



University of Louisiana at Lafayette

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March 30, 2017

Université des Acadiens

Dr. James B. Henderson
President
University of Louisiana System
1201 North Third Street, Suite 7-300
Baton Rouge, LA 70802

Dear Dr. Henderson:

This is a request for approval of the revised request for authority to offer a new degree program, the Master of Science in Informatics.

Please place this item on the agenda for consideration at the April 2017 meeting of the Board of Supervisors.

Sincerely,

A handwritten signature in black ink, appearing to read "E. Savoie", written over a horizontal line.

E. Joseph Savoie
President

svc

Attachments

Louisiana Board of Regents

AA 2.05: REQUEST FOR AUTHORITY TO OFFER A NEW DEGREE PROGRAM*

-- Including incremental credentials building up to the Degree --

* Prior to final action by the Board of Regents, no institution may initiate or publicize a new program.*

Date:

Institution: University of Louisiana at Lafayette	Requested CIP, Designation, Subject/Title: Informatics; CIP 11.0104, Master of Science in Informatics
Contact Person & Contact Info	
Dr. Michael W. Totaro, Associate Professor School of Computing and Informatics Ray P. Authement College of Sciences University of Louisiana at Lafayette (337) 482-5697 miket@louisiana.edu	
Date Letter of Intent was approved by Board of Regents: 12/14/2015	
Date this Proposal was approved by Governing Board:	
Planned Semester/Term & Year to Begin Offering Program: Spring 2017	

1. Program Description

Describe the program concept: (a) purpose and objectives; (b) mode of delivery (on-site/hybrid/on-line). Describe plan for developing and rolling out new courses.

(a) Purpose and Objectives

The Mission and Purpose of the Master of Science in Informatics (MSI) program is to educate graduate students in the application of the scientific method to computing and information technologies, as well as to educate graduate students in the design, maintenance, and adaptation of information systems that solve problems pertinent to human needs. As defined by the National Center for Education Statistics (NCES), and as per *The Integrated Postsecondary Education Data System (IPEDS), Classification of Instructional Programs (CIP)*, Informatics, as a field of study, is: "a program that focuses on computer systems from a user-centered perspective and studies the structure, behavior and interactions of natural and artificial systems that store, process and communicate information. It includes instruction in information sciences, human computer interaction, information system analysis and design, telecommunications structure and information architecture and management" (from <http://nces.ed.gov/ipeds/cipcode/searchresults.aspx?y=55&aw=Informatics&sw=1,2,3&ct=1,2,3&ca=1,2,5,3,4>). As such, our Master of Science in Informatics program is designed to support advanced education and research in the information sciences and information technology. This program is consistent with one of several strategic initiatives described in the framework "Fostering Innovation through Research in Science and Technology in Louisiana" (FIRST Louisiana).

Our graduates will be trained in the Information Technology aspect of enterprise computing, regardless of end-user/organization domain or area. Enterprise computing includes the analytics, reporting, database management, and other software solutions systems, which span the entire organization. The curriculum is sufficiently generalized to allow graduates to find employment both within and outside of Louisiana, primarily with IT companies. Examples of such companies in Louisiana include the recently opened CGI, Perficient, and Enquero in Lafayette, GE Capital Technology Center, IBM Baton Rouge, and CenturyLink in Monroe, to name a few. As Lafayette continues to develop into a regional hub for information technology industries and services, the initial area of focus of the program will be to use information in local and regional organizations in order to improve products and services.

The objectives of our Master of Science in Informatics program are as follows:

- A. To provide a curriculum that encompasses the breadth of the field of Informatics (applied computing and information technology), and provides depth in one of several specialized areas.
- B. To prepare graduate students to function professionally in the field of Informatics and/or to pursue graduate research in Informatics or related fields.
- C. To develop graduate students' computational and critical thinking, as well as problem-solving skills, through use of the scientific method.

Upon successful completion of the Master of Science in Informatics program, graduates will:

- A.1 Understand and employ the fundamental principles of the science of Informatics, including those of pervasive themes in Informatics, history of information technology, information technology and its related and informing disciplines, and application domains;

- A.2 Analyze and design computing and information technology hardware and software infrastructures that are of varying complexity and configuration, as applied to a variety of criteria and/or processes relevant to the task;
- B.1 Apply concepts and analytical methods used in the computational, natural, mathematical, and social sciences to the design and implementation of computing and information technology solutions across multiple domains;
- B.2 Understand the professional, ethical, legal, and societal issues and responsibilities of the design and application of computing and information technology solutions, as well as their global impact;
- C.1 Acquire the ability to solve structured, unstructured, and semi-structured problems by means of computational thinking and appropriate design choices, and to demonstrate a working knowledge of current Informatics tools, techniques, and skills.

Although there are other graduate programs in the field of Informatics at various institutions across the United States (for example, at Indiana University) our Master of Science in Informatics program would be the first of its kind in Louisiana.

Students who complete our Master of Science in Informatics Program will be well-prepared for one or more of the following:

1. To pursue a doctoral degree in fields such as: Informatics, Information Systems, or Information Technology; or
2. To pursue middle-/upper-management positions (e.g., Technology manager; Chief Information Officer); or
3. To attain mid-career professional advancement (e.g., Professional recognition award, etc.)

Application of the Scientific Method:

Our Master of Science in Informatics Program integrates the use and application of the scientific method (see *Scientific Method in Practice*, by Hugh G. Gauch, Jr., Cambridge University Press, 2002) in several of the required courses. These courses are described in the curriculum section below.

Other Resources Needed:

None.

(b) Mode of Delivery

The mode of delivery for UL Lafayette's Master of Science in Informatics Program is face-to-face (i.e., on-site).

Plan for Developing and Rolling out New Courses

Courses at the 500-level shall be created, pending final approval of the Master of Science in Informatics Program (Please see the curriculum section below for proposed courses and their descriptions.) The course rollout plan is such that 16 lecture courses and 2 Master's Project and/or Thesis Research and Thesis courses will be rolled out over four consecutive semesters. Based on the number of faculty teaching in the degree program, we anticipate that each faculty member will develop one or two (but no more than two) of the courses, as follows:

Spring 2017:

- INFX 500 Introduction to Informatics
- INFX 501 Foundations of Informatics
- INFX 510 Human-Computer Interaction (HCI) in Informatics
- INFX 540 Informatics Network Infrastructures and Management

Fall 2017:

- INFX 502 Systematic Methods in Informatics
- INFX 512 Data Analysis and Visualization
- INFX 530 Database and Network Systems
- INFX 580 Systems Development

Spring 2018:

- INFX 520 IT and Network Security
- INFX 590 IT Governance, Risk Management, and Compliance (GRC)
- INFX 570 Web Application Development
- INFX 581 Process Analysis, Modeling and Design
- INFX 599 Thesis Research and Thesis

Fall 2018:

- INFX 531 Distributed Database Management
- INFX 532 Data Mining and Business Intelligence
- INFX 575 Mobile Application Development and Design
- INFX 591 Informatics Capstone
- INFX 595 Master's Project

Map out the proposed curriculum, in sequence, identifying any incremental credentials and/or concentrations within the degree. Indicate which courses will be new, including those that would be offered in the new program as electives. Describe any special requirements (e.g., internships, comprehensive exam, thesis, etc.).

Basic Structure of the Curriculum and Components/Concentrations:

The Master of Science in Informatics Program requires students' completion of 33 graduate credit hours for both thesis and non-thesis options. Thus, a full-time student can complete the curriculum in four regular semesters or roughly 24 months. Students may pursue several course threads, which include but are not limited to the following areas: Business, Media Technology, System Administration, and Web Development.

There are two tracks available to earn the Master of Science in Informatics:

- Master of Science in Informatics with an undergraduate degree in a related field (e.g., informatics, computer science, computer engineering)
- Master of Science in Informatics with an undergraduate degree in another field

Track 1: Master of Science in Informatics with an undergraduate degree in a related field

The Master of Science in Informatics with an undergraduate degree in a related field is organized as four components:

1. At least 18 credit hours of required core coursework;
2. At least 3 credit hours of elective INFX coursework;
3. At most 6 credit hours from one of the following options:
 - a. additional INFX elective coursework; or
 - b. elective coursework in a relevant discipline outside of INFX – for example, Biology, Business, Geology, Mathematics, Physics, Psychology, and other disciplines (as approved by the Informatics Graduate Coordinator);
4. One of the following:
 - a. Non-thesis option: 3 credit hours of INFX 597 (Special Project) and 3 credit hours of INFX 595 (Capstone);
or
 - b. Thesis option: 6 credit hours of INFX 599 (Thesis).

Track 2: Master of Science in Informatics with an undergraduate degree in another field

The Master of Science in Informatics with an undergraduate degree in another field is organized as four components:

1. At most 6 credit hours of Foundation coursework, which shall include both INFX 500 and INFX 530;
2. At least 18 credit hours of required core coursework;
3. At most 3 credit hours from one of the following options:
 - a. additional INFX elective coursework; or
 - b. elective coursework in a relevant discipline outside of INFX – for example, Biology, Business, Geology, Mathematics, Physics, Psychology, and other disciplines (as approved by the Informatics Graduate Coordinator);
4. One of the following:
 - a. Non-thesis option: 3 credit hours of INFX 597 (Special Project) and 3 credit hours of INFX 595 (Capstone);
or
 - b. Thesis option: 6 credit hours of INFX 599 (Thesis).

Graduate courses in Informatics shall be organized as follows:

FOUNDATION

INFX 500 Introduction to Informatics

INFX 530 Database and Network Systems

REQUIRED CORE COURSES

INFX 501 Foundations of Informatics

INFX 502 Systematic Methods in Informatics

INFX 510 Human-Computer Interaction (HCI) in Informatics

INFX 540 Informatics Network Infrastructures and Management

INFX 580 Systems Development

INFX 590 IT Governance, Risk Management, and Compliance (GRC)

ELECTIVES

INFX 512 Data Analysis and Visualization
INFX 520 IT and Network Security
INFX 531 Distributed Database Management
INFX 532 Data Mining and Business Intelligence
INFX 533 Cloud Computing and Big Data Applications
INFX 570 Web Application Development
INFX 575 Mobile Application Development and Design
INFX 581 Process Analysis, Modeling and Design

CAPSTONE

INFX 591 Informatics Capstone

PROJECT OR THESIS

INFX 595 Master's Project
INFX 599 Thesis Research and Thesis

ELECTIVES OUTSIDE OF INFX

A maximum of six hours may, with the approval of the student's committee chair and the Graduate Coordinator, be taken in a discipline other than Informatics.

COURSE DESCRIPTIONS

FOUNDATION

INFX 500 Introduction to Informatics (3 credit hours). This course is intended for students whose prior university studies are in non-computing areas. It provides students with a breadth-level foundation of the Informatics discipline: namely, an overview of computing architectures, algorithms and programming, operating systems, data structures, file organization, and databases concepts.

INFX 530 Database and Network Systems (3 credit hours). This course is intended for students whose prior university studies are in non-computing areas. It provides students with a breadth-level foundation in the Informatics areas of database systems and network infrastructures.

REQUIRED CORE COURSES

INFX 501 Foundations of Informatics (3 credit hours). This course serves as an intensive introduction to the most central technical tools of Informatics: most importantly, probability and statistics, computation and data analysis (using R). It also examines ethical, legal, and social issues surrounding contemporary research and practice in science Informatics. Topics include the nature of science and technology, the ramifications of recent advances in science Informatics, relevant science policy, ethics, and surveys of diverse theories of globalization to identify the best approaches for professional informatics career planning.

INFX 502 Systematic Methods in Informatics (3 credit hours). This course surveys a broad range of research methods employed in Informatics. The course explores the theoretical foundation and exemplifies the application of systematic methods to specific research questions. The course introduces qualitative and quantitative research methods in sampling, data collection, data analysis and the mathematical prerequisites for understanding probability and statistics.

INFX 510 Human-Computer Interaction (HCI) in Informatics (3 credit hours). This course explores, analyzes, and appraises underlying assumptions and the rationale behind some of the most influential theoretical attempts in HCI and related fields. This course offers a survey of the field of Human-Computer Interaction Design. It introduces interaction design, cognitive modeling, distributed cognition, computer-supported cooperative work, data visualization, ubiquitous computing, affective computing, and domestic computing.

INFX 540 Informatics Network Infrastructures and Management (3 credit hours). This course presents the foundations of data communications – with particular emphasis on the ISO-OSI Reference Model and TCP/IP – and takes a bottom-up approach to computer networks. The course concludes with an overview of core network security and management concepts.

INFX 580 Systems Development (3 credit hours). This course provides students with the tools and skills needed to define, understand, and implement successful enterprise architectures that provide real value to organizations. Agile (e.g., Scrum) and object-oriented methods of information systems analysis and design for organizations with data-processing needs are discussed. The course aims to develop proficiency in all basic project management tools and software techniques, including software architecture, project communications, risk analysis, cost estimation and budgeting, and quality control, as well as proficiency in preparing and implementing a comprehensive project plan and a software development life cycle. This course will enhance students' competence sufficiently to oversee the architecture, design, and implementation of software systems.

INFX 590 IT Governance, Risk Management, and Compliance (GRC) (3 credit hours). This course looks at systems and protocols, and prepares students to design threat models and to use a large number of current security technologies and concepts to block specific vulnerabilities. The course begins with an introduction to relevant definitions (i.e. security, privacy, trust, etc.), then moves to a series of timely case studies of security technologies. This course covers the integration of risk management into governance and compliance but it is not limited to security design/implementations that allocate risk, determine authority, reify or alter relationships, and determine trust extended to organizational participants.

ELECTIVES

INFX 512 Data Analysis and Visualization (3 credit hours). This course focuses on analytical reasoning facilitated by interactive visual interfaces. It serves as an introduction to the science and technology of visual analytics. The course content will include both theoretical foundations of this interdisciplinary science as well as practical applications of integrated visual analysis techniques to real-world problems.

INFX 520 IT and Network Security (3 credit hours). This course is an extensive survey of system and network security. It discusses methodologies for identifying, quantifying, mitigating, and controlling risks. Students implement comprehensive IT risk management plans (RMP) that identify alternate sites for processing mission-critical applications, and techniques to recover infrastructure, systems, networks, data, and user access. The course provides the foundation for more advanced security courses and hands-on experiences through course projects.

INFX 531 Distributed Database Management (3 credit hours). This course covers advanced aspects of database management systems, including advanced normalization and de-normalization, query optimization, object-oriented and object-relational databases, data warehousing, data mining, distributed databases, XML, XSL, and databases for web applications.

INFX 532 Data Mining and Business Intelligence (3 credit hours). The course provides an introduction to concepts behind data mining, text mining, and web mining. Algorithms will be tested on data sets using the Weka Data mining software and Microsoft SQL Server 2014 (Business Intelligence Development Studio).

INFX 533 Cloud Computing and Big Data Applications (3 credit hours). This course provides an introduction to applied parallel computing using the MapReduce programming model facilitating large scale data management and processing. Emphasis on hands-on experience working with the Hadoop architecture, an open-source software framework written in Java for distributed storage and processing of very large data sets on computer clusters. Also includes the use of related big data technologies from the Hadoop tool environment, such as Hive, Impala, and Pig in developing analytics and solving problems faced by enterprises today.

INFX 570 Web Application Development (3 credit hours). This course focuses on building core competencies in web design and development. It begins with a complete immersion into HTML — essentially XHTML and Dynamic HTML (DHTML). Students are exposed to Cascading Style Sheets (CSS), as well as Dynamic CSS. The fundamentals of JavaScript language, including object-oriented JavaScript, are covered comprehensively. AJAX with XML and JSON are covered, as they are the primary means to transfer data from client and server. Topics also include comparison of e-commerce procedures, payment mechanisms, applications in different industry sectors, security, the challenges of starting and maintaining an electronic business site.

INFX 575 Mobile/Pervasive Application Design and Development (3 credit hours). The aim of this course is to provide students with the ability to design and implement novel interactions with mobile and pervasive technologies. The course will engage in discussions of interaction paradigms and explore different technologies related thereto. Students will design, build, implement, and refine mobile and pervasive computing applications for their domain of interest.

INFX 581 Process Analysis, Modeling and Design (3 credit hours). This course aims to identify, execute, measure, monitor, and control both automated and non-automated business processes to achieve consistent, targeted results aligned with an organization's strategic goals. The course focuses on use of information technology to manage, transform, and improve business processes. It examines the modeling of processes, relationships, and costs, as well as the re-engineering of processes to reduce waste, add value, shorten cycle times, decrease variability, and improve productivity. This course provides a detailed understanding of project management and presents concepts that promote efficient communication and coordination among various groups. Students will learn to construct a project plan and manage project costs, risk, and communication within the context of Project Portfolios.

CAPSTONE

INFX 591 Informatics Capstone (3 credit hours). This project-based course provides an overview of contemporary information technology (IT) management. It explains the relevant issues of effectively managing information services. The course highlights areas of greatest current and potential application of IT to business needs, and reviews electronic business, enterprise business systems, and decision support systems.

PROJECT OR THESIS

INFX 595 Master's Project (3 credit hours).

INFX 599 Thesis Research and Thesis (3-6 credit hours).

2. Need

Outline how this program is deemed essential for the well-being of the state, region, or academy (e.g., how is it relevant, how does it contribute to economic development or relate to current/evolving needs).

UL Lafayette's Master of Science in Informatics Program will address the current and expected demand for well-prepared computing and information technology professionals across the state, including the Acadiana region. According to information provided by Louisiana Economic Development (LED), Louisiana's traditional and emerging industries continue to grow at a healthy rate. These industries include the following:

- Aerospace
- Agribusiness
- Automotive
- Energy
- Entertainment & Game Design
- Manufacturing
- Process Industries
- Software Development
- Water Management

Businesses choose Louisiana because of competitive incentives, a skilled workforce, a business-friendly tax environment, and a unique quality of life. Such companies include, but are not limited to, the following: AAR, Albemarle Corporation, Bell Helicopter, Benteler, Bercen, Inc., CenturyLink, CGI, Cheniere, ConAgra Foods, CSC, Dr. Reddy's, Electronic Arts, Enquero, Gameloft, Gardner Denver, GE Capital, Halliburton, IBM, K&B Machine, Moonbot Studios, Nucor, Perficient, Pixel Magic, Sasol, Schumacher Group, SNF Flopam, Zagis, and Gulf Coast Spinning.

Several key technology companies recently located and/or established facilities in Louisiana:

- In March of 2013, IBM announced a major 800-job technology center in Baton Rouge, the purpose of which is to provide quantitative-intense business solutions to its domestic customers. The new IBM Technology Center opened in 2015 as part of a \$55 million urban development.
- Also in March of 2013, CenturyLink broke ground on its 250,000-square-foot headquarters expansion, which it calls its "Technology Center of Excellence," adding 800 jobs in Monroe and 1,170 new indirect jobs in the greater Monroe area. This Center opened in late 2014 and is fully operational.
- In April of 2014, CGI announced a 400-job technology center in Lafayette, the construction of which is currently in progress. Specifically, by way of its new 50,000-square-foot facility, CGI will deliver technology solutions as an anchor tenant of the University of Louisiana at Lafayette's Research Park. The facility was completed in March 2016.
- In July of 2014, Enquero, a company that provides technology solutions for major domestic customers, announced a 350-job enterprise software center in Lafayette. Enquero's offices are located in the LITE Center, Lafayette, Louisiana.
- In September of 2014, Perficient announced a 245-job software development center in Lafayette. Perficient currently operates in its downtown Lafayette office location.

In addition to the expected several thousand jobs created by these technology companies, so-called "non-technology" companies (e.g., Bell Helicopter, Benteler, ConAgra Foods, and others) require computer and information technology solutions, which are developed and deployed by informatics professionals. Overall, the job outlook for computing and information technology occupations is expected to grow faster than average (i.e., between 8% - 37%, depending upon the specific occupation, between now and the year 2022), according to the U.S. Bureau of Labor Statistics (bls.gov). Moreover, among the various computing and information technology occupations that require a minimum of a Bachelor's degree, the 2012 range of median pay spans between \$62,500 and \$93,350 per year.

It should be noted that, even with this new Master's Program, the needs and requirements by the aforementioned companies for graduates of such a program will still be unmet. Nevertheless, the production of graduates from this Master's Program will help greatly in meeting these needs.

The Acadiana Region continues to experience an economic environment that is both vibrant and poised for continued growth. In fact, a 2013 report by Louisiana Economic Development (LED) includes the following statement:

"Area Development magazine ranked Lafayette the No. 1 city in the U.S. for economic and job growth. According to fDI (Foreign Direct Investment) magazine's 2013-14 American Cities of the Future, Lafayette ranked No. 7 overall among the Top 10 Small American Cities of the Future and No. 1 among small American cities in the category of fDI Strategy, a

ranking based on a city's current strategy for foreign direct investment promotion."

A September 2014 report by the Lafayette Economic Development Authority (LEDA) identifies the following major industries in Lafayette Parish:

- Construction
- Retail Trade/Leisure & Hospitality/Entertainment
- Finance
- Manufacturing
- Medical/Health care
- Oil and Gas
- Information Technology
- Transportation/Distribution

The 21st century economy necessitates direct support of computing and IT needs, irrespective of the industry or market space within which an organization operates. Our proposed program would directly support the computing and information technology needs and requirements of these major industries in Lafayette Parish, as well as across the state. This is due in no small measure to the multidisciplinary and cross-functional nature of our proposed program.

Relevance of the MSI to the Board of Regents (BOR) Master Plan for Public Postsecondary Education in Louisiana: 2011 (Revised April, 2012)

Our program specifically addresses the following goals and objectives in the BOR 2011 Master Plan:

Goal 1, Objective 1.7: "Develop a Skilled Workforce to Support an Expanding Economy."

Our Master's program will train a new generation of workers to support computing and IT management, as well as problem-solving in areas critical to the State of Louisiana. We specifically address this need in our curriculum through our business and internship modules. Contributing to the development of a qualified labor pool in the domain of informatics will facilitate business attraction and retention.

Goal 2, Objective 2.1: "Maintain and Build Strength in Foundational Science and Technology Disciplines Identified in FIRST Louisiana."

Digital Media, Cyber Security, and Information Technology and Services are targeted by FIRST Louisiana and these are precisely the areas we support by way of our Master's program.

"Recruit, cultivate, and retain research talent in the foundational sciences."

The addition of a Master's program will allow us to greatly expand our research in Computational Science and Information Technology, which will attract quality research-active faculty and provide an incentive to retain them as members of the University community.

"Develop and maintain cutting-edge infrastructure and facilities for fundamental science and technology research."

Although we already have and are building leading-edge laboratory facilities (e.g., a Virtual Desktop Infrastructure, or VDI), the Master's program will provide new opportunities to advance infrastructure. We can leverage the Master's program to secure new technologies through grants, and we can rely on the more highly-trained Master's students to help operate and maintain hardware and software.

Goal 2, Objective 2.2: "Promote Multidisciplinary and Multi-Institutional Collaborative Research Efforts."

Informatics is by definition multidisciplinary. This is evidenced by the available course threads in areas such as Business, Media Technology, System Administration, and Web Development.

"Address multi-disciplinary and multi-institutional collaborations in campus research plans."

Our multidisciplinary approach reflects the University of Louisiana at Lafayette's strategic plan for advancing multidisciplinary research.

Goal 2, Objective 2.3: "Sustain and Advance Research Commercialization and Translational Activities that Promote Economic Development in Louisiana."

We are embracing translational research as our primary focus, with the aim of bridging the gap between fundamental and applied research. This focus includes an emphasis on Economics and Management courses, as well as opportunities for internships. This approach is designed to enhance commercialization.

"Promote Multidisciplinary and Multi-Institutional Collaborative Research Efforts."

See above

“Foster networking and strategic collaborations between higher education, government, and Louisiana’s existing and prospective high-growth industry sectors.”

Louisiana’s High-growth industry sectors include Digital Media and Cyber Security. Our course threads directly support these two sectors. Hence, our Master’s framework and educational approach of embracing translational research will foster collaborations between higher education and industry and government partners.

“Build capacity in areas of competitive advantage and target niches which align with campus and State research priorities.”

As described above, our course threads are closely aligned with the research priorities of UL Lafayette and the State of Louisiana. By filling these niches, we add value to our program for our students, our community, and society.

In summary, our proposed Master’s program will uniquely benefit Louisiana because:

- Our focus areas are closely aligned with the strategic focus areas identified by the BOR in the FIRST Louisiana framework.
- We combine these interrelated focus areas into one unique Master’s program, as opposed to multiple programs administered by different colleges or administrative units.
- Our program is unique in its focus on providing educational and research activities at the Master’s level that bridge the gap between fundamental and application-based research. This problem-solving approach will result in more tech transfer, research commercialization, and business partnerships, providing a real return on investment for Louisiana.
- The Master’s program will greatly increase our ability to secure external research funding and provide more national and international recognition for the state of Louisiana.
- The Master’s program will build on our existing B.S. program in Informatics and generate a mutually beneficial interaction with this undergraduate program.
- Additional costs for program implementation are limited because we can rely heavily on existing faculty, staff, and research infrastructure.
- The Master’s program will increase the level of STEM degree attainment within the state by providing more upper-level educational opportunities in areas of high growth where more intellectual capacity is needed.

Describe how the program will further the mission of the institution.

The University of Louisiana at Lafayette is the largest member of the University of Louisiana System. Our Master’s program aligns well with the University’s mission as articulated in its own Mission Statement, as part of its continuing excellence in graduate education, research, and public service. Moreover, our Master’s program will contribute to the University’s ongoing development of scholars who advance knowledge and improve the material conditions of society. The program also aligns with the University’s Statewide Mission as included in the *Master Plan for Postsecondary Education in Louisiana: 2011*, specifically with regard to serving “economic development interests and entrepreneurs throughout the state” (p. 70).

Our proposed Master’s program is an institutional priority at this time because the continuing integration of information technology infrastructures by small, medium, and large businesses must be supported by IT professionals who have currency in the field, as well as the intellectual agility to assimilate new technologies as they become available. This priority, in turn, directly supports the State of Louisiana’s economic prosperity through the development of a skilled, educated citizenry, and aligns with the Board of Regents’ Master Plan, which has established a goal of increasing the educational attainment of its adult citizens to the SREB average of 42% by 2025.

Identify similar programs in the state and explain why the proposed one is needed: present an argument for a new or additional program of this type and how it will be distinct from existing offerings.

According to information available from the Louisiana Board of Regents website, the following are Masters-level degree programs in the area of Computer and Information Sciences and Support Services:

Active Degree and Certificate Programs/Options
Selected List

Discipline/Area=Computer and Information Sciences and Support Services (11)
Degree Level=Masters
Programs Found=7

Institution	2010 CIP Code	Degree	Subject/Discipline	Approved	Average Completes (5-Year)
L.S.U. and A&M College	110401	MSSS	SYSTEMS SCIENCE	05/1974	27
L.S.U. in Shreveport	110401	MS	COMPUTER SYSTEMS TECHNOLOGY	07/1988	8
Louisiana Tech University	110701	MS	COMPUTER SCIENCE	05/1980	13
Southern University and A&M College	110701	MS	COMPUTER SCIENCE	06/1983	18
Southern University in New Orleans	110401	MS	COMPUTER INFORMATION SYSTEMS	08/2013	0
University of Louisiana at Lafayette	110701	MS	COMPUTER SCIENCE	n/a	49
University of New Orleans	110701	MS	COMPUTER SCIENCE	05/1991	15

These programs are aligned with particular computing areas, namely, computer science, information systems, computing technology, and systems science (engineering). In contrast to these existing programs, our graduates will be trained in the Information Technology aspect of enterprise computing, regardless of end-user/organization domain or area. Enterprise computing involves all the diverse computing solutions, such as database systems, network and Web infrastructures, application software, and business processes. The curriculum is sufficiently generalized to allow graduates to find employment both within and outside of Louisiana, primarily in IT companies. In Louisiana, examples of such companies include the recently opened CGI, Perficient, and Enquero in Lafayette, GE Capital Technology Center, IBM Baton Rouge, and CenturyLink in Monroe, to name a few. As stated in Section 1, the initial area of focus of the program will be to use information in local and regional organizations to improve products and services. This goal will facilitate Lafayette's transformation into a regional hub of information technology and service industries (e.g., CGI, Perficient, and Enquero).

If approved, will the program result in the termination or phasing out of existing programs? (Is it a replacement?) Explain.

The Program will not result in the termination or phasing out of existing programs, nor is it a replacement for any existing programs.

If a Graduate program, cite any pertinent studies or national/state trends indicating need for more graduates in the field. Address possibilities for cooperative programs or collaboration with other institution(s).

Please refer to "Section 2. Need" above.

3. Students

Describe evidence of student interest. Project the source of students (e.g., from existing programs, or the prospects of students being recruited specifically for this program who might not otherwise be attracted to the institution).

A survey of senior undergraduate students majoring in Informatics was conducted in February of 2015. Of the 22 respondents, 20 (91%) indicated an interest in pursuing a Master of Science in Informatics at UL Lafayette. Additionally, graduates of both the Informatics Program and its predecessor, the former Management Information Systems Program (MIS), were surveyed by way of a private LinkedIn group, "Informatics Program (and former MIS Program) Alumni Group." Twelve group members (alumni) indicated an interest in our proposed Master's program. From these student polls, we may surmise that this group of 32 respondents would apply for acceptance into such a program, if it were in place today.

In addition to having a strong base of students in our existing undergraduate programs, we have developed a recruitment strategy to foster additional enrollment. Our recruitment strategy comprises three key components: (1) establishing pipelines through partnerships with other state, national, and international institutions; (2) implementing an aggressive traditional recruitment campaign; and (3) launching a non-traditional marketing campaign that utilizes social media.

Our non-traditional recruitment efforts will include utilization of various social media mechanisms including Facebook, Twitter, and LinkedIn. We will post information relative to the program to institutional pages as well as those of professional associations, economic development agencies and industry partners. UL Lafayette now has over 52,000 "fans" alone. We also have the expertise at the University to plan and implement an innovative social media recruitment campaign.

Project enrollment and productivity for the first 5 years, and explain/justify the projections.

Assuming a conservative acceptance rate, then the table below reflects projected enrollments for the first five years of its existence.

Master of Science in Informatics -- Projected Enrollments and Degrees Awarded (Years 1 - 5):

Year	Enrollment	Degrees Awarded
1	10	
2	13	
3	17	7
4	22	10
5	28	14

For purposes of comparison and to provide context, projected enrollment and degrees awarded, as per existing UL Lafayette computer science and informatics programs, at both the Bachelor's and Master's levels for the period 2014-2024, are shown in the tables below.

Projected enrollment (2016-2024)						Projected degrees awarded (2016-2024)					
Projected enrollment (2016-2024)						Projected degrees awarded (2016-2024)					
Year	Fall Semesters	CMPS (Bachelors)	INFX (Bachelors)	CS (Masters)	TOTAL	Year	Academic Year	CMPS (Bachelors)	INFX (Bachelors)	CS (Masters)	TOTAL
0	2016	386	212	75	673	0	15/16	28	41	54	123
1	2017	391	242	84	717	1	16/17	31	47	58	136
2	2018	396	272	93	761	2	17/18	34	53	62	149
3	2019	401	302	102	805	3	18/19	37	59	66	162
4	2020	406	332	111	849	4	19/20	40	64	70	174
5	2021	411	362	120	893	5	20/21	43	70	74	187
6	2022	416	392	129	937	6	21/22	46	76	78	200
7	2023	421	422	131	974	7	22/23	49	80	81	210
8	2024	427	427	136	990	8	23/24	54	84	84	222

Provide enrollment/completer data for closely related programs currently offered at the institution.

Enrollment/completer data for Masters in Computer Science, School of Computing and Informatics, are as follows:

Fall Enrollments

2011 – 81 students
 2012 – 53 students
 2013 – 64 students
 2014 – 103 students
 2015 – 66 students

Completers (academic year)

2008-09—48 graduates
 2009-10—76 graduates
 2010-11—49 graduates
 2011-12—50 graduates
 2012-13—40 graduates
 2013-14—30 graduates
 2014-15 —51 graduates

What preparation will be necessary for students to enter the program?

Students entering the program should have completed successfully at least one course in fundamental calculus and one course in statistics.

An undergraduate cumulative GPA of at least 2.75 or a 3.0 GPA in the last 60 hours, satisfactory GRE scores (as defined by the Graduate School), and three supportive letters of recommendation are among the criteria used for admissions evaluation. Moreover, in accordance with Graduate School requirements, the following English language proficiency expectations apply:

UL Lafayette Graduate School has set the following preferred expectations for English Language Proficiency Exams. TOEFL or IELTS scores are only one factor of several considered when determining admission.

NOTES: 1) UL Lafayette Graduate School uses a portfolio approach in all admission decisions; 2) Some graduate programs expect slightly higher than the general scores stated below. 3) Conditional admission may be considered for application portfolios with TOEFL or IELTS scores below the stated preferred expectations.

TOEFL

Internet-based Test: 81

Computer-based Test: 213

Paper-based Test: 550

IELTS

Preferred score expectation: 6.5

If a Graduate program, indicate & discuss sources of financial support for students in the program.

In addition to the four graduate assistantships requested from UL Lafayette, many students will be funded by external research funds and by industry partners, as a business recruiting tool for graduates (e.g., internships). We point out the several companies have already pledged 19-22 student internships annually. Additionally, industry partners may fund scholarships, the criteria of which shall be developed by way of coordination with the sponsor and UL Lafayette Scholarships Office.

4. Faculty

List present faculty members who will be most directly involved in the proposed program: name, present rank; degrees; courses taught; other assignments.

Primary Faculty with appropriate Graduate Faculty Membership

- Michael Totaro, Ph.D., Associate Professor, Informatics
- Sonya Hsu, Ph.D., Associate Professor, Informatics
- Mehmet Tozal, Ph.D., Assistant Professor, Informatics
- Ashok Kumar, Ph.D., Associate Professor, Computer Science
- Henry Chu, Ph.D., Professor, School of Computing and Informatics
- Subrata Dasgupta, Ph.D., Professor, School of Computing and Informatics
- Arun Lakhotia, Ph.D., Professor, Center for Advanced Computer Studies
- Christoph Borst, Ph.D., Associate Professor, Center for Advanced Computer Studies

Supporting Faculty with appropriate Graduate Faculty Membership

- Magdy Bayoumi, Ph.D., Professor, Center for Advanced Computer Studies
- Dmitri Perkins, Ph.D., Professor, Center for Advanced Computer Studies
- Vijay Raghavan, Ph.D., Professor, Center for Advanced Computer Studies
- Nian-Feng Tzeng, Ph.D., Professor, Center for Advanced Computer Studies
- Hongyi Wu, Ph.D., Professor, Center for Advanced Computer Studies
- Miao Jin, Ph.D., Associate Professor, Center for Advanced Computer Studies
- Tony Maida, Ph.D., Associate Professor, Center for Advanced Computer Studies
- Danella Zhao, Ph.D., Associate Professor, Center for Advanced Computer Studies

Faculty Teaching Assignments

Numbering of the INFX courses is structured such that the first digit of the course number represents the level of the course, and the second digit of the course number represents a knowledge area within Informatics, as follows:

Course Number Code	Knowledge Area	At least one of the following faculty members <u>may</u> teach courses in this knowledge area
"0"	Of general interest to all areas	All faculty
"1"	Human computer interaction	Borst, Hsu, Maida
"2"	Information assurance and security	Lakhotia, Tozal
"3"	Information management	Chu, Jin, Totaro, Raghavan
"4"	Information technology infrastructure	Chu, Kumar, Perkins, Totaro, Tzeng, Wu
"5"	System administration and maintenance	Kumar, Totaro, Tozal
"6"	Entertainment, multimedia	Borst, Chu, Kumar
"7"	Web systems and technologies	Raghavan, Totaro, Tozal
"8"	Systems integration and architecture	Hsu, Totaro, Tzeng, Zhao
"9"	Special courses	All faculty

Project the number of new faculty members needed to initiate the program for each of the first five years. If it will be absorbed in whole or part by current faculty, explain how this will be done. Explain any special needs.

The program will be absorbed by current faculty (see previous question). Some of the current faculty members teach lower level courses. In cases when such graduate faculty members are assigned to teach a graduate course in Informatics, instructors shall be assigned to replace those graduate faculty members reassigned to graduate classes, such that the instructors will teach lower level courses.

Describe involvement of faculty – present and projected – in research, extension, and other activities and the relationship of these activities to teaching load. For proposed new faculty, describe qualifications and/or strengths needed.

The School of Computing and Informatics already has in place a highly-structured framework for the management of teaching loads, based on research, extension, and other activities. All new faculty members who teach at the graduate level are required to hold a terminal degree, and must demonstrate success in research, teaching, and service, as part of their annual performance evaluation and membership on the Graduate Faculty.

5. Library and Other Special Resources

Are present library holdings in related fields adequate to initiate the program? To meet program needs in the first 5 years, what will be needed? Do other institutions have library resources available to faculty & students for the proposed program?

Present library holdings in the related fields of Computer Science, Computer Engineering, and Information Systems/Technology are adequate to initiate the Master of Science in Informatics. The Library supports instruction and research with collections in a variety of formats. The Library provides electronic access to materials through the library's website.

Other institutions' resources are available to faculty and students for the Master of Science in Informatics through Interlibrary Loan and LOUIS (The Louisiana Library Network). The Library participates in formal arrangements in order to supplement the collections owned by the Library. This includes participation in LOUIS: The Louisiana Library Network, a consortium that allows Louisiana academic libraries to share library resources, collaboratively purchase resources, and extend borrowing privileges across the state. Through the library's membership in LOUIS, students and faculty may obtain a LOUIS card and directly borrow materials from all of the colleges and universities throughout the state of Louisiana.

Indicate/estimate total expenditure for the last two fiscal years in library acquisitions for fields or departments offering or related to the proposed program.

Total Library Expenditures for 2014/2015 and 2015/2016 are as follows:

Print and Electronic Serials Subscriptions :
\$21,068.45

Online Research Databases (includes LOUIS Consortium Membership):
\$1,041,631.42

Print and Electronic Books:
\$51,772.54

Project library expenditures needed for the first 5 years of the program.

The Master of Science in Informatics shall leverage library expenditures, as they support other Graduate programs within the School. As such, no additional library expenditures are anticipated.

What additional special resources, other than library holdings, will be needed?

There are no anticipated additional special resources needed, other than library holdings.

6. Facilities and Equipment

Describe *existing* facilities (classrooms, labs, offices, etc.) available for the program. Describe present utilization of these facilities that are assigned to the sponsoring department.

The School of Computing and Informatics operates a large variety of computer equipment for use by its faculty, staff and students. An extensive high-speed network connects computers and peripherals in the department to the campus data network and it is a fully managed trunked-VLAN network, with a 1Gbps core and 100Mbps to workstations, utilizing both fiber-optic and copper lines. This network is battery-backed in case of power failure. There are approximately 325 workstations in total, with roughly half running Windows and the other half running UNIX, and around seventy servers, of which about 85% run UNIX and the rest Windows. It also provides email and web-space for its students.

Labs:

We do not require any additional laboratory space for this program.

Other Physical Facility Needs:

None. We already have space in James R. Oliver Hall (the building that will house this new program) to assign offices to the Graduate Teaching Assistants.

Describe the need for new facilities (e.g., special buildings, labs, remodeling, construction, equipment), and estimate the cost, proposed sources of funding, and estimated availability for program delivery.

No new facilities are anticipated, as the Master of Science in Informatics Program will leverage such resources, as they already exist to support existing Masters and Ph.D. Programs in the School of Computing and Informatics.

7. Administration

In what department, division, school, college, or center/institute will the proposed program be administered? How will the new program affect the present administrative structure of the institution?

The Master of Science in Informatics shall be administered by the Informatics Program, which is a unit within the School of Computing and Informatics, in the Ray P. Authement College of Sciences. The new program will have no impact on the present administrative structure of the institution.

Describe departmental strengths and/or weaknesses and how the proposed program will affect them.

The Master of Science in Informatics shall leverage the highly viable infrastructure already in place within the School of Computing and Informatics. The School of Computing and Informatics currently offers six degree programs among three academic units: the Center for Advanced Computer Studies, the Computer Science program, and the Informatics program. The School has 30 faculty members with teaching and research expertise in all major branches of computer science, computer engineering, and informatics.

Students can choose from a diverse set of courses every semester and have access to state-of-the-art facilities in James R. Oliver Hall, the newest academic building on UL Lafayette's campus. Additionally, the School has strong relationships with local and national technology companies that actively seek out our graduates for internships and careers.

The mission of the Center for Advanced Computer Studies (CACS) at The University of Louisiana at Lafayette is to provide high-quality, cutting-edge educational experiences to computing majors at the Master's and Ph.D. levels. The Center aims to provide students with strong conceptual foundations (theoretical and experimental), and also expose them to the forefront of the developments in the field of computing. Recognizing the applicability of computing to all fields of knowledge and practice, the Center will provide a variety of degrees and programs at each of the degree levels, and will cooperate with other units of the University to provide interdisciplinary degree programs. CACS is the research arm of the School of Computing and Informatics that supports graduate education at the Master's and doctoral levels. CACS is responsible for conducting world-class research supported by outside grants. Our students, particularly at the doctoral level, are engaged in all stages of research. CACS offers graduate level courses in computation, computer architecture, algorithms, cybersecurity, and more.

The Computer Science Program offers the B.S. degree in computer science, with concentrations in cognitive science, computer engineering, information technology, scientific computing, and video game design and development.

The Informatics Program offers the B.S. degree in informatics, with concentrations in business informatics, health informatics, media technology, systems administration, and web development. The Program also offers an individualized concentration, which is intended to support the education of Informatics students whose professional and personal interests extend beyond what is offered by way of the other concentrations.

The table below shows enrollment and completer data for UL Lafayette's B.S. in Informatics and B.S. in Computer Science.

Academic Year	B. S. in Informatics			B. S. in Computer Science		
	Enrollment		Degrees Awarded (Fall-Spring-Summer)	Enrollment		Degrees Awarded (Fall-Spring-Summer)
	Fall	Spring		Fall	Spring	
2011-2012	43	74		308	281	11
2012-2013	108	114		328	277	27
2013-2014	151	158	16	366	302	25
2014-2015	158	150	36	373	309	26
2015-2016	182	185		381	341	

*The B. S. in Informatics Program was initiated in the Fall 2011 semester.

**Degrees Awarded indicated are for Academic Year (Fall-Spring-Summer).

The School of Computing and Informatics partners with the following companies:

- Acadian Companies
- Acadiana Computer Systems
- Apex Innovations
- CBM Technology
- CenturyLink
- CGI
- Enquero
- GE Capital
- HealthUnity
- Innovative Advertising
- Lafayette Advocates of Innovation and Design
- LHC Group

Louisiana Immersive Technologies Enterprise (LITE)
McIlhenny Company
Perficient
Praeses
Schumacher Group
Stuller, Inc.
Tata Consultancy Services
Techneaux
UL Center for Business and Information Technologies
Weatherford International

As of Fall 2015, the School of Computing and Informatics had 563 undergraduates and 111 graduate students. On average, there are approximately 30 students per semester graduating in either computer science or informatics, and roughly 20 graduating per semester with either a Master's or doctoral degree.

At the School of Computing and Informatics at UL Lafayette, faculty and students work with industry in designing and implementing computer-based hardware and software solutions to data, computation, and telecommunication issues. In sum, the School has diverse interests that all work together in research to improve the quality of health for South Louisiana.

8. Accreditation

Describe plan for achieving *program* accreditation, including: name of accrediting agency, basic requirements for accreditation, how the criteria will be achieved, and projected accreditation date.

There currently is no existing program accreditation body for the Informatics discipline.

If a graduate program, describe the use of consultants in developing the proposal, and include a copy of the consultant's report as an appendix.

Consultants were not used for the development of this proposal.

9. Related Fields

Indicate subject matter fields at the institution which are related to, or will support, the proposed program; describe the relationship.

Related subject matter fields include the following: Computer Science, and Computer Engineering. The School of Computing and Informatics currently offers M.S. and Ph.D. degrees in both areas.

10. Cost & Revenue

Summarize additional costs to offer the program, e.g., additional funds for research needed to support the program; additional faculty, administrative support, and/or travel; student support. How will the program affect the allocation of departmental funds?

Our proposed program can be fully implemented with little new costs to UL Lafayette. This includes no new additional funds required for supplies, operating expenses, or travel. Costs incurred by graduate assistantships represent a minimal but necessary investment and will be matched by industry-supported internships, and offset by tuition revenue.

One adjunct shall be hired in Year 3 (see separate budget form) at a cost of \$2200, and shall continue into Year 4, along with a second adjunct hire, for a total Year 4 cost of \$4400.

In preparation for the new program, a number of initiatives will be implemented as needed to assure long-term support of the program:

1. Two full-time instructors previously assigned to the UNIV 200 computer literacy course (no longer required by most programs) will be assigned to the basic introductory informatics courses, thus freeing terminally-qualified faculty to focus on upper-level and graduate courses;
2. Courses assigned will be re-arranged so that qualified faculty will support teaching courses in the MSI program; and
3. Academically-qualified adjunct faculty working for federal agency partners will be tasked as necessary to teach appropriate courses.

Finally, Master's students will have full access both to the UL Lafayette and the LSU libraries, as well as resources provided through the LOUIS consortium, so no additional library costs are anticipated.

GA (number, funding source, Full or Tuition waiver only):

The University will provide support for two 2-year (continuing) graduate teaching or research assistantships for the first year of

the program, followed by two additional 2-year assistantships for the second year, as the program demonstrates its viability. This includes a stipend, as well as a tuition waiver. Graduate assistantships serve an important role in recruiting and retaining highly-qualified students. Graduate assistantships also help to offset faculty workloads, which are expected to increase with the inception of a graduate program. To compensate for this investment by the University, significant funds for graduate student support will come from the private sector, in the form of four internships subsidized by local companies. Students funded by industry funds will pay regular (in-state or out-of-state, as appropriate) tuition, which will bring revenue to the University.

*On the separate budget form, estimate new costs and revenues for the projected program for the first four years, indicating need for additional appropriations or investment by the institution.

Outside of revenue from tuition & fees, explain and justify any additional anticipated sources of funds, e.g., grants (in hand, promised, or in competition), institutional funds, etc.

Research by Dr. Mehmet Tozal, an Assistant Professor with the School of Computing and Informatics, involves analyzing, modeling and sampling real world complex systems including network topologies, social networks and information networks. Dr. Tozal serves as the director of the Network Science Research Group at the University of Louisiana at Lafayette. Dr. Tozal received two grants from the National Science Foundation Center for Visual and Decision Informatics (CVDI) and the State of Louisiana Board of Regents in the past two years. (Please see below for grant details.) Additionally, Dr. Tozal has two pending grant proposals submitted to the NSF Center for Visual and Decision Informatics (CVDI).

Grant Details:

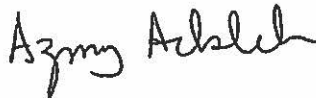
CVDIY4, \$78,556 & NSF Center for Visual and Decision Informatics Graph Sampling Summarization and Touch-Based Visual Analytics for Large Complex Systems

LEQSF-ENH-TR-31, \$80,679 & Louisiana Board of Regents, ENH & Interactive Visualization and Analysis of Big Data for Research and Education

Additionally, Dr. Michael Totaro (Systems and Infrastructures Administration and Optimization) and Dr. Sonya Hsu (Enterprise Resource Planning and Health Informatics) anticipate submitting several grant proposals to Board of Regents and/or National Science Foundation in 2016.

Faculty will continue to pursue research funding pertinent to the mission of the unit. Moreover, graduate students in the Master of Science in Informatics Program would be enriched by having opportunities to participate in these research projects.

CERTIFICATIONS:



Primary Administrator for Proposed Program

Date: 5/5/16

Dr. Azmy Ackleh, Dean of the Ray P. Authement College of Sciences



Provost/Chief Academic Officer

Date: 5/5/16

Dr. Fabrice Leroy, Assistant Vice President for Academic Affairs/Academic Programs

Management Board/System Office

Date

SUMMARY OF ESTIMATED ADDITIONAL COSTS/INCOME FOR PROPOSED PROGRAM

Institution: University of Louisiana at Lafayette

Date: May 3, 2016

Degree Program, Unit: Master of Science in Informatics, Ray P. Authement College of Sciences

FTE = Full Time Equivalent (use the institution's standard definition and provide that definition).

EXPENDITURES								
INDICATE ACADEMIC YEAR:	FIRST		SECOND		THIRD		FOURTH	
	AMOUNT	FTE	Amount	FTE	AMOUNT	FTE	AMOUNT	FTE
Faculty	\$		\$		\$2,200	20%	\$4,400	40%
Graduate Assistants	\$36,420		\$72,840		\$72,840		\$72,840	
Support Personnel								
Fellowships and Scholarships								
SUB-TOTAL	\$36,420		\$72,840		\$75,040		\$77,240	
	AMOUNT	AMOUNT	AMOUNT	AMOUNT				
Facilities	\$	\$	\$	\$				
Equipment								
Travel								
Supplies								
SUB-TOTAL	\$	\$	\$	\$				
TOTAL EXPENSES	\$36,420		\$72,840		\$75,040		\$77,240	
REVENUES								
Revenue Anticipated From:	AMOUNT	AMOUNT	AMOUNT	AMOUNT				
*State Appropriations	\$	\$	\$	\$				
*Federal Grants/Contracts								
*State Grants/Contracts								
*Private Grants/Contracts								
Expected Enrollment	10	13	17	22				
Tuition	\$36,373	\$54,558	\$78,806	\$109,116				
Fees	\$18,258	\$27,387	\$39,559	\$54,774				
*Other (specify)								
TOTAL REVENUES	\$54,631	\$81,945	\$118,365	\$163,890				

* Describe/explain expected sources of funds in proposal text.