Item E.1.   **Northwestern State University's** request for approval of an Undergraduate Certificate in Remote Systems Science and Technology.

EXECUTIVE SUMMARY

Northwestern State University (NSU) is requesting approval to offer an Undergraduate Certificate in Remote Systems Science and Technology (RSST UC). The use of aerial remote systems, popularly referred to as drones, has expanded rapidly from primary military use to a wide range of industrial, public, and academic research applications with current and future economic impact that is measured in the billions of dollars. In addition to aerial platforms, industries with significant resources offshore, such as the oil and gas industry, are seeing an increase in demand for the deployment of underwater remote systems and terrestrial remote systems, while not yet as widely utilized, are seeing increased use in industrial and public safety, agriculture, hotels, hospitals and retail stores such as Walmart. Because of the widespread applicability of remote systems science and technology and the increasing demands for skilled operators, the proposed RSST UC will be an interdepartmental, multidisciplinary effort which can serve as an add-on to enhance a wide variety of existing undergraduate degree programs.

The proposed 18-hour curriculum consists of purposefully designed new courses (five in total) and carefully selected existing courses that will prepare students to assess the need for remote systems in a given situation, to select and employ the appropriate system following all applicable national, state, and local laws, and to process the data/images acquired by the selected remote system. All students enrolled in the proposed RSST UC will take twelve hours of specified required courses (Introduction to Remote Systems Science & Technology; Introduction to Geographic Information Systems; Introduction to Geographic Information Systems Laboratory; Remote Systems Science and Technology; and Advanced Remote Systems Science and Technology) as well as six hours of upper level elective courses designated by their respective academic departments. The goal of the proposed curriculum is to provide NSU students with a foundation in aerial, terrestrial, and underwater remote systems applications, operations, and regulation, with electives to support each student's major field. Students will acquire instruction and training in the acquisition and processing of remotely-acquired data for their respective disciplines. Courses will be delivered in a combination of modalities: traditional (on-site), hybrid, and online.

The proposed RSST UC will help to address the predicted dramatic increase in the demand for remote system operations in a wide range of disciplines over the course of the next five years including, but not limited to, construction, land survey, forestry, wildlife biology, agriculture, law enforcement, fire and rescue, journalism, filmmaking, photography, computer programming, retail business, real estate, infrastructure inspection services, and tourism. Letters of support provided by the Louisiana Department of Agriculture & Forestry, Natchitoches Soil and Water Conservation

District, and Air Data Solutions clearly establish the fact that the reliance on remote operated systems will only increase and, as such, there is a need for individuals with knowledge and skill sets acquired via the proposed RSST UC. Northwestern's proposed RSST UC will complement the University of Louisiana at Monroe's existing Undergraduate Certificate and Bachelor of Science in Unmanned Aircraft Systems Management which focuses primarily on aviation. The University will be able to offer the proposed RSST UC at no additional costs; however, demand would warrant the hiring of an additional adjunct faculty member. Initial industry partners have expressed interest in assisting the University in that regard as well as providing hands-on learning opportunities, guest lectures, and other forms of support.

RECOMMENDATION

It is recommended that the following resolution be adopted:

NOW, THEREFORE, BE IT RESOLVED, *that the Board of Supervisors for the University of Louisiana System hereby approves Northwestern State University's request for approval to offer Undergraduate Certificate in Remote Systems Science and Technology.*

NORTHWESTERN STATE
Office of the President

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E.1.

September 30, 2020

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

Re: Proposal to add Undergraduate Certificate: Remote Systems Science and
        Technology (RSST)

Dear Dr. Henderson:

Northwestern State University is submitting the attached proposal to add
Undergraduate Certificate: Remote Systems Science and Technology (RSST) to be
placed on the agenda for approval at the October 2020 Board Meeting.

Thank you for your consideration.

Sincerely,

Dr. Chris Maggio
President

Attachment

PROPOSAL to DEVELOP a NEW ACADEMIC CERTIFICATE PROGRAM
(CAS, PAC, UC, PBC, GC, PMC, PPC)

Date: October 13, 2020

Campus:	Program: <u>CIP, Certificate Designation, Title</u>
Northwestern State University	**Undergraduate Certificate (UC) in Remote Systems Science and Technology (RSST), CIP 45.0702 - Geographic Information Science and Cartography.**

Institutional Contact Person & Contact Info (if clarification is needed)
Tommy Ike Hailey, Ph.D.   Professor of Anthropology and Archaeology   Department of Criminal Justice, History, and Social Sciences   Kyser Hall 103   Northwestern State University of Louisiana   Natchitoches, LA 71497   haileyt@nsula.edu   318.357.6195 (Department)   318.554.9442 (Cell)

1. Certificate Description

Describe the program concept: purpose and objectives; proposed curriculum; mode of delivery (on-site/hybrid/on-line). Indicate which courses are new; describe plan for rolling out new courses.

** <u>Attach catalog descriptions for the required and elective courses, including prerequisites and LCCN, when applicable.</u> **

PROGRAM CONCEPT:

The proposed NSU Remote Systems Science and Technology Undergraduate Certificate will provide our students with a foundation in aerial, terrestrial, and underwater remote systems applications, operations, and regulations, with electives to support each student's major field. The use of aerial remote systems, popularly referred to as drones, has expanded rapidly from primarily military use[1] to a wide range of industrial, public, and academic research applications[2] with current and future economic impact that is measured in the billions of dollars.[3] In addition to aerial platforms, industries with significant resources offshore, such as the oil and gas industry, are seeing an increase in demand for the deployment of underwater remote systems,[4, 5, 6] and terrestrial remote systems, while not yet as widely utilized, are seeing increasing use in industrial and public safety, [7] agriculture,[8] hotels,[9] hospitals,[10] and retail stores such as Walmart. [11, 12] Because of the widespread applicability of remote systems science and technology and the increasing demands for skilled operators, the proposed RSST Undergraduate Certificate will be an interdepartmental, multidisciplinary effort which can serve as an add-on to enhance a wide variety of existing undergraduate degree programs.

PURPOSE AND OBJECTIVES:

The interest in and demand for the development and operation of remote systems for aerial, terrestrial, and underwater applications expands on a seemingly daily basis. As stated on the Lockheed-Martin's Autonomous and Unmanned Systems webpage, "People are relying on machines to help them make better informed decisions, expand reach and access, and increase safety and productivity. This new era of human-machine collaboration depends on trust and understanding—allowing each component of the team to do what it does best."[4] With the proposed Undergraduate Certificate in Remote Systems Science and Technology, Northwestern State University seeks to address that increasing demand not by the development of a technical degree for specialists in remote systems, but by training NSU students in our existing majors when and how to apply remote systems within their chosen fields of study. With this focus, the NSU RSST certificate will enhance the employability of graduates in any applicable major, thereby contributing significantly to workforce development.

Much of the current public attention on remote systems is focused on aerial remote systems, commonly referred to as drones, and the NSU RSST Undergraduate Certificate will incorporate aerial platforms as one aspect of the program. There are several reasons for this increased public attention. One can scarcely turn on the news, a sporting event, movie, or television show without experiencing views from aerial remote platforms, and headlines tell us of innovations such as the delivery of retail goods or medical supplies, and inspection of difficult to reach or dangerous locations by utilizing drone technology. The Alliance for Drone Innovation estimates that the economic impact of aerial drone integration will exceed 13.6 billion dollars in the first three years of the process, increasing to 82.1 billion dollars by 2025, and that the demand for drones in the workplace will create nearly 104,000 jobs by 2025.[3] The integration of remotely operated aircraft into the national air space is generating a boom in opportunities for government agencies, industries, businesses, and research entities to employ aerial drones in their day to day operations, allowing them to reduce costs and maximize the efficiency of their operations, but it also raises concerns that the remote aircraft must be operated safely and in accordance with all applicable laws and policies. The responsibility for integrating aerial remote systems into the national airspace was assigned by Congress to the FAA in 2017,[3] so any remote systems program needs to prepare students for meeting FAA requirements for Remote Pilot certification. The NSU RSST program will do that through the required coursework for the proposed undergraduate certificate.

Since the NSU RSST program proposes to include terrestrial and underwater remote systems as well, students who earn the proposed RSST Undergraduate Certificate will enhance their employability in any field of study they choose that does or can potentially utilize remote systems. These students will have a distinct advantage in securing employment and in the pursuit of their careers after graduation. With that in mind, the proposed NSU RSST program was developed in cooperation with and is supported by the NSU School of Business, the Department of Biological and Physical Sciences, the Computer Information Systems Program, the Mrs. H. D. Dear and Alice Dear School of Creative and Performing Arts, the Department of Criminal Justice, History, and Social Sciences, the Department of Engineering Technology, the Department of English, Foreign Languages, and Cultural Studies, and the Department of Hospitality Management and Tourism. Each of these academic units has designated elective courses that will be of the greatest value to their majors who are pursuing the RSST Undergraduate Certificate (Please see attached NSU Letter of Support).

The objectives of the RSST Undergraduate Certificate program are:
1) Students will learn how aerial, terrestrial, and underwater remote systems are currently employed in government, industry, and research;
2) Students will learn the legal aspects of remote systems operations and the responsibilities of the remote operator;
3) Students will gain knowledge and skill in remote operations and data processing through hands-on training;
4) Students will apply their acquired skills in real-world applications in their respective majors;
5) Students will learn to effectively communicate the results of their endeavors to professional audiences and to the public.

PROPOSED CURRICULUM:
The proposed 18-hour curriculum consists of purposefully designed new courses and carefully selected existing courses that will prepare students to assess the need for remote systems in a given situation, to select and employ the appropriate system following all applicable national, state, and local laws, and to process the data/images acquired by the selected remote system. All students enrolled in the proposed RSST program will take twelve hours of specified required courses as well as six hours of elective courses designated by their respective academic departments. The two elective courses must be upper division courses.

Required Courses	Credit Hours	
RSST 2010: Introduction to Remote Systems Science and Technology	3	(NEW)
BIOL2030/GEOG 2030: Introduction to Geographic Information Systems	3	
BIOL2031/GEOG 2031: Introduction to Geographic Information Systems Laboratory	1	
RSST 3010: Remote Systems Operations, Law, and Policy	2	(NEW)
RSST 4010: Advanced Remote Systems Science and Technology	3	(NEW)
ELECTIVE COURSE (3000-Level or 4000-Level). Course designated by department in which students' major field of study is housed	3	
ELECTIVE COURSE (3000-Level or 4000-Level). Course designated by department in which students' major field of study is housed	3	

COURSE CATALOG DESCRIPTIONS:
Required Courses:
RSST 2010: INTRODUCTION TO REMOTE SYSTEMS SCIENCE AND TECHNOLOGY (3-2—1) Overview of remote systems technology. This course will cover small unmanned aerial systems (sUAS), remote operated vehicles (ROV), and other remotely operated technology. Emphasis will be placed on emerging workforce needs and practical applications of remote operated technology.

BIOL2030/GEOG 2030: INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEMS. (3-3-0). Fundamental principles of Geographic Information Systems (GIS), including components of a GIS, data availability and format, data models, map projections, georeferencing, and image classification.

BIOL 2031/GEOG 2031: INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEMS LABORATORY. (1-0-3). Laboratory to accompany Introduction to Geographic Information Systems. Computer exercises on various topics in GIS. Corequisite: Enrollment in 2030.

RSST 3010: REMOTE SYSTEMS OPERATIONS, LAW, AND POLICY (2-2-0). This course will cover the laws, regulations and policies governing small unmanned aircraft (sUAS) operation and prepare students for the FAA part 107 Remote Pilot Certification Exam. Content will include operations, interpreting aeronautical sectional charts, weather, aeronautical communications, aeronautical decision making (ADM), risk management, airspace classification, and sUAS maintenance.

RSST 4010: ADVANCED REMOTE SYSTEMS SCIENCE AND TECHNOLOGY (3-2-1) This course will instruct students in advanced operations of various remotely operated systems. Course content will include the scientific theory behind various sensor platforms, advanced mission planning, introduction to data analytics and rendering. Students will be introduced to industry leaders currently using remote systems technology and will learn how remote systems technology is integrated into the modern workflow.

Elective Courses:

The following 3000-Level and 4000-Level courses for each affiliated undergraduate program have been selected by the administrative heads of the School of Business, the Department of Biological and Physical Sciences, the Computer Information Systems Program, the Mrs. H. D. Dear and Alice Dear School of Creative and Performing Arts, the Department of Criminal Justice, History, and Social Sciences, the Department of Engineering Technology, the Department of English, Foreign Languages, and Cultural Studies, and the Department of Hospitality Management and Tourism. Students will consult with their advisor to select appropriate electives based on their chosen academic and career path.

ANTH 4200: FIELD TECHNIQUES IN UNDERWATER ARCHAEOLOGY. (3-3-0). An overview of methods used in underwater archaeology, including: archaeological survey and remote sensing, underwater site recording and excavation, preliminary artifact conservation, and laboratory analysis. Prerequisites: 3020, or consent of instructor, and open water diving certification

ANTH 4060: SPECIAL PROBLEMS. (3-3-0). Prerequisite: minor in anthropology, senior standing, consent of instructor.

BIOL 3900: SPECIAL TOPICS IN BIOLOGY. (1 to 3-1 to 3-0). In-depth study of various upper-level elective topics in the biological sciences; in particular, those not included explicitly among the catalog listings. Prerequisite: 1010/1011, 1020/1021 or consent of instructor. This course may be repeated any number of times, but no more than 9 credit hours may be applied toward a B.S. degree.

BIOL 3901: SPECIAL TOPICS IN BIOLOGY LABORATORY. (1 to 3-0-1 to 9). In-depth laboratory component of various upper- level elective topics in the biological sciences; in particular, those not included explicitly among the catalog listings. Prerequisite: 1010/1011, 1020/1021 or consent of instructor. Co-requisite: 3900. This course may be repeated any number of times, but no more than 3 credit hours may be applied toward a B.S. degree.

BUAD 4190: SMALL BUSINESS ENTREPRENEURSHIP. (3-3-0). Analysis of small business operations. Integration of knowledge and application of theories across functional areas. Prerequisite: Senior standing and consent of instructor.

CIS 3410: CERTIFIED ETHICAL HACKING. (3-3-0). In order to protect a network against a hacker, one must learn to think like one. Through penetration testing, vulnerabilities in a system can be discovered and corrected. This course will explore ways a hacker can gain access to computer resources. It will investigate weaknesses in operating systems, databases, coding, and networks. When possible, we will actively perform various attacks on pre-staged systems. This course will focus on the ethics involved in performing a penetration test. Finally, we will explore methods to prevent or mitigate vulnerabilities. Prerequisite: CIS 3400.

CIS 4700: TOPICS IN INFORMATION TECHNOLOGY HARDWARE AND SOFTWARE. (3-3-0). An in-depth study of current technology as it relates to either hardware or software. Topics may include, but are not limited to: Multimedia technology, PC hardware configurations, operating systems, assembly and machine languages, data structures, wireless technology, vendor certification in networks, operating systems, databases or development tools. May be repeated for credit when topics vary. Prerequisites: Consent of instructor.

COMM 4420: ADVANCED VIDEO JOURNALISM. (3-3-0). Shooting, editing, writing and producing unique, accurate, and visually interesting and professional produced journalism video stories for multimedia platforms, such as broadcast or the Web. Prerequisite: COMM 2510, 2440, 3480, or consent of the instructor.

COMM 4470: TELEVISION PRODUCING/DIRECTINGACTIVITIES. (3-3-0). Producing and directing programs for television, both in field and in studio. Emphasis on producing and directing newscasts and educational programs. Prerequisite: COMM 2440 or consent of instructor.

COMM 4520: SPECIAL PROBLEMS IN COMMUNICATION. (3-3-0). Study of special topics or problems in communication. Prerequisite: Consent of instructor. Repeatable for undergraduate credit only to six hours as subject changes.

CJ 4110: SPECIAL PROBLEMS. (1 to 3-3-0). Directed individual study of a problem related to the field of criminal justice. Prerequisite: 1100 and junior or senior standing; scheduled by arrangement with instructor only.

EET 4920: ADVANCED SPECIAL PROBLEMS. (1 to 3-0-0). Selection of advanced special problems in engineering technology. Individual or small group work. Prerequisite: Credit for or registration in 3340-3341 and consent of instructor.

EET 4940: PROJECT DESIGN I. (3-3-0). Principles of project management and engineering economics. Development of proposals for senior design project. Prerequisites: Credit for or registration in English 3230, 3190 or IET 3720 and senior status or consent of instructor.

EET 4950: PROJECT DESIGN II. (3-0-0). This is a capstone course. Students will independently design (including specifications), construct, and test an approved electronics project within budget and on schedule. Students will prepare a written project report and give an oral presentation. Prerequisites: 4940.

ENGL 3530: VIDEO PRODUCTION. (3-3-0). This course is designed as an introduction to a broad range of practices sometimes labeled "video art" or "experimental video." Students will learn strategies and theories to produce creative video projects. Students will be asked to engage theoretical issues through the design and realization of their own video projects. Each student will be expected to develop multiple approaches to visual, sound, and editing styles. Production strategies will range from introductory to advanced, depending of the background of each student. Prerequisites: ENGL 1020 or permission of the instructor.

ENGL 4340: ETHNOGRAPHIC AND DOCUMENTARY FILMMAKING. (3-3-0). Course will focus upon a definition of ethnography and will incorporate the best practices in documentary filmmaking. Issues to be addressed will include editorial choices, inclusion of contextual information, cultural ownership and culture as commodity/product, and the best ways in which to depict cultures on their own terms.

ENGL 4040: ADVANCED TECHNICAL REPORT WRITING. (3-3-0). Focused study and practice in preparing corporate reports, feasibility studies, proposals, and professional articles.

GEOG 4010: ADVANCED GEOGRAPHIC INFORMATION SYSTEMS. (3-3-0). Fundamental principles of Geographic Information Systems (GIS), including components and applications of GIS technology, data availability and format, data models, spatial analysis, map projections, and georeferencing. Corequisite: 4011.

GEOG 4011: ADVANCED GEOGRAPHIC INFORMATION SYSTEMS LABORATORY. (1-0-1). Laboratory to accompany Advanced Geographic Information Systems. Computer exercises on various topics in GIS. Corequisite: 4010.

HMT 4110: SPECIAL PROBLEMS IN HOSPITALITY MANAGEMENT AND TOURISM. (1 to 3-3-3). Individual and class study of specialized problems for advanced students who are interested in and have a need for work in a particular area of Hospitality Management and Tourism.

IET 4920: SPECIAL PROBLEMS (1 to 3-0-0). Selection of advanced special problems. Individual or group independent work. Prerequisite: At least twelve (12) semester hours credit in IET and/or EET courses and consent of instructor.

IET 4950: RESEARCH PROBLEMS. (1 to 3-0-0). The student selects a problem in his major field and through investigation formulates an acceptable solution. Prerequisite: Upper level status and consent of instructor.

IET 4960: PROJECT DESIGN II. (3-0-0). This is a capstone course for ET majors. Students will work with a professor to design a project that reflects several aspects of the student's curriculum. Independent or group work. Students will prepare a written project report and give an oral presentation. Prerequisite: EET 4940.

MGT 4450: PURCHASING AND SUPPLY MANAGEMENT. (3-3-0). Principles of purchasing and supply management applicable to manufacturing and service organizations with an emphasis on electronic purchasing (e-purchasing). Topics include the purchasing process, organization, strategy, buyer-supplier relationships, supplier selection and management, negotiation, cost/price analysis, quality, global sourcing, inventory, transportation, public purchasing, and legal and ethical issues. (This course is the same as MKTG 4450.) Prerequisite: MGT 3220, MKTG 3230.

MGT 4460: SUPPLY CHAIN MANAGEMENT. (3-3-0). Principles of supply chain management applicable to manufacturing and service organizations. Topics include supply chain planning—forecasting and inventory, supplier management, physical distribution, logistics, transportation, coordination in the supply chain, the purchasing process, and e-business and the supply chain. (This course is the same as MKTG 4460.) Prerequisites: MGT 3220, MKTG 3230.

UPSA 4700: VENUE AND EVENT SECURITY. (3-3-0). A comprehensive examination and analysis of events and venue security from the varied perspectives of event stakeholders; application of principles of Homeland Security within local jurisdiction protocols; event matrix construction; and assessment of social, institutional and political implications of mass gatherings and events. Prerequisite: 1500 or consent of instructor.

MODE OF DELIVERY:
Courses will be delivered in a combination of modalities: traditional (on-site), hybrid, and online.

NEW COURSES:
Five new courses have been developed in conjunction with the development of the RSST Undergraduate Certificate Proposal. Others will be added as necessitated by demand. The five new courses are:

RSST 2010: Introduction to Remote Systems Science and Technology
RSST 3010: Remote Systems Operations, Law, and Policy
RSST 4010: Advanced Remote Systems Science and Technology

PLAN FOR ROLLING OUT NEW COURSES:

Course	Semester and Year
RSST 2010: Introduction to Remote Systems Science and Technology	SPRING 2021
RSST 3010: Remote Systems Operations, Law, and Policy	FALL 2021
RSST 4010: Advanced Remote Systems Science and Technology	SPRING 2022

SECTION REFERENCES:
1) Department of Defense. 2005. Unmanned Aircraft Systems Roadmap 2005-2030.
   https://fas.org/irp/program/collect/uav_roadmap2005.pdf
2) Murfin, Tony. 2018. UAV Report: Growth trends & opportunities for 2019. *GPS World*.
   https://www.gpsworld.com/uav-report-growth-trends-opportunities-for-2019/
3) Alliance for Drone Innovation. 2018. Facts and Figures. http://www.droneinnovation.org/facts-and-figures.html
4) Lockheed-Martin Autonomous and Unmanned Systems. "The Future of Autonomy isn't Human-Less, It's Human
   More." https://www.lockheedmartin.com/en-us/capabilities/autonomous-unmanned-systems.html
5) Energy Dais. 2019. "ROV Operations Pushing the Boundaries of Oil & Gas Offshore".
   https://insights.energydais.com/rov-operations-pushing-boundaries-oil-gas-offshore/
6) Energy Dais. 2019. "ROV in Oil and Gas: The Eyes and Hand in the Sea" https://insights.energydais.com/rov-in-oil-gas/
7) "Robotics and Automation News. 2020. "RMUS Partners With Sarcos Robotics Guardian S 'Snake Robot".
   https://roboticsandautomationnews.com/2020/05/07/rmus-partners-with-sarcos-robotics-guardian-s-snake-robot/32141/
8) New York Times. 2020. A Growing Presence On The Farm: Robots"
   https://www.nytimes.com/2020/02/13/science/farm-agriculture-robots.html
9) Sociatables. 2020. "Robots in Hotels: 6 Hotel Brands Lead the Way" https://www.socialtables.com/blog/hospitality-technology/hotel-brands-robot/
10) HealthTech. 2020. Nonsurgical Robots Keep Hospitals Clean and capable"
    https://healthtechmagazine.net/article/2020/05/nonsurgical-robots-keep-hospitals-clean-and-capable
11) The Verge. 2017. "Walmart is Using Shelf-Scanning Robots To Audit Its Stores"
    https://www.theverge.com/2017/10/27/16556864/walmart-introduces-shelf-scanning-robots
12) Harvard Business Review. 2020. "What Robots Can Do For Retail" https://hbr.org/2020/10/what-robots-can-do-for-retail

2. Need

Outline how this program is deemed essential for the wellbeing 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). Identify similar programs in the state and explain why the proposed certificate is needed.

RELEVANCE OF PROGRAM, CONTRIBUTION TO ECONOMIC DEVELOPMENT, RELATION TO EVOLVING NEEDS:
As technological developments shift toward an increasing reliance on autonomous systems for aerial, terrestrial, and underwater applications, the demand for a workforce trained in those technologies is dramatically increasing. Remotely operated systems are not only the wave of the future, they are the wave of the present.[1] As stated above, the Alliance for Drone Innovation estimates that the economic impact of aerial drone integration alone will exceed 13.6 billion dollars in the first three years of the process, increasing to 82.1 billion dollars by 2025, and that the demand for drones in the workplace will create nearly 104,000 jobs by 2025.[2] Because of the wide variety of applications that employ of remote systems, graduates possessing the knowledge of how and when to apply remote technology, and how to do so safely and legally, will be in demand. The value in the NSU RSST Undergraduate Certificate is that students would not be relying solely on the possibility of securing employment as a remote pilot. Upon completion of the RSST Undergraduate Certificate program, students will possess the necessary skills to implement remote operated technology in their selected fields of study (Please see attached letters of support from initial industry partners).

SIMILAR PROGRAMS IN THE STATE:
Nicholls State University in Thibodeaux and Tulane University have received joint funding from the Board of Regents for small unmanned aerial systems (sUAS) surveys of coastal research, but neither seems to have a remote technology-specific program. Nicholls houses its drone operations in the Department of Geomatics,[3] while Tulane's can be found in the Department of Earth and Environmental Sciences.[4]

The University of Louisiana at Monroe offers a Bachelor of Science in Unmanned Aircraft Systems Management[5] and an Undergraduate Certificate Program in Unmanned Aircraft Systems Management.[6] These programs focus primarily on aviation.[7] The proposed NSU UC in Remote Systems Science and Technology differs from the ULM UAS UC program in significant ways:

- **CIP Code:**
  - **ULM Unmanned Aerial Systems Management Undergraduate Certificate: CIP 49.0101,** **Aeronautics/Aviation/Aerospace Science and Technology, General.** Definition: A program that focuses on the general study of aviation and the aviation industry, including in-flight and ground support operations. Includes instruction in the technical, business, and general aspects of air transportation systems.

  - **NSU Remote Systems Science and Technology Undergraduate Certificate: CIP 45.0702,** Geographic Information **Science and Cartography.** Definition: A program that focuses on the systematic study of map-making and the application of mathematical, computer, and other techniques to the analysis of large amounts of geographic data and the science of mapping geographic information. Includes instruction in cartographic theory and map projections, computer-assisted cartography, geographic information systems, map design and layout, photogrammetry, air photo interpretation, remote sensing, spatial analysis, geodesy, cartographic editing, and applications to specific industrial, commercial, research, and governmental mapping problems.

- **Goals:**
  - **The goal of the ULM program,** as stated in their UC proposal is **"to meet the needs of students seeking coursework and skills necessary to become an FAA certified UAS pilot"** and it is **"designed for individuals who are seeking functional competency in UAS (drone) management".** There is no wording in the ULM proposal to indicate that their UAS Undergraduate Certificate is designed for anything other than aerial applications.

  - **The goal of the NSU program** is to **"provide our students with a foundation in aerial, terrestrial, and underwater remote systems applications, operations, and regulations, with electives to support each student's major field."** Thus, while aerial remote systems will be a component of the NSU program, the proposed Remote Systems Science and Technology Undergraduate Certificate will also incorporate terrestrial and underwater remote systems. It will provide students with instruction and training in the acquisition and processing of remotely-acquired data as their required in their respective disciplines.

- **Required Coursework:**
  - **the ULM Unmanned Aerial Systems Undergraduate Certificate requires "15 hours of the following aviation courses" (again reinforcing the aerial emphasis of their program):**
    - **AVIA 2080 (Intro of Unmanned Aircraft Systems– 3 cr. Hrs.)** An overview of the development, present and future status of the UAS in the civil aviation industry. Specific sections deal with aircraft, ground operations, communication, and launch and recovery systems while emphasizing human integration into the UAS system.
    - **AVIA 3080 (UAS Design and Systems– 3 cr. Hrs.)** those that differ significantly from their manned counterparts, and emphasis on autopilot systems and their integration with flight controls and airborne communication systems.
    - **AVIA 3081 (Unmanned Aircraft Ground Systems and Communication and Telemetry Systems– 3 cr. Hrs.)** Subsystems that comprise the UAS ground control and mission planning system/software and various sensor technologies and communications; launch and recovery systems; theory and practice of normal and degraded operations of UAS comm. and telemetry data link systems.
    - **AVIA 4080 (Image Interpretation and Geospatial Information– 3 cr. Hrs.)** Examine remotely sensed images from various angles, scales, platforms, resolutions and wavelengths for the purpose of identifying objects and judging their significance.
    - **AVIA 4081 (UAS Operations– 3 cr. Hrs)** Safe employment of UAS in practical applications, including aircraft operating software, launch and recovery operations, payload operations, normal and emergency procedures, mission planning and execution. Students must complete appropriate flight lessons to satisfactorily complete the course.

  - **the NSU Remote Systems Science and Technology Undergraduate Certificate requires 18 hours of instruction. As stated previously, 12 of these hours are required of all students seeking the certificate, while the remaining six hours are to be chosen from the electives selected by the associated departments as appropriate for their majors. The current 26 elective choices are listed above on pages 3-4. The 12 required hours are:**
    - **RSST 2010: INTRODUCTION TO REMOTE SYSTEMS SCIENCE AND TECHNOLOGY (3-2--1)** Overview of remote systems technology. This course will cover small unmanned aerial systems (sUAS), remote operated vehicles (ROV), and other remotely operated technology. Emphasis will be placed on emerging workforce needs and practical applications of remote operated technology.
    - **BIOL2030/GEOG 2030: INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEMS. (3-3-0).** Fundamental principles of Geographic Information Systems (GIS), including components of a GIS, data availability and format, data models, map projections, georeferencing, and image classification.

- BIOL 2031/GEOG 2031: INTRODUCTION TO GEOGRAPHIC INFORMATION SYSTEMS LABORATORY. (1-0-3). Laboratory to accompany Introduction to Geographic Information Systems. Computer exercises on various topics in GIS. Corequisite: Enrollment in 2030.
- RSST 3010: REMOTE SYSTEMS OPERATIONS, LAW, AND POLICY (2-2-0). This course will cover the laws, regulations and policies governing small unmanned aircraft (sUAS) operation and prepare students for the FAA part 107 Remote Pilot Certification Exam. Content will include operations, interpreting aeronautical sectional charts, weather, aeronautical communications, aeronautical decision making (ADM), risk management, airspace classification, and sUAS maintenance.
- RSST 4010: ADVANCED REMOTE SYSTEMS SCIENCE AND TECHNOLOGY (3-2-1). This course will instruct students in advanced operations of various remotely operated systems. Course content will include the scientific theory behind various sensor platforms, advanced mission planning, introduction to data analytics and rendering. Students will be introduced to industry leaders currently using remote systems technology and will learn how remote systems technology is integrated into the modern workflow.

- **Multidisciplinary Focus:**
    - **The ULM Unmanned Aerial Systems Undergraduate Certificate,** as indicated by the required courses and the wording of their proposal, is designed primarily to train pilots for unmanned aerial systems, while also acknowledging that multidisciplinary expansion could be possible – "While predicting student interest is difficult, we do believe that the release of FAA guidelines for certification will make the program attractive to undergraduate students. We have seen an increase in interest from other programs on campus (atmospheric sciences, ag business, construction management, and risk management and insurance) in the program. We believe once commercial applications become clearer, more individuals will consider the certificate to prepare them for the FAA Part 107 exam."

    - **The NSU Remote Systems Science and Technology Undergraduate Certificate** was intentionally designed with the cooperation of multiple departments on campus from the outset, to ensure that the program would provide a wide range of majors with the knowledge and skills students will need to successfully and effectively incorporate remote systems into their chosen careers. Aside from the newly developed RSST courses, the academic course offerings in this program include selected courses in Anthropology/Archaeology, Biology, Business Administration, Computer Information Systems, Communications, Criminal Justice, Electrical Engineering Technology, English, Geography, Hospitality Management & Tourism, Industrial Engineering Technology, Management, and Unified Public Safety Administration.

Similarities Between the ULM UC program mand the proposed NSU UC program:
Like the ULM Unmanned Aerial Systems UC program, the NSU Remote Systems Science and Technology UC program cannot certify pilots of aerial drones, as that is the purview of the Federal Aviation Administration. However, also like the ULM program, the NSU program will prepare students to achieve FAA certification as commercial remote pilots to fly under Part 107. Obtaining a Remote Pilot Certificate from the FAA is a relatively straightforward process with the following requirements[8, 9]:

1) Be at least 16 years old
2) Be able to read, speak, write, and understand English
3) Be in physical and mental condition to safely fly a drone
4) Pass the initial aeronautical exam

The aeronautical exam is multiple choice and must be passed with a 70% or higher score. No formal classes are required to take the exam, and many motivated individuals use online videos and freely downloadable printed study guides and other materials to prepare for and pass the exam. What the ULM program does, and the NSU program will do, is provide a structure that will guide undergraduate students in the process of preparing for the Remote Pilot exam. ULM does that as a means of training Unmanned Aerial Systems pilots. NSU will do that as a means of training future professionals in a variety of fields to become aerial remote pilots, while also training them in the applications of terrestrial and underwater remote systems. The course NSU students will take to prepare for the initial aeronautical exam is RSST 3010: Remote Systems Operations, Law, and Policy.

WHY THE PROPOSED NSU REMOTE SYSTEMS SCIENCE AND TECHNOLOGY UNDERGRADUATE CERTIFICATE IS NEEDED:
The proposed RSST Undergraduate Certificate addresses the predicted dramatic increase in demand for remote system operations in a wide range of disciplines over the course of the next five years,[1, 2] including, but not limited to, construction, land survey, forestry, wildlife biology, agriculture, archaeology, law enforcement, fire and rescue, journalism, filmmaking, photography, computer programming, retail business, real estate, infrastructure inspection services, and tourism. Concomitant with the increased demand in remote pilots will be the need for development of new software and hardware to both promote the use of remote technology and, in some cases, to protect the public from its misuse. To fill that void, remote platform design and construction by electrical and industrial engineers and remote-platform-specific computer programming will be essential to allow operation, detection, identification, and protection. The proposed NSU RSST program would address current and future needs at many levels and would give our students an edge in seeking employment and in maximizing the potential of their respective degrees.

SECTION REFERENCES:
(1) Lockheed-Martin Autonomous and Unmanned Systems. "The Future of Autonomy isn't Human-Less, It's Human More." https://www.lockheedmartin.com/en-us/capabilities/autonomous-unmanned-systems.html
(2) Alliance for Drone Innovation. 2018. Facts and Figures. http://www.droneinnovation.org/facts-and-figures.html
(3) Nicholls State University Geomatics Program. https://www.nicholls.edu/applied-sciences/
(4) Tulane University Department of Earth and Environmental Sciences https://sse.tulane.edu/eens
(5) Bachelor of Science in Unmanned Aircraft Systems Management, University Catalog, University of Louisiana at Monroe. http://catalog.ulm.edu/preview_program.php?catoid=31&poid=3479&returnto=3900
(6) Berry, Ron. ULM Proposal to develop a New Academic Certificate Program in Unmanned Aircraft Systems management (May 28, 2019).
(7) "Welcome to the Unmanned Aircraft Systems Program at ULM", University of Louisiana at Monroe. https://www.ulm.edu/cbss/aviation/index.html
(8) Federal Aviation Administration. "Certificated Remote Pilots including Commercial Operators." https://www.faa.gov/uas/commercial_operators/
(9) Federal Aviation Administration. "Become a Drone Pilot." faa.gov/uas/commercial_operators/become_a_drone_pilot/

3. Students

Describe student interest. Project enrollment and productivity for the first 5 years; justify projections.

NSU students from many different majors have expressed interest in the proposed Remote Systems Science and Technology Undergraduate Certificate. Rather than serving as an independent major, the RSST UC serves as an invaluable add-on to their existing majors. Students earning the certificate will give their degrees added value and will increase their employability in their chosen fields.

The proposed NSU Remote Systems Science and Technology Undergraduate Certificate is an interdisciplinary and interdepartmental effort. The initial cohort will begin taking the 12 required courses for the Certificate in their first year, then will branch out into electives related to their majors in their second year as new students begin the first year of the program. We initially estimated that potentially 100-150 students could be served in the first year and a half based on projected enrollments of 45-50 per class, and we believe that to be realistic when things return to normal. Due to pandemic restrictions, however, a potential course size of 20-30 may be closer to what we can expect:

- Spring 2021: Introduction to Remote Systems Science and Technology – 20-30 students
- Fall 2021: Remote Systems Operations, Law, and Policy – 20-30 students
- Spring 2022: Introduction to Remote Systems Science and Technology – 20-30 students

As the first-year cohort advances through the program and additional students begin, and as we move past the current pandemic conditions, it is conservatively estimated that 250-300 students per academic year across all relevant disciplines will be served.

Over the course of five years, if growth increases at a modest 10% (much lower than FAA estimates of the demand for remote pilots), approximately 1200-1600 students can be expected to be served).

4. Accreditation

Describe plan for achieving program accreditation.

Northwestern State University of Louisiana is accredited by Southern Association of Colleges and Schools Commission on Colleges (SACSCOC).

5. Faculty, Administration, & Other Resources

How will instructional needs be met: will additional faculty, facilities, equipment, or library resources be required? What department will deliver and oversee the proposed program?

RESOURCES:
The proposed Remote Systems Science and Technology Undergraduate Certificate is broadly multidisciplinary in nature and has support from the following academic units:
- The School of Business
- The Department of Biological and Physical Sciences
- The Mrs. H.D. Dear and Alice Dear School of Creative and Performing Arts
- The Department of Criminal Justice, History, and Social Sciences
- The Computer Information Systems Program
- The Department of Engineering Technology

- The Department of English, Foreign languages, and Cultural Studies
- The Department of Hospitality, Management. And Tourism

Initially, course instruction needs will be met using existing faculty, facilities, equipment and other resources. Grant funding will be sought to supplement equipment needs and expand offerings.

PROGRAM DELIVERY:
Primary personnel:
- Dr. Tommy Ike Hailey, Professor of Anthropology and Archaeology, with experience in terrestrial, aerial, and underwater archaeology. 18 years of experience in aerial data collection and processing using aerial photography, videography, and thermal imaging of archaeological sites. Aerial platforms have included conventional aircraft, ultralights, and remote systems for NSU projects with partner universities, state agencies, and the National Park Service in Arkansas, Georgia, Illinois, Kansas, Louisiana, Mississippi, Nebraska, North Dakota, Ohio, Oklahoma, Texas, and Washington.
- J.D. Cox, Adjunct Professor of Biology, Licensed Remote Pilot – 3 years experience; Remote Pilot Trainer, 1 year experience; ESRI ArcGIS Software – 5 years experience; ESRI ArcGIS Instructor – 3 years experience; Remote Data Collection, Orthoimagery Construction – 3 years experience.
Dr. Hailey and Mr. Cox will teach the required Remote Systems Science and Technology introductory and advanced courses and the Remote Systems Operation, Law, and Policy course. They will also provide instruction to other faculty members and assist in demonstrations and hands-on activities in other classes as needed.

Dr. Billy Culver (Biology) and Dr. Dean Sinclair (Geography) will provide instruction in Geographic Information Systems.

Professors in affiliated academic units - the School of Business, the Department of Biological and Physical Sciences, the Computer Information Systems Program, the Mrs. H. D. Dear and Alice Dear School of Creative and Performing Arts, the Department of Criminal Justice, History, and Social Sciences, the Department of Engineering Technology, the Department of English, Foreign Languages, and Cultural Studies, and the Department of Hospitality Management and Tourism - will provide instruction in the electives they have selected for their majors who are enrolled in the proposed RSST Undergraduate Certificate Program.
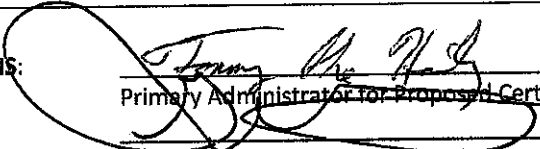
PROGRAM OVERSIGHT:
The NSU Department of Criminal Justice, History, and Social Sciences will oversee the proposed program.

6. Cost

Summarize additional costs to offer the program. On separate budget sheet, estimate costs and revenues for the projected program for the first four years, indicating need for additional appropriations (if any).

No additional costs are anticipated in the first year. As demand increases, it may be necessary to hire additional adjunct faculty to teach the Introduction to Remote Systems Science and Technology course and the Remote Systems and the Law course. Initial industry partners have expressed interest in assisting us in this regard if desired.

CERTIFICATIONS:

_____   13 OCT 2020
Primary Administrator for Proposed Certificate   Date

_____   10.16.2020
Provost/Chief Academic Officer   Date

_____   _____
Management Board/System Office   Date

SUMMARY OF ESTIMATED ADDITIONAL COSTS/INCOME FOR PROPOSED CERTIFICATE

Institution:___Northwestern State University_____   Date: ___17DEC2019_____

Certificate Program, Unit: ___Remote Systems Science and Technology, Criminal Justice, History, and Social Sciences_____

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

EXPENDITURES								
	FIRST YEAR		**SECOND YEAR**		**THIRD YEAR**		**FOURTH YEAR**	
	AMOUNT	FTE	Amount	FTE	AMOUNT	FTE	AMOUNT	FTE
Faculty	$		$ 2,640 (Adjunct)	.25	$ 2,640 (Adjunct)	.25	$ 2,640 (Adjunct)	
Graduate Assistants								
Support Personnel								
Fellowships and Scholarships								
SUB-TOTAL EXPENSES	$		$ 2,640 (Adjunct)		$ 2,640 (Adjunct)		$ 2,640 (Adjunct)	
	AMOUNT		**AMOUNT**		**AMOUNT**		**AMOUNT**	
Facilities	$		$		$		$	
Equipment								
Travel								
Supplies								
SUB-TOTAL	$		$		$		$	
GRAND TOTAL EXPENSES	$		$		$		$	

REVENUES								
Amount & Percentage of Total Anticipated From:	AMOUNT	%	AMOUNT	%	AMOUNT	%	AMOUNT	%
State Appropriations	$		$		$		$	
Federal Grants/Contracts								
State Grants/Contracts								
Private Grants/Contracts								
Tuition								
Fees								
Other (specify)								
TOTAL	$		$		$		$	

December 10, 2019

NSU Curriculum Review Council
175 Sam Sibley Dr.
Natchitoches, LA 71497

Louisiana Board of Regents
1201 N. Third St., Suite 6-200
Baton Rouge, LA 70802

To whom it may concern,

In support of the Remote Systems Science and Technology (RSST) Undergraduate Certificate program proposed by Northwestern State University, I would like to offer my recommendation of their proposal.

The use of unmanned aerial systems (sUAS / drones) is becoming one of the most recognized and essential methods for natural resource conservation planning, implementation and monitoring. In Louisiana, this technology is becoming key to efficient real-time discernment of land features, natural & induced hydrologic systems, natural resources inventory & damage assessments, watershed planning, invasive species management & control, vegetative type mapping, prescribed burn management, restoration project monitoring, various elements of precision agriculture and more.

Toward this end, the NSU School of Biological and Physical Sciences, and Department of Criminal Justice, History, & Social Sciences staff possess the expertise, technical capacity, enthusiasm and primary resources to deliver this curriculum in the manner appropriate to ensure the highest degree of aptitude among its program participants, and I ask that you give their proposal your utmost consideration.

Sincerely,

Joey Breaux
Agri. Environmental Specialist /Admin. Coordinator
LA Dept. of Agriculture/Office of Soil & Water Conservation
Joey_b@ldaf.state.la.us
225-922-1269

December 9, 2019

To Who It May Concern:

The Natchitoches Soil and Water Conservation is pleased to submit this letter of support for the Remote Systems Science and Technology (RSST) Undergraduate Certificate Program. As primary end users of remote operated technology, specifically small unmanned aircraft systems (sUAS), we believe this certificate program will be highly beneficial to students seeking employment in the natural resource conservation industry. As technology changes, we anticipate that our reliance on remote operated systems will only increase.

The Natchitoches Soil and Water Conservation District and Northwestern State University collaborate with one another on a variety of projects and programs. These include hands on learning opportunities for students as Earth Team Volunteers, outreach and education opportunities for students and professors on local conservation efforts including natural resource assessments using sUAS technology, and networking opportunities to facilitate further education and training of Northwestern State University students. The proposed Remote Systems Science and Technology Undergraduate Certificate will strengthen existing collaborative efforts and provide student with the skills necessary to today's conservation professionals.

We strongly encourage the approval of the proposed undergraduate certificate curriculum.

Sincerely,

Sidney B. Evans III, Chairman
Natchitoches Soil and Water Conservation District

CONSERVATION   DEVELOPMENT   SELF-GOVERNMENT

502A Airport Road
Natchitoches, LA 71457

December 16, 2019

Dear NSU Curriculum Review Council:

"Northwestern State University is seeking support for the **Remote Systems Science and Technology (RSST) Undergraduate Certificate** program. This new curriculum seeks to provide undergraduate students with the necessary skills and information to operate small unmanned aerial systems (sUAS, or drones) and other remote platforms. The objective of this certificate program is to prepare students to enter the workforce in their fields of study as fully capable remote operators."

Air Data Solutions (ADS) is a UAV and manned aircraft service provider based in Natchitoches, LA. ADS employs many former NSU students and alumni and has collaborated with NSU on several projects in the past. The undersign ADS leaders wish to express their strongest support for the development of a NSU Remote Systems Science and Technology (RSST) Undergraduate Certificate program. Our company is well poised to support this effort in multiple ways including hiring of qualified students, guest lecturing on the sUAS (drone) industry and on the adaptation of sensors to the aircraft and the acquisition and processing of the imagery. We will also be open to sharing our commercial sector experience with the program to assist in development of course material.

Our company roots in sUAS technologies goes back to mid-2000s when our COO (Kirk Demuth) worked on the US Military Predator mission and was the Chief Pilot for drone training, operations and testing at Kansas State University. Our President has been flying drones commercially for nearly 10 years, and our Chief Emerging Technologies Officer (Dr. Kevin Price) started research on drone imaging in 2011 and has been teaching remote sensing and geospatial analytics for 27 years. He has graduated over 80 Ph.D. and MS/MA students and started the first drone course in agriculture and natural resource management at Kansas State University. He would welcome the appropriate appointment at NSU that would allow him to offer basic remote sensing lectures to students as needed.

Sincerely,

Don Cummins
President,
Air Data Solutions

Dr. Kevin Price
Chief Emerging Technologies Officer
Air Data Solutions

Item E.2.   **Southeastern Louisiana University's** request for approval to offer a Bachelor of Science in Integrated Science and Technology.

EXECUTIVE SUMMARY

Southeastern Louisiana University (SLU) requests approval to offer a Bachelor of Science in Integrated Science and Technology (BS ISAT). The Letter of Intent was approved by the Board of Supervisors for the University of Louisiana System in August 2018 with subsequent approval granted by the Louisiana Board of Regents in October 2019.

The proposed program is designed to provide a broad-based, flexible science curriculum for students whose needs are not fully met by current degree offerings. Departments within the College of Science and Technology at SLU offer degrees in Biological Sciences, Chemistry, Computer Science, Engineering Technology, Industrial Technology, Mathematics, Physics and Occupational Safety Health & Environment. However, some professions are better served by graduates with more multidisciplinary learning experiences. The proposed BS ISAT will serve as a flexible STEM degree that can be adapted to fast-changing and diverse science and technology-related careers. Such a program will offer students a rigorous, but nimbler alternative to obtain a STEM degree tailored to individual needs.

The proposed 120-credit-hour curriculum is designed to build a broad understanding of science and technology along with the practical applications of an integrated science and technology approach, while using focus areas to build a student's expertise in particular disciplines that meet career goals and workforce needs. This will be accomplished through an innovative curriculum that contains a number of unique features. First and foremost, the proposed program will include three core ISAT courses. The first two will address a variety of topics related to the integration of science in technology ranging from ethical and social issues in various fields to industry trends and career options, and the third will be a supervised internship. These core courses will be team taught by faculty assigned as ISAT advisors from each participating STEM department. The curriculum also includes at least 6-8 credit hours in each of the following subject areas: Biology, Chemistry, Mathematics and Physics; and a minimum of 3 hours of Computer Science. In recognition of the importance of communication skills and reasoning ability, students will be required to complete Introduction to Public Speaking (COMM 211), Critical Thinking (PHIL 310), and Technical Writing (ENGL 322). The remaining hours of the curriculum will be dedicated to electives split between two focus areas chosen from the College of Science and Technology.

The impetus behind the development of the proposed program was the realization that the current individual degrees offered at SLU were not directly compatible with the rapidly changing needs of the workforce. For example, as technology becomes increasingly integrated into many facets of society, applicants who are conversant in both a primary field, such as biology or chemistry, along with computer science, may be at an advantage. According to the U.S. Bureau of Labor Services' Occupational Outlook Handbook, employment in professional, scientific and technical services is projected to grow by 34% with employment in management, scientific and technical consulting services anticipated to expand at "a staggering 83%." On a local level, a further need for a program like the one proposed is related to the large number of technology companies that have moved into the State in recent years, the most exciting example of this being DXC Technology which intends to hire up to 2,000 new employees in the next five years. Although a large portion of recruits will be those with a traditional Computer Science degree, DXC representatives have also expressed interest in hiring graduates with a breadth of experiences and perspectives so that they are more readily able to respond to rapidly changing demands of their clients. Having an ISAT degree in place will allow for SLU to respond immediately to the ever diversified needs of industry as Louisiana attracts more and more high tech companies.

The proposed BS ISAT is unlike any other baccalaureate degree currently available at a public university in Louisiana. While there is some potential overlap within concentrations that exists at other universities, there are no existing degree programs that provide a flexible, multidisciplinary, science-focused degree program such as the one being proposed by SLU. Based on enrollment growth in degree programs offered in the College of Science and Technology, the University anticipates the program will annually complete 40 students once established. Cost of program implementation will be minimal since the proposed program will utilize the talents of existing faculty, and facilities are more than sufficient. The curriculum will draw from courses already taught at SLU with only three new courses needing to be developed. A program of this nature is a natural extension of SLU's degree inventory; the University offers a Master of Science in Integrated Science and Technology which completes, on average, five (5) students annually.

RECOMMENDATION

It is recommended that the following resolution be adopted:

NOW, THEREFORE, BE IT RESOLVED, *that the Board of Supervisors for the University of Louisiana System hereby approves Southeastern Louisiana University's request for approval to offer a Bachelor of Science in Integrated Science and Technology.*

SOUTHEASTERN | Office of the President
LOUISIANA UNIVERSITY

October 1, 2020

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

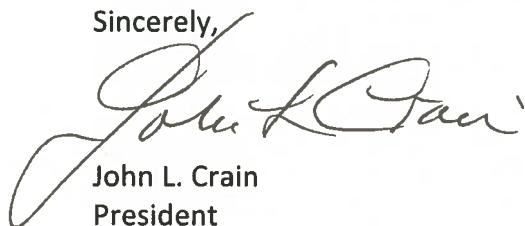Re: Proposal for a Bachelor of Science in Integrated Science and Technology

Dear Dr. Henderson:

Southeastern Louisiana University requests that its proposal to develop a new academic program leading to a Bachelor of Science in Integrated Science and Technology be placed on the agenda for the October meeting of the University of Louisiana System Board of Supervisors. On August 23, 2018 the Board of Supervisors approved the Letter of Intent to develop the proposal now submitted.

The proposed Bachelor of Science in Integrated Science and Technology (ISAT) degree will be housed within the College of Science and Technology. The purpose of the four-year degree is to provide a broad-based, flexible science curriculum for students whose needs are not fully met by the current degree offerings. Departments within the College of Science and Technology offer degrees in Biological Sciences, Chemistry, Computer Science, Information Technology, Engineering Technology, Industrial Technology, Mathematics, Physics, and Occupational Safety Health & Environment. However, some professions are better served by graduates with more multidisciplinary learning experiences. The new ISAT degree will reflect the multidisciplinary nature of many workforce requirements. Currently, Southeastern offers an M.S. in ISAT, which is a Professional Science Master's degree with direct applicability to workforce needs. The proposed B.S. in ISAT would be a natural feeder program into this M.S., but even more importantly, would provide many of the same types of workforce-related skills to students at the undergraduate level.

Your consideration of this request is appreciated.

Sincerely,

John L. Crain
President

Attachment

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: September 30, 2020

Institution: **Southeastern Louisiana University**	Requested CIP, Designation, Subject/Title: Bachelor of Science in Integrated Science and Technology 30.1501 Science, Technology and Society

Contact Person & Contact Info: Dr. Tena L. Golding, Provost and Vice President for Academic Affairs. SLU 10798 Hammond LA, 70402 phone (985) 549-2316 fax (985) 549-2304
Date BoR approved the Letter of Intent: October 23, 2019
Date Governing Board approved this Proposal:
Planned Semester/Term & Year to Begin Offering Program: Fall 2021
Program Delivery Site (s): Southeastern Louisiana University, Hammond campus

1. Program Description

Describe the program concept: (a) <u>purpose and objectives</u>; and (b) list learning outcomes for the proposed program, i.e., what students are expected to know and be able to do upon completion of the program. Be as specific as possible.

This Proposal is to create a Bachelor of Science in Integrated Science and Technology (ISAT) within the College of Science and Technology at Southeastern Louisiana University. The purpose of the four-year degree is to provide a broad-based, flexible science curriculum for students whose needs are not fully met by the current degree offerings. Departments within the College of Science and Technology offer degrees in Biological Sciences, Chemistry, Computer Science, Information Technology, Engineering Technology, Industrial Technology, Mathematics, Physics, and Occupational Safety Health & Environment. However, some professions are better served by graduates with more multidisciplinary learning experiences. The new ISAT degree will reflect the multidisciplinary nature of many workforce requirements. Currently, Southeastern offers an M.S. in ISAT, which is a Professional Science Master's degree with direct applicability to workforce needs. The proposed B.S. in ISAT would be a natural feeder program into this M.S., but even more importantly, would provide many of the same types of workforce-related skills to students at the undergraduate level.

The objective of the proposed curriculum is to provide an integrated science and/or technological education for our students so they can take advantage of rapidly evolving multidisciplinary employment opportunities. Therefore, expected learning outcomes will be: (i) students will gain technical and/or scientific proficiency in the specific disciplines; (ii) students will have a broad scientific and technical grounding (iii) students will learn the necessary communication and critical thinking skills required in the workforce, and (iv) students will be aware of the wide variety of interdisciplinary careers available to them.

This objective will be accomplished through an innovative curriculum that contains a number of unique features. Along with typical general education requirements, the core curriculum for the ISAT degree will provide a broad scientific foundation, including at least 6-8 hours in each of our major subject areas: Biology, Chemistry, Mathematics and Physics. In addition, we require that all students take a minimum of 3 hours of Computer Science. In recognition of the importance of communication skills and reasoning ability, our students will be required to complete Introduction to Public Speaking (COMM 211), Critical Thinking (PHIL 310) and Technical Writing (ENGL 322). Furthermore, in order to provide a rounded educational experience that formally provides connections between the sciences and technology, three new ISAT courses will be developed that students will take in their second, third, and fourth year. ISAT 201

will be a multidisciplinary course that will be team-taught by faculty from the different departments in the College of Science and Technology. The faculty teaching this course, and the other ISAT courses will be the designated ISAT advisors from each contributing department. This course will expose students to the wide variety of applications and careers in Science and Technology and will have the students initiate a career exploration that best matches their skills and interests. During this course, students will map out their major electives in context of the remainder of their four-year curriculum. ISAT 301 will also be team-taught, and will address the following topics that are of common interest to all areas of Science and Technology: social, ethical, and economic issues; analytical methods; communication methods (written and verbal) and; problems solving skills, both individual and group-based. ISAT 401 will be a professional internship course. All of these courses will be taught by the ISAT advisors.

The ISAT curriculum contains a great deal of flexibility. For example, a typical science/computer science degree requires between 70 and 80 hours of science and mathematics, including over 40 hours in the major area.   The ISAT core curriculum has 45 to 46 hours across the scientific fields with an additional 36 hours of major electives split between two focus areas chosen from the departments within the College of Science and Technology. For the ISAT degree the student, in consultation with the ISAT advisor, will focus on two, rather than one, of the "typical" major areas. For example, a student interested in bioinformatics might take 18 hours of additional biology courses (above the core hours) and 18 hours of additional computer science courses. Another student might complete 16 hours of mathematics and 20 hours of physics. Each of the two focus areas would have to include at least 15 total hours, 9 of which must be upper level (300/400) hours. In order to ensure an appropriate level of rigor, these courses must be chosen from courses taken by majors in those disciplines. One appeal of this type of curriculum is that it is readily adaptable to current trends in technology.

Map out the proposed curriculum, including course credits and contact hours (if applicable). Identify any incremental credentials and/or concentrations within the degree. Indicate which courses will be new. Describe plan for developing and offering new courses as well as any special program requirements (e.g., internships, comprehensive exam, thesis, etc.).

Below is the curriculum as it would appear in the Southeastern General Catalogue. The curriculum includes the three new courses: ISAT 201 in the third semester, ISAT 301 in the fifth semester, and ISAT 401, an internship in the seventh semester. The descriptions of these new courses are as follow:

ISAT 201 Introduction to Interdisciplinary Science and Technology
Semesters Offered : Fall and Spring
Course Description :
Credit 3 hours. Completion of 8 hours of science and Math 151/161 with a C or better. This course is designed to expose students to a wide variety of applications and careers in Science and Technology. It will also address the interdisciplinary nature of many modern-day topics. Lessons will assist students in exploring their abilities and goals to help them make informed decisions about degree and career planning.

ISAT 301 Professional Aspects of Scientific and Technical Careers
Semesters Offered : Fall and Spring
Course Description :
Credit 3 hours. Prerequisites: Major in ISAT and credit for ISAT 201. This course will focus on a variety of topics and skills important in science and technology including scientific ethics, analytical methods, and economic issues. Active engagement including individual and group discussions, problem-solving, case studies and student presentations will be emphasized.

ISAT 401 Professional Experience
Semesters Offered : Varies
Course Description :

Credit 1-3 hours. Prerequisite: Junior/Senior standing and permission of ISAT coordinator. This course is designed to give students practical experience working with professionals in their chosen field. The student is responsible for finding a professional with whom to work. Students earn 1 credit per approximately three hours worked averaged over the semester (6 hours per week in a summer semester), up to a maximum of 3 credits for 9 hours worked per week (18 in the summer) averaged over the semester. May be repeated more than once for up to 6 credit hours.

Curriculum in Integrated Science and Technology
Leading to the Degree of Bachelor of Science

First Year

FIRST SEMESTER	S.H.	SECOND SEMESTER	S.H.
[††]General Biology 151[G]	3	[††]General Biology 153[G]	3
[††]Biology Lab 152	1	[††]Biology Lab 154	1
English 101[G]	3	[*]Chemistry 121[G]	3
[*]Mathematics Sequence I[1,G]	3-5	Chemistry Lab 123	1
Computer Science 161	3	Mathematics Sequence II[1,G]	3-5
Southeastern 101	2	English 102[G]	3
	15-17		14-16

Second Year

Chemistry 122	3	Communication 211[G]	3
Chemistry Laboratory 124	1	[††]Major Electives	6-7
Social Science Elective[4,G]	3	Philosophy 310	3
[††]ISAT 201	3	English 230, 231, or 232[G]	3
Mathematics Sequence III[1,G]	0-3		
[††]Major Electives	3-6		
	13-16		15-16

Third Year

[††]Major Electives [2]	4-6	[††]Major Electives [2]	6-7
Arts Elective[3,G]	3	English 322	3
[††]ISAT 301	3	Elective	3
Physics 191	3	Physics 192	3
Physics Lab 193	1	Physics Lab 194	1
	14-16		15-16

Fourth Year

Social Science Elective[4,G]	3	[††]Major Electives[2]	8-9
[††]Major Electives[2]	6-8	Elective	3
[††]ISAT 401	3	History Elective[G]	3
Elective	0-3		
	13-17		14-15

Total Minimum Semester Hours Required	120
Total Minimum Semester Hours Required in Major	50

Southeastern 101 is not required of transfer or readmitted Southeastern students with 30 hours or more. Those students will replace Southeastern 101 with 2 hours of free electives.

[G]General Education Courses
[*]Grade of "C" or better
[††]A grade of "C" or better is required in these major courses.
[1]Students have the choice of the following course sequences: Mathematics 161, 162, and 163 (9 credit hours); Mathematics 175 and 200 (10 credit hours); Mathematics 200 and 201 (10 credit hours). Students who take the first sequence are required to take one additional elective hour.
[2]Students must choose approved courses from TWO of the following six disciplines: Biological Sciences, Chemistry, Computer Science, Engineering Technology, Mathematics, or Physics. Within each sub-discipline, students must take at least 15 hours and at least 9 of those hours must be at the 300 level or above, which much be chosen from courses required by the major. The total number of Major Elective must total 36 hours.
[3]Courses can be taken in music, art, dance, or theatre.
[4]Courses can be selected in economics, geography, anthropology, political science, psychology, criminal justice, or sociology.

Identify any embedded Industry-Based Certifications (IBCs). Describe process for student to earn/receive the IBC.

Not applicable.

Program Delivery (Courses): To what extent must a student come to the campus to complete this program, including orientation or any face-to-face meetings?

☒ On-site (>50% delivered face-to-face)	☐ Hybrid (51%-99% online)	☐ Online (100% online)
☐ Day courses offered	☐ Evening courses offered	☐ Weekend courses offered

2. Need

How is this program essential for the wellbeing 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).

The impetus behind the development of this proposal was the creation of a flexible degree program to allow students to customize a program of study to quickly adapt for fast-changing and diverse technology-related careers. For example, as technology becomes increasingly integrated into many facets of society, applicants who are conversant in both a primary field, such as biology or chemistry, along with computer science, may be at an advantage. For example, a decade ago the iPad was first introduced. Now, it has become an invaluable tool in the health care profession. Students in this program could couple Computer Science with medical courses in Biological Sciences, thus allowing them to adapt more effectively as this technology becomes even more widespread.

According to the latest data available from the U.S. Bureau of Labor and Statistics, the number of "professional, Scientific, and Technical" jobs is expected to grow from 9.3M in 2018 to 10.4M in 2028.

Further in 2018 it was stated that, "Employment in management, scientific, and technical consulting services is anticipated to expand at a staggering 83 percent, making up about 31 percent of job growth in this sector. Demand for these services will be spurred by businesses' continued need for advice on planning and logistics, the implementation of new technologies, and compliance with workplace safety, environmental, and employment regulations."

On a more local level, the Louisiana Department of Labor has compiled projections for the labor market through 2026 (LaWorks website at http://www.laworks.net/). In several regions, including the New Orleans, Baton Rouge, and Shreveport areas, the highest predicted job growth is in the category of Professional, Scientific and Technical Services.

A further need for this integrative degree is related to the large number of technology companies that have moved into the State in recent years, the most spectacular example of this being DXC Technology establishing a site in New Orleans where they have hired several hundred employees to date and intend to hire many hundreds more over the next few years. Although a large portion of their new employees will be students with a traditional Computer Science degree, they have also expressed interest in hiring graduates with a breadth of experiences and perspectives so that they are more readily able to respond to rapidly changing demands of their clients. Having the ISAT degree in place will allow for an immediate response to the ever-diversifying needs of industry as Louisiana attracts more and more high tech companies.

LOUISIANA WORKFORCE COMMISSION STAR LEVEL (http://www.laworks.net/Stars/)

☒ 5 Stars	☒ 4 Stars	☐ 3 Stars	☐ 2 Stars	☐ 1 Star

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

The development of the B.S. in Integrated Science and Technology is in alignment with strategic priorities of Southeastern as stated in the Vision 2025 document.

Strategic Priority 1: *To engage a diverse population of learners with powerful experiences.*

This B.S. in ISAT is unlike any Bachelor's degrees currently available at the public institutions in the State of

Louisiana. The degree is specifically designed to be flexible while providing the rigorous coursework and experiences necessary for our students to be successful in the workplace.

The interdisciplinary nature of the ISAT degree will allow students to explore multiple facets of science and technology. The curriculum is specifically designed to be flexible in order to meet changing workforce needs. All students would receive broad training in the sciences, would focus more deeply on two scientific and/or technical fields, and would still have the opportunity to complete multiple relevant non-science courses in their field of interest.

As was described earlier, the intent is to create three new courses that will provide a coherent framework for the interdisciplinary nature of the proposed degree. Since this degree will be largely shaped by regional workforce demands, these courses will address the interdisciplinary nature of many modern-day topics (living systems, energy, the environment, bioinformatics, automation, etc.). The second course will address many of the skills that are needed in all areas of science and technology, but which are not commonly addressed in most science curricula, such as communication skills, social impact of technology, problems solving skills, and working in groups. Again, since this is a degree with a direct workforce connection, students will be required to carry out an internship in their senior year.

The ISAT degree will encourage students to complete undergraduate research in one of the ISAT departments, and will require all students to complete a professional internship in a relevant field. The program will emphasize the importance of "doing" rather than just "learning about" science and technology.

Perhaps the greatest appeal of the B.S. in ISAT is its adaptability to rapidly changing workforce needs. An acknowledged problem with higher education is that development and implementation of degree programs takes much longer than is needed to meet the more immediate needs of industry. The BS in ISAT will work at the speed of business and be able to adapt immediately. Specifically, the B.S. in ISAT will create a degree that is directly aligned with the targeted workforce development needs within the state.

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.

A search of the Board of Regents Inventory of Degree and Certificate Programs reveals that the proposed B.S. in ISAT does not duplicate programs at any of the public Universities in Louisiana. A more detailed search of individual university websites shows some potential overlap within concentrations, but the overall concept of an interdisciplinary science degree has not been duplicated.

Several Universities, including LSU (https://www.lsu.edu/majors/interests/environmental-sciences.php), UNO (http://new.uno.edu/academics/cos/ees), Louisiana Tech (https://ans.latech.edu/biological-sciences/environmental-science/), and ULL (https://geosciences.louisiana.edu/academic-programs/environmental-science), offer some type of Environmental degree, which could be a focus area in ISAT if a student were to choose Biology and Engineering Technology, for example. Degrees such as the ULL Environmental Sciences concentration or the B.S. in Earth and Environmental Sciences at UNO are both housed in Departments of Geology and are much more focused on coastal and geosciences. The B.S. in Coastal and Environmental Science at LSU is of an interdisciplinary nature, but is more specialized than our proposed Environmental Science program. The Environmental Biology concentration at Nicholls State University ((https://www.nicholls.edu/biology/) is focused on Biology and is much less interdisciplinary than our proposed degree. Again, the multidisciplinary nature of this proposed degree sets it apart. The environmental scientist with a background in remote sensing (i.e. Engineering Technology) would be able to incorporate new measurement techniques to this important field.

Our proposed curriculum allows students who have primary interests in two fields of science to accommodate interdisciplinary employment opportunities. The only similar program is seen at LSU,

which has three choices of "Concentration in Chemistry with a Second Discipline", "Concentration in Physics with a Second Discipline" and Concentration in Computer Sciences" with a Second Discipline. This option is not offered for Mathematics or Biology as in our proposed degree.

Despite the lack of integrated science degree offerings in Louisiana, many other universities have developed such programs. Some examples include:

> University of Central Arkansas, B.S. in General Science
> South Dakota School of Mines, B.S. in Science, Technology and Society
> Virginia Commonwealth University, B.S. in Science (Interdisciplinary Science)
> Rensselaer Polytechnic Institute, B.S. in Interdisciplinary Science
> Florida Institute of Technology, B.S. in Interdisciplinary Science
> University of Oregon, B.A. and B.S. in General Science
> University of Arizona, B.S. in Integrated Science
> James Madison University, B.S. in Integrated Science and Technology
> University of Texas at San Antonio, B.S. in Multidisciplinary Science

While the degrees vary, these Universities tout the benefits of a flexible, interdisciplinary, science-focused degree program such as the one we are proposing.

If approved, will the program result in the termination or phasing out of existing programs? Explain.

No, this program is designed to complement rather than terminate 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).

Not applicable.

3. Students

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

Over the past decade, the enrollment in the degree programs offered in the College of Science and Technology has grown from about 1,800 students to over 2,200 students. The greatest areas of growth have been in Computer Science and Information Technology as well as in two of our newest degree programs, Engineering Technology and Occupational Safety Health & Environment. Having said that, we could be producing even more graduates in STEM disciplines because many of the students who initially chose a STEM major transfer to another discipline outside of the College.

A good example of this are the numbers of graduates in General Studies who chose the Natural Sciences or Applied Sciences group. These students are interested in scientific fields but are not fully served by the existing STEM degrees. Here are the number for the past five graduating groups:

Fall 2018	28
Spring 2019	30
Summer 2019	7
Fall 2019	34
Spring 2020	28

We have also recently had a number of students who have alternated back and forth between a Biological Sciences major and a Computer Science major. For these students interested in Bioinformatics, the Integrated Science and Technology degree would be ideal.

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

Based upon the students listed above, we would expect in the area of 30-40 students enrolled in the major in the first year with that number based upon the assumption that about 50% - 70% of the students in the General Studies degree would opt for this degree. However, we feel that with this new and flexible degree program, we would be able to advise students early in their academic career to stay in a STEM-related field. Furthermore, once this program is in place, we will be able to recruit students into this unique and workforce-friendly degree program. Therefore, we are anticipating an additional 10-15 students per year after the first year. The following table summarizes the predicted total majors using these estimate, assuming an increase of 12 majors a year:

Year 1	Year 2	Year 3	Year 4	Year 5
30	42	54	66	78

And the following table estimates the number of graduates. This takes into account usual attrition levels as well as extended time required for some students to graduate.

Year 1	Year 2	Year 3	Year 4	Year 5
0	15	24	32	40

No graduates are listed for Year 1, since students who transfer to the program will still be required to take the three ISAT courses.

List and describe resources that are available to support student success.

Along with the resources available to all students in the College of Science and Technology, the ISAT students will have access to multiple ISAT advisors from different departments within the College to assist them in all facets of their degree and career planning.

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

Students eligible to enter the different majors in the College of Science and Technology will also be prepared for this new degree program.

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

Not applicable.

4. Faculty

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

The following faculty will participate in the delivery of the courses and will advise students in the courses:
Dr. Mary White, Professor of Biological Sciences. Dr. White will serve as the ISAT Coordinator. She has served as the Assistant Dean for two years. She teaches a course called 'The Profession of Biology' to all Biology majors, and advises over 30 students.
Dr. Ghassan Alkadi, Professor of Computer Science. Dr. Alkadi supervises all of our project courses in Computer Science which focus on interfacing students with industrial partners. An important part of this course is having students work on their communication and presentation skills when working with their clients, and also applying technology to create solutions.
Dr. Kent Neuerburg, Professor of Mathematics. Dr. Neuerburg is a former Director of the Honors program, so he has extensive experience working with students with a diverse range of interests.
Dr. April Wright, Assistant Professor of Biological Science. Dr. Wright is a computational Biologists, so her work lies directly at the interface of Biological Science and Computer Science. She has been instrumental in exploring a Scientific Computing Minor within the College of Science and Technology which involves four different departments.

Dr. John Burris, Associate Professor of Computer Science. Dr. Burris is also a lead on the Scientific Computing Minor.

Project the number of <u>new</u> 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.

New faculty will not be necessary to initiate the program. Current faculty will cover the three new courses and will continue to cover the required existing courses. The new courses will be team-taught by faculty throughout the College, avoiding a high burden on any of the individual Departments. The only added support that may be needed in the future is more faculty being needed to serve as advisors, which will depend directly on the enrollment as well as the interests of the students.

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 main roll of the faculty will be to team teach the three ISAT courses. All faculty selected have shown the ability and interest to work on interdisciplinary subjects, and all have outstanding presentation and communication skills. The course work would be a part of the regular teaching load when they are asked to teach the course. All have active research programs, and these programs typically draw students from many disciplines, so they would certainly be willing to mentor any interested student in a research project, or help to direct them to a more appropriate mentor. The only faculty member who will have extra duties will be the Coordinator who at this time will be Dr. Mary White.

5. Library and Other Special Resources
To initiate the program and maintain the program in the first five years what library holdings or resources will be necessary? How do journal, database, monograph, datasets, and other audiovisual materials compare to peer institutions' holdings with similar/related programs?

The library materials necessary to support this degree program are the same materials that support our current programs in Science and Technology. Databases such as JSTOR, Academic Search Complete, Applied Science and Technology Source, Computer Source, ACM Digital Library, Web of Science, BioOne Complete, and others are currently available. Students will also have access to the statewide LaLinc reciprocal borrowing program and the InterLibrary Loan program for resources not directly available on campus.

What additional resources will be needed?

The only resource need initially will be dedicated time for the ISAT Coordinator who will be given a one-course reassignment every semester to coordinate the program. This may increase as the number of majors increases.

Are there any open educational resources (OER), including open textbooks, available to use as required course materials for this program? If so, which courses could these materials support, and what is the anticipated savings to students?

The three new ISAT courses will not require textbooks; they will use instructor-generated resources available on Moodle at no cost to students. All other courses will fall within our existing programs and will not use additional materials above those already required by students.

6. Facilities and Equipment
Describe *existing* facilities (classrooms, labs, offices, etc.) available for the program and their present utilization.

Majors in ISAT will be sharing resources with the traditional majors in the College. The three new ISAT courses will not siphon resources from current courses.

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.

This program does not require new facilities but will operate within the existing facilities.

7. Administration

In what administrative entity (department/school/college) will the proposed program be housed? How will the new program affect the present administrative structure of the institution?

The program will operate out of the College of Science and Technology and within existing departments. It will not impact the present administrative structure of Southeastern.

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

The departments in the College of Science and Technology at Southeastern offer traditional programs in the sciences and technology-related fields. The strength of all of these programs is that they are rigorous and require coursework that has traditionally been considered necessary for our majors to progress into graduate programs or demanding jobs in those fields. While that is a strength for many students and for many prospective careers, it necessarily makes these majors less easily adaptable to changing environments and workforce requirements. The BS in ISAT will offer students a rigorous, but a more nimble alternative to obtain a STEM degree tailored to individual needs.

The BS in ISAT program will increase interaction among faculty and students in different departments in the College, which should be for the benefit of all. We expect many of the majors to be either from General Studies, as documented in #3 above, or newly recruited to this innovative, integrative program. Though some students may transfer from existing majors (i.e Biological Sciences and Computer Sciences) these majors have sufficient numbers of graduates that they will not be negatively impacted. We do not anticipate negative impacts to our programs with lower numbers of graduates, such as Physics, Mathematics and Chemistry, and the new major may succeed in attracting additional students to the upper level courses in these majors.

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 is no relevant accrediting agency for this interdisciplinary program.

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.

Not applicable.

9. Related Fields

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

The ISAT program will involve all of the disciplines within the College of Science and Technology. While there is already interaction among these departments, the new interdisciplinary courses are expected to facilitate additional interactions to the benefit of all departments. The new program, will also facilitate increased interactions with other programs such as the Department of Sociology and Criminal Justice, with courses such as Environmental Sociology (SOC 360), Food, Sustainability and Society (SOC 460), Environmental Conservation and Geography (GEOG 126), Geographic Information Systems (GEOG 343) and Remote Sensing (GEOG 370); and the Department of History and Political Science with courses such as Ethics (PHIL 313), a Special Topics course on Philosophy of Science (PHIL 314) and Politics and the Environment (POLI 446).

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?

Program costs for the Bachelor of Science in Integrated Science and Technology will be nominal. This degree program will require the development of only three new courses. No new resources will be required for the development of these courses.

One undergraduate ISAT Coordinator will be designated and this person will receive a reduced teaching load to administer this program. Each participating department will identify an ISAT advisor who will be responsible for teaching the undergraduate ISAT courses, and working with the students to shape their curriculum.

*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.

The existence of this degree should allow us to become more competitive for Workforce Development grants.

CERTIFICATIONS:

_____   9/30/2020
Primary Administrator for Proposed Program   Date

_____   9/30/2020
Provost/Chief Academic Officer   Date

_____   _____
Management Board/System Office   Date

SUMMARY OF ESTIMATED ADDITIONAL COSTS/INCOME FOR PROPOSED PROGRAM

Institution: ____Southeastern Louisiana University_____ **Date:** _____Sept 29, 2020_____

Degree Program, Unit: ___B.S. Integrated Science and Technology, College of Science and Technology__

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	$50,000	0.50	$50,000	0.50	$50,000	0.50	$50,000	0.50
Graduate Assistants								
Support Personnel								
Fellowships and Scholarships								
SUB-TOTAL	$50,000	0.50	$50,000	0.50	$50,000	0.50	$50,000	0.50
	AMOUNT		**AMOUNT**		**AMOUNT**		**AMOUNT**	
Facilities	$		$		$		$	
Equipment/Library Resources								
Travel								
Supplies								
SUB-TOTAL	$		$		$		$	
TOTAL EXPENSES	$50,000		$50,000		$50,000		$50,000	
REVENUES								
Revenue Anticipated From:	**AMOUNT**		**AMOUNT**		**AMOUNT**		**AMOUNT**	
*State Appropriations	$		$		$		$	
*Federal Grants/Contracts								
*State Grants/Contracts								
*Private Grants/Contracts								
Expected Enrollment	0		12		24		36	
Tuition	0		69,326.00		138,653.00		207,979.00	
Fees	0		32,126.00		64,253.00		96,379.00	
*Other (specify)								
TOTAL REVENUES	$0		$101,453.00		$202,906.00		$304,358.00	

Describe/explain expected sources of funds in proposal text.

Item E.3. **University of Louisiana at Monroe's** request for approval to offer a Ph.D. in Pharmacology.

EXECUTIVE SUMMARY

The University of Louisiana at Monroe (ULM) requests approval to offer a Ph.D. in Pharmacology. Currently, ULM offers a Ph.D. in Pharmacy with areas of specialization in Medicinal Chemistry, Pharmaceutics, Pharmacology and Toxicology; the Graduate Program was established in 1967. At this time, ULM would like to take the existing Pharmacology component and convert it into a Ph.D. program. The faculty and graduate students within this component have grown and progressed to a level that would best be served by splitting off from the Ph.D. in Pharmacy and forming a new and separate Ph.D. in Pharmacology. Representatives from ULM and the University of Louisiana System met with Board of Regents staff on August 10, 2020 to discuss this concept at which time the need for a Letter of Intent was waived by Regents staff.

The rationale for transforming the Pharmacology component into a stand-alone Ph.D. program is to better define what is offered at ULM. Candidates who wish to pursue a degree in Pharmacology often overlook ULM's program and apply to named programs in Pharmacology. As such, the name of the current graduate program makes it difficult to attract and recruit high quality students interested in pursuing doctoral training in Pharmacology. Furthermore, graduates from ULM's current graduate program earn a doctoral degree in Pharmacy and this degree title does not spotlight their training and expertise in Pharmacology. Therefore, current students have a more difficult time seeking and obtaining employment in their areas of expertise because their degree does not highlight training received in Pharmacology. The graduate faculty in the ULM College of Pharmacy strongly believe that the formation of a new and separate doctoral program in Pharmacology will stimulate academic growth and research that will better serve faculty, students, and graduates.

During the past seven years, 55 students earned a Ph.D. in Pharmacy from ULM. Of those 55 Ph.D. graduates, 26 were trained by graduate faculty with a research focus in Pharmacology; the remaining 29 graduates were trained by graduate faculty in Medicinal Chemistry, Pharmaceutics and Toxicology. These completer numbers demonstrate that dividing the current Ph.D. in Pharmacy into two separate programs (Ph.D. in Pharmacy and Ph.D. in Pharmacology) would result in the creation of two viable programs. Both would produce the number of graduates that would far exceed the minimum required by the Louisiana Board of Regents (average of two Ph.D. degrees/year). Also, the expectation is that establishing Pharmacology as a separate degree will result in an increase in enrollment since potential applicants often overlook ULM because

there is the impression that the Ph.D. in Pharmacy is primarily focused on clinical pharmacy. Proper visibility and labeling will enhance graduate student recruitment and application submission thereby increasing the number of superior graduate students applying to the proposed Ph.D. program and ultimately promoting growth and productivity.

At present, there are two Ph.D. programs in Pharmacology that are offered by LSU Health Science Centers in Shreveport and New Orleans. The program offered by LSUHSC-S is a Ph.D. in Pharmacology, Toxicology and Neuroscience (3 yr avg = 1.6). This program primarily focuses on the areas of autonomic pharmacology, clinical pharmacology, neuropharmacology, toxicology and psychopharmacology. The program offered by LSUHSC-NO is a Ph.D. in Pharmacology with a focus in neuroscience and cardiovascular disease (3 yr avg = 3). The Ph.D. in Pharmacology proposed by ULM is distinctly different than the two existing programs because it would be based in a College of Pharmacy. In addition, the main focus areas of ULM faculty involved in Pharmacology include cancer research, diabetes, cardiovascular disease and drug discovery. The Ph.D. program proposed by ULM would complement the Pharmacology programs offered by LSUHSC-S and LSUHSC-NO and there is already research collaboration between the three institutions. It is also important to keep in mind that ULM is already providing teaching and research in Pharmacology but as an area of focus within the Ph.D. in Pharmacy; what is being requested is to morph the focus area into its own program. And, this can be accomplished at no additional cost to the University since current faculty will support the proposed program, graduate student assistantships are already available and existing facilities and equipment are sufficient.

RECOMMENDATION

It is recommended that the following resolution be adopted:

NOW, THEREFORE, BE IT RESOLVED, *that the Board of Supervisors for the University of Louisiana System hereby approves the University of Louisiana at Monroe's request for approval to offer a Ph.D. in Pharmacology.*

E.3.

September 21, 2020

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

Dear Dr. Henderson:

The University of Louisiana Monroe (ULM) respectfully requests that the University of Louisiana System Board of Supervisors approve the attached proposal for a new PhD in Pharmacology.

The Graduate Program in Pharmacology will train men and women to work in the biopharmaceutical sector to discover, develop, formulate and deliver innovative medicines. This research and innovation results in high-wage jobs, significant tax revenues and growing economic outputs for local communities, as well as ensuring that patients across the State of Louisiana and the nation benefiting from the latest treatments and cures. This educational program will be unique and will be delivered by existing faculty with minimal additional cost to the University. Attached is a copy of the proposal. After it is approved, we ask that you forward it to the Louisiana Board of Regents for their consideration.

Sincerely,

Ronald L. Berry, D.B.A.
President

Enclosure

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 Monroe	Requested <u>CIP, Designation, Subject/Title:</u>
	Pharmacology, 261001

Contact Person & Contact Info
ULM Dean of Pharmacy, Dr. Glenn Anderson ph. 318-342-1600, email, <u>ganderson@ulm.edu</u>

Date Letter of Intent was approved by Board of Regents:
Date this Proposal was approved by Governing Board:
Planned Semester/Term & Year to Begin Offering Program: July 1, 2021

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 Graduate Program in Pharmacology in the College of Pharmacy at ULM will offer a comprehensive and rigorous training leading to the Ph.D. degree in Pharmacology (CIP code 26.1001). Pharmacology is the study of the effects of drugs and chemical on living organisms.   Modern pharmacology is inherently interdisciplinary and builds on the strengths of biochemistry, physiology, cell biology, neuroscience and molecular biology to investigate the mechanism(s) of drug action. Because drugs and chemical are powerful tools that allow researchers to probe the molecular machinery of living systems, pharmacology research is primarily directed toward understanding how cellular and organ systems function and how they are regulated. Currently, the ULM College of Pharmacy awards a Ph.D. degree in Pharmacy, Pharmaceutical Sciences and Administration, CIP code 51.2003. While there is a Pharmacology component in this degree, the faculty and graduate students within this component have grown and progressed to a level that would best be served by splitting off from the current Graduate Program and forming a new and separate Graduate Program in Pharmacology. Since the current program is listed as a doctoral program in Pharmacy, candidates who wish to pursue a degree in Pharmacology often look past our Program and apply to named programs in Pharmacology. As such, the name of our current graduate program makes it difficult to attract and recruit high quality students interested in pursuing doctoral training in Pharmacology. Furthermore, graduates from our current graduate program have a doctoral degree in Pharmacy and this degree does not spotlight their training and expertise in Pharmacology. Therefore, our current students have a more difficult time seeking and obtaining employment in their areas of expertise because their degree does not highlight training in Pharmacology.
The graduate faculty in the ULM College of Pharmacy strongly believe that the formation of a new and separate doctoral program in Pharmacology will stimulate academic grown and research to better serve our faculty, students and graduates.

The ULM College of Pharmacy doctoral program is classified as a PhD in Pharmacy (CIP code 51.2003) and the new proposed degree program will be a PhD in Pharmacology (CIP code 26.1001). Although these individual programs are similar, the educational and research focus of each individual program is vastly different. Pharmaceutical science research involve a broad range of disciplines, includes identification of molecules with potential benefit, investigation of biological effects, characterization of toxicological effects, development of novel methods of drug delivery, as well as pharmacokinetic and pharmacodynamic studies.

The PhD Pharmacy degree is largely associated with the drug develop side of the drug development process, namely the discovery and optimization of new bioactive molecules, physical chemistry, and the creation of novel drug formulations for optimized drug delivery to target tissues.

In contrast, the PhD Pharmacology program is focused on the biological effects of drugs, identification of the intracellular mechanism(s) of drug action, drug toxicity and therapeutic drug use. Training of students in the PhD Pharmacy and PhD Pharmacology programs will share common core classes covering pharmacokinetics, basic instrumentation, and pharmacodynamics. However, these programs diverge into clearly separate programs as they progress through their individual curriculum. This clear delineation of programs is necessary and appropriate to better identify student training and expected skills for potential employers.

(b) Mode of Delivery: The Graduate Program in Pharmacology will have a strong didactic component that will be taught on site. However, the Ph.D. degree in this Program is inherently a research degree. Starting in their first year, students training will be divided between research and course work. The later years of training are devoted nearly exclusively to a novel research projects culminating in publications in high impact professional scientific journals and an original Ph.D. dissertation. On average, students will complete the PhD Program in Pharmacology in 4-5 years.

Plan for Developing New Courses: The Ph.D. in Pharmacology program will have an early focus on didactic learning, but its overall emphasis is research. The first year will consist of a set of core courses. Dissertation research also typically begins during the first year. Elective courses deemed to be important to the student's research topic are usually taken during the second year. By the end of this period, the student and their major professor will develop a dissertation research proposal. Throughout the program, students present their current research to the program in progress reports and meeting, as well as annual seminars to all faculty and students. Upon completion of the research project, a dissertation is written and defended, and a Ph.D. degree will be awarded. The Program requires a minimum of 30 credits of graduate coursework which gives a working knowledge of biochemistry, physiology, and pharmacology. The training of Ph.D. students in the Pharmacology Program also involves an integrated approach to learning. In addition to course work and thesis research, formal and informal learning situations are integrated into the course of study in the form of journal clubs, seminars, and other student-student and student-faculty interactions. All of the required courses for the Ph.D. in Pharmacology are currently established and approved by the ULM curriculum committee. However, with the establishment of its own Program, new courses will be created in the future to meet the needs of the students in this program.

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.).

Each student's specific degree plan is organized to meet their individual needs, as determined by the student, faculty advisor and dissertation advisory committee. A minimum of 30 semester hours of structured coursework, excluding seminars, dissertation research and directed study. Of the minimum 30 hours, 80 percent must be in 5000 or higher level courses. New courses can then be developed at a later time if needed. In general, the curriculum sequence for the PhD Program in Pharmacology is described below.

Required Course

Fall 1:	MATH 5020-Statistical Methods for the Experimenter (3 credits)
	PHAR 5021-Advanced Physiology (3 credits)
	PHAR 5022-Advanced Pharmacology Laboratory (3 credits)

Spring 1	MATH 5021-Statistical Methods for the Experimenter (3 credits)
	PHAR 5081-Advanced Toxicology (3 credits)
	PHAR 5052-Seminar (1 credit)
	PHAR 5082-Advanced Toxicology Laboratory (3 credits)

| Summer 1 | PHAR 6099-Dissertation (3 credits) |

Fall 2	PHAR 5058-Advanced Cancer Pharmacology (3 credits)
	BIOL 5096-Special Topics: Cell and Molecular Biology (3 credits)
	PHAR 5050-Biochemical Toxicology (3 credits)

Spring 2	PHAR 5010-Advanced Cardiovascular Physiology (3 credits)
	PHAR 5052-Seminar (1 credit)
	BIOL 4025-Neurology (3 credits)
	BIOL 4043-Neurology Laboratory (1 credit)
	PHAR 6099-Dissertation (1 credit)

| Summer 2 | PHAR 6099-Dissertation (3 credits) |

Fall 3	PHAR 6051-Advanced Directed Study (2 credits)
	BIOL 5042-Endocrinology (3 credits)
	BIOL 5005-Research Methods (2 credits)
	PHAR 6099-Dissertation (2 credits)
Spring 3	Electives, if needed
	PHAR 5052-Seminar (1 credit)
	PHAR 6099-Dissertation (3 credits)
Summer 3	PHAR 6099-Dissertation (3 credits)
Fall 4	Electives, if needed
	PHAR 6099-Dissertation (6-9 credits)
Spring 4	PHAR 6099-Dissertation (8 credits)
	PHAR 5052-Seminar (1 credit)
Summer 4	PHAR 6099-Dissertation (3 credits)
Fall 5	PHAR 6099-Dissertation (9 credits), if necessary
Spring 5	PHAR 6099-Dissertation (9 credits), if necessary)

2. Need

Outline how this program is deemed essential for the wellbeing 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).
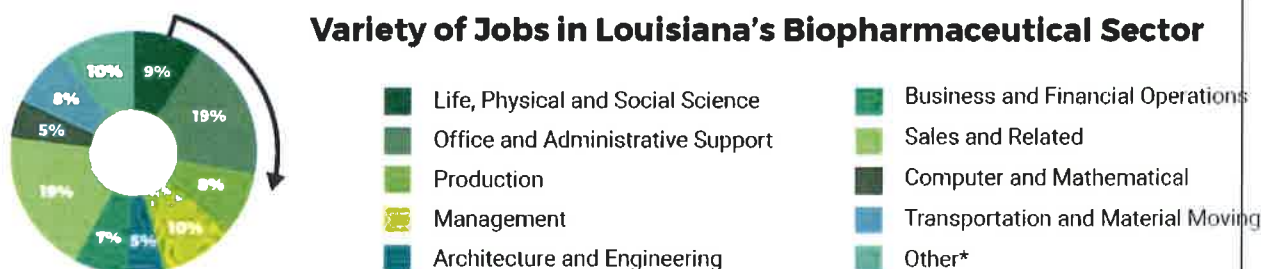
Ph.D. graduates in the Pharmacology Program will have a working knowledge of specialties and training that includes drug discovery, drug mechanism of action, and investigation of drug molecular and genetic action. Graduates will receive employment in a variety of areas including academia, government, large and startup pharmaceutical companies and consulting. Big Pharma accounts for a high percentage of jobs in these fields and hires scientists at all stages of research and development, whereas startups represent the high-risk/high reward option for scientists. Consulting can also be a strong career choice for scientists, particularly for new biotech companies that need advice and mentoring of experienced scientists. Many regulatory bodies, notably the U.S. Pharmacopoeia and the FDA, hire Pharmacology scientists for their expertise in testing new drugs to verifying their performance and to make sure side effects are accurately reported by the manufacturers. Most importantly, a Ph.D. degree is an absolute requirement for a career in academia. A terminal degree, such as a PhD, is required for submission of grants as a principal investigator of the proposed research, and is an absolute requirement for attaining tenure. In addition to their traditional role of conducting pure research, universities now attempt to monetize their faculty's discoveries by obtaining patents and bringing them to market. A 2015 survey conducted by the American Association of Pharmaceutical Scientists reported that respondents with a Ph.D. in Pharmacology had an averaged base salary of $138,400 a year, with a further $22,800 in bonuses and $3,800 in outside income. The top 25 percent earned $171,300, with $30,000 in bonuses and incentives. Of the Ph.D. respondents in this survey, 41 percent had been in the field for 20 years or more. Male respondents reported a median salary of $135,000, while female respondents earned a median salary of $113,000.

The Graduate Program in Pharmacology will train men and women to work in the biopharmaceutical sector to discover, develop, formulate and deliver innovative medicines. This research and innovation results in high-wage jobs, significant tax revenues and growing economic outputs for local communities, as well as ensuring that patients across the State of Louisiana and the nation benefiting from the latest treatments and cures. According to a 2017 report prepared by TEConomy Partners, LLC for PhRMA, *"The U.S. biopharmaceutical industry is not only a world leader in the development of new medicines, vaccines, and diagnostics and one of our nation's top performing industry innovation drivers, but is also a highly valuable industry in terms of its economic contributions and impacts."* The biopharmaceutical sector's research and development (R&D) is a lead driver of our nation's economic development. In fact, biopharmaceutical manufacturers spend more in R&D relative to sales than any other manufacturing industry,

investing more than six times the average for all manufacturing industries. The overall economic impact of the biopharmaceutical industry on the U.S. economy is substantial. The biopharmaceutical industry accounted for more than $1.3 trillion in economic output, representing 4% of total U.S. output in 2015. This total economic impact includes $558 billion in revenues from biopharmaceutical businesses and $659 billion from suppliers and worker spending.

In Louisiana, the biopharmaceutical sector accounts for $3.1 billion in total economic output, with $421,202 output per employee in direct biopharmaceutical sector jobs, as compared to $192,686 output per employee across all Louisiana job sectors. In addition, the Louisiana biopharmaceutical sector is responsible for generation $144.4 million in total state and federal taxes. The average compensation for each employee in the biopharmaceutical sector was $79,535 per employee in direct jobs, whereas the per employee average compensation across all Louisiana jobs was $52,435. During this same time period, the biopharmaceutical sector was responsible for the creation of 13,611 total jobs and 3,342 direct jobs in Louisiana, as reported by the Pharmaceutical Research and Manufacturers of America (PhRMA) Louisiana State fact sheet (www.PhrMA.org/Economic-impact). Figure 1 summarizes the types of jobs that exist in Louisiana's biopharmaceutical sector.

Currently, 7% of graduates from the ULM Pharmacy Graduate Program are employed in Louisiana in academic, government and industrial positions related to their doctoral training. The majority of graduates from the ULM Pharmacy Graduate Program are employed outside the State because there is greater employment opportunities in larger more populated states that contain greater numbers of research-focused institutes of higher education and a more highly developed biopharmaceutical sector. Nevertheless, the biopharmaceutical sector in Louisiana is growing rapidly and the ULM Pharmacy Graduate Program plays a critical role in providing highly-trained research scientists to meet the future needs of the biopharmaceutical sector in the State.

Variety of Jobs in Louisiana's Biopharmaceutical Sector

- Life, Physical and Social Science
- Office and Administrative Support
- Production
- Management
- Architecture and Engineering
- Business and Financial Operations
- Sales and Related
- Computer and Mathematical
- Transportation and Material Moving
- Other*

Although Figure 1 Represents only a snapshot of the biopharmaceutical sector's total impact, these findings demonstrate the importance of a strong and vibrant sector of the economy that is helping other businesses grow and contributing to a robust State and national economy. The biopharmaceutical industry relies on highly skilled talent across a range of occupational categories and educational levels, including those with skills, education, and training in pharmacy, as well as science, technology, engineering, and math (STEM). An array of STEM-related jobs are required by this industry and can range from those requiring a Ph.D. in Pharmacology and other college degrees such as highly-skilled technicians to blue collar positions such as advanced manufacturing jobs and other production personnel.

The Graduate Faculty and Students in the ULM Graduate Program in Pharmacology conduct research that directly addresses the needs of the healthcare and the biopharmaceutical sectors. Patents resulting from intellectual property discovered and/or created here in research pharmacology laboratories at the ULM College of Pharmacy has led to business partnerships (Segue Therapeutics, First Tech International, LifeShare Blood Centers) that will commercialize these discoveries and ultimately further stimulate economic development and employment within Louisiana.

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

The University of Louisiana at Monroe is one of the State's six doctoral granting institutions of higher education. The Carnegie Classification of Institutions of Higher Education (CCIHE) is the leading framework for recognizing and describing institutional diversity in U.S. higher education for the past four and a half decades. In 2016, ULM's classification was upgraded from the "Master's College and University – Larger Program (M1) status to a "R3" Moderate Research Activity Doctoral university. At that time, ULM joins the ranks of 109 other universities across the U.S and only 5 other universities within the state. It should be noted that a university does not move into the

"Doctoral University" category overnight. It takes many years of strategic planning and successful organization on the part of the administration and faculty, commitment of graduate students in their respective programs, and increased efforts in recruiting. Receiving the classification speaks volumes about the growth of The University of Louisiana at Monroe as a whole. The ULM Graduate Program in Pharmacology will play a significant role in elevating ULM's Carnegie Classification status.

The current ULM PhD in Pharmacy program has established itself as a center of innovation and discovery in the Northeast region of Louisiana. Through our graduate education and research the current program has built partnerships and collaborations with regional businesses, industry and local governments to enhance economic growth in Louisiana. These efforts have advanced the ULM College of Pharmacy's reputation within the State and nationally. Pharmacy Graduate Faculty and Graduate Student research, discovery and creation of intellectual property has provided a driving force for economic development. Furthermore, Pharmacy doctoral graduates have demonstrated that they are highly trained and industry-ready and provide a ready workforce for high-demand scientific occupations that are defined by the regions and State's economic development stakeholders.

Establishment of a new Graduate Program in Pharmacology will further advance the mission of the College of Pharmacy and University of Louisiana at Monroe, by building and expanding the current training of Graduate Students in Pharmacology.

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.

At present, there are two programs in Louisiana that offer a Ph.D. degree in Pharmacology that are located on the campus of the LSU Health Science Centers in Shreveport and New Orleans. The Program at LSUHSC-Shreveport offers a Ph.D. in Pharmacology, Toxicology and Neuroscience. This program's primary interest focuses on the areas of autonomic pharmacology, clinical pharmacology, neuropharmacology, toxicology and psychopharmacology. The Program at LSUHSC-New Orleans offers a Ph.D. in Pharmacology with a focus in neuroscience and cardiovascular disease. Both of these Pharmacology Programs are housed in Louisiana's state supported medical schools.

The ULM Graduate Program in Pharmacology would be distinctly unique, as compared to the other two Pharmacology Graduate Programs in the State, because it would be based in a College of Pharmacy. The Faculty and Graduate Students currently participating in the Graduate Program in Pharmacy at ULM are among the most productive and accomplished research scientists working at the University of Louisiana at Monroe. The major divisions within the existing department include Medicinal/Natural Products Chemistry, Pharmaceutics, Pharmacology and Toxicology. However, 50% of the research faculty are involved in Pharmacology based research. The major research emphasis of these Pharmacology faculty researchers can be categorized into specific areas that include: 1) cancer research; 2) diabetes; 3) cardiovascular disease and 4) drug discovery. Although there is some overlap between the proposed ULM Graduate Program in Pharmacology and that of the LSUHSC-Shreveport program in terms of area of focus, the specific research approach differs significantly. As such, the two Programs at ULM and Shreveport complement each other and has already lead to ongoing collaborations between the two campuses. In addition, the areas of research focus within the ULM Pharmacology Program inherently has much crossover and overlap, and this has led to significant interaction and collaboration among research faculty and their students within the ULM College of Pharmacy. Pharmacology faculty are routinely involved in their colleagues' grant applications and publications. Furthermore, this spirit of cooperation and collaboration has created an environment in which graduates students are able to freely interact with members of other laboratories to learn new techniques and use another laboratory's analytical equipment. It is very common for faculty to share mentoring of graduate students during their doctoral studies at ULM. As a result, there is a nurturing and supportive research climate and culture currently existing in the current ULM Graduate Program in Pharmacy. However, it has become increasingly evident that creation of a new and separate Graduate Program in Pharmacology will further enhance the activity and focus of the faculty and their graduate students, increasing research productivity and expand Pharmacology graduate students training and exposure to new methodologies, ideas, and equipment.

An argument could be made that any PhD Pharmacology program requires a "health sciences focus", a focus that is might appear to be absent at ULM because the University is not associated with a Medical School on campus. However, the health science reference to doctoral programs in Pharmacology generally refers to the presence of a research focus within medical subdisciplines/subspecialties (endocrine, cardiovascular, neurology, etc). These subdisciplines/subspecialties are exactly the focus of the current ULM doctoral program in Pharmacy. Hence, a

health sciences focus is the foundation for all PhD student experiences within our current program, particularly those students training in the area of Pharmacology. Furthermore, the Edward Via College of Osteopathic Medicine (VCOM), located on the campus of ULM, has now opened its doors to their first class of medical students this Fall (2020). In addition, VCOM is currently renting laboratory space in the ULM College of Pharmacy, finalized an agreement to share and use common research instrumentation and has been in discussion with ULM Pharmacy faculty in order to development research collaborations. In summary, the research being conducted in the ULM College of Pharmacy has always had a health sciences focus and this focus is now further enhanced and supported by the opening of the VCOM Medical School on the campus of ULM.

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

No, at present, the Graduate Program in Pharmacy offers a Doctor of Philosophy (Ph.D.) degree in Pharmacy. There is no Masters of Science (M.S.) degree offered by the Program. Over the past five years, 30-47 graduate students have participated in the current Program each year, and between 6-12 students graduate annually with a doctoral degree in Pharmacy. The current Graduate Program Pharmacy is multidisciplinary, offering specialized instruction and research training in Medicinal/Natural Products Chemistry, Pharmaceutics, Pharmacology and Toxicology. General coursework requirements are equivalent for doctoral candidates in these areas of study and are supplemented by unique requirements for each discipline.

The current Graduate Program in Pharmacy is listed with a CIP title of "**Pharmacy, Pharmaceutical Sciences, and Administration, Other**" with a CIP Code of **512099** (in contrast to Professional Program in Pharmacy (PharmD) which is listed with a CIP Title of "**Pharmacy**" and a CIP Code of **512001**). Therefore, it is proposed that the Graduate Program in Pharmacy be split up into two separate PhD Graduate Programs that would include 1) CIP Title "**Pharmacy, Pharmaceutical Sciences, and Administration, Other**", CIP Code **512099**, and 2) CIP Title "**Pharmacology**", CIP Code **261001**.

The Graduate Program in Pharmacy (512099) would be composed of disciplines and graduate faculty already existing in the ULM Pharmacy Graduate Program (e.g. Medicinal Chemistry, Pharmaceutics and Toxicology) minus Pharmacology. The Graduate Program in Pharmacology would house the Pharmacology faculty currently housed in the existing Graduate Program in Pharmacy. As such, the creation of the new Program would not require the hiring of new faculty and/or the investing in new laboratories or facilities. The current Graduate Coordinator could also supervise both Programs so additional administration is not necessary.

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).

The Louisiana WISE program is structured to align higher education programming with the current Louisiana job market. Increased funding is targeted for college and university programs in engineering, computer science, business and health professions. The ULM Graduate Program in Pharmacology will provide training that match up well with the mission of the Louisiana WISE program related specifically to the area of health care professions. According to a report published by the American Association of Colleges of Pharmacy (AACP) in 2016, the demand for trained pharmacy professionals has increased due to the rapid growth in the healthcare and pharmaceutical industries, especially for the growing elderly populations, and demands are increasing in related areas of research, administration and business. The number of people requiring healthcare services is steadily increasing and because of the large role that medications play in healthcare, there is a corresponding increase in the demand for additional research for novel and more effective therapies. The demand for our graduates is very promising.

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).

The ULM Graduate Program in Pharmacy was established in 1967 and offers a PhD in Pharmacy. During the past seven years, 55 graduate students in this Program in Pharmacy have graduated with an earned Ph.D. degree in Pharmacy. Of those 55 Ph.D. graduates, 26 were trained by Graduate Faculty with a research focus in Pharmacology, with the remaining 29 graduates were trained by Graduate Faculty in Medicinal Chemistry, Pharmaceutics and Toxicology. These data demonstrates that dividing the current Graduate Program in Pharmacy into two separate Programs would result in the creation of two viable programs, both of which that would annually produce graduates in numbers far in excess of the minimum (average of 2 Ph.D. degrees/year) required by the Louisiana Board of Supervisors. Furthermore, many students who want to apply to a Graduate Program in Pharmacology, often times

are unaware that the ULM Graduate Program in Pharmacy offers training in Pharmacology. As a result, many potential applicants do not apply because they have the impression that a Ph.D. in Pharmacy is primarily focused on clinical pharmacy. For example, the search entitled Pharmacology Programs and Graduate Schools in Louisiana on the www.gradschools.com website lists both LSUHSC in Shreveport and New Orleans as giving a Ph.D. in Pharmacology, but list ULM as giving a degree in Pharmacy. It is strongly believed that by having a designated Ph.D. Graduate Program in Pharmacology at ULM will greatly enhance graduate student recruitment and application submission by providing proper visibility and labeling of our Program, thereby increasing the number of superior graduate students applying to the program and ultimately promoting the growth and productivity of the Program.

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

As stated above, during the past seven years the ULM Graduate Program in Pharmacy has produced 26 Ph.D. graduates with a focus in Pharmacology. Establishment of a degree Program in Pharmacology will not only maintain this graduation rate, but most likely increase the number of graduates earning a Ph.D. in Pharmacology because of greater visibility, which will enhance recruiting and bring a higher quality of student into the Program.

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

The current Graduate Program in Pharmacy has been successful in the recruitment and retention of outstanding graduate students. A summary of the number of applicants to the program, number of students accepted into the program, and the number of students that have completed the program over the past seven years is provided in the table below.

Annual graduate student applications, admission, enrollment and completion rates.

Academic Year	Applications	# Accepted	# Enrolled	# Completed	Still Enrolled	Graduated
2011-2012	61	13	12	12 (100%)	0 (0%)	12 (100%)
2012-2013	58	11	9	8 (88.9%)	0 (0%)	8 (89%)
2013-2014	58	10	9	7 (78%)	0 (0%)	7 (100%)
2014-2015	62	12	10	0 (0%)	2 (20%)	8 (80%)
2015-2016	47	10	9	0 (0%)	8 (89%)	1 (11%)
2016-2017	51	14	12	0 (0%)	12 (100%)	0 (0%)
2017-2018	53	7	6	0 (0%)	6 (100%)	0 (0%)

Enrollment of graduate students has remain very consistent over the past decade. The average number of students per Graduate Faculty member averages 3.4 students, with the largest laboratories supporting 5-8 graduate students and the smallest laboratories supporting 1-2 students. The total number of students enrolled in the ULM Pharmacy Graduate Program between 2012 and 2018 is summarized in the table below.

Table 2. Pharmacy Graduate Student Enrollment 2012-2017.

Academic Year	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Students Enrolled	37	41	42	42	43	41

During the past decade, enrollment of students in the ULM Graduate Program in Pharmacy as increased slightly, but remains relatively constant. It is strongly believed that by splitting out Pharmacology from the existing Graduate Program in Pharmacy, the newly formed Graduate Program in Pharmacology will attract more students because of greater visibility as a standalone Program. Between the Fall 2003 and Spring 2018 semesters, the Graduate Program in Pharmacy has produced 154 doctoral students, of which, nearly 50% of these Graduates received training in the Pharmacology division of the Graduate Program in Pharmacy.

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

Applicants should have a Master's degree from an accredited institution; however, exceptional students with a baccalaureate degree may be admitted. General coursework requirements are equivalent for doctoral candidates in these areas of focused study, but each discipline is supplemented with unique courses specific to their areas of research. Although an applicant must meet the requirements for admission to the University of Louisiana at Monroe Graduate School, typical applicants selected for admission into the Graduate Program in Pharmacy show performance significantly higher than the University minimum. In general, graduate students currently accepted into the Graduate Program in Pharmacy have a GPA ranging from 3.3-4.0 and accumulative GRE of 300-310 (old score range 1050-1300). These standards will be maintained for the newly created Graduate Program in Pharmacology. Each student's specific degree plan is organized to meet their individual needs, as determined by the student, faculty advisor and thesis advisory committee. All graduate students in the program are required to take a minimum of 30 semester hours of structured coursework, excluding seminars, dissertation research and directed study. Of the minimum 30 hours, 80 percent must be in 5000 (doctoral level) level courses. Between the Fall 2003 and Spring 2018 semesters, the Graduate Program in Pharmacy has produced 154 doctoral students.

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

During the past decade, the State of Louisiana funding for higher education has experienced major cuts. As a result, the budget for College-funded Graduate Assistantships experienced a slight decrease. However, during this same time period, the Graduate Program in Pharmacy was able to gradually increase the Graduate Assistantship stipend level from $15,000/year in 2008 to $18,000/year in 2018. Graduate Assistantships also include a tuition wavier for our Graduate Students. The funding increase in Graduate Assistantship stipends was accomplished by reducing the total number of College-funded stipends and using the remaining money to provide raises. During this same time period, Graduate Faculty in the Program received a corresponding increase in extramural funding. The Pharmacy Graduate Program also increased their admission of graduate students receiving scholarship from their home country's government. The net result was that the Graduate Program in Pharmacy was able to provide raises and maintain Graduate enrollment without additional funding support from the University. While the research faculty in the Pharmacy Graduate Program has continued to be successful in obtaining extramural funding to support Graduate Student assistantships and research, maintaining a high level of funding remains a challenge. Furthermore, while the Pharmacy Graduate Program has maintained a consistent level of Graduate Student enrollment, the Program strives to improve and grow in student numbers. Opportunities to maintain and increase growth of the Program include the establishment of a new Graduate Program in Pharmacology, which accounts for almost 50% of the students in the existing Graduate Program in Pharmacy. It is strongly believed that by having the Pharmacology faculty and graduate students housed in the existing Graduate Program in Pharmacy is having a negative impact on increasing the number of students accepted and conducting research in the area of Pharmacology.

4. Faculty

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

List of Current Full Graduate Faculty Members in the ULM Graduate Program in Pharmacy

Kevin Baer, Professor of Toxicology
Nektarious Barabutis, Assistant Professor of Pharmacology
Karen Briski, Professor of Pharmacology
Jean Chamcheu, Assistant Professor of Pharmacology
Khalid El Sayed, Professor of Medicinal Chemistry
Ronald Hill, Associate Professor of Medicinal Chemistry
Keith Jackson, Associate Professor of Pharmacology
Seetharama Jois, Professor of Medicinal Chemistry
Yong-Yu Liu, Professor of Pharmacology
Georgios Matthaiolampakis, Assistant Professor of Pharmaceutics
Sharon Meyer, Professor of Toxicology
Girish Shah, Professor of Pharmacology
Paul Sylvester, Professor of Pharmacology

Proposed Division of Pharmacy Graduate Faculty into the Two Graduate Programs in Pharmacy:

Graduate Program in Pharmacy (CIP 512099)
Kevin Baer, Toxicology
Ron Hill, Medicinal Chemistry
Khalid El Sayed, Medicinal Chemistry
Seetharama Jois, Medicinal Chemistry
Georgios Matthaiolampakis, Pharmaceutics
Sharon Meyer, Toxicology
Open position in Pharmaceutics (to be filled in 2021)

Graduate Program in Pharmacology (CIP 261001)
Nektarios Barabutis, Assist. Professor of Pharmacology
Jean Chamcheu, Assistant Professor of Pharmacology
Keith Jackson, Associate Professor of Pharmacology
Yong-Yu Liu, Professor of Pharmacology
Girish Shah, Pharmacology
Paul Sylvester, Pharmacology
Karen Briski, Professor of Pharmacology

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.

None. As can be seen above, no new faculty will need to be hired to immediately establish a new Graduate Program in Pharmacology, by dividing the current Graduate Program in Pharmacy into two separate Programs (Pharmacy and Pharmacology).

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.

Since the creation of a Graduate Program in Pharmacology will result from the splitting of the current Graduate Program in Pharmacy into two separate Graduate Programs (Pharmacy and Pharmacology) no new faculty will need to be hired at this time. As such, faculty teaching duties in the professional program (Pharm.D. students) will not be affected. Furthermore, teaching of Graduate students in the Graduate Program in Pharmacy will be provided by the Medicinal Chemistry, Toxicology and Pharmaceutics faculty, whereas the teaching of Graduate Students in the Graduate Program in Pharmacology will be provided by the Pharmacology faculty. The Graduate Student Seminar course will be a combined course containing student from both Programs. Therefore, teaching loads, teaching qualifications and expertise will not change.

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?

The ULM and Pharmacy libraries to support the Graduate Program in Pharmacology are already adequate to support the development of a new Graduate Program in Pharmacology. The ULM College of Pharmacy has historically been very supportive of the existing Graduate Program in Pharmacy and the College and University Administration has expressed continued support of both the Graduate Program in Pharmacy and the Graduate Program in Pharmacology.

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

The estimated total expenditure for the last two fiscal years in library acquisitions for fields and departments offerings as well as the Graduate Program in Pharmacy by the ULM College of Pharmacy is $1,820,000 between 2017-2018 and 2018-2019. The ULM College of Pharmacy is committed to supporting academic and research activities for all students and faculty.

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

No new library expenditures will be needed. The College of Pharmacy already supports all the academic and research library resources needed for the proposed new Graduate Program in Pharmacology.

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

No additional special resources will be needed at this time following the creation of a new Graduate Program in Pharmacology.

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 existing facilities, including classrooms, labs and offices are currently established within the ULM College of Pharmacy because the newly established Graduate Program will be created using existing faculty and research facilities. There is instrumentation within each faculty member's laboratory, as well as equipment for common use housed in common instrument rooms and facilities. Listed below are available equipment and facilities available to all research faculty within the ULM College of Pharmacy.

Microscopes:
F.E.I. environmental scanning electron microscope with Oxford INCA EDX and Alto 2100 cryotransfer systems
Ted Pella 208HR high resolution sputter coater.
Zeiss LSM 5 Pascal laser scanning microscope
Zeiss, Nikon, and VWR brightfield and epifluoresence upright and inverted microscopes

Tissue Preparation/Histology:
Zeiss P.A.L.M. Laser catapult microbeam system
Leica CM 1850 cryostat
Leica UCR ultracut microtome with Peltier cold stage
Campden Vibroslice, Harvard Apparatus brain slice perfusion chambers and temperature regulator
Richard Allan HM 450 and Reichert-Jung sliding microtomes
Fisher MicroProbe staining station and slide incubator,
Leica CPC Universal cryoworkstation
Leica EM AFS freeze-substitution system

Molecular/Chemical Analysis:
JOEL NMR
Applied Biosystems 3000 LC-MS-MS
AKTA FPLC protein purification system
Syngene G:Box Chemi imaging system
Life Technologies EVOS FL imaging system
Agilent 2100 Bioanalyzer system with electrophoresis/low cytometry components
Perkin Elmer ProScanArray HT system
BioRad *i*cycler PCR unit with *i*Qcycler optical unit
BioRad Experion RNA electrophoresis system
Biotek Synergy Hybrid fluorescence polarization plate reader; additional plate readers
BioRad and Hoeffer mini-gel electrophoresis units
BioRad electroeluter, gel dryer, and transblot cell with plate electrodes
BioRad TransBlot SD Semi-Dry transfer cell
Kodak X-OMAT 1000A X-ray film processor
BioRad Protean IEF system
Dionex, Waters, Agilent, Elite Lachrom, and TSI HPLCs
Agilent CE Capillary electrophoresis system.
GE Health Care AKTA START protein purification system.
Reichert Technologies SR7000DC surface plasmon resonance system
Shimadzu HPLC system with UV detector and fraction collector, manual injection.
Savant SC210 SpeedVac Concentrator,
Rudolph Research Analytical Autopol III Automatic Polarimeter
CEM Discover SP microwave assisted synthesis system
Shimadzu Multi-Spec photodiode array UV-spectrophotometer
Thermo scientific Genesys 10s UV-vis Spectrophotometer
Varian Cary 50 UV-Vis spectrophotometer
340U UV/vis Photodiode detector
HunetrLab ColorQuest XE colorimeter
TA.XT.Plus texture analyzer
MFL.01 Vector microflo-coater
Vankel VK7000 dissolution apparatus
Korsch/Manesty single punch and rotary tableting machines
V-blenders
WA Bachofen Turbula mixer

Granulators
Drying ovens
VanKel dissolution tester
USP approved tablet disintegration tester, tablet hardness tester, and powder flow meter.
LV1 Low Volume Processor (high pressure homogenizer) by Microfluidics
Mini Spray Dryer B-290 by BUCHI
Setaram Micro DSC III differential scanning calorimeter
TGA 2950 thermogravimetric analyzer
SGA vapor sorption analyzer
TA AR 200 advanced rheometer
Nicomp DLLS particle sizer
TissueTek and ultrasonic homogenizers

Radioimmunoassay/Liguid scintillation:
Digiflex CX automated pipettor
PerkinElmer Wallac Wizard gamma counters
Perkin Elmer WinSpectral scintillation counter

Animal:
E-Z Anesthesia unit (rat, mouse)
Stoelting stereotaxic apparatus (rat, mouse), with microinfusion accessory

Other:
Beckman Allegra tabletop centrifuges
Packard spectrophotometer
Virtis sonicator
Liquid N_2 storage unit
Yamato DX600 drying oven
Thermolyne reciprocating orbital shaking incubator
IEC ultramicrocentrifuge
Rotating platforms
ISCO UA5 absorbance detector
ISCO Wiz peristaltic pumps
Mettler analytical scales
pH meters
Refrigerators, freezers, ultracold freezers
Biological hoods, CO_2 incubators
Dubanoff metabolic shaker, water re-circulator
Medium- and ultraspeed centrifuges.

Accessible in BPTS Common Equipment Room:
Leica Research Cryostat
Beckman Coulter ultra-speed centrifuges
PerkinElmer IR Spectrophotometer
General Data Tissue Processing and Embedding Histology Stations
Amnis Flow Cytometer

Accessible in College of Pharmacy Vivarium:
PerkinElmer IVIS Lumina In Vivo Imaging System
Stoelting microwave brain processing system

Accessible in the ULM Common Core Laboratory:
ThermoScientific NanoDrop One
Bio-Rad ChemiDoc Touch Imaging System
Protein Simple Wes Western Blotting System
Bio-Rad CFX96 Real-Time System

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.

None, there is no need for new facilities necessary for the creation of a new Graduate Program in Pharmacology

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 current Graduate Program in Pharmacy and the newly created Graduate Program in Pharmacology will be housed in the School of Basic Pharmaceutical and Toxicological Sciences within the ULM College of Pharmacy. The Graduate Program in Pharmacy (512099) would be composed of disciplines and graduate faculty currently in the Program minus Pharmacology (e.g. Medicinal Chemistry, Pharmaceutics and Toxicology). The Graduate Program Pharmacology would bet taught by Pharmacology faculty. As such, the creation of the new Program would not require the hiring of new faculty and investing in new laboratories or facilities. The current Graduate Coordinator would also supervise both Programs so additional administration is not necessary.

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

Faculty and Graduate Students in the Graduate Program in Pharmacy faculty are among the most productive and accomplished research scientists working at the University of Louisiana at Monroe. The major divisions within the department include Medicinal/Natural Products Chemistry, Pharmaceutics, Pharmacology and Toxicology. However, the major research emphasis of faculty researchers can be categorized into specific areas that include: 1) cancer research; 2) diabetes; 3) Alzheimer's disease; 4) cardiovascular disease 5) novel drug delivery. 6) drug discovery and 7) environmental toxicology. Creation of a new Graduate Program in Pharmacology will greatly strengthen the Program's ability to recruit and retain outstanding faculty and graduate students. At present, the visibility of Pharmacology research and faculty within the existing Graduate Program in Pharmacy is obscured because it is combined with all the other sub-disciplines (medicinal/natural products chemistry, pharmaceutics and toxicology). Because, a little more than 50% of the faculty and graduate students in the current Graduate Program are involved in Pharmacology research and teaching, it is strongly believed that splitting the current Program into two Programs (Pharmacy and Pharmacology) will greatly enhance each departments' visibility, as well as the ability of each program to grow and expand. This is an opportune time to split the current Program into two separate and complementary programs, in order to optimize the strengths and focus of both resulting Programs. Having the Graduate Program in Pharmacy remain as currently organized represents the largest weakness to the growth and advancement of the Graduate Program in Pharmacy. Splitting the current Program into two individual programs would benefit both resulting programs.

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.

The newly created Graduate Program in Pharmacology is not a program that requires accreditation.

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.

No consultants were used in developing the proposal.

9. Related Fields

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

Subject matter fields at the institution which are related and may support the proposed Graduate Program in Pharmacology include the Departments of Biology and Chemistry. However, the greatest potential for collaboration and support includes the newly established of the Edward Via College of Osteopathic Medicine (VCOM) at the University of Louisiana at Monroe, which will opened in the Fall of 2020. VCOM is a nonprofit, private (501) c-3 four-year osteopathic medical school offering the Doctor of Osteopathic Medicine (DO) degree. Meetings between VCOM and the ULM Pharmacy research faculty have already been initiated to discuss possible research collaboration and teaching activities. Establishment of a Graduate Program in Pharmacology would greatly enhance these initiatives

and possibly lead to the creation a new duel-degree DO/Ph.D. degree program at ULM.

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?

Because the new Graduate Program in Pharmacology will result from splitting the existing Graduate Program in Pharmacy into two separate Graduate Programs (Pharmacy and Pharmacology), no additional cost to run and support the new Program will be necessary. The faculty are already established within the College of Pharmacy, as is the laboratories, administrative support and mechanism to recruit graduate students. As such, there will be no additional cost to the School or College and no change is the allocation of funds.

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 graduate faculty that train students in the current Graduate Program in Pharmacy are all members of the School of Basic Pharmaceutical Sciences and Toxicology (BPST). This department contains many of the most productive and highly funded faculty at ULM. Since 2012, the American Association of Colleges of Pharmacy (AACP) has required Schools of Pharmacy in the United States to report extramural research grant funding. The Table below summarizes BPTS' extramural funding each year from 2012 through 2018, as reported to and verified by AACP during those years. As is shown in the Table, the Graduate Program in Pharmacy Graduate Faculty success in obtaining extramural funding for their research, particularly highly competitive Federal (e.g. National Institutes of Health (NIH) grant awards. At present, the majority (60%) of extramural funding received has been award to faculty in the Pharmacology division of the current Graduate Program in Pharmacy. Splitting the current Program into two Programs will not have a negative impact on the resulting Programs in Pharmacy and Pharmacology, because adequate funding for teaching and research activities already exist. It is believed that creating a new Graduate Program in Pharmacy will allow both programs to focus on their unique expertise to allow greater growth and enhancement of each Program as separate entities as compared the growth that would occur if the units remained combined.

Extramural Funding for the Faculty in the ULM Graduate Program in Pharmacy.

Funding Source	2012	2013	2014	2015	2016	2017	2018	Total
NIH Grants	$463,666	$688,659	$558,180	$876,954	$783,088	$391,951	$563,521	**$4,326,019**
Other Fed Grants	$192,016	$12,000	$12,000	$12,000	0	0	0	**$228,016**
Non Fed Grants	$320,350	$12,000	$12,000	$134,000	$234,085	$134,940	$185,000	**$1,032,375**
Co-PI Grants	$0	$0	$0	$185,717	$83,051	$50,051	$42,026	**$360,845**
Student Grants	$205,000	$235,000	$215,000	$188,000	$206,100	$150,094	$160,852	**$1,359,946**
Total	**$1,181,032**	**$947,659**	**$797,180**	**$1,396,671**	**$1,306,324**	**$727,036**	**$896,399**	**$7,252,201**

As stated previous the AACP collects data on the extramural funding of all Colleges of Pharmacy in the United States. AACP then lists each school in terms of regional and national ranking. The Southern region of the United State that includes the States of Alabama, Arkansas, Louisiana, Mississippi Tennessee and Texas, and includes at least 22 Colleges of Pharmacy. Specifically, the ULM College of Pharmacy is ranked tenth in extramural funding in the Southern region. Nationally, the ULM College of Pharmacy is ranked sixty-first in extramural funding out of a total of 155 Colleges of Pharmacy. This reported ranking also clearly demonstrate that all of the Institutions ranked higher than ULM in the Southern Region are much larger schools (University of Texas, University of Mississippi, University of

Tennessee, University of Arkansas, Auburn University, etc.). In addition, most these higher ranking Universities represent the flagship institutions in their respective State and have total student enrollment many times greater than that of the University of Louisiana at Monroe. The ULM Graduate Program is very proud of their research productivity. However, the Graduate Program in Pharmacy has outgrown its current organizational structure. As state above, it is strongly believed that the research Graduate Faculty and Students can progress to even greater levels of productivity and accomplishment if the present Program is split into two separate Graduate Programs in Pharmacy and Pharmacology.

Summary of Estimated Additional Costs/Income for Proposed Program (see Budge Sheet)
There will be no additional costs to establish a Graduate Program in Pharmacy. This proposed Program will included faculty that are already employed by the ULM College of Pharmacy and members of the School of Basic Pharmaceutical and Toxicological Sciences. Therefore, no additional hiring of faculty will be required. College funded Graduate Student Assistantships will be equally divided between the Graduate Programs in Pharmacy and Pharmacology, which represents the approximate division of existing Assistantships between Pharmacology faculty and students versus Medicinal Chemistry/Pharmaceutics/Toxicology faculty and students in the Graduate Program in Pharmacy. Once the new Pharmacology Program is created existing resources will be divided equally. The same will be true for Support Personnel, Fellowships and Scholarships, in that these resources will be equally divided between the two Graduate Programs in Pharmacy and Pharmacology.

Revenue anticipated from the proposed Graduate Program in Pharmacology will be generated by faculty and students participating in the Program. At present, faculty and students in the Pharmacology division of the current Graduate Program in Pharmacy represent approximately 50% of the total number of faculty and students in the Program. However, the Pharmacology faculty and students generate a majority (60%) of the extramural funding and student scholarships. Therefore, establishment of a new Graduate Program in Pharmacology will be well funded, without creating of a financial hardship for the remaining faculty and students in the Graduate Program in Pharmacy. A summary of additional expenses and anticipated revenues for the proposed Graduate Program in Pharmacology is shown in the Budget Table Sheet provided below.

*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 (see budget form on next page).

SUMMARY OF ESTIMATED ADDITIONAL COSTS/INCOME FOR PROPOSED PROGRAM

Institution:__ULM College of Pharmacy

Date: __1/16/2019_____

Degree Program, Unit: Graduate Program in Pharmacology (CIP Code 261001)

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

EXPENDITURES								
INDICATE ACADEMIC YEAR:	**FIRST 2021-2022**		**SECOND 2022-2023**		**THIRD 2023-2024**		**FOURTH 2024-2025**	
	AMOUNT	FTE	Amount	FTE	AMOUNT	FTE	AMOUNT	FTE
Faculty	$N/A		$N/A		$N/A		$N/A	
Graduate Assistants	$N/A		$N/A		$N/A		$N/A	
Support Personnel	$N/A		$N/A		$N/A		$N/A	
Fellowships and Scholarships	$N/A		$N/A		$N/A		$N/A	
SUB-TOTAL	$N/A		$N/A		$N/A		$N/A	
	AMOUNT		AMOUNT		AMOUNT		AMOUNT	
Facilities	$N/A		$N/A		$N/A		$N/A	
Equipment	$N/A		$N/A		$N/A		$N/A	
Travel	$N/A		$N/A		$N/A		$N/A	
Supplies	$N/A		$N/A		$N/A		$N/A	
SUB-TOTAL	$N/A		$N/A		$N/A		$N/A	
TOTAL EXPENSES	$N/A		$N/A		$N/A		$N/A	

REVENUES				
Revenue Anticipated From:	AMOUNT	AMOUNT	AMOUNT	AMOUNT
*State Appropriations	$None	$None	$None	$None
*Federal Grants/Contracts	$300-400,000	$300-400,000	$400-500,000	$400-500,000
*State Grants/Contracts	$50-100,000	$50-100,000	$50-100,000	$50-100,000
*Private Grants/Contracts	$50-100,000	$50-100,000	$50-100,000	$50-100,000
Expected Enrollment	20-22	22-24	23-25	24-26
Tuition	waived	waived	waived	waived
Fees	$74-81,000	$81-89,000	$85-93,000	$89-96,000
*Other (Scholarship)	$40-80,000	$40-80,000	$40-80,000	$40-80,000
TOTAL REVENUES	$514-761,000	$521-769,000	$625-873,000	$629-876,000

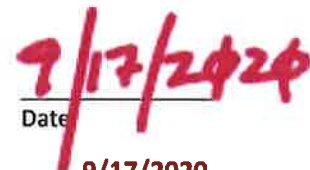* Describe/explain expected sources of funds in proposal text.

CERTIFICATIONS:

[signature]

Primary Administrator for Proposed Program

9/17/2020
Date

[signature] Albert B

Provost/Chief Academic Officer

9/17/2020
Date

Management Board/System Office

Date

ACADEMIC AND STUDENT AFFAIRS COMMITTEE

October 22, 2020

Item E.4.   **University of New Orleans'** request to award an Honorary Doctorate of Humane Letters to Mr. Harry Shearer at the Fall 2020 Commencement Exercises.

EXECUTIVE SUMMARY

The University of New Orleans (UNO) requests approval to award an Honorary Doctorate of Humane Letters to Mr. Harry Shearer during the University's Fall 2020 commencement ceremony. Mr. Shearer is a highly acclaimed comedian, actor, voice-over actor, filmmaker, broadcaster, and author with a decades-long connection to New Orleans. He earned his undergraduate degree in Political Science from UCLA and attended graduate school at Harvard University. Mr. Shearer's career in television and film began at the age of ten, appearing in *Abbott and Costello Go to Mars*. During his career he has appeared in several films and television series, including *Saturday Night Live* and *This is Spinal Tap*. Mr. Shearer's longest tenure has been as one of the main voice actors in *The Simpsons*, in which he is the voice of Ned Flanders and 20 other characters. He has been a cast member for all 31 years of the show's run. Mr. Shearer received a primetime Emmy Award for Outstanding Character Voice-Over Performance in 2014 for *The Simpsons*; he also received Emmy nominations as a writer for his work on *America 2Night* (1978) and *Saturday Night Live* (1980).

In addition to his work in film and television, Mr. Shearer is the host of the radio show and podcast, *Le Show*, which is heard on stations across the country and around the world. The program is distributed nationally by WWNO, the New Orleans public radio station that is located on UNO's campus. When Mr. Shearer is in New Orleans (he has had a residence in the city for over 30 years), he records *Le Show* at WWNO's studios on the University's campus. In 2010 Mr. Shearer wrote and directed the film documentary *The Big Uneasy*, which addressed the impact of Hurricane Katrina, including the levee failures and flooding in metropolitan New Orleans. The film was selected for several film festivals and won both The Golden Eagle Award and the Visionary Award at the DC Independent Film Festival.

The University would like to recognize Mr. Shearer's remarkable achievements in film, television, and radio as well as his longtime advocacy for New Orleans and UNO. He is an outstanding artist who has been involved in groundbreaking work and who has demonstrated a deep attachment to and understanding of the city and its people. As such, the University of New Orleans would like to honor Mr. Shearer by awarding him an Honorary Doctorate of Humane Letters.

RECOMMENDATION

It is recommended that the following resolution be adopted:

NOW, THEREFORE, BE IT RESOLVED, that the Board of Supervisors for the University of Louisiana System hereby approves the University of New Orleans' request to award an Honorary Doctorate of Humane Letters to Mr. Harry Shearer at the Fall 2020 Commencement Exercises.

THE UNIVERSITY *of*
NEW ORLEANS
OFFICE OF THE PRESIDENT

September 28, 2020

Dr. Jim Henderson
President
The University of Louisiana System
1201 North Third Street
Baton Rouge, LA 70802

Dear Dr. Henderson,

The University of New Orleans requests approval to award a doctorate Honoris Causa during the University's fall commencement on Friday, December 11, 2020 to Mr. Harry Shearer.

Mr. Shearer is a highly acclaimed comedian, actor, voice-over actor, filmmaker, broadcaster and author with a decade-long connection to the city of New Orleans. He has an undergraduate degree in Political Science from UCLA and attended graduate school at Harvard University.

Thank you for your consideration of this request. Please do not hesitate to contact me should you have any questions.

Sincerely,

John W. Nicklow
President

School of the Arts

To: John Nicklow
               President, University of New Orleans

Through: Mahyar Amouzegar
               Provost and Senior Vice President, University of New Orleans

Through: Kim Martin Long
               Dean, College of Liberal Arts, Education, and Human Development

From: Charles Taylor
               Director, School of the Arts

Date: September 23, 2020

Re: Harry Shearer

The School of the Arts recommends that the University of New Orleans award Harry Shearer an Honorary Doctorate of Humane Letters during the University's Fall 2020 commencement ceremony on December 11, 2020. Mr. Shearer is a highly acclaimed comedian, actor, voice-over actor, filmmaker, broadcaster and author with a decades-long connection to New Orleans. He completed an undergraduate degree in Political Science from UCLA and attended graduate school at Harvard University. His career in television and film began at the age of 10, appearing in *Abbot and Costello Go to Mars*. Since that time he has appeared in several films and television series, including *Saturday Night Live* and *This Is Spinal Tap*. Mr. Shearer's longest tenure has been as one of the principal voice actors in *The Simpsons*, in which he is the voice of Ned Flanders and 20 other characters. He has been a cast member for all 31 years of the show's run. In addition to his continuing role with *The Simpsons*, Mr. Shearer is the host of the radio show and podcast *Le Show*, which is heard on stations across the country and around the world. The program is distributed nationally by WWNO, the New Orleans public radio station that is located on the University of New Orleans campus. When Mr. Shearer is in New Orleans, he records *Le Show* at WWNO's studios on the campus of UNO.

Mr. Shearer has had a residence in New Orleans for over 30 years. In 2010 he wrote and directed the film documentary *The Big Uneasy*, which addressed the impact of Hurricane Katrina, including the levee failures and flooding in metropolitan New Orleans. The film was selected for several film festivals and won both The Golden Eagle Award and the Visionary Award at the DC Independent Film Festival.

Mr. Shearer received a primetime Emmy Award for Outstanding Character Voice-Over Performance in 2014 for *The Simpsons*; he had previously been nominated for his work on the show in 2009. He received two other primetime Emmy nominations as a writer for his work on *America 2Night* (1978) and *Saturday Night Live* (1980). In addition to his work in film and television, Mr. Shearer has released five comedy albums, three of which were nominated for Grammy Awards (2008, 2009, 2010).

The School of the Arts is pleased to offer the nomination of Harry Shearer in recognition of his prodigious achievements in film, television, and radio and his longtime advocacy for New Orleans and the University of New Orleans. He is an outstanding artist who has been involved in groundbreaking work and who has demonstrated a deep attachment to and understanding of the city and its people.