Routing for On-Campus Approval of the Letter of Intent for a New Degree Program

Proposed Program Title: **Econometrics and Quantitative Economics**
Degree Type (circle one): Bachelor's / Master's / Doctoral
Proposed Effective Date: **Aug 15, 2020** Program Contact: Xiaoyang Zheng, xzheng@ncsu.edu

**Routing Action:** Indicate date when the following occurs

**Completed Letter of Intent and 1-page Concept Paper 12/13/18**

**Completed Letter of Intent**

1/2/2019 Department Head endorses*
1/11/2019 College Curriculum Committee (undergraduate or graduate) recommends*
1/17/2019 College Dean endorses*

**Letter of Intent moves to Undergraduate or Graduate office for routing**

3/14/19 Recommended by Vice Provost, DELTA, if applicable*
3/18/19 Associate Deans Council or Graduate Operations Council informed
3/25/19 Dean (Graduate School or DASA) approves*

**Letter of Intent moves to the Executive Vice Chancellor Provost's office for routing**

2/13/19 Substantive Change Review Team (SCRT) makes initial determination of likelihood of SACSCOC notification
12/13/18 IR Council of Deans recommends*
12/19/18 Anticipate June 2019 Vice Provost informed
12/13/18 Anticipate Aug 2019 University Council informed
4/16/19 Executive Vice Chancellor and Provost approves*
4/18/19 Submitted to UNC System Office by Provost's Office
5/17/19 Approved

* Signature is required on the signature page for the action
Request to Plan has been approved

uncprep@northcarolina.edu <uncprep@northcarolina.edu>
To: ldcavis@ncsu.edu, mlnosbis@ncsu.edu, bbschamb@ncsu.edu, fcrwfo@ncsu.edu, pjharrie@ncsu.edu, dklarick@ncsu.edu, lamarcus@ncsu.edu

Request to Plan has been approved for the following degree program from NC State University:

Master's in Econometrics and Quantitative Economics

Request to Establish should be submitted within four months.

https://prep.northcarolina.edu/arp/dashboard/dashboard.php
The following approvals must be obtained prior to sending the Letter of Intent to Develop a New Academic Degree Program to the UNC System Office.

Institution ___________________________ North Carolina State University ___________________________

Degree Program Title (e.g. M.A. in Biology) Master of Econometrics and Quantitative Economics

Reviewed and Approved By (Name and title only. No signature required in this section.)
Check box to indicate participation in review. (Provost is required.)

☒ Provost: Warwick Arden
☐ Faculty Senate Chair (as appropriate):
☒ Graduate Council (as appropriate): List of council members can be found at https://grad.ncsu.edu/about/people/goc/
☒ Undergraduate or Graduate Dean (as appropriate): Peter Harries
☒ Academic College Dean: Frank Buckless and Richard Linton
☒ Department Chair: Lee Craig and John Beghin
☒ Program Director/Coordinator: Xiaoyong Zheng

New Academic Proposal Process
New academic programs are initiated and developed by the faculty members. Approval of the Letter of Intent to Develop a New Academic Degree Program must be obtained from department chairs and college deans or equivalent administrators before submission to the UNC System Office review.

Directions: Please provide a succinct, yet thorough response to each section. Obtain the Provost’s signature and submit the proposal via the PREP system to the UNC System Vice President for Academic Programs, Faculty, and Research, for review and approval by the UNC System Office. Once the Letter of Intent to Develop is approved, the institution can begin work on the formal Request to Establish a New Degree Program.
# Letter of Intent to Develop a New Academic Degree Program

<table>
<thead>
<tr>
<th>Institution</th>
<th>North Carolina State University</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joint Degree Program (Yes or No)? If so, list partner campus.</td>
<td>No</td>
</tr>
<tr>
<td>Degree Program Title (e.g. M.A. in Biology)</td>
<td>Master of Econometrics and Quantitative Economics</td>
</tr>
<tr>
<td>CIP Code and CIP Title (May be found at National Center for Education Statistics)</td>
<td>45.0603 Econometrics and Quantitative Economics</td>
</tr>
<tr>
<td>Require UNC Teacher Licensure Specialty Area Code (Yes or No). If yes, list suggested UNC Specialty Area Code(s).</td>
<td>No</td>
</tr>
<tr>
<td>Proposed Delivery Mode (campus, online, or site-based distance education). Add maximum % online, if applicable.</td>
<td>Campus</td>
</tr>
<tr>
<td>Proposed Term to Enroll First Students (e.g. Spring 2019)</td>
<td>Fall 2020</td>
</tr>
<tr>
<td>List other programs in the UNC System (may be found at UNC System website)</td>
<td>MS in Quantitative Economics and Econometrics offered by East Carolina University</td>
</tr>
</tbody>
</table>

**SACSCOC Liaison Statement:** *(Provide a brief statement from the University SACSCOC liaison regarding whether the new program is or is not a substantive change.)*

The Substantive Change Review Team (SCRT) reviewed this proposal on 12/13/2018 and determined it was not a substantive change for NC State.

**Program Summary:** *(Briefly describe the proposed program and summarize the overall rationale.)*

Maximum of 1,000 words.

Include the following in your narrative:
- Ways in which the proposed program is distinct from others already offered in the UNC System (use the 4-digit CIP as a guide). Information on other programs may be found on the UNC System website.
- How this program supports specific university and UNC System missions.
- Collaborative opportunities with other UNC institutions as appropriate.
Brief Description

The proposed Master of Econometrics and Quantitative Economics program is a traditional on-campus master's program. The program will require a minimum of 30 credit hours, with an average GPA of at least 3.0. The proposed curriculum consists of 6 required courses: 2 theory courses in calculus based intermediate microeconomics (ECG 700) and macroeconomics (ECG 703) and a sequence of 4 courses in applied econometrics (ECG 561, ECG 562, ECG 563 and ECG590). In addition, it requires 4 elective courses. Initially, elective courses in four concentrations will be offered: financial/macro econometrics, environmental and resource economics, international development and trade and economic policy. Students will be able to select one or more concentrations. To complete one concentration, students need to complete at least two courses from the same concentration. These concentrations are informal in nature and may be added or eliminated in the future in response to the interests of students and faculty. All courses required in the proposed program are currently being offered, and no new courses need to be developed. The target audience for the proposed program is domestic as well as international students who would like to gain training and experience in applying advanced applied econometrics tools to analyze local, regional, national and global economic and social issues. Compared with the existing master of economics programs we currently offer, the program gives students additional training in applied econometrics and prepares them better for careers that require strong quantitative and econometric skills.

How this program supports the missions of UNC System and NC State University

The proposed program will help achieve two specific goals identified in the UNC System's strategic planning process (http://www.northcarolina.edu/strategic-planning). The first one is student success, which calls for “the development of competencies essential for meaningful engagement in 21st-century life, including critical and creative thinking, technological mastery, resilience, effective communication, flexibility, collaboration, and an appreciation for the value of life-long learning, among others.” The proposed program will help students master the technical skills needed for many positions in economic analytics for which our society currently has a high demand (see the Societal Demand Section below).

The second strategic goal the proposed program corresponds with is Economic Impact and Community Engagement, which says “The University can enhance economic impact and community engagement by preparing graduates to be well-rounded citizens and lifelong learners; improving quality of life; investing in foundational research; speeding the discovery, application, and translation of research; and deepening sustained partnerships that strengthen local communities and the state’s economy.” The proposed program will train students for applying advanced applied econometric tools to analyze economic and social issues in North Carolina and findings from such analyses will help economic agents and policy makers make better-informed decisions. This will certainly strengthen the local communities and the state’s economy.

This proposed program, which is classified as a STEM program by US Department of Education, is also consistent with NC State's mission to promote “excellent teaching, the creation and application of knowledge” and would further consolidate NC State's strength in science and technology. It is worth noting that the proposed program could be NC State's first STEM program in a social science discipline. The proposed program also helps achieve one of the five strategic goals identified in NC State's 2011-2020 strategic plan, that is, “Enhancing the success of our students through educational innovation.” In recent years, there has been an increasing societal demand for students with excellent training in using applied econometrics and quantitative skills to analyze economic and social problems. The proposed program will allow the Economics Graduate Program to recruit more top-notch students and help students secure higher-level professional opportunities after graduation.


Relationships with other existing programs and potential collaborations

ECU is the only other institution in the UNC system that offers an MS program in Econometrics and Quantitative Economics. The establishment of this program would not create unnecessary program duplication for the following reasons. First, ECU mainly serves students in eastern part of North Carolina while our program will draw students from central and western parts of North Carolina and international students. For example, currently, there are 13 domestic students enrolled in our master's program and all but one student come from central or western parts of North Carolina. Also, in an email, Dr. Philip Rothman, the current director of the master's program at ECU, told us that “a high fraction of our students were undergrad Econ majors at ECU.” Second, there are only two econometrics courses in ECU’s curriculum (https://sites.google.com/site/ecueconfiles/academics/grad/MS%20Typical%20Graduate%20Program%20Course%20Sequence.doc?attredirects=0), while our program features fours econometrics courses. Our econometrics sequence will equip students with all the current major applied econometrics tools widely used in analyzing economic and social problems. Therefore, our program will attract those students who want to learn more econometrics tools. Third, the ECU program offers the students the opportunity to specialize in coastal resources and environmental economics; economic forecasting, financial economics; health care; and issues of poverty and regional development, while our program allows them to specialize in financial/macro econometrics; international trade and development; natural resource and environmental economics and economic policy. Therefore, our program will attract students with different interests than those attending ECU’s program.

At NC State, there are three other graduate programs that offer students advanced training in analyzing data. The first is the MS in Analytics program offered by the Institute for Advanced Analytics, the second is the Graduate Certificate Program in Data Science Foundations offered by the Departments of Computer Science and Statistics and the third is the MS in Financial Mathematics program jointly offered by PCOM, COS and CALS. Our proposed program is related to these three programs as all four programs teach students advanced data analytics techniques. However, our proposed program is distinct from these three programs in two important aspects. First, The Analytics, Data Science Foundations and Financial Mathematics programs mainly teach students statistical, mathematical and computer science tools (e.g. machine learning and artificial intelligence), while our program offers students training in econometrics methods. Econometrics is a field that stemmed, but is distinct, from statistics. While statistical methods are best suited to analyze data generated from random experiments, econometric methods are methods designed to analyze economic data that are generated by economic activities naturally happening in the society. The goals of the two fields are also different. While statistical methods are often used to find correlations among different variables, econometric techniques are mainly used to identify and estimate causal relationships among different economic variables. Furthermore, while different econometrics methods are needed to analyze different kinds of economic data, the methods taught in the Financial Mathematics program focuses on mathematical and statistical methods that are best suited to analyze financial data only. Second, two of the three programs do not require students to take any economics courses and the Financial Mathematics program only requires students to take two economics courses, while our proposed program requires students to take an additional six core and elective economics courses, in addition to the four courses in the econometrics sequence. These economics courses are an essential part of the proposed program as they teach students how to apply critical thinking, problem solving and quantitative skills relevant to formalize an economic analysis, before they apply econometrics methods learned to analyze data and identify, quantify the economics relationships and formulate economic policy recommendations.

In our program, we currently offer a traditional master's degree in economics. It offers both the non-thesis track
(MR) as well as the thesis track (MS). We do not plan to make any changes to the existing program at this moment. Once the new program is approved, we expect the enrollment in the existing program to decrease, especially the enrollment of international students. We plan to offer both the new and existing programs for several years and then evaluate whether we should terminate the existing program at that time.

Finally, we do not foresee any collaboration opportunities with other institutions. However, within NC State, we plan to explore potential collaborative opportunities with Institute for Advanced Analytics and Department of Statistics. The courses in our program will also benefit their students. Potential collaborative opportunities include allowing certain courses to count toward each other's degrees and establishing minor and co-major programs. Several statistics professors are actively involved in research projects with economics graduate faculty.

**Student Demand:** *(Provide evidence of student demand. Discuss the extent to which students will be drawn from a pool of students not previously served by the institution. Maximum length 1,000 words.)*

The CIP code for the program is 45.0603, which is classified as a STEM major. Due to their associated optional practical training benefits (allowed to work in the U.S. after graduation for 36 months rather than 12 months for non-STEM majors), STEM majors are popular choices among international students. Every year, we receive inquiries from many potential international applicants about whether our economics master's program is classified as STEM or not. Many of these students would have chosen to apply and enroll in our program, if we offered a STEM program. Right now, we are losing these students to other universities that offer a STEM program in economics such as University of Wisconsin-Madison, University of Texas-Austin, Tufts University, and many others.

In addition, due to high industry demand for job applicants with strong quantitative economics and econometrics skills (see Societal Demand section below), the proposed program is also expected draw domestic students in North Carolina who want to seek positions requiring such skills. Enrollment in ECU's master of econometrics and quantitative economics program has been increasing. 17, 15, 12, 11 and 10 students enrolled in their program inAY 18-19, 17-18, 16-17, 15-16 and 14-15, respectively.

**Societal Demand:** *(Provide evidence of societal demand and employability of graduates from each of the following source types. Maximum length 1,000 words)*

- Labor market information (projections, job posting analyses, and wages)
  - Specific to North Carolina (such as ncworks.gov, nctower.com, or outside vendors such as Burning Glass)
  - Available from national occupational and industry projections (such as the U.S. Bureau of Labor Statistics)
- Projections from professional associations or industry reports
- Other (alumni surveys, insights from existing programs, etc.)

When we searched “Economists in North Carolina” on Monster.com, a popular job search website, on July 2, 2018, we found 597 jobs. For example, the first job returned is a “Big Data Analyst” position at Fidelity Investments in Durham, NC. The job requirements include “Bachelor's Degree in Marketing, IT, Economics or related field (Advanced Degree a plus)” and “Strong data analytics expertise, including experience translating customer KPIs into actionable marketing strategies that drive growth. Experience with data analytics tools and
technologies across data (SQL, R, SAS, Python), visualization (Tableau, QlikView, or PowerBI) and digital analytics tools (Google Analytics, Omniture).”

In its latest job outlook report for economists, BLS states that (https://www.bls.gov/ooh/life-physical-and-social-science/economists.htm), “employment of economists is projected to grow 6 percent from 2016 to 2026, about as fast as the average for all occupations. Job prospects should be best for those with a master’s degree or Ph.D., strong analytical skills, and experience using statistical analysis software.” The proposed master of econometrics and quantitative economics program will produce exactly the type of job applicants the market demands, that is, students with strong analytical tools and ample experience with various statistical software.

During the most recent Economics graduate program review in Spring 2018, we talked to several alumni working at MetLife, SAS, BB&T and Pentagon Federal Credit Union. They all stated that there is currently a high demand for job applicants with strong skills in economic analytics and econometrics and encouraged us to revise our curriculum to better prepare students for such jobs. At the same time, we noticed that in recent years, those students in our master’s programs who took more quantitative and econometrics courses and had more experience in applying statistical software to analyze social and economic problems were able to find jobs sooner and to find higher-level positions after graduation than those students without such additional preparation.

Contact: (List the names, titles, e-mail addresses and telephone numbers of the person(s) responsible for planning the proposed program.)

<table>
<thead>
<tr>
<th>Position Title</th>
<th>Name</th>
<th>E-mail Address</th>
<th>Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Director of Economics Graduate Programs</td>
<td>Xiaoyong Zheng</td>
<td><a href="mailto:xzheng@ncsu.edu">xzheng@ncsu.edu</a></td>
<td>919-515-4543</td>
</tr>
<tr>
<td>Head of Department of Economics</td>
<td>Lee Craig</td>
<td><a href="mailto:lacraig@ncsu.edu">lacraig@ncsu.edu</a></td>
<td>919-513-2870</td>
</tr>
<tr>
<td>Associate Dean PCOM</td>
<td>Steve Allen</td>
<td><a href="mailto:sgallen@ncsu.edu">sgallen@ncsu.edu</a></td>
<td>919-515-5584</td>
</tr>
</tbody>
</table>
This Letter of Intent to Plan a New Program has been reviewed and approved by the appropriate campus authorities.

<table>
<thead>
<tr>
<th>Position Title</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provost</td>
<td></td>
<td>9/11/19</td>
</tr>
<tr>
<td>Provost (Joint Partner Campus)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Econometrics and Quantitative Economics
North Carolina State University

This request has been reviewed and approved by the appropriate campus committees and authorities.

Endorsed By:
Xiaoyong Zheng 1/2/2019
Director of Economics Graduate Program (Printed Name and Signature) Date

John Beavin 1/2/2019
Head, Ag and Resource Economics (Printed Name and Signature) Date

Lee A. Craig
Head, Economics (Printed Name and Signature) Date

Recommended By:
Kimberly Allen 1/17/19
Chair, CALS Graduate Studies Committee (Printed Name and Signature) Date

Stephen H. Barr 1/29/19
Chair, PCOM Graduate Studies Committee (Printed Name and Signature) Date

Endorsed By:
John B. Davis 11/7/19
CALS Dean (Printed Name and Signature) Date

Steven G. Allen 1/28/19
PCOM Dean (Printed Name and Signature) Date

Recommended By:
N/A
Vice Provost, DELTA (if DE degree) (Printed Name and Signature) Date

Approved By:
Peter J. Herriges 3/12/19
Dean of the Graduate School (Printed Name and Signature) Date

Recommended By:
Earl S. Chowaniec 12/13/19
Dean's Council (Printed Name and Signature) Date

Approved By:
University 4/5/19
Executive Vice Chancellor and Provost (Printed Name and Signature) Date

Approved By:
N/A
Chancellor (Printed Name and Signature) Date

(revised August 2015)