

**BOARD OF HIGHER EDUCATION  
REQUEST FOR COMMITTEE AND BOARD ACTION**

**COMMITTEE**    Academic Affairs

**No.:**    AAC 21-09

**COMMITTEE DATE:**    April 27, 2021

**BOARD DATE:**    May 4, 2021

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**APPROVAL OF LETTER OF INTENT OF THE UNIVERSITY OF MASSACHUSETTS  
LOWELL TO AWARD THE BACHELOR OF SCIENCE IN QUANTITATIVE ECONOMICS  
AND AUTHORIZATION FOR FAST TRACK REVIEW**

**MOVED:**            The Board of Higher Education (BHE) has evaluated the Letter of Intent of the **University of Massachusetts Lowell** to award the **Bachelor of Science in Quantitative Economics** and has determined that the proposal aligns with BHE criteria. Accordingly, the BHE authorizes the Commissioner to review the program and to make a final determination on degree granting authority pursuant to the Fast-Track review protocol.

**VOTED:**            Motion adopted by AAC 4/27/2021; adopted by BHE 5/4/2021.

Authority:            Massachusetts General Laws Chapter 15A, Section 9(b); AAC 18-40

Contact:            Winifred M. Hagan, Ed.D., Senior Associate Commissioner for Strategic Planning and Public Program Approval

**BOARD OF HIGHER EDUCATION**  
**May 2021**  
**University of Massachusetts Lowell**  
**Letter of Intent**  
**Bachelor of Science in Quantitative Economics**

**DEGREE TITLE ABSTRACT ON INTENT AND MISSION OF PROGRAM**

The University of Massachusetts Lowell (UML) intends that the proposed Bachelor of Science in Quantitative Economics (BS/QE) program will serve to meet an increasing demand from employers for more graduates with mathematical and quantitative skills. It is also intended to reflect the UML commitment to the economic and social mobility of its students and expected to prepare students for well-compensated employment opportunities. An important goal of creating the proposed program, (as opposed to altering the existing BA in Economics) is to provide students with the capacity to demonstrate quantitative skills to potential employers. The proposed BS in Economics is expected to enable UML to train undergraduate students in economics, so that they can understand both the numbers and the softer side of things<sup>1</sup>. The opportunity to study toward a BS in Economics is not currently available within the University of Massachusetts system. This new degree is planned to be housed at UML, entirely within the Department of Economics in the College of Fine Arts, Humanities, and Social Sciences at the University of Massachusetts Lowell.

The proposed Bachelor of Science in Quantitative Economics was approved by the University of Board of Trustees on April 20, 2020. The LOI was circulated on February 16, 2020. No comments were received.

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<sup>1</sup> Belkin Douglas. (2017b, April 25). Adding Math to Save Humanities. *The Wall Street Journal*, A3.

## **A. ALIGNMENT WITH MASSACHUSETTS GOALS FOR HIGHER EDUCATION**

### *Address Gaps in Opportunity and Achievement in Alignment with Campus-Wide Goals*

UML reports that the Economics Department has a strong record of attracting and serving a diverse student body, citing that in the spring 2018, 45% of majors were Black, Indigenous, People of Color (BIPOC). It is expected that this history will contribute to closing gaps in student opportunity and achievement. UML reports that closing the gender gap will be a pronounced and deliberate effort when promoting the proposed program. Recognizing the demonstrated importance of role models and community in recruitment and retention UML has sought to hire diverse faculty (36% female) and to invite diverse alumnae for introductory courses to recruit majors.<sup>2</sup> In addition UML has created a successful *Women in Economics Group* where female faculty meet once a month with female students to discuss challenges and career aspirations. The UML plan is to continue this effort and involve female faculty and students as ambassadors of economics to attract more students during recruitment events. UML plans further to collaborate closely with an effort undertaken by the American Economic Association<sup>3</sup> to close the gender and racial gap in economics through special programs for BIPOC students.

### *Program or Department Supports to Ensure Student Retention and Completion*

The Economics Department at UML has restructured its advising system so that all faculty and staff are proactive and involved in meeting, assisting, and advising students. It is planned that the proposed BS/QE will build on this new departmental culture to

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<sup>2</sup> Porter, Catherine, and Danila Serra. 2020. *American Economic Journal: Applied Economics* Volume 12, Number 3, pages 226-254. <https://www.aeaweb.org/articles?id=10.1257/app.20180426>

<sup>3</sup> (e.g. <https://www.aeaweb.org/about-aea/committees/aeasp>)

ensure that students will progress through the program to complete the degree requirements. In addition, a full-time faculty member is planned to serve as a dedicated advisor to students entering the proposed program. UML expects this strategy will quickly surface any potential issues or general problems students may encounter. UML expects to further support students using its' College-Based Advising which focuses on supporting first-year students; this is in addition to the faculty advisor that is assigned to each incoming student. UML Centers for Learning, Advising and Student Success include a tutoring program with trained and certified peer tutors, and success coaching, study skills and time management workshops. In addition, UML plans to redesign the ECON.4911 Independent Study course so that the highest achieving students will be able to obtain course credits for formally tutoring others. Beyond tutoring and faculty advising UML also plans to keep investing into the growth of current two-student lead groups (the *Economics Society* and *Women in Economics*), which organize regular events for economic majors. UML has funded, supported, and encouraged both groups as part of the recruitment and retention effort.

#### *Alliances and Partnerships with PK-12, Other IHE's, Community Employers*

Designed for what UML describes as seamless integration, it is planned that transfer students from MA community colleges and other institutions will enroll in the program. that the BS in Economics will maintain the existing practice of a pathway from associate to bachelor's degrees exactly as is done for other programs. Although no separate, formal articulations specific to the new program have been developed because it is expected that Mass Transfer will continue to be effective.

UML is in the process of creating an advisory board consisting of alumni employed in occupations that require quantitative skills as well as local employers seeking graduates

with these skills. It is also planned that the advisory board will include faculty from at least one community college and one high school in the area, including Northern Essex and the Bedford Public Schools.

### *Relationship to MassHire Regional Blueprints*

The UML proposed BS/QE program is designed for students to develop the competencies in mathematical reasoning and data analysis skills that are increasingly in demand in the labor market. UML reports that the US Bureau of Labor Statistics projects the employment of economists to grow by 6% from 2016 to 2026 and that such prospects will be stronger for those with strong analytical skills, and experience using statistical analysis software. UML reports that the proposed program will match growing computer and mathematical occupations and address a projected worker shortage.<sup>4</sup> Similarly, professional, scientific, and technical services related occupations also show significant need for new workers because of high replacement demand.<sup>5</sup> UML finds that these occupations also comprise the top three priority industries in the region because of earning potential, and the strategic supporting role the occupation plays with other industries and therefore the overall regional economy. The professional and technical services industry is facing a challenge as the number of young people pursuing STEM degrees does not meet the demand.<sup>6</sup>

### *Duplication*

The University of Massachusetts Amherst offers a BS in Resource Economics that has an environmental as well as a quantitative focus, and a BS program in Managerial Economics that focuses on business decision making. It is expected that the proposed

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<sup>4</sup> *University of Massachusetts Donahue Institute. 2018. Greater Boston Workforce Planning Blueprint*

<sup>5</sup> *Massachusetts Workforce Skills Cabinet, 2018. Northeast Labor Market Blueprint*

<sup>6</sup> *Ibid*

BS/QE will not create any redundancy within the UMass system. Northeastern University offers both a BA and BS in Economics within the College of Social Sciences and Humanities. Boston University offers a BS in Economics in its Metropolitan College. Tufts University offers both a BA in Economics and in Quantitative Economics. The University of New Hampshire offers a BS in Economics.

### *Innovative Approaches to Teaching and Learning*

UML anticipates that the proposed BS/QE program will enable students to develop strong economic data analysis skills and proficiency in multiple statistical software packages. Courses will be designed for students to develop hands-on use of a statistical software for homework and projects, providing students with experience in multiple software packages commonly used by economists, and broadening the students' portfolio of marketable skills. Student learning experiences are further planned to include economic modeling and empirical economics within assigned projects that will be aligned with relevant literature. The teaching and learning pedagogy will focus on replication of published academic journals or economic research reports. It is planned that each course will include written and oral presentation of data analysis using appropriate software through student projects. The learning of such skills follows a chronological order of courses and we will continually evaluate the learning and skill level of the students. This is planned to help assess the effectiveness of the curriculum and buttress the development of advanced technical skills acquired by students. will permit them to serve successfully as undergraduate student assistants for the research of our faculty. It is also planned that the advisory board will continually discuss the methods and software in courses, as well as projects produced by students in the

*Analytical Economics* class. Through such discussion and examination, UML plans continually assess whether and how the proposed program promotes meets its' goals.

## **B. ALIGNMENT WITH CAMPUS STRATEGIC PLAN AND MISSION**

### *Priority Rationale and Support of Strategic Plan and Overall Mission of Institution*

The proposed BS/QE program is expected to enhance UML's mission to get students 'work-ready'. UML reports that companies often ask for graduates who have an ability to analyze data, use it to describe and predict behaviors of individuals and of markets.<sup>7</sup> UML also reports that liberal arts schools are increasingly realizing that strengthening their curriculum with quantitative and data analysis courses will permit them to produce undergraduates who are in highest demand<sup>8</sup> and who can understand both the numbers and the softer side of things.<sup>9</sup> UML anticipates that the proposed BS/QE will enable students to succeed in becoming skilled quantitative learners and informed citizens. Course work focused on analysis of world data (such as economic data from the World Bank and the Organization for Economic Cooperation and Development (OECD<sup>10</sup>), will help fulfill the university's goal to prepare students to work in the real world and analyze and solve real problems. UML underscored the program objectives are well-aligned with the institutions' goals. The proposed program is expected to become an established degree for the greater Lowell area, to increase visibility of the program externally, to

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<sup>7</sup> Belkin Douglas. (2018, November 8). *At Berkeley, Big Data on Campus. The Wall Street Journal, A3*

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Belkin Douglas. (2017a, April 25). *Liberal Arts Lose Luster. The Wall Street Journal, A3*

<sup>9</sup> Belkin Douglas. (2017b, April 25). *Adding Math to Save Humanities. The Wall Street Journal, A3*

<sup>10</sup> *The Organisation for Economic Co-operation and Development (OECD) is an international organization that works to build better policies for better lives. Its' goal is to shape policies that foster prosperity, equality, opportunity and well-being for all. Retrieved 4/9/2021 <https://www.oecd.org/about>*

promote the BS degree within UMass Lowell, strengthen connections with employers, and strengthen connections with alumni.

### **C. ALIGNMENT WITH OPERATIONAL AND FINANCIAL OBJECTIVES OF INSTITUTION**

UML plans that the proposed program will fit readily into the array of offerings in Economics, with a minimum of additional resources to launch the program.

#### *Enrollment Projections (Form C)*

During the initial years of the proposed program, UML expects three sources of new full-time students. The first group is planned to consist of students who are already pursuing the current BA in economics; the second group is expected to consist of either double majors or students in those disciplines who switch to the proposed program BS degree entirely; the third group is expected to consist of new students. UML does not anticipate these students to impact enrollment in other programs. During years 4, 5, and thereafter, UML plans that only a third of the enrolled students will be internal and that two-thirds are planned to be sourced from outside the institution.

#### *Resources and Financial Statement of Estimated Net Impact on Institution (Form D)*

It is not planned that an immediate need for any additional full-time faculty, staff, space, or equipment will be necessary to start the proposed BS/QE program. Existing faculty are planned to deliver the proposed curriculum. UML also expects to be fully capable of providing sufficient resources through its' computer labs. There are two, new primary expenses forecast. The addition of two required courses, *Advanced Software for Economics* and *Analytical Economics* is planned to utilize existing full-time faculty to



teach, thus incurring the hire of an adjunct to cover one additional course per semester. UML also forecasts a small marketing budget to advertise and increase the visibility of our new BS degree.

#### **STAFF REVIEW AND VALIDATION**

Staff thoroughly reviewed the **LOI** proposing full degree granting authority for the **Bachelor of Science in Quantitative Economics** submitted by the **University of Massachusetts Lowell**. Staff validate that the **LOI** includes all data required by the Massachusetts Board of Higher Education. Staff recommendation is for BHE authorization for the Commissioner to review the program pursuant to the Fast-Track review protocol.

## Form A1: LOI Undergraduate Program Curriculum Outline

<b>Required (Core) Courses in the Major (Total # courses required = 10)</b>		
<i>Course Number</i>	Course Title	Credit Hours
ECON 2010	Economics I (Principles of Microeconomics)	3
ECON 2020	Economics II (Principles of Macroeconomics)	3
ECON 2110	Statistics for Business and Economics I	3
ECON 2120	Statistics for Business and Economics II	3
ECON 3030	Microeconomic Theory	3
ECON 3040	Macroeconomic Theory	3
ECON 3110	Mathematical Economics	3
ECON 4070	Econometrics	3
ECON 4200	Advanced Software for Economics	3
ECON 4300	Analytical Economics	3
	<b>Sub Total Required Credits</b>	30
<b>Elective Courses (Total # courses required = 4) (attach list of choices if needed)</b>		
ECON 3020	Labor Economics	3
ECON 3060	Urban Economics	3
ECON 3100	Development Economics	3
ECON 3120	Managerial Economics	3
ECON 3160	Investments: Instruments and Strategies	3
ECON 3070	Capital Markets	3
ECON 3180	Financial Markets and Monetary Policy	3
ECON 3190	Public Finance	3
ECON 3250	United States Economic History	3
ECON 3450	Health Economics	3
ECON 4020	Industrial Organization	3
ECON 4030	International Economics	3
ECON 4060	International Macroeconomics	3
ECON 4150	Environmental Economics	3
ECON 4160	Experimental and Behavioral Economics	3
	<b>Sub Total Elective Credits</b>	12

<b><i>Distribution of General Education Requirements</i></b> Attach List of General Education Offerings (Course Numbers, Titles, and Credits)		# of Gen Ed Credits
Arts and Humanities, including Literature and Foreign Languages		9
Mathematics and the Natural and Physical Sciences		11
Social Sciences		9
<b><i>Sub Total General Education Credits</i></b>		29
<b><i>Curriculum Summary</i></b>		
Total number of courses required for the degree		14 (42 economics credits)
Total credit hours required for degree		120
<b><i>Prerequisite Requirements:</i></b>		
MATH 1280	Calculus 1A	3 credits
MATH 1290	Calculus 1B	3 credits

### Undergraduate Program Curriculum Outline General Ed courses

<b><i>Quantitative Economics Gen Ed Courses</i></b>		
<i>Course Number</i>	<i>Course Title</i>	<i>Credit Hours</i>
ENGL.1010	College Writing I	3
ENGL.1020	College Writing II	3
	Gen Ed (AH) elective	3
	Gen Ed (AH) elective	3
	Gen Ed (AH) elective	3
	Gen Ed (SS) elective	3
	Gen Ed (SS) elective	3
	Gen Ed (SS) elective	3
	Gen Ed (Science) elective	4
	Gen Ed (Science) elective	4
	Gen Ed (Science/STEM) elective	3
<b><i>Sub Total Elective Credits</i></b>		35

## Form B: LOI Goals and Objectives

Goal	Measurable Objective	Strategy for Achievement	Timetable
Become an established BS degree in the area	About 90 students enrolled by year 5	External and internal marketing of the program, tracking projected enrollment (Form C)	5 years since program approval
Increase the visibility our BS degree externally	Advertise to community colleges and high-schools	Task faculty to achieve these goals	Ongoing Engagement with CC and high-schools
Promote our BS degree within UMass Lowell	Develop guidelines to facilitate double-major in Economics and other subjects such as Math, Computer Sciences, Political Sciences etc.	Task faculty to achieve these goals	Guidelines developed by end of 2021 and revised over time as needed.
Strengthen connections with employers	Continue Employer in Residence program. Leverage network of advisory board's members.	Continue teaming up with Career Services for Employer in Residence program.	At least one Employer in Residence event each year
Strengthen connections with alumni	Continue events where alumni are invited to speak about their career to current students.	Maintain strong ties with alumni both through those on the advisory board and using department's presence online (Twitter, Facebook, LinkedIn).	At least one alumni panel each year

For the first five years of the program, UML will conduct self-evaluations to make sure objectives are being achieved; each year it is planned to meet with our advisory board to share progress, problems and receive feedback. After five years, when it is expected that the program will be fully established, the evaluations and meetings with advisory board are planned to be performed as needed.

### Form C: LOI Program Enrollment

	Year 1	Year 2	Year 3	Year 4	Year 5
New Full-Time	12	15	18	22	25
Continuing Full-Time	--	12	27	45	67
New Part-Time	--	--	--	--	--
Continuing Part-Time	--	--	--	--	--
<b>Totals</b>	<b>12</b>	<b>27</b>	<b>45</b>	<b>67</b>	<b>92</b>

### Form D: LOI Program Budget

<b>One Time/ Start Up Costs</b>		<b>Annual Enrollment</b>				
		<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
	<b>Cost Categories</b>					
	Full Time Faculty (Salary & Fringe)	\$0	\$0	\$0	\$0	\$0
	Part Time/Adjunct Faculty (Salary & Fringe)	\$12,200	\$12,200	\$12,200	\$12,200	\$12,200
	Staff	\$0	\$0	\$0	\$0	\$0
	General Administrative Costs	\$0	\$0	\$0	\$0	\$0
	Instructional Materials, Library Acquisitions	\$0	\$0	\$0	\$0	\$0
	Facilities/Space/Equip ment	\$0	\$0	\$0	\$0	\$0
	Field & Clinical Resources	\$0	\$0	\$0	\$0	\$0
	Marketing	\$10,000	\$10,000	\$10,000	\$10,000	\$10,000

	Other (Specify)	\$0	\$0	\$0	\$0	\$0
<b>One Time/Start-Up Support</b>			<b>Annual Income</b>			
	<b>Revenue Sources</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
	Grants	\$0	\$0	\$0	\$0	\$0
	Tuition & Fees	\$192,312	\$240,390	\$288,468	\$352,572	\$400,650
	Fees	\$0	\$0	\$0	\$0	\$0
	Departmental	\$0	\$0	\$0	\$0	\$0
	Reallocated Funds	\$0	\$0	\$0	\$0	\$0
	Other (specify)	\$0	\$0	\$0	\$0	\$0
	<b>TOTALS</b>	\$192,312	\$240,390	\$288,468	\$352,572	\$400,650