UNIVERSITY OF MARYLAND
OFFICE OF THE PRESIDENT

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July 1, 2020

James D. Fielder, Jr.
Secretary of Higher Education
Maryland Higher Education Commission
6 N. Liberty Street
Baltimore, MD 21201

Dear Secretary Fielder:

I am writing to request approval for a proposal to change the current degree award for our master's program in Measurement, Statistics, and Evaluation from Master of Arts to Master of Science. The proposal for the new program is attached. I am also submitting this proposal to the University System of Maryland for approval.

The proposal was endorsed by the appropriate faculty and administrative committees. I also endorse this proposal and am pleased to submit it for your approval.

Sincerely,

Darryll J. Pines
Glenn L. Martin Professor of Aerospace Engineering
President

DJP/mdc

cc: Antoinette Coleman, Associate Vice Chancellor for Academic Affairs
Mary Ann Rankin, Senior Vice President and Provost
Jennifer King Rice, Dean, College of Education

Office Use Only: PP#

Cover Sheet for In-State Institutions
New Program or Substantial Modification to Existing Program

Institution Submitting Proposal	University of Maryland, College Park

Each action below requires a separate proposal and cover sheet.

- (●) New Academic Program
- ( ) New Area of Concentration
- ( ) New Degree Level Approval
- ( ) New Stand-Alone Certificate
- ( ) Off Campus Program
- ( ) Substantial Change to a Degree Program
- ( ) Substantial Change to an Area of Concentration
- ( ) Substantial Change to a Certificate Program
- ( ) Cooperative Degree Program
- ( ) Offer Program at Regional Higher Education Center

Payment Submitted: ( ) Yes (●) No

Payment Type: (●) R*STARS ( ) Check

Payment Amount: 850

Date Submitted:

Department Proposing Program	Human Development and Quantitative Methodology	
Degree Level and Degree Type	Master's; Master of Science (converting from Master of Arts)	
Title of Proposed Program	Measurement, Statistics, and Evaluation	
Total Number of Credits	30	
Suggested Codes	HEGIS: 82400.00	CIP: 13.0603
Program Modality	(●) On-campus	( ) Distance Education (*fully online*)
Program Resources	(●) Using Existing Resources	( ) Requiring New Resources
Projected Implementation Date	(●) Fall ( ) Spring ( ) Summer	Year: 2020
Provide Link to Most Recent Academic Catalog	URL: academiccatalog.umd.edu/	
Preferred Contact for this Proposal	Name: Michael Colson	
	Title: Senior Coordinator for Academic Programs	
	Phone: (301) 405-5626	
	Email: mcolson@umd.edu	
President/Chief Executive	Type Name: Darryll J. Pines	
	Signature:	Date: 07/01/2020
	Date of Approval/Endorsement by Governing Board:	

Revised 4/2020

A. Centrality to the University's Mission and Planning Priorities

Proposal Rationale. The University of Maryland, College Park (UMD) currently offers a Master of Arts (M.A.) in Measurement, Statistics and Evaluation. The purpose of this proposal is to convert this existing program to a Master of Science (M.S.) program. **There are no other changes, curricular or otherwise, being made to the program.** Changing the program degree award to an M.S. would immediately increase the marketability of the program to prospective students looking to acquire advanced training in quantitative methods. The M.S. designation is aligned with competitor institutions that offer an M.S. degree with similar degree requirements as our program (i.e., 30 credit hours of course work, a comprehensive examination covering core course topics, and a methodological paper that represents a capstone experience). Lastly, the M.S. degree designation is more clearly aligned with STEM fields, and as such is more attractive to potential employers—especially research agencies and companies who hire graduates of master's programs from areas such as statistics, mathematics, biostatistics, and other such academic programs that offer M.S. degrees. The current M.A. program has been offered by UMD for decades, and with an M.S. degree award, it would remain consistent with UMD's mission to achieve "excellence in teaching, research, and public service within a supportive, respectful and inclusive environment."[1]

Program Description. The program in Measurement, Statistics and Evaluation provides balanced intermediate level graduate training in quantitative methods for students preparing for a variety of positions in government, educational institutions, and private industry. Proximity to Washington, D.C. provides opportunities for students to engage in a variety of academic and professional experiences. The program requires a minimum of 30 credit hours in courses acceptable for credit toward a graduate degree. None of these aspects will change with the M.S. degree award.

Relation to Strategic Goals. Among UMD's strategic goals for graduate education is to provide advanced education for the professional workforce and to prepare graduate students to be leaders in their fields. As stated in UMD's Strategic Plan, "The University will maintain excellent professional graduate programs that are nationally recognized for their contributions to the practice of the professions, for their forward-looking curricula, and for their spirit of innovation and creativity . . . Our Master's and professional doctoral graduates will provide leadership in their fields and will be known for their command of the theories and practices of their chosen disciplines."[2] The program provides balanced intermediate level graduate training in quantitative

[1] University of Maryland, College Park. (August 1, 2018). *Mission statement*. Retrieved June 9, 2020, from https://svp.umd.edu/sites/default/files/2019-09/Mission-Vision.pdf.
[2] University of Maryland, College Park. (May 21, 2008). *Transforming Maryland: Higher expectations. The strategic plan for the University of Maryland.* Retrieved January 9, 2020, from http://www.provost.umd.edu/SP07/StrategicPlanFinal.pdf.

methods for students preparing for a variety of positions in government, educational institutions, and private industry. It will continue to do so as an M.S. program.

Funding. The program already exists; consequently, no additional funding is needed.

Institutional Commitment. The program has been offered by the Department of Human Development and Quantitative Methodology within the College of Education for many years, and will continue to have the support of UMD.

B. Critical and Compelling Regional or Statewide Need as Identified in the State Plan

Need. The program already serves a regional and statewide need for professionals in educational measurement, statistics and evaluation. Whether in school systems, governmental agencies, or private organizations, there is a need for experts who can apply quantitative strategies in educational research. For decades, this program has served to meet this need and will continue to do so as an M.S. program.

State Plan. As noted in strategy 8 of the *Maryland State Plan for Postsecondary Education,* "More than ever, employers seek employees who have the flexibility to understand changing conditions and solve emerging problems."[3] This program reflects the *Maryland State Plan's* call for understanding changing conditions by teaching students to understand the quantitative dimension of educational assessment and evaluation. Most of the educational and social science research that takes place today relies on the expertise of those who can develop data collection instruments such as assessments, questionnaires, and interview protocols, plan research and evaluation studies, design sampling frameworks, collect and analyze data, and develop new statistical models and methods. The M.S. program will continue to provide this training.

C. Quantifiable and Reliable Evidence and Documentation of Market Supply and Demand in the Region and State

The program's enrollment numbers provide evidence of demand. The program has consistently enrolled 35-40 students per year for several years.

D. Reasonableness of Program Duplication

As the program has existed for many years as an M.A. program, changing the degree award to an M.S. should not result in unreasonable program duplication. According to MHEC's website, no other university within the state offers a Master's program with the

[3] Maryland Higher Education Commission. (2017). Maryland Sate Plan for Postsecondary Education: Increasing Student Success with Less Debt, 2017-2021. (p. 66). Retrieved June 4, 2020 from: http://www.mhec.state.md.us/About/Documents/2017.2021%20Maryland%20State%20Plan%20for%20Higher%20Education.pdf

CIP Code 130603 (Educational Statistics and Research Methods). UMD's M.S. program will continue to fill this need.

E. Relevance to High-demand Programs at Historically Black Institutions (HBIs)

As indicated above, the program has existed for many years as an M.A. program. The change in degree award should not adversely affect any current program at a state of Maryland HBI.

F. Relevance to the identity of Historically Black Institutions (HBIs)

As indicated above, the program has been offered for many years as an M.A. program by the Department of Human Development and Quantitative Methodology. The program itself is not changing other than the degree award earned. The M.S. award better fits the quantitative nature of the program, which is not changing. Accordingly, the program should not adversely affect the identity of any Maryland HBI.

G. Adequacy of Curriculum Design, Program Modality, and Related Learning Outcomes

Curricular Development. The curriculum, which is not changing, reflects model-based reasoning, exposure to advanced statistical modeling techniques, and computational methods.

Faculty Oversight. The program will continue to be overseen and taught by faculty in the Department of Human Development and Quantitative Methodology.

Educational Objectives, Learning Outcomes, and Assessment.

See Appendix A

Course requirements. The program requires 30 credits, organized as follows:

EDMS623 Applied Measurement: Issues and Practices (3 Credits)
EDMS646 General Linear Models I (3 Credits)
EDMS647 Causal Inference and Evaluation Methods (3 Credits)
EDMS651 General Linear Models II (3 Credits)
EDMS655 Introduction to Multilevel Modeling (3 Credits)
EDMS657 Exploratory Latent and Composite Variable Methods (3 Credits)
EDMS724 Modern Measurement Theory (3 Credits)
Thesis or Non-Thesis option:

Thesis: EDMS799 Master's Thesis Research (6 Credits) & One Elective (3 Credits)
or
Non-Thesis:
Electives (9 Credits)

Total Credits: 30

See course descriptions in Appendix B.

General Education. N/A

Accreditation or Certification Requirements. There are no specialized accreditation or certification requirements for this program.

Other Institutions or Organizations. The program does not contract with another institution or non-collegiate organization.

Student Support. The Department of Human Development and Quantitative Methodology will continue to provide support for admissions, scheduling, registration, billing and payment, graduation, and appeals.

Marketing and Admissions Information. The program, with the new M.S. degree award, will continue to be clearly and accurately described in the university website and be marketed at university recruiting events.

H. Adequacy of Articulation

N/A

I. Adequacy of Faculty Resources

Program faculty. As has been the case, faculty expertise will continue to be drawn from the Department of Human Development and Quantitative Methodology. Faculty biographies for those who currently teach in the program are in Appendix C.

Faculty training. The university offers numerous opportunities for faculty training and support in the classroom, through the Teaching and Learning Transformation Center (TLTC), workshops by the Office of Faculty Affairs, and by the Division of Information Technology's Learning Technology Design group. Both the TLTC and the Learning Technology Design group also provide workshops and support in pedagogy and technology for the delivery of online components for any courses.

J. Adequacy of Library Resources

The University Libraries are able to meet, with its current resources, the curricular and research needs of the program.

K. Adequacy of Physical Facilities, Infrastructure, and Instructional Resources

The Department of Human Development and Quantitative Methodology's existing facilities, infrastructure, and equipment will continue to be adequate to support this program. All students have access to the UMD email system.

L. Adequacy of Financial Resources

As the only change is the degree award given to students, no additional funding is needed for this proposal.

M. Adequacy of Program Evaluation

Formal program review is carried out according to the University of Maryland's policy for Periodic Review of Academic Units, which includes a review of the academic programs offered by, and the research and administration of, the academic unit (http://www.president.umd.edu/policies/2014-i-600a.html). Faculty within the department are reviewed according to the University's Policy on Periodic Evaluation of Faculty Performance (http://www.president.umd.edu/policies/2014-ii-120a.html). Since 2005, the University has used an online course evaluation instrument that standardizes course evaluations across campus. The course evaluation has standard, university-wide questions and also allows for supplemental, specialized questions from the academic unit offering the course.

N. Consistency with Minority Student Achievement Goals

Our program, like the majority of competitor programs around the country, is faced with the challenge of recruiting students from underrepresented backgrounds, especially African-American and Latinx students. Saying that, each year the program faculty actively recruits undergraduate students across many academic programs at UMD including psychology, mathematics, and computer science for the master's degree and combined bachelor's/master's degree program. We also have periodically promoted our programs through colleagues at both Howard University and Morgan State University, as well as through the McNair scholars program. Our program is also currently funded by NSF to enhance the quantitative methods capabilities of scholars studying racial and ethnic disparities in STEM-related fields; although these diverse scholars are not in our Master's program, they are in a position to be strong advocates for our Master's program to students in underrepresented groups who are interested in our field.

Once enrolled, we ensure minority student success by assigning them a graduate student mentor who, with their EDMS faculty advisor, closely oversee the student's academic progress. An additional benefit of this type of mentorship program is that students are integrated into the social and professional fabric of graduate student life within the EDMS program, where there is a very strong and supportive internal community. For those graduate students in our program who do find themselves

struggling, we provide a variety of safeguards to help them successfully navigate the degree requirements. These include, among other strategies, establishing study groups within their courses, formal student mentorship outside of class, regular structured meetings with their advisor, and yearly review from program faculty.

O. Relationship to Low Productivity Programs Identified by the Commission

N/A

P. Adequacy of Distance Education Programs

N/A

Table 1: Expenditures

Expenditure Categories	Year 1	Year 2	Year 3	Year 4	Year 5
1. Faculty (b+c below)	$290,925	$299,653	$308,642	$317,902	$327,439
a. #FTE	2.5	2.5	2.5	2.5	2.5
b. Total Salary	$225,000	$231,750	$238,703	$245,864	$253,239
c. Total Benefits	$65,925	$67,903	$69,940	$72,038	$74,199
2. Admin. Staff (b+c below)	$13,540	$13,946	$14,365	$14,796	$15,239
a. #FTE	0.2	0.2	0.2	0.2	0.2
b. Total Salary	$10,000	$10,300	$10,609	$10,927	$11,255
c. Total Benefits	$3,540	$3,646	$3,756	$3,868	$3,984
3. Total Support Staff (b+c below)	$13,540	$13,946	$14,365	$14,796	$15,239
a. #FTE	0.2	0.2	0.2	0.2	0.2
b. Total Salary	$10,000	$10,300	$10,609	$10,927	$11,255
c. Total Benefits	$3,540	$3,646	$3,756	$3,868	$3,984
4. Graduate Assistants (b+c)	$0	$0	$0	$0	$0
a. #FTE	0.0	0.0	0.0	0.0	0.0
b. Stipend	$0	$0	$0	$0	$0
c. Tuition Remission	$0	$0	$0	$0	$0
d. Benefits	$0	$0	$0	$0	$0
5. Equipment	$0	$0	$0	$0	$0
5. Library	$5,000	$5,000	$5,000	$5,000	$5,000
6. New or Renovated Space	$0	$0	$0	$0	$0
7. Other Expenses: Operational Expenses	$5,000	$5,000	$5,000	$5,000	$5,000
TOTAL (Add 1 - 8)	**$328,005**	**$337,545**	**$347,372**	**$357,493**	**$367,917**

Table 2: Resources

Resources Categories	Year 1	Year 2	Year 3	Year 4	Year 5
1.Reallocated Funds	$0	$0	$0	$0	$0
2. Tuition/Fee Revenue (c+g below)	$383,775	$395,288	$407,147	$419,361	$431,942
a. #FT Students	30	30	30	30	30
b. Annual Tuition/Fee Rate	$10,965	$11,294	$11,633	$11,982	$12,341
c. Annual FT Revenue (a x b)	$328,950	$338,819	$348,983	$359,453	$370,236
d. # PT Students	5	5	5	5	5
e. Credit Hour Rate	$731	$753	$776	$799	$823
f. Annual Credit Hours	15	15	15	15	15
g. Total Part Time Revenue (d x e x f)	$54,825	$56,470	$58,164	$59,909	$61,706
3. Grants, Contracts, & Other External Sources	$0	$0	$0	$0	$0
4. Other Sources	$0	$0	$0	$0	$0
TOTAL (Add 1 - 4)	**$383,775**	**$395,288**	**$407,147**	**$419,361**	**$431,942**

Appendix A

Educational Objectives, Learning Outcomes, and Assessment Plan
Measurement, Statistics and Evaluation Program
Department of Human Development and Quantitative Methodology

Overview

In line with the policy established by the Graduate Committee of the College of Education at the University of Maryland, the *Measurement, Statistics and Evaluation* (EDMS) program in the Department of *Human Development and Quantitative Methodology* (HDQM) assesses the following three areas of competence:

> **C1) Professional and content knowledge:** *the ability to know, comprehend, and apply key terms, facts, and ideas in educational and psychological measurement and statistics. This includes, for example, the ability to translate social science research questions into model equations with assumptions, estimate these models in software programs, interpret resulting output, and explain convergent and divergent patterns of evidence. Similarly, it includes the ability to articulate connections between different modeling frameworks and historical developments in related areas of statistics generally and latent-variable modeling specifically, which relies on their analysis, synthesis, and evaluation abilities.*
>
> **C2) Research competence:** *the ability to perform a literature review and synthesis, formulate research questions, design simulation or real data studies that provide evidence for these research questions, implement these studies using modern software programs in our field, interpret the resulting evidentiary patterns, evaluate the importance of this work for the field at large, and identify and discuss limitations and directions for future research in the area.*
>
> **C3) Professional competence:** *the ability to effectively communicate the rationales, choices, and interpretations relevant to students' own research projects as well as the research projects of others, both orally and in writing. It also includes the ability to prepare effective presentation materials such as posters and PowerPoint slides that meet professional standards for visual and verbal clarity and coherence. It also includes the ability to teach others the key terms, facts, and ideas in educational and psychological measurement and statistics within a formal instructional environment such as classes or workshops.*

EDMS Master's degree students are assessed for competency, especially in areas C1 and C3, in four different ways during their program:

a) Course performance (formative and summative)
b) Self-rated course-based proficiency in three competency areas (formative)
c) Master's comprehensive examination (summative)
d) Master's research paper (summative)

Formative Processes

At the end of April each year, each student completes the **Annual Student Report** form (see Appendix A). This form includes grades for each course taken and a self-reported proficiency (low, moderate, high) demonstrated in each class on the three competency

areas that are relevant for our program. It should be noted that a student's self-reported proficiency levels reflect a combination of both the student's abilities and the curriculum (some courses are not intended to target research skills, for example).

Using the **Annual Student Report** as a guide, the advisor discusses with the student the progress that has been made and includes an overall assessment of the student on the three core areas of competence: (1) professional and content knowledge, (2) research competence, and (3) professional competence, based on the joint discussion with the student. The advisor then forwards the final form to the *Director or Graduate Studies* who, in turn, makes it available to all program faculty for review.

Each May, the program faculty convene to discuss each student's progress. These **Annual Student Reports** guide the discussion. The committee ensures that the student is making timely progress toward degree completion and discusses competency levels.

Feedback from the full committee is then provided to the student on his or her **Annual Student Report**. This feedback may include a description of timelines and milestones that the student needs to follow in order to remain in good standing within the program. If a student is not making satisfactory progress to degree, the advisor designs a remediation plan with the student that (1) clarifies the student's areas of concern, (2) details the specific progress expected in the upcoming year, and (3) notes the expected completion dates for specific milestones. If a student continues to make unsatisfactory progress in subsequent years, the faculty committee may recommend dismissal from the program.

Summative Processes

Course grades are used as summative evaluation. Students are required to earn at least a "B" (3.0) in all courses that are to be applied toward the degree.

The **Master's comprehensive examination** provides an evaluation of the student's declarative and procedural knowledge based on the core courses of the program and consists of student short answers, brief essays, and statistical analysis. Each student response is graded by a three-person examination committee on a scale from 0 to 4. Students must earn at least a 2 in order to be considered to have passed that component of the examination.

The **Master's research paper** is completed during a student's last semester in the program and involves either an applied analysis or a methodological / computer simulation study. The quality of this paper is expected to be such that the manuscript could / can be submitted to a peer-reviewed journal in educational measurement or statistics (although the paper does not have to be submitted/accepted to a journal for it to qualify as a valid Master's paper). The rubric for assessing these papers, to be completed by the advisor, is shown in Appendix B.

Use of Assessment Information to Make Program Improvements

Improvements to the program are made based on a summary and analysis of the information from the Annual Student Reports, course grade distributions, Master's comprehensive examination results, and Master's research paper rubric scores. The data from the prior year's student performance are aggregated and then discussed at the first faculty meeting of the semester. In the past, those discussions have led to a refinement of the information provided to the students in preparation for the Master's comprehensive exams, proposed program course changes, and discussions about additional initiatives that provide professional experiences (e.g., a potential consulting laboratory and a data consulting course).

An example yearly quantitative summary is shown below:

	N	Mean	SD		
Core Course Performance					
EDMS646	3	3.9	0.1		
EDMS647	5	3.7	0.3		
EDMS651	7	3.7	0.2		
EDMS623	7	3.3	0.5		
	N	Low (%)	Mid (%)	High (%)	
Self-rated Competence Proficiency					
C1: Knowledge	7	14	43	43	
C2: Research	7	43	43	14	
C3: Professional	7	43	14	43	
	N	Mean	SD		
Master's Comprehensive Examination					
Research Design and Assessment	3	2.4	0.5		
Measurement	3	2.8	0.6		
Statistics	4	2.2	0.4		
	N	No (%)	Minimal (%)	Some (%)	Comp (%)
Master's Paper (Evidence Level Scores)					
Literature Review	4	0	0	25	75
Research Questions	4	0	0	0	100
Suitability of Design & Analysis	4	0	0	25	75
Implementation	4	0	0	50	50
Summary Analyses	4	0	0	25	75
Substantive Interpretations	4	0	0	0	100

Language & Organization	4	0	0	50	50
Format / Professional Presentation	4	0	0	25	75

Appendix A – Annual Student Report

A total of at least 30 credits for EDMS courses are required to complete the M.A. program.

Course Number	Course Title	Semester & Year	Credits	Grade	Transfer? (Y/N)	Self-Reported Competency*		
						C1	C2	C3
623	Applied Measurement: Issues and Practice		3					
646	General Linear Models I		3					
647	Causal Inference and Evaluation Methods		3					
651	General Linear Models II		3					
655	Introduction to Multilevel Modeling		3					
657	Exploratory Latent and Composite Variable Methods		3					
724	Modern Measurement Theory		3					
TBA	Elective 1							
TBA	Elective 2							
TBA	Elective 3							
Total Number of Credits								
Total Number of Credits within EDMS								
Advisor's Combined Rating on Competency Areas (based on Coursework and other EDMS Experiences)								
Comprehensive Exam Date and Pass Status:								

* Rate yourself as 'low', 'moderate', or 'high' proficiency relative to the content and objectives of the course:
C1= Professional and content knowledge; C2=Research competency; C3=Professional competency

Program faculty and advisor comments:

Appendix B – Master's Paper Rating Grid

Rating Grid for Final Paper (Applied Analysis Paper; *25 Points*)

	No Evidence (0 Points)	Minimal Evidence (1 Point)	Some Evidence (2 Points)	Comprehensive Evidence (3 Points)	Your Score
Literature Review	Results of a literature review are not described.	Results from a literature review are described, but are not synthesized to guide the design of the study.	Results from a literature review are synthesized, but it is unclear how they guide the design of the study.	Results from a literature review are clearly synthesized and the design of the study clearly follows from them.	
Research Questions	Research questions are not included.	Research questions are ambiguously / imprecisely worded and / or confound multiple aspects of a research design.	Research questions are worded generally well, but contain some imprecision and / or some confounding of research design aspects.	Research questions are clearly worded, contain no notable imprecision or confounding of research design aspects.	
Suitability of Data Set	A data set is not identified.	A data set is described but it is not suitable for the proposed study / a data set is described in a cursory manner.	A suitable data set is chosen but its description is incomplete and / or not all relevant variables are identified.	A suitable data set is chosen and clearly described and all relevant variables are clearly identified.	
Statistical Methodology (Rationale)	The statistical methodology is not described.	The statistical methodology is not suitable for answering the research questions of interest and / or does not include a variety of suitable analyses.	A suitable statistical methodology is selected, but links between the research questions are sometimes unclear and / or certain analyses are imprecisely described.	A suitable statistical methodology is selected, clearly linked to the research questions, and all analyses are clearly described.	
Statistical Analyses (Implementation)	The statistical analyses are not conducted.	The statistical analyses are conducted but major core components of the analyses such as inferential tests or tests for assumptions are lacking.	The statistical analyses are conducted, but they contain several mistakes or misinterpretations.	The statistical analyses are conducted properly throughout and all interpretations are appropriate given the statistical results.	

	No Evidence (0 Points)	Minimal Evidence (1 Point)	Some Evidence (2 Points)	Comprehensive Evidence (3 Points)	Your Score
Substantive Interpretations	The results from the statistical analyses are not interpreted with respect to the research questions.	The results from the statistical analyses are not appropriately interpreted with respect to some research questions and not all research questions are addressed.	The results from the statistical analyses are generally interpreted correctly, but contain some mistakes such as overgeneralizations or inappropriate claims and / or not all research questions are addressed.	The results from the statistical analyses are interpreted correctly with respect to all research questions.	
Language & Organization	The language contains numerous errors and /or the organization is incoherent.	The language contains several errors and / or the organization is coherent only at a macro-level.	The language is mostly error-free and the organization is mostly coherent at the macro-level and mostly concise at the micro-level.	The language is essentially error-free and the organization is coherent and concise throughout the proposal.	
Format / Professional Presentation	The final paper is not handed in.	The final paper is submitted in an unprofessional format or the paper is submitted at least a day late.	The final paper is submitted in a professional format but is submitted at least a day late.	The paper is submitted in a professional format and is submitted on time.	

Your Name: _____ Total Score for Final Paper: 1 + _____ = _____ .

Rating Grid for Master's Paper (Small-scale Simulation Paper; *25 Points*)

	No Evidence (0 Points)	Minimal Evidence (1 Point)	Some Evidence (2 Points)	Comprehensive Evidence (3 Points)	Your Score
Literature Review	Results of a literature review are not described.	Results from a literature review are described, but are not synthesized to guide the design of the study.	Results from a literature review are synthesized, but it is unclear how they guide the design of the study.	Results from a literature review are clearly synthesized and the design of the study clearly follows from them.	
Research Questions	Research questions are not included.	Research questions are ambiguously / imprecisely worded and / or confound multiple aspects of a research design.	Research questions are worded generally well, but contain some imprecision and / or some confounding of research design aspects.	Research questions are clearly worded, contain no notable imprecision or confounding of research design aspects.	
Suitability of Design & Analysis	A design for the simulation study is not provided.	A design is described but it is not suitable for the proposed study and / or the chosen outcome measures / secondary analyses are not suitable.	A design is described but it is only partially suitable for the proposed study and / or only some outcome measures / secondary analyses are suitable.	A suitable design is described and all outcome measures as well as secondary analyses are suitable.	
Implementation	The implementation is not described.	The implementation is described but the description makes a variety of unrealistic assumptions.	The implementation is described but some aspects remain unclear.	The implementation is clearly described and all aspects appear clearly feasible.	
Summary Analyses	The results from the simulation study are not summarized / synthesized.	The results are summarized / synthesized, but in incorrect or inappropriate ways or in ways that do not address the research questions.	The results are summarized / synthesized generally appropriately, but several mistakes in reasoning and /or the choice of method for summary / synthesis are apparent.	The results are summarized / synthesized accurately and properly with suitable statistics and / or graphical methods.	

	No Evidence (0 Points)	Minimal Evidence (1 Point)	Some Evidence (2 Points)	Comprehensive Evidence (3 Points)	Your Score
Substantive Interpretations	The results from the simulation study are not interpreted with respect to the research questions.	The results from the simulation study are interpreted, but the interpretations are generally inaccurate and / or the research questions are not addressed.	The results from the simulation study are generally accurately interpreted, but several key mistakes are apparent or research questions are not addressed.	The results from the simulation study are accurately interpreted with respect to all research questions.	
Language & Organization	The language contains numerous errors and /or the organization is incoherent.	The language contains several errors and / or the organization is coherent only at a macro-level.	The language is mostly error-free and the organization is mostly coherent at the macro-level and mostly concise at the micro-level.	The language is essentially error-free and the organization is coherent and concise throughout the proposal.	
Format / Professional Presentation	The final paper is not handed in.	The final paper is submitted in an unprofessional format or the paper is submitted at least a day late.	The final paper is submitted in a professional format but is submitted at least a day late late.	The paper is submitted in a professional format and is submitted on time.	

Your Name: _____ **Total Score for Final Paper: 1 +** _____ **=** _____

Appendix B: Required Courses

EDMS623 Applied Measurement: Issues and Practices (3 Credits)
Measurement theory and its application at an intermediate level; test development, validation and interpretation; issues and recent developments in measurement.

EDMS646 General Linear Models I (3 Credits)
A first post-introductory inferential statistics course, with emphasis on analysis of variance procedures and designs from within the general linear modeling framework. Assignments include student analysis of education and related data; application of statistical software packages is emphasized.

EDMS647 Causal Inference and Evaluation Methods (3 Credits)
Counterfactual (potential outcomes) framework for causal inference, design/analysis strategies for confounder control, and specific best-practice applications to the evaluation of programs.

EDMS651 General Linear Models II (3 Credits)
Multiple regression and correlation analysis; trend analysis; hierarchical and stepwise procedures; logistic regression; software for regression analysis.

EDMS655 Introduction to Multilevel Modeling (3 Credits)
Introduction to multilevel models and methodology as strategies for modeling change and organizational effects.

EDMS657 Exploratory Latent and Composite Variable Methods (3 Credits)
Development of models for exploratory factor analysis and their practical applications. Additional topics will draw from latent class analysis, cluster analysis, mixture models, canonical correlation, multidimensional scaling, and configural frequency analysis.

EDMS724 Modern Measurement Theory (3 Credits)
Theoretical formulations of measurement from a latent trait theory perspective.

Required for the Thesis Option:
EDMS799 Master's Thesis Research (1-6 Credits)
Registration required to the extent of 6 credits.

Appendix C: Faculty

Name	Degree & Field	Title	Status	Courses
Hancock, Gregory	Ph.D., Measurement, Statistics & Evaluation	Professor	Full-Time	EDMS657, Elective Courses
Harring, Jeffrey	Ph.D., Measurement, Statistics & Evaluation	Professor	Full-Time	EDMS651, Elective Courses
Jiao, Hong	Ph.D., Measurement, Statistics & Evaluation	Professor	Full-Time	EDMS623, Elective Courses
Liu, Yang	Ph.D., Measurement, Statistics & Evaluation	Assistant Professor	Full-Time	EDMS623, EDMS646, EDMS724, Elective Courses
Stapleton, Laura	Ph.D., Measurement, Statistics & Evaluation	Associate Dean & Professor	Full-Time	Elective Courses
Steiner, Peter	Ph.D., Measurement, Statistics & Evaluation	Associate Professor	Full-Time	EDMS647, Elective Courses
Sweet, Tracy	Ph.D., Measurement, Statistics & Evaluation	Associate Professor	Full-Time	EDMS647, EDMS655, Elective Courses
Yang, Ji Seung	Ph.D., Measurement, Statistics & Evaluation	Associate Professor	Full-Time	EDMS651, EDMS724, Elective Courses