintenance of existing computer systems and their associated

software systems, whereas baccalaureate degree graduates are well prepared for development and implementation of computer systems.

Information Systems focuses on the information aspects of information technology, rather than supporting the infrastructure. IS specialists focus on integrating information technology solutions and business processes to meet the information needs of businesses and other enterprises, enabling them to achieve their objectives in an effective, efficient way. They must understand both technical and organizational principles and practices so that they can serve as an effective bridge between the technical and management communities within an organization, enabling them to work in harmony to ensure that the organization has the information and the systems it needs to support its operations. IS specialists are also uniquely prepared to work with users and management at all levels of business and enterprise. They could also be involved in areas such as databases, strategic use of computing enterprise, project management, application management, and possibly assume responsibility for hardware and software selection appropriate to an organization.

Information Technology emphasizes the information infrastructure that underlies an organization's information requirements rather than the format or content of the information itself. There is some overlap between all of the disciplines, but IT professionals have a special focus on satisfying the information user's needs that arise from computing technology. Today, organizations of every kind need support from IT staff. They need to have appropriate systems in place. These systems must work properly, be secure, and be upgraded, maintained, and replaced as appropriate. The IT program prepares students to meet the computer technology needs of business, government, healthcare, schools, and other kinds of organizations. Graduates of IT programs will possess the right combination of knowledge and practical, hands-on expertise to take care of both an organization's information technology infrastructure and the people who use it. IT specialists assume responsibility for selecting hardware and software products appropriate for an organization, integrating those products with organizational needs and infrastructure, and installing, customizing, and maintaining those applications for the organization's computer users. IT professionals should be able to work effectively at planning, implementation, configuration, and maintenance of an organization's computing resources. In short, IT is concerned with information infrastructure.

c. Impact on other institutional, research or service programs of the institution

The principal impact will be within the CEIT department where students may exercise the option to move to the IT B.S. program. Faculty workloads within CEIT will be reorganized to meet this need.

d. Proposed program's utilization of existing resources

Existing courses in Computer Engineering Technology and Electrical Engineering Technology are used to support the new program, as shown in the plan of study. Existing courses in mathematics, physical sciences, and general education will also be utilized. Expected additional students for this curriculum will increase utilization of existing classrooms, laboratories, and computers in the CEIT department and in the College of Engineering, Technology, and Computer Science.

2. Student Demand

a. Enrollment data

Based on the ACM Computing Curricula 2005 report, industry demands for the IT skills taught through the Division of Continuing Studies at IPFW, informal statistics of about 80-100 incoming freshmen inquiring about an IT program availability in the past 4 years, enrollment histories at institutions across the country that offer similar programs, and a new B.S. IT program needs survey (northeastern Indiana region) completed Sept. 2008, it is estimated that the proposed IT program will

experience an initial growth rate of approximately 20 percent per year to meet the demand of the northeast Indiana area.

Enrollment projections are based on experience with existing technical programs, discussions with students, and the IT program needs survey completed on September 2008. (See Section 5c)

b. Enrollment projections

Enrollment projections for the IT program are shown in Table 1: Program Enrollments and Completions. Projections use AY 2011 as a baseline and are based on projected industry demand and existing student preferences. The enrollment projections, credit hours, FTEs, and headcount include all four years of the IT program.

3. Transferability

All credits earned in the Computer Engineering Technology (option in Networking) will count toward the fulfillment of graduation requirements for the proposed baccalaureate program. All credit earned is also transferable statewide within the Purdue University system. Credits earned in the proposed program generally should be transferable to baccalaureate programs elsewhere and credit earned in accredited IT associate and baccalaureate programs elsewhere will generally be accepted for transfer to IPFW. Two year programs in similar areas are in place at other Indiana institutions such as Ivy Tech Community College and Vincennes University. Articulation agreements for transfer credit from Ivy Tech Community College in their CIT (Computer Information Technology) and CIS (Computer Information Systems) areas will be established and closely monitored to ensure that accreditation requirements are met.

4. Access to Graduate and Professional Programs

Upon completion of a BS degree in IT, students will be prepared for graduate degree opportunities on the IPFW campus in areas such as M.S. in Technology (IT and Advanced Computer Applications), M.S. in Applied Computer Science, and similar programs offered by other universities. Graduates will also be prepared for graduate programs in technology such as those offered at Purdue University, West Lafayette and at Indiana State University. Other Master's Degree programs in technology and technology management exist nationally.

5. Demand and Employment Factors

a. Demand and Employment

The employment outlook is favorable for graduates possessing the knowledge and core IT skills necessary to function as network systems and data communications analysts, computer system analysts, computer support specialists, and computer and information system administrators. Increasing demand for enterprise application integration and enterprise information integration, as well as the convergence of voice, data, and video communication services, and the expansion of mobile and wireless communication information services and products into all areas of industry will contribute to strong employment growth in this specialty area.

Nationally, the U.S Bureau of Labor Statistics maintains a table of the 30 occupations with the largest employment growth, 2008-2018, (http://www.bls.gov/news.release/ecopro.t06.htm). Data extracted from this table is shown below and indicates that from 2008 to 2018, there are two major occupation categories for which graduates of this IT program may compete. The exact qualifications for each category of occupation will vary based on the specific employer.

The largest growing occupations, 2008-2018

Occupation	Employment		Change	
	2008	2018	Number	Percent
Computer software engineers, applications	515	690	175	34.0 (B.S.)
Network systems and data communication analyst	292	448	156	53.4 (B.S.)

[Bureau of Labor Statistics, Numbers in thousands of jobs]

The favorable short- and long-term occupation projections for North East Indiana (the proposed IT program service area) compiled by the Indiana Department of Workforce Development office, are:

- Indiana Workforce Development – Research & Analysis, http://www.hoosierdata.in.gov/nav.asp?id=25 Economic Growth Region 3 - (Counties: Adams, Allen, Dekalb, Huntington, LaGrange, Noble, Steuben, Wells, Whitley)
- Short-Term Occupation Projections - from 1st Quarter 2008 to 1st Quarter 2010, show a demand for trained IT graduates to fill the jobs as specified in the following table.

Short Term Occupation Projections for North East Indiana

Job Title	Emp Growth 1st Q. 2008 – 1st Q 2010	Total Growth in Region 3
Computer Specialists	1.7%	87
Network Systems and Data Communication Analysts	6.7%	42
Computer System Analysts	4.1%	28
Network and Computer Systems Administrators	2.9%	22
Computer Support Specialists	0.3%	3
Computer and Information Systems Managers	0.2%	1
Computer Specialists, All Other	0.8%	1
Database Administrators	4.4%	10

Long-Term Occupation Projections – 2009 to 2016, compiled by the Indiana Workforce Development, http://www.hoosierdata.in.gov/dpage.asp?id=39&view_number=2&menu_level=smenu1&panel_number=2 , also show a continuous demand of trained IT graduates to fill the same job categories as shown in the following table.

Long-Term Occupation Projections, 2009-2016

Job Title	Emp Growth 2009 – 2016	Total Growth in Indiana
Computer Specialists	19.9%	8136
Network Systems and Data Communication Analysts	47.1%	1754
Computer System Analysts	25.4%	1703
Network and Computer Systems Administrators	22.5%	1173
Computer Support Specialists	9.8%	817
Computer and Information Systems Managers	12.7%	532
Computer Specialists, All Other	5%	71
Database Administrators	25.1%	440

b. Geographic region to be served

The geographic region to be served by this proposed program is primarily northeast Indiana. As a regional campus, many students attending IPFW are considered “non-traditional” and are employed in the area. Most students at IPFW are linked to the northeast Indiana community by family,

employment or other financial responsibility. Most graduates of the proposed degree program are expected to seek or continue employment in northeastern Indiana.

c. Potential Employers

A survey for a new B.S. Information Technology conducted in September 2008 indicates that there is a strong demand for employees with this kind of IT skill and knowledge. The compiled result shows that northeastern Indiana region needs about 240 new hires and 90 replacement positions of trained IT professionals in the next 5 years.

Major employers of IT professionals in Region 3 include

- Lincoln Financial Group, Swiss Reinsurance, Old National Insurance,
- General Dynamics, ITT Aerospace Division and ITT Communications Division, Raytheon (defense and aerospace industries), BAE Systems (advanced defense and aerospace systems), Northrop Grumman
- Indiana University-Purdue University Fort Wayne, Fort Wayne Community Schools
- Parkview Health System, Physician Health Plan of Northern Indiana, Lutheran Hospital of Indiana
- Zimmer Inc, DePuy Orthopedics, Inc, Johnson & Johnson Family of Companies
- Franklin Electric, Fort Wayne Metals Research, Superior Essex, PHD Inc, Precision Die Technologies, Apollo Design Technology, Executive Technologies, Trust Bearer Labs, Imaging Office Systems, Reusser Design LLC
- Verizon Inc

6. Regional, State, and National Factors

a. Comparable programs in the state or region

The proposed Information Technology degree program is similar to the CIT degree program at IUPUI and Purdue Calumet and to IT programs offered throughout the nation. According to the Accreditation Board for Engineering and Technology (ABET) web site http://www.abet.org/AccredProgramSearch/AccreditationSearch.aspx, there are only 8 accredited Information Technology B.S. programs (Brigham Young University, University of Cincinnati, East Tennessee State University, Georgia Southern University, University of Missouri-Kansas City, Rochester Institute of Technology, University of South Alabama, and United States Naval Academy), and 1 accredited Computer and Information Technology B.S. program (Purdue University, West Lafayette). A program must have graduates prior to seeking accreditation, so there are other programs that have not yet been accredited, including the IUPUI CIT program.

b. External agencies

It is expected that the proposed program will be implemented effectively and apply for CAC/ABET accreditation during AY 2016.

D. Program Implementation and Evaluation

The Information Technology B.S. degree program is proposed for implementation in fall 2010.

1. Quality and Efficiency

Annual assessment reviews of each program are conducted by each department in accordance with IPFW requirements. These assessments include measurements and evaluations of success for the goals

for each program and include pertinent data such as enrollment figures, retention rates, and student academic progress. Measures used for assessment include student course evaluations, student success in completion of selected courses, evaluation of student capstone projects by faculty, and annual surveys of alumni and employers of alumni. A continuous improvement component is contained in each program assessment. It is intended that the degree will meet the accreditation guidelines of the CAC/ABET (Computing Accreditation Commission/Accreditation Board for Engineering and Technology). Assessment of student academic achievement will be based on ABET and IPFW requirements. It is expected that the proposed program will be implemented effectively and apply for CAC/ABET accreditation during AY 2016.

2. Appropriateness

A comprehensive program assessment plan will be developed, and feedback and quantitative data from the graduates and program constituencies will be periodically collected and evaluated by the IT faculty members for continuous program improvement purposes.

3. Availability of Similar Programs

The proposed Bachelor of Science with a major in Information Technology degree program is similar to the Computer & Information Technology (C&IT) degree program at Purdue University, West Lafayette, and the Computer Information Technology (CIT) programs at IUPUI and Purdue Calumet. Indiana Institute of Technology, Fort Wayne, offers a B.S. in Management Information Systems (MIS) which includes a combination of computer and management courses. Trine University, as well as IPFW, offers a B.S. in Computer Engineering. Within the state of Indiana, there is a similar four-year program at Indiana State University, a B.S. in Information Technology.

4. Personal and Social Utility

There are many campus-wide student organizations that will strengthen ties and communications for students at all levels. Some of these organizations are Indiana Purdue Student Government Association (IPSGA), Student Activity Board (SAB), and Tau Alpha Pi (the engineering technology honor society). Within the College of Engineering, Technology, and Computer Science, there are student chapters of the Institute of Electrical and Electronics Engineers (IEEE), Association of Computing Machinery (ACM), Association of Information Systems (AIS), Computer Information Association, Computer Science Student Advisory Board, Upsilon Pi Epsilon, etc. The College of Engineering, Technology, and Computer Science has a Director of Outreach Programs to coordinate national outreach programs such as Bridge Building Contest, Future City Competition, First Lego League, Science & Engineering Fair, and Summer Exploration.

5. Student Demand

Enrollment data from the IPFW Admission Office and the Student Success Advising Center of the College of Engineering, Technology, and Computer Science indicate student demand for the educational opportunities offered by the Information Technology program. Forecasted program enrollments are shown in Table 1. Continuous monitoring of actual enrollment and retention rates will be conducted along with the annual program assessment to show student demand and satisfaction levels. Continued demand is anticipated since the proposed degree provides preparation for a more focused career opportunity for students.

6. Student Access

IPFW has an institutional commitment to facilitate student academic success. Currently, many support programs and tutoring opportunities are available through the Center for Academic Support & Advancement (CASA), the Writing Center, the Center for Woman and Returning Adults, Multicultural Services and the Mastodon Advising Center (MAC). In addition, IPFW also has an office of Services for Students with Disabilities to provide people with disabilities an equal opportunity to participate in, contribute to, and benefit from university programs, services, and activities.

7. Flexibility of Program Design

The proposed program is designed to be flexible in providing reasonable transfer credit for entry into the program, and program transfer without major loss of credit. The degree focus prepares graduates in designing, developing, programming, and implementing information technology based systems, with an emphasis on network and communication systems (voice, data, and video), mobile and telecommunications systems, computer system & application management and administration, Web application development, computer system securities, and enterprise application and information integration. The adoption and integration of evolving technologies to meet changing needs will also be a priority in the proposed program.

8. Market Demand

Immediate market or short-term demand for the Information Technology graduates will be gathered and tracked through company human resources departments, local job listings, technical managers of local industries, and industrial advisory committee members. Long-term market demand will be gathered from the Indiana Department of Workforce Development, State and Local Labor Market Information, and the National Bureau of Labor Statistics Reports.

9. Inter-institutional and Inter-departmental Cooperation

All courses in the program are supported by academic departments at IPFW. CEIT faculty members are involved in college and university committees, student organizations, and other service activities that involve them in cooperative tasks at all levels.

10. Flexibility of Providing Instruction

A comprehensive pool of qualified and available faculty including associate faculty members exists to teach a wide diversity of IT courses. Specialized courses of the Information Technology program will be taught by qualified full-time or associate faculty members and can be changed to meet the needs of industry. Courses will be offered in both day and evening time periods, and some courses will be available via distance education.

E. Tabular Information

Table 1: Program Enrollments and Completions
Annual Totals by Fiscal Year (use SIS Definitions)

Campus: Indiana University - Purdue University Fort Wayne
Program: Bachelor of Science with a major in Information Technology

	Year 1 FY 2011	Year 2 FY 2012	Year 3 FY 2013	Year 4 FY 2014	Year 5 FY 2015
A. Program Credit Hours Generated					
1. Existing Courses	100	180	290	360	460
2. New Courses	50	150	190	240	320
TOTAL	150	330	480	600	780
B. Full-time Equivalents (FTE)					
1. Generated by Full-time Students	3	6	9	12	16
2. Generated by Part-time Students	2	5	7	8	10
TOTAL	5	11	16	20	26
3. On-campus Transfers FTEs	1	3	5	6	8
4. New-to-Campus FTEs	4	8	11	14	18
C. Program Majors (Headcounts)					
1. Full-time Students	3	6	9	12	16
2. Part-time Students	8	14	21	28	36
TOTAL	11	20	30	40	52
3. On-campus Transfers	3	5	7	9	10
4. New-to-Campus	8	15	23	31	42
5. In-State	11	20	30	40	52
6. Out-of-State	0	0	0	0	0
D. Program Completions	0	3	5	7	9

Table 2A: Total Direct Program Costs and Sources of Program Revenue

Campus: Indiana University - Purdue University Fort Wayne
Program: Bachelor of Science with a major in Information Technology

	Year 1		Year 2		Year 3		Year 4		Year 5	
	FTE	FY 2011	FTE	FY 2012	FTE	FY 2013	FTE	FY 2014	FTE	FY 2015
A. Total Direct Program Costs										
1. Existing Departmental Faculty Resources	2.00	$195,386	2.00	$195,386	2.00	$195,386	2.00	$195,386	2.00	$195,386
2. Other Existing Resources		$10,000		$10,000		$10,000		$10,000		$10,000
3. Incremental Resources	0.25	$5,000	.50	$10,000	.75	$15,000	.75	$15,000	.75	$15,000
TOTAL		$210,386		$215,386		$220, 386		$220,386		$220,386
B. Sources of Program Revenue										
1. Reallocation		$187,522		$168,295		$153,114		$126,199		$81,090
2. New-to-Campus Student Fees		$22,864		$47,091		$67,272		$94,187		$139,296
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		$210,386		$215,386		$220, 386		$220,386		$220,386

Table 2A: Explanation

Existing departmental faculty resources contain the combined salaries of the two current, full-time, faculty members (Paul Lin and Hongli Luo), who will be assigned to the proposed program. The accreditation agency states number of faculty members must be sufficient to provide program continuity, proper frequency of course offerings, appropriate levels of student-faculty interaction, and effective student advising and counseling.

Other Existing Resources includes a portion of current departmental funding (supplies and equipment) that will be used to support the proposed program.

Incremental resources of one associate faculty (.25 FTE) beginning in FY 2010, a second associate faculty (.25 FTE) beginning in FY 2011 and a third (.25 FTE) in FY 2012 will be needed to teach in the proposed program. Already funded Graduate Teaching Assistant (GTA) from the MS Technology program has the potential to also instruct courses (.25-.75 FTE).

Table 2B: Detail on Incremental or Out-Of-Pocket Direct Program Costs

Campus: Indiana University - Purdue University Fort Wayne
Program: Bachelor of Science with a major in Information Technology

	Year 1 FY 2011		Year 2 FY 2012		Year 3 FY 2013		Year 4 FY 2014		Year 5 FY 2015	
	FTE	COST	FTE	COST	FTE	COST	FTE	COST	FTE	COST
1. PERSONAL SERVICES										
a. Faculty	0.25	$6,000	0.5	$12,000	0.75	$18,000	0.75	$18,000	0.75	$18,000
c. Support Staff		0		0		0		0		0
TOTAL PERSONAL SERVICES	0.25	$6,000	0.5	$12,000	0.75	$18,000	0.75	$18,000	0.75	$18,000
2. SUPPLIES AND EXPENSES										
a. General Supplies/Expenses		$500		$1,000		$1,500		$1,500		$1,500
b. Recruiting		0		0		0		0		0
c. Travel		0		0		0		0		0
d. Library Acquisitions		0		0		0		0		0
TOTAL SUPPLIES AND EXPENSES		$500		$1,000		$1,500		$1,500		$1,500
3. EQUIPMENT										
a. New Equipment Necessary for Pgm		$700		$700		$1,000		$1,000		$1,400
b. Routine Replacement		0		0		0		0		0
TOTAL EQUIPMENT		$700		$700		$1,000		$1,000		$1,400
4. FACILITIES		0		0		0		0		0
5. STUDENT ASSISTANCE		0		0		0		0		0
SUM OF ALL INCREMENTAL DIRECT COST		$7,200		$13,700		$20,500		$20,500		$20,900

Table 3: New Academic Degree Program Proposal Summary

Campus: Indiana University - Purdue University Fort Wayne
Program: Bachelor of Science with a major in Information Technology

	Year 1 FY 2011	Year 2 FY 2012	Year 3 FY 2013	Year 4 FT 2014	Year 5 FY 2015
I . Prepared by Institution					
Enrollment Projections (Headcount)	11	20	30	40	52
Enrollment Projections (FTE)	5	11	16	20	26
Degree Completion Projection	0	3	5	7	9
New State Funds Requested (Actual)	0	0	0	0	0
New State Funds Requested (Increases)	0	0	0	0	0

II. Prepared by Commission for Higher Education

New state Funds to be Considered for Recommendation (Actual)

New State Funds to be Considered for Recommendation (Increases)

Comment:

CHE Code:

Campus Code:

County Code:

Degree Level:

CIP Code: