Certificate in Quantitative Research Methods (Online)

Certificate Requirements (14 cr.)

- EDUC-Y 502 Intermediate Statistics Applied to Education (3 cr.)
 - EDUC-Y 500 Computer Laboratory and Consultation for Educational Inquiry to support Y502 (1 cr.)
- EDUC-Y 604 Multivariate Analysis in Educational Research (3 cr.)
 - EDUC-Y 500 Computer Laboratory and Consultation for Educational Inquiry to support Y604 (1 cr.)
- Two Elective Quantitative Courses (6 cr.)*

Elective Options Include:

- Y527 Educational Assessment and Psychological Measurement (3 cr.)
- Y525 Survey Research Methodology (3 cr.)
- Y535 Evaluation Models & Techniques (3 cr.)
- Y603 Statistical Design of Educational Research (3 cr.)*
- Y617 Psychometric Theory (3 cr.)*
- Y635 Methodology of Educational Evaluation (3 cr.)
- Y637 Categorical Data Analysis (3 cr.)
- Y639 Multilevel Modeling (3 cr.)
- Y645 Covariance Structure Analysis (3 cr.)
- Y655 Longitudinal Data Analysis (3 cr.)

^{*} Depending on elective choice additional Y500 support labs may be required



Title of Degree:	Online Certificate in Quantitative Research Methods			
Campus(es) Offering Degree: IU-Bloomington				
Academic Unit				
Proposing Degree	School of Education			
	Counseling and Educational Psychology, Inquiry Methodology Program			
Department				
Hosting Degree:	Counseling and Educational Psychology			

I. Academic Features

Goals/Objectives (Rationale for the Program):

With an increase in the availability of quantitative data, many disciplines have shown an increased interest in developing methods of data analysis and the use of quantitative research, with a rising number of graduate and post-graduate students desiring specialized quantitative research training. Students who earn a Certificate in Quantitative Research Methods will be able to (a) understand basic and advanced quantitative research methods; (b) understand and effectively use a variety of quantitative techniques and practices; (c) understand basic and advanced research design issues; (d) develop an effective proposal for quantitative research; (e) use a variety of quantitative data collection methods and techniques; (f) understand and effectively use a variety of quantitative data analysis methods and techniques; (g) develop an effective quantitative research report; (h) develop an effective presentation using quantitative research methods; and (h) understand and use appropriate criteria to evaluate the quality of quantitative research.

Principal Components (5a):

A student must complete four courses (14-15 credit hours) to fulfill the requirements of the Online Graduate Certificate in Qualitative Research. All of these courses will be offered online and taught by the faculty in Inquiry Methodology with expertise in quantitative research methods.

Relation to Existing Programs (4a&b):

This certificate program is directly related to the Inquiry Methodology Master's and PhD program within the School of Education at IUB. Thus, this certificate will potentially allow for students to be prepared to enter a graduate level master's or PhD program focused on quantitative research methods. Specifically, this certificate can serve as a pipeline for graduate students for the Inquiry Methodology Master's or PhD program.

Coherence with Campus Mission (2a):

Closely linked to Indiana University's mission to provide "broad access" to outstanding programs to students everywhere, this certificate will be fully online, increasing its potential to reach students living both within the state of Indiana and elsewhere. Significantly, this certificate also supports the School of Education's core value of being "a leader in anticipating and serving the educational and research needs of our communities, the state, the nation, and the world".

Benefits of the Program for Constituents (2c, iv):

Students

Online quantitative certificates are a primary marker of proficiency in quantitative research and are expected when applying for quantitative research methods positions. Thus, this certificate will allow students to be able to compete for research industry/firm jobs, as well as prepared students interested in graduate level education.

^{*} Please note – this this document cannot exceed two pages. All responses must fit in the allotted space using 10-point font.



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This certificate supports IU in offering "broad access" to outstanding programs to students everywhere, and also serves to build the reputation of IU as the leading institution to offer methodological training for social science researchers.

State

One of the goals of Reaching Higher, Achieving More is to double the number of college degrees and certificates produced by 2025. This certificate can contribute to this goal, offering individuals working or desiring to work in research industries with opportunities to advance their skills in quantitative research methodology.

Opportunities for Degree Recipients (5f) Inclusive of Any Credentials:

Target for the certificate will be those individuals working in applied research (e.g., research associates at research firms) and current graduate students. Online quantitative certificates are a marker of proficiency in the field of quantitative research. These and similar credentials are often expected when applying for quantitative research methods positions (particularly when you do not hold a methodology PhD) and/or substantively oriented positions with an expectation of methodological expertise. Additionally, IU-based PhD and EdD students may be interested in pursuing the certificate. Thus, graduates of this program will have skills necessary to work in a research firm, corporate data analytics, and other research-related government agencies. Collectively, the professional activities provided via the certificate offers potential for high paying, long-term employment opportunities.

II. Implementation:

Steady State Enrollment/Degree Completion Projections (year five) (enrollment spreadsheet):

Headcount:	15
FTE:	8
Degree Recipients:	12

Steady Resources (year five):

Faculty Resources (3i)

No new resources are necessary and there will be no new administrative costs involved. The courses that are used in this certificate are currently taught by Inquiry Methodology faculty members who hold the relevant expertise

Capital Equipment (3iii)

No new resources are necessary.		

Facilities (3ii)

This program will be delivered online and no new resources will be needed.

Program Description

Certificate in Quantitative Research Methods To Be Offered by Indiana University at Bloomington

1. Characteristics of the Program

- a. Campus(es) Offering Program: IU Bloomington
- b. Scope of Delivery (Specific Sites or Statewide): Bloomington Campus
- c. Mode of Delivery (Classroom, Blended, or Online): Online
- d. Other Delivery Aspects (Co-ops, Internships, Clinicals, Practica, etc.): None
- e. Academic Unit(s) Offering Program: Department of Counseling and Educational Psychology, Inquiry Methodology Program

2. Rationale for the Program

a. Institutional Rationale (Alignment with Institutional Mission and Strengths)

The *Graduate Certificate in Quantitative Research* aims to provide innovative, contemporary training in quantitative research methodologies, methods, and theories. A core goal of the certificate is to support individuals across disciplines in designing and carrying out rigorous and well-grounded quantitative research. Closely linked to Indiana University's mission to provide "broad access" to outstanding programs to students everywhere, this certificate will be *fully online*, increasing its potential to reach students living both within the state of Indiana and elsewhere. Significantly, this certificate also supports the School of Education's core value of being "a leader in anticipating and serving the educational and research needs of our communities, the state, the nation, and the world". Finally, this proposal is in response to the IU Bicentennial Strategic Plan for Education, which urges "Grow Your Own" initiatives.

See Appendix 1 for links to the institution's strategic plan and the School of Education's Strategic Plan.

b. State Rationale

• How does this program address state priorities as reflected in *Reaching Higher, Achieving More*?

The proposed certificate response directly to the state calls "for new models that are focused on the unique and diverse needs of individual learners and the mindset of a commitment to lifelong learning" by offering flexible, online modalities and cutting edge methods. Further, the School of Education at Indiana University is a top program nationally, lending evidence that such a program would contribute to Indiana's goal to Hoosiers to "have a quality credential." ²

- c. Evidence of Labor Market Need
 - i. National, State, or Regional Need

Broadly, there is a growing need for social science researchers to develop skills in quantitative research methodologies and methods. With an increase in the availability of quantitative data, many disciplines have shown an increased interest in developing methods of data analysis and the use of quantitative research, with a rising number of graduate and post-graduate students desiring specialized quantitative research training. Additionally, worldwide there is a large number of applied research organizations – many of which expect their associates to hold (and/or acquire) advanced quantitative research skills. The sub-field of psychometrics (a quantitative expert in testing) continues to experience a robust job market in spite of the trend in higher education toward making admission tests optional. This is largely because school-based testing and assessment for accountability and monitoring continues in every U.S. state.

ii. Preparation for Graduate Programs or Other Benefits

By offering four courses that overlap with our current PhD program, this certificate paves the way for students to enter the PhD program in Inquiry Methodology, making the time to degree 15 hours shorter for certificate holders.

- iii. Summary of Indiana DWD and/or U.S. Department of Labor Data
 - Summarize the evidence of labor market demand for graduates of the program as gleaned from employment projections made by the Indiana Department of Workforce Development and/or the U.S. Department of Labor?

Projected growth in quantitative methods is expected to exceed 30% in the next ten years, while computer and mathematical occupations is expected to grow 12% during the same time frame.

See Appendix 2 for US Bureau of Labor Statistics evidence.

4. Similar and Related Programs

¹ https://www.in.gov/che/files/2019-20_Strategic_Plan_03-14-2020-spreads.pdf

² https://www.usnews.com/best-graduate-schools/top-education-schools/indiana-university-bloomington-06067

a. List of Programs and Degrees Conferred

i. Similar Programs at Other Institutions

Institution	Title of Certificate	Credits	Modality	Emphasis
U of Alabama	Quantitative Research Certificate	15	R	Quantitative
U of Arizona	Educational Research Methodology Certificate	14	R	Quantitative
U of Arkansas	Graduate Certificate in Educational Measurement	18	R	Quantitative
U of Arkansas	Graduate Certificate in Educational Statistics and Research Methods	18	R	Quantitative
UCLA	Certificate in Advanced Quantitative Methodology in Educational Research	18+	R	Quantitative
U of Colorado Boulder	Graduate Certificate in Quantitative Methods	18	R	Quantitative
U of Connecticut	Graduate Certificate in Program Evaluation	12	0	Evaluation
Florida State U	Measurement and Statistics - Graduate Certificate	19	R	Quantitative
U of South Florida	Graduate Certificate in Evaluation	13+	R	Evaluation
Georgia State U	Quantitative Research in Education, Graduate Certificate	21+	R	Quantitative
U of Hawaii	Measurement and Statistics certificate	15	R	Quantitative
Southern Illinois U, Carbondale	Graduate Certificate in Quantitative Methods	24	R	Quantitative
U of Illinois, Chicago	Educational Research Methodology (ERM)	9+	0	Quantitative

U of Illinois, Urbana Champaign	Graduate Certificate in Evaluation	16+	R	Evaluation
Purdue U	Quantitative Research, Assessment and Evaluation in Education	12+	Н	Quantitative
U of Kentucky	Research Methods in Education	15	R	Quantitative
U of Maryland	Certificate (didn't really give a name)	21	R	Quantitative
Western Michigan U	Graduate Certificate in Evaluation	15	R	Evaluation
Western Michigan U	Graduate Certificate in Mixed-Methods Research	15	R	Mixed- methods
U of Missouri-Columbia	Quantitative Research Certificate	18	R	Quantitative
U of Nebraska-Lincoln	Mixed Methods Research Graduate Certificate	15	R	Mixed- methods
U of Nevada, Las Vegas	Graduate Certificate in Program Evaluation and Assessment	15	0	Evaluation
U at Buffalo (SUNY- Buffalo)	Applied Statistical Analysis	18	0	Quantitative
U at Buffalo (SUNY- Buffalo)	International Education Data Analysis	13	R	Quantitative
U of North Carolina at Charlotte	Graduate Certificate in Quantitative Analyses	12	R	Quantitative
U of Toledo	Educational Assessment Specialist	12	R	Assessment
Oklahoma State U	Program Evaluation	12	R	Evaluation
Oklahoma State U	Educational and Psychological Measurement	12	R	Measurement

Oklahoma State U	Statistical Methods and Analyses in Education and Behavioral Sciences	12	R	Quantitative
Texas A&M U	Advanced Research Methods	12	R	Quantitative
Virginia Tech	Graduate Certificate in Educational Research and Evaluation	9+	R	

Appendix 1 - Links to Strategic Plans

1. IU Bicentennial Strategic Plan for Education: https://strategicplan.iu.edu/plan/education/index.html

2. IU School of Education Strategic Plan: https://education.indiana.edu/faculty/governance/policycouncil/committees/docs/long-range-planning/13.47-StrategicPlanProposal.pdf

Appendix 2 - Links to Labor Market Projected Growth

- 1. https://www.bls.gov/emp/tables/fastest-growing-occupations.htm
- 2. https://www.bls.gov/news.release/pdf/ecopro.pdf

Graduate Certificate in Quantitative Research Methods

Rationale

Broadly, there is a growing need for social science researchers to develop skills in quantitative research methodologies and methods. With an increase in the availability of quantitative data, many disciplines have shown an increased interest in developing methods of data analysis and the use of quantitative research, with a rising number of graduate and post-graduate students desiring specialized quantitative research training. Additionally, worldwide there is a large number of applied research organizations – many of which expect their associates to hold (and/or acquire) advanced quantitative research skills. Further, projected growth in quantitative methods is expected to exceed 30% in the next ten years, while computer and mathematical occupations is expected to grow 12% during the same time frame.¹ The sub-field of psychometrics (a quantitative expert in testing) continues to experience a robust job market in spite of the trend in higher education toward making admission tests optional. This is largely because school-based testing and assessment for accountability and monitoring continues in every U.S. state.

Thus, the *Graduate Certificate in Quantitative Research* aims to provide innovative, contemporary training in quantitative research methodologies, methods, and theories. A core goal of the certificate is to support individuals across disciplines in designing and carrying out rigorous and well-grounded quantitative research. Closely linked to Indiana University's mission to provide "broad access" to outstanding programs to students everywhere, this certificate will be *fully online*, increasing its potential to reach students living both within the state of Indiana and elsewhere. Significantly, this certificate also supports the School of Education's core value of being "a leader in anticipating and serving the educational and research needs of our communities, the state, the nation, and the world"².

The Curriculum and Credit Hours

A student must complete four courses (14-15 hours) to fulfill the requirements of the Online Graduate Certificate in Qualitative Research. All of these courses will be offered online on a rotating basis, taught by the faculty in Inquiry Methodology with expertise in quantitative research methodologies and methods. The two required courses, EDUC-Y502 and EDUC-Y604, feature a 1 credit computer lab (EDUC-Y500), making the required credits total 8. Students can select from a menu of quantitative courses, once of which (EDUC-Y617) also features a 1 credit computer lab (EDUC-Y500). This makes the total credit vary between 14 and 15, depending on the student's choice of courses.

¹ https://www.bls.gov/emp/tables/fastest-growing-occupations.htm; https://www.bls.gov/news.release/pdf/ecopro.pdf

² SoE's Long Range Plan. (2013). Retrievable at: https://education.indiana.edu/faculty/governance/policycouncil/committees/ docs/long-range-planning/13.47-StrategicPlanProposal.pdf

Course Title	Credit hours
EDUC-Y 502 Intermediate Statistics Applied to Education	3
EDUC-Y 604 Multivariate Analysis in Educational Research	3
EDUC-Y 500 Computer Laboratory and Consultation for	
Educational Inquiry to support Y502	1
EDUC-Y 500 Computer Laboratory and Consultation for	
Educational Inquiry to support Y604	1
Elective Y course (quantitative)	3
Elective Y course (quantitative)	3
Total	14

Menu of possible electives for the certificate:

- Y527 Educational Assessment and Psychological Measurement (3 cr.)
- Y525 Survey Research Methodology (3 cr.)
- Y535 Evaluation Models & Techniques (3 cr.)
- Y603 Statistical Design of Educational Research (3 cr.)*
- Y617 Psychometric Theory (3 cr.)*
- Y635 Methodology of Educational Evaluation (3 cr.)
- Y637 Categorical Data Analysis (3 cr.)
- Y639 Multilevel Modeling (3 cr.)
- Y645 Covariance Structure Analysis (3 cr.)
- Y655 Longitudinal Data Analysis (3 cr.)

Admission Criteria

Admission to the certificate program requires a student to submit the following:

- **Personal Statement.** A 750-word personal statement that addresses the student's prior experience in quantitative research and their rationale for pursuing the certificate.
- Official Undergraduate Transcript. Undergraduate degree from an accredited institution with a minimum GPA of 3.0.
- Official Graduate Transcript (where applicable). An official transcript from each institution attended where at least nine credits were earned.
- International Applicants. International applicants must provide an official report of current TOEFL scores (less than 2 years old). Students must have a TOEFL score of 550 or higher for the written version, 213 or higher for the computer-based version, or 79 or higher for the internet-based version.

Learning Objectives

This certificate program will prepare the student to design and conduct quantitative research studies. This allows all students to gain a deep understanding of statistical modeling, while gaining the skills to conduct applied studies related to the student's particular research interests.

Upon completion of this certificate, students should be able to:

- Understand basic and advanced methodological concepts that are associated with quantitative research methods.
- Understand and effectively use a variety of methodological techniques and practices that are associated with quantitative research.
- Understand basic and advanced research design issues and effectively design a research study using quantitative methods.
- Develop an effective research proposal for quantitative research.
- Understand and effectively use a variety of data collection methods and techniques that are associated with quantitative research.
- Understand and effectively use a variety of quantitative data analysis methods and techniques.
- Develop an effective quantitative research report.
- Develop an effective oral and/or visual presentation using quantitative research methods.
- Understand and use appropriate criteria to evaluate effectively the quality of quantitative research.

Online Program Delivery

The certificate will use all existing courses in the current PhD program. Several of these courses are currently offered online (e.g., EDUC-Y502; EDUC-Y535). The remainder will be offered on a regular rotating schedule that will allow students to finish in 3-4 semesters, assuming 1 course per semester (see above section on Curriculum and Credit Hours). The assessments used will be the same as those already offered in the existing online or face-to-face courses. For example, in all of these courses students are required to complete mini-research studies and/or engage in methodological writing. We intend to use these assignments as a basis for assessment in the certificate program, particularly given they already serve in supporting students in applying the concepts to a 'real world' research study. In addition, we plan to routinely update the program to align with developments in the field of quantitative research as well as feedback from students on the methods that are most valuable to their practice.

Demand for Program and Targeted Students

According to the National Council on Measurement in Education (NCME), there are approximately 83 graduate programs that provide training in quantitative methods, evaluation, and/or educational measurement. Out of 83, only 18 institutions provide some type of quantitative certificate. In addition, we found five additional universities that provide similar certificates, for a total of 23 institutions. We noted that three universities (Western Michigan University, SUNY, and Oklahoma State) offer multiple certificates centered on the topics of research methodology, measurement, and evaluation.

In the table below, a list of all universities and certificates that our search produced are listed, alongside the number of credit hours the certificate holders are expected to complete, as well as our understanding of whether the certificates are offered online, residential, or some combination.

Institution	Title of Certificate	Credits	Modality	Emphasis
U of Alabama	Quantitative Research Certificate	15	R	Quantitative
U of Arizona	Educational Research Methodology Certificate	14	R	Quantitative
U of Arkansas	Graduate Certificate in Educational Measurement	18	R	Quantitative
U of Arkansas	Graduate Certificate in Educational Statistics and Research Methods	18	R	Quantitative
UCLA	Certificate in Advanced Quantitative Methodology in Educational Research	18+	R	Quantitative
U of Colorado Boulder	Graduate Certificate in Quantitative Methods	18	R	Quantitative
U of Connecticut	Graduate Certificate in Program Evaluation	12	0	Evaluation
Florida State U	Measurement and Statistics - Graduate Certificate	19	R	Quantitative
U of South Florida	Graduate Certificate in Evaluation	13+	R	Evaluation
Georgia State U	Quantitative Research in Education, Graduate Certificate	21+	R	Quantitative
U of Hawaii	Measurement and Statistics certificate	15	R	Quantitative
Southern Illinois U, Carbondale	Graduate Certificate in Quantitative Methods	24	R	Quantitative
U of Illinois, Chicago	Educational Research Methodology (ERM)	9+	0	Quantitative
U of Illinois, Urbana Champaign	Graduate Certificate in Evaluation	16+	R	Evaluation
Purdue U	Quantitative Research, Assessment and Evaluation in Education	12+	Н	Quantitative

U of Kentucky	Research Methods in Education	15	R	Quantitative
U of Maryland	Certificate (didn't really give a name)	21	R	Quantitative
Western Michigan U	The Graduate Certificate in Evaluation	15	R	Evaluation
Western Michigan U	The Graduate Certificate in Mixed-Methods Research	15	R	Mixed- methods
U of Missouri-Columbia	Quantitative Research Certificate	18	R	Quantitative
U of Nebraska-Lincoln	Mixed Methods Research Graduate Certificate	15	R	Mixed- methods
U of Nevada, Las Vegas	Graduate Certificate in Program Evaluation and Assessment	15	0	Evaluation
U at Buffalo (SUNY- Buffalo)	Applied Statistical Analysis	18	0	Quantitative
U at Buffalo (SUNY- Buffalo)	International Education Data Analysis	13	R	Quantitative
U of North Carolina at Charlotte	Graduate Certificate in Quantitative Analyses	12	R	Quantitative
U of Toledo	Educational Assessment Specialist	12	R	Assessment
Oklahoma State U	Program Evaluation	12	R	Evaluation
Oklahoma State U	Educational and Psychological Measurement	12	R	Measurement
Oklahoma State U	Statistical Methods and Analyses in Education and Behavioral Sciences	12	R	Quantitative
Texas A&M U	Advanced Research Methods	12	R	Quantitative

Virginia Tech

Graduate Certificate in Educational Research and Evaluation

9+ R

Note. R = Residential; O = online; H = hybrid

The majority of the programs noted above target graduate students within their own institution that are broadly interested in gaining additional quantitative research methods, evaluation, or measurement and assessment skills. One notable difference was that of University of Missouri-Columbia, which is a stand-alone certificate. More so, institutions which require a fewer number of credit hours typically have prerequisites (often of the introductory courses), so that students coming in have basic foundation in research methods, or they have only set a minimum requirement but encourage students to take additional advanced courses (indicated with + in the table). There are only *four* online certificates, two of which focus on evaluation (University of Connecticut and University of Nevada, Las Vegas), while two others are more research/statistically oriented (SUNY-Buffalo and University of Illinois at Chicago).

We will recruit students nationally and internationally, with a particular focus on applied researchers and current IU graduate students. We see great potential with our IU students from the School of Public Health and the College of Arts and Sciences, many of who already take our courses and who minor in Inquiry Methodology. This certificate would be very appealing to them. Additionally, we view applied researchers who work within education and social sciences as an additional audience for the certificate. Lastly, beyond research organizations/applied researchers, graduate students at (the many) universities that do *not* offer quantitative research certificates may be interested in pursuing an online certificate.

Resources

No new resources are necessary and there will be no new administrative costs involved. The majority of the courses that are used in this certificate are currently taught by Inquiry Methodology faculty members who hold the relevant expertise. Specifically, the Department of Counseling & Educational Psychology has four Inquiry Methodology faculty members who specialize in quantitative methodologies and methods: Dr. Julie Lorah (Assistant Professor), Dr. David Rutkowski (Associate Professor, Inquiry Methodology affiliated faculty), Dr. Leslie Rutkowski (Associate Professor), Dr. Dubravka Svetina (Associate Professor). All four faculty members hold Doctorate degrees with specializations in some aspects of quantitative inquiry and extensive experience and significant publication records in the field of quantitative research. Importantly, several of these faculty members also work closely with applied research organizations, including the Word Bank, the OECD, and the International Association for the Evaluation of Educational Achievement, offering methods workshops and consultation. This "on the ground" work will allow for important insights to inform the certificate curriculum, as well as serve as a potential mechanism for recruiting potential certificate students.

Graduate Studies Committee Template

1	
Prior to presenting at the Graduate Studies Committee (GSC) for review, please provide answers to the following questions, as relevant. Please contact Matthew Boots (<u>mboots1@iu.edu</u>) with any questions.	!
Title: Online Certificate in Quantitative Research Methods	
GSC presenter: Leslie Rutkowski	
This proposal is for a	
\square program change \boxtimes new program \square policy change \square new policy	
Include responses to each question, as relevant:	
1. What are you proposing and why? (If proposing a change, then the description and	
rationale should be relevant to the change(s) only.) To establish a new online certificate i	n
quantitative research methods.	
2. How will this impact enrollment? It should increase.	
3. How will this impact students' time to degree? It should have no impact.	
4. How will this impact specific student populations and/or DEI issues? It should have not impact.	
5. How will this impact School of Education resources, including faculty loads? It should have a minimal impact on faculty loads as these courses are currently being taught and we do not expect the need to include new sections.	
6. How will this be effectively sustained over time? As long as the department maintains the current faculty the program should easily be sustained.	
7. What was the departmental vote tally for this proposal? (e.g., "12 in favor, 2 opposed, 3	

abstained") 26 Yes, I abstain (Executive Associate Dean), o No