

BOARD OF HIGHER EDUCATION

REQUEST FOR COMMITTEE AND BOARD ACTION

COMMITTEE: Academic Affairs

NO: AAC-16-35

COMMITTEE DATE: June 7, 2016

BOARD DATE: June 14, 2016

APPLICATION OF THE UNIVERSITY OF MASSACHUSETTS LOWELL TO AWARD THE BACHELOR OF SCIENCE IN PHARMACEUTICAL SCIENCES

MOVED: The Board of Higher Education hereby approves the application of **University of Massachusetts Lowell** to award the **Bachelor of Science in Pharmaceutical Sciences**

Upon graduating the first class for this program, the University shall submit to the Board a status report addressing its success in reaching program goals as stated in the application and in the areas of enrollment, curriculum, faculty resources, and program effectiveness.

Authority: Massachusetts General Laws Chapter 15A, Section 9(b)

Contact: Winifred M. Hagan, Ed.D., Associate Commissioner for Academic Affairs and Student Success

BOARD OF HIGHER EDUCATION
June 2016
University of Massachusetts Lowell
Bachelor of Science in Pharmaceutical Sciences

INTENT AND MISSION

The proposed Bachelor of Science in Pharmaceutical Sciences (BS/PS) program at the University of Massachusetts Lowell (UML) in the School of Pharmacy and Pharmaceutical Sciences within the College of Health Sciences (CHS) is expected to prepare students for technical positions in drug discovery and development or for marketing of pharmaceutical products. The program is also intended to provide the groundwork for entry into pharmaceutical/biopharmaceutical graduate studies, or professional education in medicine, pharmacy, dentistry, veterinary medicine, business or law. UML reports that the program is in alignment of the institutional mission to provide an affordable and accessible education of high quality and to conduct programs of research and public service that advance knowledge and serve the public good. The proposed program is further intended to serve as an entry to UML's existing MS/PSM/PhD degrees in Pharmaceutical Sciences as well as its' PharmD degree.

UML intends that BS/PS students will acquire knowledge of the basic life and physical sciences including anatomy and physiology, biology, microbiology, psychology, chemistry, and physics, as well as calculus, psychology, sociology, economics, and the principles of public health during the first two years of the program. Academic success in the first two years of the curriculum has been designed to satisfy the required prerequisites for entry into a PharmD program. Students interested in other post-baccalaureate programs can choose to continue in one of the two tracks of the undergraduate program in pharmaceutical sciences, earning a BS degree with a specific skill set related to pharmaceutical sciences or pharmaceutical marketing and management. It is anticipated that the proposed program will train students for jobs in industry, business, government service, academia, or other relevant areas. As well, UML intends that the program will offer an interdisciplinary field of study, which seeks to achieve better understanding of the pharmaceutical science field, and in particular drug discovery and development.

The proposed program has obtained all necessary governance approvals on campus and was approved by the University of Massachusetts, Board of Trustees on April 13, 2016. The required letter of intent was circulated on February 3, 2016. No comments were received.

NEED AND DEMAND

National and State Labor Market Outlook

UML reports that between 2012 and 2022 the U.S. Department of Labor's Occupational Outlook Handbook projects growth rates of 22% for medical lab technologist, 20% for pharmacy technician, 10% for biological technician, and 9% for pharmaceutical sales

representative. Growth rates of 22% and 20% are reportedly "much faster than average" while rates of 10% and 9% are "as fast as average"¹.

Major pharmaceutical companies with locations in Massachusetts include Genzyme, Biogen, AbbVie, Shire, Pfizer, AstraZeneca, Bayer, Novartis, Sanofi-Aventis, Bristol-Myers Squibb, Merck, and Johnson & Johnson. UML indicates that several of these have recently expanded or are planning to expand their local operations, including Novartis, Sanofi-Aventis, and Merck, as well as Amgen, Shire, GE Healthcare Life Sciences, and Baxter International. UML cited the *Boston Globe* report that as more companies relocate and expand, the Boston area is becoming a magnet for the biopharmaceutical industry. In Massachusetts, the industry grew by 41% between 2004 and 2013, from just over 41,100 jobs to over 57,600 jobs in the state.² In terms of job growth in the general STEM fields, a 2004 Massachusetts Department of Education study projected STEM industry workforce growth from 2004 to 2014 as 18.1%.³ Based on the local and regional expansion of biopharmaceutical and technology firms, this growth trend should continue into the next decade. Occupations in STEM fields are expected to grow by 17% by 2018, nearly double the rate of growth in non-STEM occupations. The U.S. will have over 1 million job openings in STEM-related fields by 2018. In Massachusetts alone, the biotech industry has seen a 42% growth in employment since 2002. People in STEM fields can expect to earn 26% more money on average and be less likely to experience job loss.⁴

UML noted that the Commonwealth of Massachusetts has a robust life sciences research and development community with more than 600 companies, over 1350 new drug entities in various phases of development and clinical trials, and with greater than 6% of the global therapeutic agents in development. Citing the 2013 U.S. Bureau of Labor Statistics Quarterly Census of Employment and Wages, four Massachusetts counties were identified among the leading counties nationally in biotechnology research and development employment, with Middlesex leading all counties in the country. UML further noted that in 2015, the Massachusetts biotechnology industry showed over 1100 jobs in the life sciences fields that required a BS degree.

Student Demand

¹ Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook. <http://www.bls.gov/ooh/healthcare/medical-and-clinical-laboratory-technologists-and-technicians.htm>. <http://www.bls.gov/ooh/healthcare/occupational-health-and-safety-technicians.htm>. <http://www.bls.gov/ooh/sales/wholesale-and-manufacturing-sales-representatives.htm>. Accessed 5/15/15.

² Massachusetts Biotechnology Council, "MassBio Industry Snapshot 2014," citing the U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages. http://www.massbio.org/writable/editor_files/2014_snapshot_final_8.20.14.pdf

³ Massachusetts Department of Education, Education Research Brief, October 2007: "Supply and Demand of STEM Workers," <http://media.umassp.edu/massedu/stem/STEM%20SD.pdf>.

⁴ Massachusetts Biotechnology Educational Foundation, citing data from US News and World Report, the US Department of Labor, and the US Commerce Department. https://www.massbioed.org/career_pathways/college_programs

When UML started developing pharmaceutical sciences programs several years ago, it is reported that numerous inquiries from students interested in pharmacy and pharmaceutical sciences came in at all levels. UML indicates that students are enthusiastic about corollary programs, including pharmaceutical sciences, and fully expects the BS/PS program to quickly fill to capacity. The proposed BS/PS program is designed to attract potential students interested in a wide variety of pharmacy-related careers. In addition to students who are interested in career as pharmacists and pharmaceutical scientists, this degree is planned to incorporate options for students who have interests in the business and management aspects of the pharmacy industry.

OVERVIEW OF PROPOSED PROGRAM

The proposed BS/PS program will be administered through the Department of Pharmaceutical Sciences of the School of Pharmacy and Pharmaceutical Sciences. The School leadership committee will oversee the program after its approval and shall be responsible for developing job descriptions, student recruitment, program outreach, soliciting nominations and making recommendations. The BS/PS curriculum committee, consisting of five faculty from the School of Pharmacy and Pharmaceutical Sciences, will be charged with periodically reviewing and revising the curriculum as necessary, and consider proposals for changes in the curriculum and review teaching methods used in the delivery of the curriculum. The chair of the committee will serve as the program coordinator and will report directly to the Dean of the School of Pharmacy and Pharmaceutical Sciences. The committee will also receive and evaluate recommendations from the School's curricular assessment committee.

Furthermore, it is planned that the BS/PS Academic Standing and Admission Committee, a three-member committee of Pharmaceutical Sciences faculty, shall regularly review students' performance at the end of each academic semester. This committee will make recommendations to the School's associate dean for academic affairs and assessment. All faculty members of the School will be eligible to serve on both committees. Both committees are responsible to the School leadership committee for operation of the program, and all three committees shall coordinate collectively student recruitment, program outreach, admission, course scheduling, curriculum development, progression requirements, policy implementation and program assessment.

Duplication

The proposed BS/PS program would be the first public program of its kind in Massachusetts; in New England, it would be the second public program and the third program overall. Currently, a Pharmaceutical Sciences B.S. degree is offered by MCPHS University in Boston and the University of Rhode Island. Four additional universities in the Northeast region offering similar programs are Albany College of Pharmacy and Health Sciences, York College, SUNY Buffalo, and the University of the Sciences in Philadelphia.

ACADEMIC AND RELATED MATTERS

Admission

Admission to all baccalaureate day programs at UML is made through the Office of Undergraduate Admissions according to established undergraduate admission criteria. Applicants to the proposed BS/PS program will be required to present records of academic performance that indicate a probability of success. For regular freshman admissions, probability of success is measured by an individual's high school record, class and standardized test results, and/or by his or her academic record at UML for prescribed provisional courses of study. Applicants whose performance record indicates the highest probability of success will be offered admission first. Admission is expected to be based on available space in the program.

Admission requirements planned for the BS/PS are a high school diploma, an overall minimum GPA of 3.0, high school minimum grades of B and completion of a high school program that focuses on college preparatory courses including English, biology, and chemistry. It is strongly recommended that incoming freshman take math through pre-calculus or calculus and complete high school physics. Combined SAT scores totaling a minimum of 1100 (mathematics and verbal) will be required.

Transfer students will be accepted to the program at the discretion of the BS/PS Academic Standing and Admission Committee. External transfer students will be required to have completed the appropriate coursework at an accredited institution and must have earned a minimum of a 3.0 GPA in all relevant courses. The department chair will review courses to determine transferability. External transfer prerequisites are planned to provide an opportunity for high school graduates to complete the requirements in either a two- or four-year post-secondary program.

Program Enrollment Projection

Full Time	2017-18	2018-19	2019-20	2020-21
New students	30	60	80	75
Continuing students		30	60	80
Continuing students			30	60
Continuing students				30
Totals	30	90	170	245

Curriculum (Attachment A)

It is planned that the BS/PS curriculum will consist of 120 credits of coursework designed to allow full-time students to complete the program in 4 years. Coursework will generally be scheduled in the fall and spring semesters, although some summer courses

may be offered as well. The curriculum is designed with two tracks: (1) pharmaceutical sciences and (2) pharmaceutical marketing and management. The first two years of the four-year curriculum will consist of a common core curriculum shared by the two tracks.

Internships or Field Studies

It is expected that a 4 or 5-credit pharmaceutical internship will be part of the proposed curriculum for each of the tracks within the degree.

It is planned that Biotechnology and Pharmaceutical industry sites that ensure significant learning outcomes that support both the technical and the personal development of the students will be selected by UML for recruitment. The final determination of suitability of sites for recruitment will be made by the School dean and the faculty coordinator of experiential education in Pharmaceutical Sciences. Site evaluation, selection and recruitment are expected to begin after program approval. All agreements are expected to be in place by 2019.

UML plans that students will be trained and supervised at industry sites by approved preceptors. The preceptor and the coordinator of experiential education (CEE) will define and coordinate the site-specific learning objectives to be met during each practical experience. It is planned that the CEE will meet regularly with the preceptor and the student to evaluate student performance, to ensure that the practicum learning objectives are met, as well as to determine that the working environment is suitable for student learning and success.

The College of Health Sciences at UML provides multiple programs that require various types of internships and rotations such as the Medical Laboratory Sciences program and has demonstrated experience at developing relationships with appropriate preceptor sites to provide students with quality external experiences. UML provided sample evaluation and agreement forms as examples of what will be used for student evaluation during the industry experience in Pharmaceutical Sciences.

RESOURCES AND BUDGET

Fiscal (Attachment B)

Revenue projections for the proposed program are based on a targeted enrollment headcount of 30 students the first year and 75 new students by year 4, with 60% of students paying in-state tuition. Expenditure projections include salary allocations for four new full-time faculty and 1.5 support staff. Operating expenses include annual allocations for lab supplies and equipment starting in year 3. The CHS will cover expenses such as program marketing and faculty recruitment expenses. Additional investment into the program will not be required until year 3, thus it is expected that the program's revenue will exceed expenses starting in year 1.

Tuition and Fees:

The revenue for tuition and fees is based on the official table of Fees and Tuition expenses per semester/per credit hour maintained in the UML Bursar's Office. It is anticipated that the majority of students will be in-state residents with 20% non-residents and 20% northeast regional or international students.

Grants:

Faculty will be expected to generate extramural funding to support their research activities. Industrial support and faculty-generated funding have not been included in the budget proposal.

Expenditures:

UML anticipates the need for a minimum of three faculty members by academic year 2019-20 (two tenure-tracks and one non-tenure track) and one additional tenure-track in 2020-2021. The searches for faculty will be initiated in academic year 2018-19 with appointment in 2019-20 and in 2019-20 for appointment in 2020-21. In response to the proposal reviewer comment, an additional faculty line has been added to the budget for academic year 2021-2022, for a total of five faculty members.

Although the adjunct faculty budget is not included in the projected budget as a separate line, it is anticipated that additional teaching workload will be covered by six adjuncts (\$6K per faculty adjunct-total \$36K) in academic year 2019-20 and ten (total of \$60K) in subsequent years.

Administration:

The office of the Dean of Pharmacy and Pharmaceutical Sciences will oversee the program during the first two years 2017-18. It is expected that one of the faculty members hired in 2019-20 will accept the responsibilities of the program and become the chair of pharmaceutical sciences.

Staff:

One administrative staff will be hired in academic year 2019-20 to support the department chair and the program. A full-time coordinator of the internship will also be hired for the same academic year.

Operating Budget:

The operating budget will include the salary of adjunct faculty members and customary operating expenses such as office supplies, small equipment, travel, events, etc.

Supplies and Equipment:

In response to the external reviewer concern related to the laboratory's equipment and supplies, the initial figure of \$150K is increased to \$250K in academic year 2019-20 and \$150K in academic year 2020-21 for the teaching laboratory's supplies, equipment of the compounding lab and pharmaceutical analysis.

Marketing/Promotional Expenses:

As a new program, marketing will be important to promote awareness of the program regionally and nationally. Marketing activities will be essential to recruit talented undergraduate students.

Faculty Recruitment Expenses:

The centralized budget of CHS recruitment should incorporate targeted funds for advertising and travel for faculty candidates. This will remain as an annual budget item in anticipation of recruiting faculty and to ensure ongoing recruitment process across all disciplines of CHS.

Capital:

Adequate facilities are available on campus to meet the needs of the Pharmaceutical Sciences program. Ongoing facilities and equipment needs will be incorporated into faculty start-up packages.

Start-up Packages:

Appropriate start-up support will be needed to recruit and help faculty to set up their research labs and to develop successful extramural funding for their research. The start-up packages are important particularly for tenure-track faculty.

Budget Balance:

The Pharmaceutical Sciences degree will utilize existing university faculty for the vast majority of the teaching in years 1-2; the program expects to return funds to the university from the very first year.

Faculty and Administration (Attachment C)

UML reports a wealth of faculty from a variety of disciplines with expertise related to pharmaceutical sciences. Over 25 full-time faculty members from across departments in multiple science and engineering colleges are already committed to being involved in the new Pharmaceutical Sciences MS/PSM/PhD degree programs. Some faculty will be tapped to teach in the undergraduate program. The diversity of disciplines represented by faculty is expected to enhance the interdisciplinary nature of the Pharmaceutical Sciences program. These faculty are well qualified, respected in their fields, and have proven track records of scholarly journal publication and grant activity that attest to their achievements in their respective fields and their ability to support an interdisciplinary program.

The University has faculty capable of teaching all courses in the first two years of the proposed program. In addition to current faculty, four new full-time faculty will be hired to teach specialized courses in pharmaceutical sciences, starting in year 3 of the program.

Administrative staff currently assigned to the CHS will contribute to the implementation of the proposed program in the first year that classes are taught. Additional administrative staff are expected to be added as the program grows. At the beginning of

the program, staff support will include a half-time administrative assistant and an internship coordinator to assist with student placement.

Facilities, Library and Information Technologies

Science Teaching Laboratories:

Weed Hall, the primary building housing the CHS, contains basic science laboratories, labs for medical laboratory science, nutritional science, exercise physiology, and physical therapy. The research laboratories total approximately 7000 square feet. Equipment in these labs includes thermocyclers, kinetic microplate readers, an auto sampler, a PCR instrument, electrophoresis systems, GC's, HPLC's, a platelet aggregation measurement device, a coagulation analyzer, a cell counter, a diode array detector, a fluorescence detector, an electrochemical detector, an analytical balance, heating blocks, vortex mixers, spectrophotometers, incubators, centrifuges, pH meters, chemical fume hoods, water baths, autoclaves, biological safety cabinets, refrigerators and freezers. All microbiology laboratories have Institutional Biosafety Committee approval to use Level II microorganisms in both teaching and research. Four professional technicians provide teaching support for the labs.

Health Assessment Laboratory:

The Health Assessment Laboratory (HAL) provides human health assessment resources for students and faculty in the CHS. Affiliated faculty perform interdisciplinary research integrating the fields of biomedical engineering, clinical laboratory science, ergonomics, exercise physiology, nutrition, nursing and physical therapy. HAL's include phlebotomy, DXA (bone scans and body composition), measuring resting metabolic rate, exercise testing with oxygen consumption, ambulatory monitoring, non-invasive continuous blood pressure monitoring, pulse transit time measurement, and other functions.

OEH/Industrial Hygiene Laboratory:

This is an instructional and research laboratory whose work focuses on exposure assessment, sampling and analysis of air contaminants. Extensive air sampling equipment (including personal sampling pumps, direct reading particulate, gas and vapor monitors, and microbial air samplers) are housed here. In addition, an atomic absorption spectrometer, gas chromatography, UV/Vis spectrophotometer and microbalance are used in chemical analyses done in the lab. A computer system linked to the autosamplers of the analytical equipment also supports the instrumentation in this laboratory. Other equipment includes confined space monitors, noise dosimeters, Hnu photoionization detector, and high-volume sampling pumps.

Aerosol Science Laboratory:

This lab is equipped with an aerosol generation system, where test aerosols can be generated to test aerosol measurement and control equipment. The lab also contains ventilation evaluation equipment and is used to teach ventilation design and evaluation methods. The equipment includes a Zeiss light microscope equipped for phase contrast, a laser particle spectrophotometer, a Wright dust feeder, and a fibrous aerosol generator.

Toxics Use Reduction Institute Exposure Biology Laboratory:

The Toxics Use Reduction Institute (TURI) tests the effectiveness of greener cleaning chemicals and related equipment on a variety of substrates and soils. The lab's goal is to identify, develop and promote safer alternatives to hazardous materials such as chlorinated and other organic solvents. The lab uses standard industrial practices of surface preparation, cleaning, rinsing, drying and analysis in investigating alternatives. The lab is equipped with both cleaning equipment and analytical equipment to measure surface cleanliness as well as machinery suitable for a variety of substrates and soils. Most recently, the lab has focused on the evaluation of aqueous-based cleaning systems being developed as alternatives to chlorinated solvents.

Other Resources: M2D2

The Massachusetts Medical Device Development Center (M2D2) serves as a catalyst for the incubation of new biopharmaceutical industries in the region. It offers investors and executives affordable and coordinated access to world-class researchers and resources at the UML and UMass Medical School campuses. There are presently 15 tenant medical device companies located in M2D2 laboratory space. The development of the M2D2 incubator space was facilitated by \$4 million in funding from the Massachusetts Life Sciences Center. Over the past several years M2D2 has connected with more than 100 start-up medical device companies, providing significant assistance to more than 40 of them. These companies have in turn raised more than \$40 million in external funding.

M2D2 has a positive impact on the development of drug delivery devices and in facilitating the connection between industry and research in the biopharmaceutical industry.

Library

UML reports that library resources are strong in bioscience, chemistry, clinical lab sciences, pharmaceutical science, engineering and health science topics. Overall, UML invests several million dollars annually in library resources that support graduate study in all fields including pharmaceutical sciences. Full access is provided to the relevant areas of natural science, social science and professional practice at a level consistent with a comprehensive research university. No additional funds are planned for library resources due to the strength of current holdings which are detailed in the full proposal. UML is a full member of the Boston Library Consortium as well as the WorldCat network, providing guaranteed interlibrary loan access to virtually any book or journal article that can be identified. The WorldCat database links to an accessible collection (via expedited interlibrary loan) of over 15 million book titles.

Information Technologies

UMass Lowell has wireless access in all academic buildings and residence halls as well as in high-traffic common areas. 100% of the dedicated teaching spaces on campus are technologically-enhanced and lecture-capture equipment is available in heavily utilized classrooms. Faculty and students have access to campus-wide software licenses for conducting data analysis. The Help Center provides support for 6,500 computers and is used by faculty, students, and staff. The Help Center also is responsible for the Computer Replenishment Program, an initiative to replace 25% of primary faculty/staff and lab computers on campus every year. The Office of Information Technology, in collaboration with the Office of the Provost, offers faculty development workshops on

web-enhanced teaching, technology-enhanced classrooms, lecture-capture technologies, and in use of the SMART Podium. The Office of Online and Continuing Education provides training programs for faculty in the use of Blackboard Learn in web-enhanced and online courses.

The CHS maintains two computer labs with teaching stations for a total of 41 computers for student use. One lab consists of 17 iMac computers configured for both the Mac and Windows operating systems, which gives users the option to pick which they feel more comfortable using. The other lab has 24 Windows-based computer systems. All computer systems are equipped with university-licensed software such as Microsoft Windows, Microsoft Office, Adobe Acrobat and IBM SPSS. They also have department-specific software targeted to the specific majors in CHS. The Resource Center, used for tutoring and academic study by students, has five computers that have basic university software plus internet access.

CHS employs a full-time network administrator who maintains the student computer labs as well as hardware and software for faculty and staff, ensuring that all technology resources are functional, secure, and up-to-date.

Affiliations and Partnerships

UML currently has general articulation agreements with 14 community colleges in New England, and the post-secondary basic science courses for K-12 graduates are aligned significantly to ease the transfer process.

Articulations with regional community colleges to facilitate enrollment of transfer students interested in pharmacy science careers would be a benefit both to the students and to the Pharmaceutical Sciences programs. Once the BS in Pharmaceutical Sciences program is approved, UML has plans to move promptly to extend articulation agreements with MA community college partners. The majority of these colleges collaborate effectively with CHS:

Bunker Hill Community College (Massachusetts)
Cape Cod Community College (Massachusetts)
Great Bay Community College (New Hampshire)
Massachusetts Bay Community College (Massachusetts)
Massasoit Community College (Massachusetts)
Middlesex Community College (Massachusetts)
Mount Wachusett Community College (Massachusetts)
Nashua Community College (New Hampshire)
NHTI – Concord's Community College (New Hampshire)
North Shore Community College (Massachusetts)
Northern Essex Community College (Massachusetts)
Quinsigamond Community College (Massachusetts)
Roxbury Community College (Massachusetts)
York County Community College (Maine)

It is expected that the CHS collaborations will extend and develop the success of the proposed BS/PS program. A co-director of M2D2 also serves as Associate Vice

Chancellor of Entrepreneurship and Economic Development at UML. This position is an indicator of the administration's commitment to supporting industry/University partnerships for expansion of mutual innovative, entrepreneurial and economic growth, such as the proposed Pharmaceutical Sciences program. The Director of Operations for the UMass Center for Clinical and Translational Science (CCTS), located on the medical school campus, is a member of the M2D2 Executive Board and coordinates overall activities and assists in the implementation of sponsored programs associated with the UMass CCTS. The position also serves as contact person for external resources, such as the biopharmaceutical industry, and communicates resources to researchers, aids researchers in developing projects, and maintains a working knowledge of all CCTS services, programs, and operations. The UMass CCTS is a valuable resource to the Lowell campus and will facilitate the collaboration between researchers focused on pharmaceuticals on all UMass campuses. Opportunities for externally-funded projects and student involvement in research are expected to be facilitated by interdepartmental and intercampus collaborations.

PROGRAM GOALS

Measurable Objective	Strategy for Achievement	Timetable	Assessment
Goal 1. Produce high quality graduates in Pharmaceutical Sciences. Prepare students to enter the workforce or graduate programs with relevant scientific knowledge, competencies, and skills.			
Recruit high quality and diverse applicants consistent with target timeline, from a regional, national, and international applicant pool.	Market BS program to colleges and companies. Announce BS program in academic newsletters and professional meetings. Develop a strong web presence. Advertise to alumni. Recruit at local, national, and international partner institutions.	Market 3 to 9 months before program launch, then ongoing.	Perform trend analysis of student profiles.
Retain and graduate high quality students within projected four-year timeline. Set an 80-90% target retention rate for first-year enrollees, and an 80-95% target graduation rate by year 5 for full-time students.	Recruit high-quality applicants matched to program strength. Provide routine high quality faculty advising. Continually monitor student progress. Manage course offerings. Manage faculty/staff support.	Ongoing.	Track time to graduation and perform trend analysis.

Measurable Objective	Strategy for Achievement	Timetable	Assessment
<p>Facilitate employment of graduates in quality positions in industry, community, academic, research, or other private-employment positions. Target 85% rate of job placement in industry or enrollment in graduate school within 1 year of graduation.</p>	<p>Produce high-quality graduates with superior skill sets. Create formal partnerships with potential employers. Partner with non-governmental organizations, international organizations and governments to facilitate student experiences. Leverage UMass Lowell international university partnerships. Support student career networking. Hold annual career fair. Support student chapters of professional organizations. Support professional conference participation.</p>	<p>Ongoing.</p>	<p>Track salaries, placements, and time to employment; perform trend analysis.</p>
<p>Goal 2. Increase the visibility of UMass Lowell. Ensure that the Pharmaceutical Sciences faculty demonstrate appropriate expertise through their knowledge, academic performance, experience and research interests.</p>			
<p>Generate more faculty representation in the local press related to pharmaceutical sciences topics.</p>	<p>Publicize faculty representation in press. Proactively advertise faculty strengths to local press.</p>	<p>Ongoing.</p>	<p>Track local publications involving faculty.</p>
<p>Increase and elevate faculty participation at professional conferences.</p>	<p>Support travel to conferences.</p>	<p>Ongoing.</p>	<p>Track faculty activities at conferences, including keynote invitations and presentations.</p>
<p>Goal 3. Increase the admission of students into post-baccalaureate programs. Prepare students for success in professional or graduate work in pharmacy, medicine, pharmaceutical sciences, business, public health, and more.</p>			
<p>Prepare students for acceptance into PharmD programs at UMass Lowell or at other PharmD programs.</p>	<p>Deliver the proposed pre-pharmacy curriculum as designed. Maintain student success programs at University and College level.</p>	<p>Ongoing.</p>	<p>Track acceptance rates into PharmD programs.</p>

Measurable Objective	Strategy for Achievement	Timetable	Assessment
Encourage students to apply to Medical School, MPH program, MBA program, and MS/PSM/PhD programs in Pharmaceutical Sciences at UMass Lowell.	Distribute or publicize graduate-program information to undergraduates through courses or advising.	Ongoing.	Track acceptance rates into these graduate programs.

EXTERNAL REVIEW AND INSTITUTIONAL RESPONSE

The review team consisted of Dr. David R. Taft, Professor of Pharmaceutical Sciences, in the Division of Pharmaceutical Sciences, Arnold & Marie Schwartz College of Pharmacy at Long Island University, and Dr. Tamara Minko, Distinguished Professor and Chair, in the Department of Pharmaceutics, Ernest Mario School of Pharmacy at Rutgers University. The team found the core curriculum to provide students with foundational knowledge across an array of disciplines that align with the field of pharmaceutical sciences. They noted that the proposed program is distinguished by the breadth and scope of the curriculum beyond the core, and that this dual pathway is a first of its kind providing laboratory experience, industrial internship and unique course offerings in Pharmaceutical Sciences.

One curricular concern regarding a lack of elective opportunities was identified by the reviewers. They also suggested that running the program throughout a 4-year cycle will require additional faculty members to teach the required coursework in both the Pharmaceutical Sciences Track and Pharmaceutical Marketing and Management Track.

In response to the reviewers, UMB noted appreciation for the recommendations and has made a curricular adjustment regarding electives. Regarding the faculty recommendation, a line has been added to the budget for academic year 2021-2022. Appropriate funding for adjunct faculty will also be requested starting with academic year 2019-2020 and thereafter.

STAFF ANALYSIS AND RECOMMENDATION

Staff thoroughly reviewed all documentation submitted by the **University of Massachusetts Lowell** and external reviewers. Staff recommendation is for approval of the proposed **Bachelor of Science in Pharmaceutical Sciences** program.

ATTACHMENT A: CURRICULUM

Bachelor of Science in Pharmaceutical Sciences: Pharmaceutical Sciences Track

<i>Major Required (Core) Courses (# Total courses required = 19)</i>		
Course Number	Course Title	Credit Hours
HSCI.1020 & HSCI.1040	Human Anatomy and Physiology II & Lab	4
HSCI.1021	Introduction to Public Health	3
HSCI.2110 & HSCI.2130	Basic Clinical Microbiology and Pathology & Lab	4
CHEM.1210 & CHEM.1230L	Chemistry I & Lab*	4
CHEM.1220 & CHEM.1240L	Chemistry II & Lab*	4
CHEM.2210 & CHEM.2290L	Organic Chemistry I & Lab	4
CHEM.2230 & CHEM.2300L	Organic Chemistry II & Lab	4
MLSC.3500	Human Biochemistry	3
NUTR.2100	Nutrition and Health	3
PHYS.1030 & PHYS.1030L	General Physics I & Lab	4
PHYS.1040 & PHYS.1040L	General Physics II & Lab	4
	Sub Total Core Credits	41
*These courses require the CHEM.1210/1230L and CHEM.1220/1240L sequence		
<i>Other Required Courses in Related Subject Areas (# Total courses required = 16)</i>		
Course Number	Course Title	Credit Hours
PHRM.3311	Physical Pharmacy	3
PHRM.3312	Drug Delivery Systems	2
PHRM.3313	Compounding Laboratory	1
PHRM.3321	Pharmaceutical Chemistry	3
PHRM.3322	Pharmaceutical Analysis	2
PHRM.3323	Pharmaceutical Analysis Laboratory	1
PHRM.3324	Pharmaceutical Biotechnology	3
PHRM.3331	Pharmacology I	3
PHRM.3332	Pharmacology II	3
PHRM.3412	Pharmaceutical/Biopharmaceutical Industry Internship	5
PHRM.3414	Biopharmaceutics and Pharmacokinetics	3
PHRM.3415	Quality Control and Good Manufacturing Practice (GMP)	2
PHRM.3416	Introduction to Research Methods and Biostatistics	2
PHRM.3417	FDA/ICH Guidelines and Regulation	2

PHRM.3418	Drug Discovery and Development	3
PHRM.3512	Case Studies in Pharmaceutical Sciences	2
	Sub Total Related Credits	40
<i>Elective Courses (# Total courses required = 0)</i>		
Course Number	Course Title	Credit Hours
N/A	N/A	0
	Sub Total Elective Credits	0
<i>Distribution of General Education Requirements ("Core Curriculum")</i> Attach List of General Education Offerings (Course Numbers, Titles, and Credits) (# Total courses required = 14)		# of Credits
Arts and Humanities, including Literature and Foreign Languages: Electives (3 courses)		9
Mathematics: MATH.1380-Calculus for the Life Sciences I		4
Sciences with Lab Perspective: BIOL.1220/BIOL.1240L-Biology for Health Sciences & Lab HSCI.1010/HSCI.1030-Human Anatomy and Physiology I & Lab		8
Social Sciences: PSYC.1010-Introduction to Psychology SOC.1010-Introduction to Sociology ECON.2010-Economics I		9
College Writing: ENGL.1010-College Writing I ENGL.1020-College Writing II		6
STEM Perspective: MATH.2830-Introduction to Statistics		3
		39
<i>Curriculum Summary</i>		
Total number of courses required for the degree		49
Total credit hours required for degree		120
<i>Prerequisite or Other Additional Requirements: N/A</i>		

Bachelor of Science in Pharmaceutical Sciences: Pharmaceutical Marketing & Management Track

<i>Major Required (Core) Courses (# Total courses required = 19)</i>		
Course Number	Course Title	Credit Hours
HSCI.1020 & HSCI.1040	Human Anatomy and Physiology II & Lab	4
HSCI.1021	Introduction to Public Health	3
HSCI.2110 & HSCI.2130	Basic Clinical Microbiology and Pathology & Lab	4
CHEM.1210 & CHEM.1230L	Chemistry I & Lab	4
CHEM.1220 & CHEM.1240L	Chemistry II & Lab	4
CHEM.2210 & CHEM.2290L	Organic Chemistry I & Lab	4
CHEM.2230 & CHEM.2300L	Organic Chemistry II & Lab	4
MLSC.3500	Human Biochemistry	3
NUTR.2100	Nutrition and Health	3
PHYS.1030 & PHYS.1030L	General Physics I & Lab	4
PHYS.1040 & PHYS.1040L	General Physics II & Lab	4
	Sub Total Core Credits	41
<i>Other Required Courses in Related Subject Areas (# Total courses required = 15)</i>		
Course Number	Course Title	Credit Hours
PHRM.3312	Drug Delivery Systems	2
PHRM.3313	Compounding Laboratory	1
PHRM.3331	Pharmacology I	3
PHRM.3332	Pharmacology II	3
PHRM.3415	Quality Control and Good Manufacturing Practice (GMP)	2
PHRM.3417	FDA/ICH Guidelines and Regulation	2
PHRM.3511	Pharmaceutical Marketing and Management Industry Internship	4
PHRM.3612	Pharmacoeconomics and Health Policy	3
ACCT.2010	Accounting/Financial	3
BUSI.3800	Business Ethics	3
FINA.3010	Financial Management	2
LGST.2620	Business Law	3
MGMT.3010	Organizational Behavior	3

MKTG.2010	Marketing Principles	3
PUBH.3210	Healthcare Systems	3
	Sub Total Related Credits	40
<i>Elective Courses (# Total courses required = 0)</i>		
Course Number	Course Title	Credit Hours
N/A	N/A	0
	Sub Total Elective Credits	0
<i>Distribution of General Education Requirements ("Core Curriculum")</i> Attach List of General Education Offerings (Course Numbers, Titles, and Credits) <i>(# Total courses required = 14)</i>		# of Credits
Arts and Humanities, including Literature and Foreign Languages: Electives (3 courses)		9
Mathematics: MATH.1310-Calculus		4
Sciences with Lab Perspective: BIOL.1220/BIOL.1240L-Biology for Health Sciences & Lab HSCI.1010/HSCI.1030-Human Anatomy and Physiology I & Lab		8
Social Sciences: PSYC.1010-Introduction to Psychology SOCL.1010-Introduction to Sociology ECON.2010-Economics I		9
College Writing: ENGL.1010-College Writing I ENGL.1020-College Writing II		6
STEM Perspective: MATH.2830-Introduction to Statistics		3
		39
<i>Curriculum Summary</i>		
Total number of courses required for the degree		48
Total credit hours required for degree		120
<i>Prerequisite or Other Additional Requirements: N/A</i>		

ATTACHMENT B: BUDGET

REVENUE ESTIMATES										
	Year 1 2017- 2018		Year 2 2018- 2019		Year 3 2019- 2020		Year 4 2020- 2021		Year 5 2021- 2022	
<i>Full-Time Tuition Rate: In-State</i>	1454		1454		1454		1454		1454	
<i>Full-Time Tuition Rate: Out-State</i>	8567		8567		8567		8567		8567	
<i>Mandatory Fees per Student (In-state)</i>	1279 1		13218		13658		14112		14579	
<i>Mandatory Fees per Student (out-state)</i>	2233 2		23259		24213		25197		26210	
<i>FTE # of New Students: In-State</i>	20		40		53		50		44	
<i>FTE # of New Students: Out-State</i>	10		20		27		25		21	
<i># of In-State FTE Students transferring in from the institution's existing programs</i>										
<i># of Out-State FTE Students transferring in from the institution's existing programs</i>										
Tuition and Fees	Newly Generated Revenue	Revenue from existing programs	Newly Generated Revenue	Revenue from existing programs	Newly Generated Revenue	Revenue from existing programs	Newly Generated Revenue	Revenue from existing programs	Newly Generated Revenue	Revenue from existing programs
First Year Students										
Tuition										
In-State	\$29,080	\$0	\$58,160	\$0	\$77,062	\$0	\$72,700	\$0	\$63,976	\$0
Out-of-State	\$85,670	\$0	\$171,340	\$0	\$231,309	\$0	\$214,175	\$0	\$179,907	\$0
Mandatory Fees	\$479,140	\$0	\$993,900	\$0	\$1,377,625	\$0	\$1,335,525	\$0	\$1,191,886	\$0
Second Year Students										
Tuition										
In-State			\$29,0	\$0	\$58,1	\$0	\$77,0	\$0	\$72,7	\$0

			80		60		62		00	
Out-of-State			\$85,670	\$0	\$171,340	\$0	\$231,309	\$0	\$214,175	\$0
Mandatory Fees			\$496,950	\$0	\$1,030,580	\$0	\$1,428,255	\$0	\$1,384,200	\$0
Third Year Students										
Tuition										
In-State					\$29,080	\$0	\$58,160	\$0	\$77,062	\$0
Out-of-State					\$85,670	\$0	\$171,340	\$0	\$231,309	\$0
Mandatory Fees					\$515,290	\$0	\$1,068,420	\$0	\$1,480,357	\$0
Fourth Year Students										
Tuition										
In-State							\$29,080	\$0	\$58,160	\$0
Out-of-State							\$85,670	\$0	\$171,340	\$0
Mandatory Fees							\$534,210	\$0	\$1,107,360	\$0
Fifth Year Students										
Tuition										
In-State										\$0
Out-of-State										\$0
Mandatory Fees										\$0
Gross Tuition and Fees	\$593,890	\$0	\$1,835,100	\$0	\$3,576,116	\$0	\$5,305,906	\$0	\$6,232,432	\$0
Grants	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Contracts	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Campus budget allocation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Other Revenues (specify in cell 54)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	\$593,890	\$0	\$1,835,100	\$0	\$3,576,116	\$0	\$5,305,906	\$0	\$6,232,432	\$0

EXPENDITURE ESTIMATES

	Year 1		Year 2		Year 3		Year 4		Year 5	
	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022	
	New Expenditures required for Programs	Expenditures from current resources	New Expenditures required for Programs	Expenditures from current resources	New Expenditures required for Programs	Expenditures from current resources	New Expenditures required for Programs	Expenditures from current resources	New Expenditures required for Programs	Expenditures from current resources
Personnel Services										
Faculty	\$0	\$0	\$0	\$0	\$393,000	\$0	\$552,000	\$0	\$695,000	\$0
Administrators	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Support Staff	\$32,000	\$0	\$33,000	\$0	\$94,000	\$0	\$97,000	\$0	\$100,000	\$0
Others	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Fringe Benefits 33.94%	\$10,541	\$0	\$11,200	\$0	\$153,069	\$0	\$199,907	\$0	\$249,459	\$0
Total Personnel	\$42,541	\$0	\$44,200	\$0	\$640,069	\$0	\$848,907	\$0	\$1,044,459	\$0
Operating Expenses										
Supplies	\$0	\$0	\$0	\$0	\$50,000	\$0	\$60,000	\$0	\$70,000	\$0
Library Resources	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Marketing/Promotional Expenses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Laboratory Expenses	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
General Administrative Overhead	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Other (specify)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Operating Expenses	\$0	\$0	\$0	\$0	\$50,000	\$0	\$60,000	\$0	\$70,000	\$0
Net Student Assistance										
Assistantships	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Fellowships	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Stipends/Scholarships	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Student Assistance	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Capital										
Facilities / Campus recharges	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Equipment	\$0	\$0	\$0	\$0	\$250,000	\$0	\$150,000	\$0	\$0	\$0
Other	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Capital	\$0	\$0	\$0	\$0	\$250,000	\$0	\$150,000	\$0	\$0	\$0
Total Expenditures	\$42,541	\$0	\$44,200	\$0	\$940,069	\$0	\$1,058,907	\$0	\$1,114,459	\$0

BUDGET SUMMARY OF NEW PROGRAM ONLY

	Year 1 2017 -	Year 2 2018 -	Year 3 2019 -	Year 4 2020 -	Year 5 2021 -
	2018	2019	2020	2021	2022
Total of newly generated revenue	\$593,890	\$1,835,100	\$3,576,116	\$5,305,906	\$6,232,432
Total of additional resources required for program	\$42,541	\$44,200	\$940,069	\$1,058,907	\$1,114,459
Excess/ (Deficiency)	\$551,349	\$1,790,900	\$2,636,047	\$4,246,999	\$5,117,973

ATTACHMENT C: FACULTY

Name of faculty member (Name, Degree and Field, Title)	Ten- ure d Y/N	Courses Taught Put (C) to indicate core course. Put (OL) next to any course currently taught online.	# of sect ions	Division or College of Employe ment	Full- or Part- time in Progra m	Full- or part- time in other departmen t or program (Please specify)	Sites where individual will teach program courses
Barrile, Renee PhD, Nutrition Biochemistry Lecturer	N	Nutrition and Health Community Nutrition Obesity & Weight Control Life Cycle Nutrition	(4) (1) (1) (1)	CHS	Part- Time	Part-Time, Clinical Laboratory & Nutritional Sciences	Main campus
Brunette, Maria PhD, Industrial and Systems Engineering Associate Professor	Y	Macroergonomics Global Health Intro to Public Health Work in Progress Seminar	(1) (3) (1) (1)	CHSs	Part- Time	Part-Time, Public Health	Main campus
Champagne, Nicole EdD, Health Education Associate Professor, Dept. Chair	Y	Prog Planning in Hlth Promo Comm Tech in Hlth Promo Community Hlth & Env Intro to Public Health	(1) (1) (2) (1)	CHS	Part- Time	Part-Time, Public Health	Main campus
Chiang, Long PhD, Organic Chemistry Professor	Y	Org. Chem Lab IA Org. Chem. Lab II Organic Synthesis Princs of Org Chem Lab Structural Analysis	(3) (1) (1) (1) (1)	College of Sciences	Part- Time	Part-Time, Chemistry	Main campus
Christianson, Laura MBA, CPA Lecturer	N	Managerial Accounting	(7)	Manning School of Business	Part- Time	Part-Time Accounting	Main Campus

Name of faculty member (Name, Degree and Field, Title)	Ten - ure d Y/N	Courses Taught Put (C) to indicate core course. Put (OL) next to any course currently taught online.	# of sections	Division or College of Employment	Full- or Part-time in Program	Full- or part- time in other department or program (Please specify)	Sites where individual will teach program courses
Crooker, Joan MBA, Lecturer	N	Marketing Principles	(6)	Manning School of Business	Part-Time	Part-Time Marketing	Main Campus
DiBenedetto, Lynn PhD, Molecular & Cellular Biology Lecturer	N	Anatomy & Physiology I, with lab Anatomy & Physiology II, with lab Advanced Pathophysiology	(3) (2) (1)	CHS	Part-Time	Part-Time, Clinical Laboratory & Nutritional Sciences	Main campus
Dulak, Arlee PhD, Cellular & Molecular Pathology Lecturer	N	Anatomy & Physiology 1, with lab Anatomy & Physiology 2, with lab Basic Clinical Microbiology & Pathology, with lab Advanced Pathophysiology Infectious Disease	(2) (3) (1) (1) (1)	CHS	Part-Time	Part-Time, Clinical Laboratory & Nutritional Sciences	Main campus
Foco, Rebecca PhD, Education Lecturer	N	Introduction to Public Health Intro to Health Promotion Appl. Tech. in Health Promotion Public Health Seminar	(3) (2) (1) (1)	CHS	Part-Time	Part-Time, Public Health	Main campus

Name of faculty member (Name, Degree and Field, Title)	Ten - ure d Y/N	Courses Taught Put (C) to indicate core course. Put (OL) next to any course currently taught online.	# of sections	Division or College of Employment	Full- or Part-time in Program	Full- or part- time in other department or program (Please specify)	Sites where individual will teach program courses
Freedman, Stuart PhD, Organizational Behavior, Professor, Chair	Y	Organizational Behavior	(4)	Manning School of Business	Part-Time	Part-Time Management	Main Campus
Freund, Steven PhD, Finance Assistant Professor	Y	Financial Management Introduction to Financial Derivatives Financial Economics	(2) (2) (1)	Manning School of Business	Part-Time	Part-Time, Finance	Main Campus
Garcia, Jessica PhD, Chemistry, Biochemistry, Lecturer	N	Organic Chemistry Lab Principles of Org Chem Lab	(5) (2)	College of Sciences	Part-Time	Part-Time, Chemistry	Main campus
Geiger, Brenda PhD, Pharmacology and Experimental Therapeutics Lecturer	N	Drug Metabolism Principles of Pharmaceutical Sci.	(3) (1) (2)	CHS	Part-Time	Part-Time, Clinical Laboratory & Nutritional Sciences	Main campus
He, Guixin (Susan) PhD, Microbiology Associate Professor	Y	Basic Clinical Microbiology & Pathology Infectious Disease	(3) (1)	CHS	Part-Time	Part-Time, Clinical Laboratory & Nutritional Sciences	Main campus

Name of faculty member (Name, Degree and Field, Title)	Ten - ure d Y/N	Courses Taught Put (C) to indicate core course. Put (OL) next to any course currently taught online.	# of sect ions	Division or College of Employe ment	Full- or Part- time in Progra m	Full- or part- time in other departmen t or program (Please specify)	Sites where individual will teach program courses
Holmes, Robert PhD, Law, Policy & Society Lecturer	N	Intro to Public Health Health Policy Health Care Systems Program Mgmt in Health Socioeconomic Inequal/Health	(1) (3) (2) (1) (1)	CHS	Part- Time	Part-Time, Public Health	
Hunt, Michelle DPT, Physical Therapy Lecturer	N	Anatomy & Physiology I, with lab Anatomy & Physiology II, with lab	(3) (3)	CHS	Part- Time	Part-Time, Clinical Laboratory & Nutritional Sciences	Main campus
Keyes, Mary Kate MS, Nutrition Communication Visiting Professor	N	Human Nutrition Nutrition and Health Human A&P Lab II	(1) (6) (1)	CHS	Part- Time	Part-Time, Clinical Laboratory & Nutritional Sciences	Main campus
Laycock, Silas PhD, Astronomy Assistant Professor	N	General Physics I General Physics I Lab General Physics II General Physics II Lab Astronomy & Astrophysics I	(1) (6) (1) (8) (1)	College of Sciences	Part- Time	Part-Time Physics	Main Campus
Lu, Chung-Dar PhD, Biological Sciences Professor	Y	Basic Cl Micro & Pathology Molecular Diagnostics Lab	(1) (2)	CHS	Part- Time	Part-Time, Clinical Laboratory & Nutritional Sciences	Main campus

Name of faculty member (Name, Degree and Field, Title)	Ten - ure d Y/N	Courses Taught Put (C) to indicate core course. Put (OL) next to any course currently taught online.	# of sections	Division or College of Employment	Full- or Part-time in Program	Full- or part- time in other department or program (Please specify)	Sites where individual will teach program courses
Mangano, Kelsey PhD, Nutritional Sciences Assistant Professor	N	Nutrition and Health Vitamins & Minerals	(4) (1)	CHS	Part-Time	Part-Time, Clinical Laboratory & Nutritional Sciences	Main campus
Reddie, Khalilah PhD, Chemistry, Lecturer	N	Organic Chemistry	(8)	College of Sciences	Part-Time	Part-Time, Chemistry	Main Campus
Sajo, Erno PhD, Physics Professor	Y	Lab for Exploring the Universe Monte Carlo Simul/Rad Trans Physics I Radiation Biology Radiation Interactions & Trans	(3) (1) (1) (1) (1)	College of Sciences	Part-Time	Part-Time, Physics & Applied Physics	Main campus
Tries, Mark PhD, Physics Associate Professor	Y	Ext Dosimetry & Shieldng General Physics I Lab Nuclear Instrumentation Radiation and Life Lab Radiation Safety & Control II Radiochemistry	(1) (2) (2) (3) (1) (1)	College of Sciences	Part-Time	Part-Time, Physics & Applied Physics	Main campus
Williams, Michelle MS, Physical Therapy Lecturer	N	Anatomy & Physiology I, with lab Anatomy & Physiology II, with lab	(3) (1)	CHS	Part-Time	Part-Time, Clinical Laboratory & Nutritional Sciences	Main campus

Name of faculty member (Name, Degree and Field, Title)	Tenure Y/N	Courses Taught Put (C) to indicate core course. Put (OL) next to any course currently taught online.	# of sections	Division or College of Employment	Full- or Part-time in Program	Full- or part-time in other department or program (Please specify)	Sites where individual will teach program courses
Wilson, Thomas PhD, Biological Sciences Associate Professor	Y	Human Nutrition Physiological Chem I Human Biochemistry Physiological Chem II Nutrition and Metabolism	(1) (1) (2) (1) (1)	CHS	Part-Time	Part-Time, Clinical Laboratory & Nutritional Sciences	Main campus
Xu, Jin PhD, Biochemistry Assistant Professor	N	Chemistry II Protein Chemistry	(1) (1)	College of Sciences	Part-Time	Part-Time, Chemistry	Main campus
Yaroslavsky, Anna PhD, Biophysics Associate Professor	Y	Advanced Medical Imaging Physics I Seminar in Biomedical Optics	(1) (2) (2)	College of Sciences	Part-Time	Part-Time, Physics & Applied Physics	Main campus