UNIVERSITY OF MARY WASHINGTON – PROGRAM CHANGE PROPOSAL

Electronically submit this completed form with attachments in one file to the Chair of the College Curriculum Committee.

COLLEGE (check one):	**Arts and Sciences**	x	**Business**		**Education**	
Proposal Submitted By: Brian Rizzo			Date Prepared: Nov 8 2018			
Department /Program:	**Geography / Master of Science in Geospatial Analysis**					

1. *Note: for any program change entailing the addition any new courses, or revisions to existing courses, separate proposal for those course actions must also be submitted.* If the proposal involves changes in course credit hours as a part of the program change, "Change_Course_Credits" proposal forms for each course with revised credit hours must also be submitted.

PROPOSAL TO CHANGE EXISTING PROGRAM (check **no than one** of the following).	
Revise requirements for existing **major**	
Revise requirements for a concentration within an existing **major**	
Revise requirements for an existing **degree program**	x
Revise requirements for existing **certificate** program	
Revise requirements for existing **minor**	
Implementation Date: FALL semester, year:	2019

PROPOSAL TO CREATE NEW PROGRAM *NOT* REQUIRING STATE ACTION (check no more that **one** of the following)		
New concentration within existing major		Name:
New minor		Name:
New Major but NOT a new degree*		Name:
*Use ONLY for interdisciplinary majors that will be grouped as part of the "Special Majors/General Liberal Arts and Sciences" degree (CIP Code 24.0101) or reported as a BLS degree (CIP Code 24.0199)		
Implementation Date (semester and year):		

REQUIRED ATTACHMENTS FOR ALL PROPOSALS FOR PROGRAM CHANGE OR FOR NEW PROGRAMS *NOT* REQUIRING STATE APPROVAL:

2. **Rationale statement** (Why is this additional program needed? What purposes will it serve?)
3. **Impact Statement** (Provide details about the Library, space, budget, technology, and impacts created by this program change. Supporting statements from the Library, IT Department, etc. evaluating the resource impact and feasibility of adding the new program are required.) If the proposal involves changes in course credit hours as a part of the program change, "Change_Course_Credits" proposal forms for each course with revised credit hours must also be submitted.
4. **Catalog Copy** (Provide the complete Catalog Description for the proposed new program)
5. **Any change that impacts another Department must have a written statement (such as a copy of an email) from the Chair(s) agreeing to the change.**

Department Chair Approval*: Jackie Gallagher **Date:** Nov 9 2018

CCC Chair Approval: [signature] **Date:** 12/03/2018

Dean Approval: [signature] **Date:** 12/5/2018

***COB and COE proposals approved by the Associate Dean.**

***BEFORE* consideration by the UCC, the proposal must be approved the three levels noted above. Approval by the UCC, UFC, and Provost** are noted on the proposal "status history" at the UCC web site.**

***Provost approval is required in cases of proposals for new concentrations, new minors, new majors that do not involve a new degree, or program changes involving changes to credit hours of courses in the program's requirements.*

MSGA program change: Rationale, Impact and Catalog Copy

Background: The Masters of Science in Geospatial Analysis (MSGA) program was approved in 2013-14 to fit the strengths of faculty available at that time. To meet the requirements for the degree, students have to complete all of the six courses offered as well as a capstone project: there are no electives. While Ping Yin was hired as the program began, he was not involved in creating it. With the addition of Marco Millones Mayer in 2016, faculty expertise has changed considerably since the program was devised. Given the rapid expansion of geospatial technology, and strong interest in the "4+1" program introduced in 2017, we are proposing to change our MSGA curriculum to provide more flexibility to students and to better leverage faculty expertise for students' benefit.

Summary: We propose changing the program structure from having only six courses, all of them required, to requiring three courses plus three elective courses. This will provide students with some course selection and flexibility, and allow us to begin to offer cross-level cross-listed courses to help us deliver courses in both the MSGA and GIS Certificate programs more efficiently. While we are making catalog changes, we have also updated some of the other text (introduction, mission statement) to better reflect the program now that it has been in existence for four years.

Details: At the present time the requirements for the master's degree are as follows:

Introduction and Methods Courses (16 credits) — All courses are 4 credits
MSGA 510 – Spatial Thinking
MSGA 520 – GeoDesign and Geovisualization
MSGA 540 – Modeling and Spatial Statistics
MSGA 550* – Remote Sensing and Digital Imagery
Applications Courses (8 credits) — All courses are 4 credits
MSGA 570 – Geospatial Intelligence
MSGA 580* – Geospatial Data and Services on the Web
* Students with expertise and the appropriate background in either remote sensing (MSGA 550) or geospatial data management (MSGA 580) may petition the Program Director to substitute one of these courses with an independent study: MSGA 591 – Independent Study (4 credits)
Capstone/Independent Research
MSGA 595 – Capstone Project (1-6 credits)**
**The last 3 credit hours must be taken in the last semester of the program.

With the proposed changes, requirements would be as follows:
Required core courses:
MSGA 510 – Spatial thinking (4 credits)
MSGA 540 – Modeling and Spatial Statistics (4 credits)
MSGA 555 – Programming for GIS* (proposed new course, cross-level cross-listed GISC 450)
* Students who have completed an undergraduate GIS programming course equivalent to GISC 450 prior to matriculation may substitute MSGA 580 for MSGA 555.

Electives**:
MSGA 520 – GeoDesign and GeoVisualization (4 credits)
MSGA 550 – Remote Sensing and Digital Imagery (4 credits)
MSGA 570 – Geospatial Intelligence (4 credits)
MSGA 580 – Web GIS and Programming (4 credits) (proposed name change)
MSGA 571 – Special Topics in Geospatial Analysis (4 credits) (proposed new course)

**If approved by a faculty member and the program director, students may substitute 4 credits of MSGA 591 (independent study) for one elective.

Capstone/Independent Research

MSGA 595 – Capstone Project (1-6 credits)**

**The last 3 credit hours must be taken in the last semester of the program.

Rationale: The introduction of electives will, to some extent, allow students to focus their interests, taking courses that are more relevant to them. It will also make use of faculty expertise, and will allow us to better reflect growth in the geospatial field, and even to include new topics. A further benefit is in providing for the addition of individual courses, and thus capacity, should the program grow.

Impact: This change is to the structure of the MSGA program, not to the number of credits required: it defines 3 required courses and provides students with additional elective options to fulfill the remaining 3 course requirement. Students must continue to complete the 6-credit capstone (MSGA 595) for the 30-credit program. Since we currently offer the same number of courses, we do not anticipate any immediate impact from this change.

Required are those courses we consider essential, which will be offered every year: MSGA 510 Spatial Thinking introduces students to our program; MSGA 540 Modeling and Spatial Statistics is extremely valuable; and MSGA 555 Programming for GIS will all but guarantee employment. MSGA 555 is proposed elsewhere in this packet as a cross-level cross-listed course, to be taught *every semester* with GISC 450 GIS Programming. Seats should become available in this course given the proposed change to the GIS Certificate program, which makes it no longer required in that program. At present, therefore, it will not require any additional resources.

Given that our current student population is primarily from UMW, most of those students have already taken GIS Programming and so will need the MSGA 580 Web GIS and Programming option – so this course will also be offered every year.

Other courses can be considered electives and need not be offered every year, although we anticipate strong demand for MSGA 550 Remote Sensing and Digital Imagery. MSGA 520 GeoDesign and GeoVizualization, MSGA 570 GeoIntelligence, and MSGA 571 Special Topics in Geospatial Analysis (a new course proposed elsewhere in this packet) might be taught every 2 years or so. As long as we offer 6 MSGA courses each year, plus the cross-level cross-listed MSGA 555, full-time students will be able to complete coursework in one academic year. The rotation might look something like this:

	Required			Elective				
	510	**540**	**555**	580	550	570	571	520
Year 1	Hanna	Millones	Rizzo	Yin	Millones	Yin	Millones	
Year 2	Yin	Millones	Rizzo	Yin	Millones		Yin	Hanna
Year 3	Millones	Millones	Rizzo	Yin	Millones		Millones	Hanna

The exact rotation might change, as might the semester in which a course is offered, but given that we currently teach 3 MSGA courses every fall semester, and 3 every spring semester, with GISC 450 offered every semester (plus other undergraduate GIS courses), we know that we can staff this rotation and that we have classroom space for it. We are not changing the fundamental nature of the program. In reality, an adjunct sometimes teaches MSGA 550 Remote Sensing and Digital Imagery, so we also have the personnel bandwidth to teach these courses. When not teaching masters level courses, Yin,

Millones and Hanna teach undergraduate courses; during years when they appear to not be teaching as much, undergraduate courses would be offered. At the same time, they all supervise MSGA capstones.

Change to the 5-year accelerated (4+1) MSGA program: Currently, undergraduate students accepted to this program take MSGA 510 in the fall of their senior year and MSGA 520 in the spring of their senior year, in any order. We will change this requirement to 510 and 540, both required courses. We would like the freedom to experiment with the "best" semester in which to offer these courses, so in the new catalog copy, we have removed the specification of fall semester and spring semester. Of course, one will always be offered in the fall, the other in the spring.

We are aware that full-time students will have to take the courses offered: in any given year, we will teach 6 MSGA courses plus MSGA 555, the cross-level cross-listed programming course. These students will not have any choice, as current students do not. However, part-time students will be able to plan their curriculum to some extent. At present, the majority of our students attend part time.

Transition: students currently in the MSGA program may opt to remain in the old version or may adopt the new version of the program. It is possible that substitutions will be needed if a course required in the old version is not offered during the time frame that the student needs it.

Catalog Copy

Master of Science in Geospatial Analysis

The Master of Science in Geospatial Analysis (MSGA) program ~~provides students with the advanced level skills required by companies and government agencies in careers associated with the spatial analysis of human and physical systems, biological and environmental planning, urban planning, design, and development, and business management~~ is a unique residential program that focuses on mastering the science and technologies behind the successful application of spatial systems. The MSGA program emphasizes instruction in theory and practical applications related to the capture, management, analysis, and display of spatial information. The program provides students with a technical foundation and geographic knowledge base to apply geospatial tools to a myriad of problems such as crime analysis, transportation engineering, urban planning, emergency preparedness, resource management, facilities management, climate change, and marketing. Theory and technical training will be integrated with the critical thinking, project management, and communication skills required by professionals in the geospatial fields. This is a coherent program designed to assure the mastery of specific knowledge and skills, such as programming within a geospatial environment, report writing, critical spatial analysis and solving problems.

~~Geospatial analysis integrates application software and theory from a field of disciplines that focus on the collection, management, scientific analysis, and display of spatial data – data that can be mapped. Three technology pillars are widely accepted as the foundation for geospatial analysis: Geographic Information Systems (GIS), Remote Sensing (RS), and Global Positioning Systems (GPS). GIS is the core geospatial technology, the central pillar which enables other technologies to integrate relatively seamlessly across systems.~~

~~Geospatial Technology has been identified as a 'high growth' area by the Department of Labor. Much of this growth in this employment sector is within UMW's region; almost 15% of all geospatial jobs recently advertised across the nation were located in Virginia, Washington, DC, and Maryland.~~

MSGA PROGRAM MISSION STATEMENT

~~The MSGA program emphasizes instruction in theory and practical applications related to the capture, management, analysis, and display of spatial information. The program provides students with a technical foundation and geographic knowledge base to apply geospatial applications and tools to a myriad of problems such as crime analysis, transportation engineering, urban planning, emergency preparedness, resource management, facilities management, climate change and marketing. Theory and technical training will be integrated with the critical thinking, project management, and communication skills required by professionals in the geospatial fields. This is a coherent, highly structured program designed to assure the mastery of specific knowledge and skills, such as programming within a geospatial environment, report writing, critical spatial analysis and solving problems. After completion of the program, students will be able to collect, map, manage, and analyze data from diverse fields.~~

To provide an advanced level of education to professionals working or interested in pursuing a career in geospatial technology.

ADMISSION REQUIREMENTS FOR THE MSGA PROGRAM

- Earned bachelor's degree from a regionally accredited college or university
- Successful applicants typically have a GPA of 3.0 or higher from undergraduate course work. In addition, students are required to have successfully earned credits in at least two college-level GIS classes; in lieu of completed coursework, students can gain admission by providing documented evidence demonstrating they have worked with widely used GIS software on a range of projects indicating competence in the topics typically covered in upper-level undergraduate GIS. Students may be considered for provisional admission without having previous GIS coursework or related work experience under the agreement that if they are admitted they must take GISC 200 and GISC 351 or GEOG 351 prior to beginning their graduate-level courses.
- Non-native English speakers will provide evidence of proficiency in English.

Required forms and documents:

- Completed application for admission. The application form is found online at admissions.umw.edu/graduate/arts-science/msga.
- Official transcripts of all undergraduate and graduate course work.
- A statement of purpose outlining career goals.
- Résumé, stating relevant work experience; applicants without completed coursework in GIS need to provide documented evidence demonstrating their proficiency with GIS.
- Two letters of recommendation (on the application forms provided). One should be from a person who can attest to the applicant's GIS or geospatial experience, if applicable.
    - Demonstration of English competency if English is not your native language. Any of the following is acceptable: Test of English as a Foreign Language (TOEFL) – a minimum score of 88 on the Internet based test or a 570 paper-based score. TOEFL website: toefl.org.
    - International English Language Test system (ELITS) a minimum score of 6.5 on the academic exam, ELITS website: ielts.org.
    - Certification of completion of the ELS Language Centers (ELS) Intensive English Program by completing Level 112. ELS website: els.edu.

If applicable, the International Student Application Supplement found at admissions.umw.edu/graduate/international-students

Following an initial vetting of applications by University Admissions, an interdisciplinary committee consisting of full-time UMW faculty familiar with the geospatial field will evaluate submitted documents. This committee will determine if students without undergraduate coursework in GIS have sufficient knowledge to succeed in the program.

Students are admitted for the fall or spring semester.

Application Due Dates:

Fall Admission: June 1 Spring Admission: October 1

Undergraduate Admission

Undergraduate students should apply for the MSGA Accelerated Degree Program in the second semester of their junior year (upon successful completion of 70 credits). Applications will be due on the Monday of the 6th week of that semester. Applicants should have a cumulative GPA of 2.7 or higher based on a minimum of 12 UMW credits, have completed at least two GIS courses each with a grade of B or higher, and supply a letter of recommendation from a UMW faculty member who teaches GIS. Once admitted, students will take MSGA 510 (Spatial Thinking) ~~in the fall semester~~ and ~~MSGA 520 (GeoDesign and GeoVisualization)~~ MSGA 540 (Modeling and Spatial Statistics) ~~in the spring semester~~. These courses are not sequenced; ~~520~~ 540 may be taken before 510.

On completion of the undergraduate degree, students may apply for formal admission to the graduate program, providing the forms and documents listed below. The two MSGA courses count toward both undergraduate and graduate programs if formal admission to the MSGA program is received within five years of the award of the undergraduate degree.

Deferred Enrollment. Accepted applicants may ask the College of Arts and Sciences for the option of deferring enrollment for up to two consecutive semesters. Each case is considered on an individual basis. Those who are granted deferred enrollment are subject to rules, regulations, and financial charges in effect when they actually enroll. Students who enroll at another institution before enrolling at the University of Mary Washington must reapply for admission. In cases involving military deployment, mobilization, or change in duty assignment, accepted applicants may request to extend the enrollment deferment for longer than two consecutive semesters. Any such requests will be considered on an individual basis. A copy of the person's military orders must be provided to the Office of Admissions to support such a request.

MSGA DEGREE REQUIREMENTS

~~Successful completion of all required courses or their equivalents with~~ To earn the MSGA degree, students must successfully complete MSGA 510 and MSGA 540; MSGA 555 or MSGA 580; and three other MSGA courses (12 credits) with a cumulative grade-point average of 3.0 or higher ~~is required to earn the degree~~.

All students are also required to complete a 6-credit **capstone project.** At least 3 credit hours must be taken in the last semester of the program. This independent project provides students the opportunity to pursue original research in their area of interest. As a capstone project, it will provide a measure of GIS skills acquired from the program and will demonstrate the student's ability to work independently.

~~In selected and approved cases, some~~ ~~s~~Students may propose to take ~~that~~ an **independent study** (MSGA 591) instead of ~~substitute for~~ one of the ~~required~~ offered elective courses. Students proposing an independent study will work with a faculty sponsor to create a set of readings and assignments culminating in a project equivalent to the assignments in the course for which the

independent study is a substitute. ~~Substitution decisions~~ Decision on whether to allow a student to pursue MSGA 591 will be based on an assessment of the student's work history, publications and reports, interviews with faculty, and the appropriateness of the proposed independent study project. ~~An independent study may not be requested as a substitute for any course in the program other than MSGA 550 or 580.~~

All required coursework must be completed within six years of matriculation into the program.

COMPLETION OF THE CAPSTONE

The capstone course (MSGA 595) is available for variable credit, from 1-6 hours. Students must complete 6 credit hours because of the scope and intensity of the effort expected; students are expected to do considerable independent work, averaging approximately 12 hours per week, if taking all 6 credits at the same time, and to report their progress to their course instructor on a weekly basis.

After completion of MSGA 510 and MSGA ~~520~~ 540, students will be allowed to take anywhere from 1-3 credits prior to the completion of their other coursework. The effort for these credits should be targeted towards the development of their proposal, literature review, and methodology. At least 3 credit hours must be taken in the last semester of the program, and within 1 year of completing all other classes. Full-time students may complete the capstone during the 10-week summer session.

TRANSFER COURSES

Ordinarily, a maximum of eight graduate credits can be transferred into the MSGA program. To be accepted for transfer credit, courses must have been taken from a regionally-accredited institution within the last six years with a minimum grade of B and must directly relate to one of the MSGA program courses. Transfer credit is not given for internship or practicum experiences.

REQUIREMENTS FOR CONTINUANCE IN THE MSGA PROGRAM

All matriculated MSGA students are expected to maintain satisfactory academic progress in their graduate courses toward completion of the degree program. A cumulative GPA of 3.0 (B) or higher is required for graduation from the program.

Students must maintain a minimum cumulative GPA of 3.0 (B) in each semester to remain in good academic standing, with no more than one grade lower than this benchmark per semester. A student who earns a total of three Cs (including C+, C, or C-) or one F in a graduate course in the program (other than the capstone) will automatically be suspended from the program.

To earn the MSGA, students must earn a minimum grade of B for all capstone credits taken (MSGA 595). Students who fail to achieve this grade on the last three credits of the capstone will be offered the chance to repeat these credits one time. A student who again earns a B- or below in capstone credits will automatically be dismissed from the program.

Students who voluntarily interrupt their enrollment for one to three semesters should refer to the Leave of Absence policy in the "Admission and Enrollment" section.

READMISSION TO THE MSGA PROGRAM

Students who have not attended the University for three consecutive semesters, excluding summer session, must apply for readmission through the Office of Admissions. Students who are readmitted are subject to the degree requirements in effect at the time of readmission. When a student is readmitted, the six-year limit from time of first admission is still in effect. Academic work

that was completed more than six years before the date at which the MSGA is awarded may not be used to satisfy the degree requirements. If a student needs additional time to complete the degree, the student must apply in writing to the Program Director for an extension. Such requests must be received at least one month prior to the end of the student's original six-year time limit.

A student who has been suspended from the program may apply for readmission after a lapse of three semesters. Applicants for readmission must meet current minimum admission requirements. Readmission to the program is not guaranteed.

MSGA COURSE REQUIREMENTS (30 CREDITS)

Required Core Courses (12 credits) – All courses are 4 credits

MSGA 510 – Spatial Thinking
MSGA 540 – Modeling and Spatial Statistics
MSGA 555 – Programming for GIS*

* Students who have completed an undergraduate GIS programming course equivalent to GISC 450 prior to matriculation may substitute MSGA 580 for MSGA 555.

Elective Courses (12 credits) – Students select 3 of the following – All courses are 4 credits**

MSGA 520 – GeoDesign and GeoVisualization
MSGA 550 – Advanced Remote Sensing
MSGA 570 – Geospatial Intelligence
MSGA 571 – Special Topics in Geospatial Analysis
MSGA 580 – Web GIS and Programming

** If approved by a faculty member and the program director, students may substitute 4 credits of MSGA 591 for one elective

Capstone/Independent Research (6 credits)

MSGA 595 – Capstone Project (1-6 credits)**

** The last 3 credit hours must be taken in the last semester of the program