SOUTH DAKOTA BOARD OF REGENTS

Academic and Student Affairs

AGENDA ITEM: 7 – C (4)

DATE: June 28-30, 2016

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SUBJECT: New Minor: NSU Minor in Geographic Information Sciences

Northern State University (NSU) requests authorization to offer a baccalaureate minor in Geographic Information Sciences (GIS). NSU currently has a related major in Geography. The minor will give students skills used in acquiring, mapping and analyzing spatial data that is applicable to a variety of opportunities in a rapidly growing employment field. NSU expects to graduate eight students per year with this minor after full implementation. The proposed curriculum does not require the addition of any new courses and consists of nineteen credit hours. NSU is not requesting new resources.

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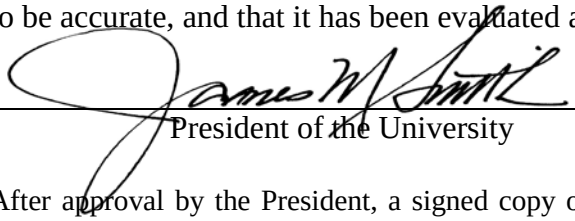
DRAFT MOTION 20160628_7-C(4): I move to approve NSU's Minor in Geographic Information Sciences as described in Attachment I.

South Dakota Board of Regents
New Baccalaureate Degree Minor

University:	Northern State University
Title of Proposed Minor:	Geographic Information Sciences (GIS)
Degree(s) in which minor may be earned:	Any, but targeted at: history, political science, sociology, criminal justice, environmental science, and management information systems (MIS)
Existing related majors or minors:	Geography minor
Proposed Implementation (term):	Fall 2016
Proposed CIP Code:	450701

University Approval
To the Board and the Executive Director: I certify that I have read this proposal, that I believe it to be accurate, and that it has been evaluated and approved as provided by university policy.



President of the University — Date: 3/22/16

After approval by the President, a signed copy of the proposal should be transmitted to the Executive Director. Only after Executive Director review should the proposal be posted on the university web site and the Board staff and the other universities notified of the URL.

1. Do you have a major in this area? _____ Yes X No

2. If you do not have a major in this area, explain how the proposed minor relates to your mission.
Northern State University's mission includes providing "service to the State of South Dakota, the region, and the nation." The United States Department of Labor declared Geospatial Technologies a high growth industry in the United States, and many businesses, organizations, and government offices seek to hire graduates with expertise in geographic information sciences (GIS).[1] It is prudent for the SDBOR to offer minors in GIS at more than one institution. SDSU and SDSM&T both offer GIS minors, and department chairs at both institutions have reviewed and recommended the NSU GIS Minor. NSU will set its GIS Minor apart from other SDBOR institutions by structuring an interdisciplinary minor and stressing the nearly universal

[1]United States Department of Labor, Employment and Training Administration. "High Growth Industry Profile-Geospatial Technology." https://www.doleta.gov/brg/indprof/geospatial_profile.cfm

applicability of GIS.[2] The GIS Minor will enhance many of the majors at NSU and make students more employable in a growth industry.

3. How will the proposed minor benefit students?

NSU students who earn minors in GIS will be competent at acquiring, mapping and analyzing spatial data using GIS. Students will understand the strengths and limitations of spatial data, how to use spatial statistics to map and analyze real data in the human and natural worlds, and how to build and maintain databases that are the backbone of GIS systems. Students from a wide range of majors become more employable with expertise in GIS. Students majoring in history, sociology, criminal justice, political science, biology, environmental science, and business and students minoring in geography can benefit from a Geographic Information Sciences (GIS) minor. NSU has about 10 Geography minors at any time, most of whom are majors in history or political science. The GIS Minor will attract students in environmental science and MIS as well as the social sciences. An April 2016 search of federal jobs in GIS found 41 active job listings with GIS in the title[3], and at least ten job search sites focus solely on jobs in GIS.[4]

4. Provide estimated enrollments and completions in the table below and explain how the estimates were developed.

	Fiscal Years*			
	1st	2nd	3rd	4th
Estimates	FY2016	FY2017	FY2018	FY2019
Students in the minor (fall)	5	5	8	10
Completions by graduates	0	2	5	8

* Do not include current year.

Estimates are based on the current number of students who are biology majors, environmental science majors, or geography minors. Those will be the first students we will recruit into the GIS Minor, and the program will build from there.

5. What is the rationale for the curriculum?

Geographic Information Sciences (GIS) is a combination of software and hardware designed to help analyze spatial data (data that has a location, or a place). Databases in GIS incorporate dozens or hundreds of columns of attribute data for each location. GIS analysts gather and generate data and maintain it in databases; map the attribute data at scales from local global; overlay other spatial data including remotely sensed images, and use GIS analysis tools .Northern State University (NSU) has been building up toward offering a minor in Geographic Information Sciences (GIS) since hiring a professor of geography in 2007. NSU began offering Introduction to GIS in 2008 and joined the ESRI Consortium for South Dakota universities at that point. In 2014, NSU hired a biology professor with expertise in GIS, remote sensing, spatial

[2] Esri. What is GIS? http://www.esri.com/what-is-gis/jobs
[3] USA Jobs. https://www.usajobs.gov/JobSearch/Search/GetResults?keyword=gis
[4] GIS Lounge. https://www.gislounge.com/job-listing-sites-in-gis/

statistics, and biogeography. This faculty member is now offering these courses on regular rotations. Additionally, NSU offers a major in Management Information Systems (MIS) within our School of Business. The faculty in the MIS major offer database management courses that are important in GIS. The NSU Minor in GIS will integrate courses offered by geography, biology, and MIS faculty to train our students to both do GIS analysis and to structure and maintain GIS databases.

6. Complete the tables below. Explain any exceptions to BOR policy being requested.

A. Distribution of Credit Hours

[title of proposed minor]	Credit Hours	Percent
Requirements in Minor	16	84.2%
Electives in the Minor	3	15.8%
Total	19	100%

B. Required Courses in the Minor

Prefix	Number	Course Title	New*	Hours
BADM ECON MATH PSYC BIOL SOC	220 220 381 371 345 209	*Statistics (offered across these departments on regular rotations)*	No	3
GEOG	372	*Introduction to GIS (schedule rotation)*	No	3
GEOG	488	*GIS II (schedule rotation)*	No**	3
GEOG BIOL	484/L 449/L	*Remote Sensing and Lab (schedule rotation)*	No**	4
MIS	484	*Database Management (schedule rotation)*	No	3

* New: Y= yes, N = no.

**Please note that GEOG 488 and GEOG 484/L are already taught as special topics courses at Northern State University and permission to teach common courses to offered these courses with permanent course numbers have already been submitted to SDSU and for approval and to NSU AAC. BIOL 449 was originally proposed as BIOL 448 – during approval process SDSU received approval to use BIOL 448 for a different course.

C. Elective Courses in the Minor: **List courses that may be taken as electives in the minor. Indicate any new courses to be added specifically for the minor.** *(If the list of existing courses is long, it may be provided as Appendix A.)*

MIS	385	*Data Mining*	No	3
GEOG BIOL	436 436	*Biogeography*	No	3

The proposed GIS Minor is interdisciplinary, which enables students with existing majors or minors to count one or more course in the GIS minor toward their existing majors and minors. Having these two classes as electives enables both biology majors and MIS majors to use an additional course in their major toward the GIS minor.

TOTAL CREDITS IN GIS MINOR: 19

7. What outcomes will be expected for all students who complete the minor? How will these outcomes be achieved?

NSU students who earn a minor in GIS will be prepared to set up and maintain geographic information systems. Courses in GIS, remote sensing, and statistics will enable students to preform GIS analysis and research. Courses in MIS and statistics will enable students to structure and properly maintain databases that are the backbone of geographic information systems.

Learning outcomes for NSU GIS Minor:

- Competency in acquiring, mapping, and analyzing spatial data using GIS.
- Competency in understanding the strengths and limitations of spatial data.
- Understand how to use spatial statistics to map and analyze real data in the human and natural worlds.
- Competency in building and maintaining databases used in GIS.

8. What instructional technologies will be used to teach courses in the minor? *This refers to the instructional technologies used to teach the <u>new</u> courses in the minor and NOT the technology applications students are expected to learn.*

Courses in GIS and Remote Sensing will be taught in the existing Geography laboratory using the ESRI software NSU has access to through membership in the South Dakota Statewide GIS University Site License Consortium. Courses in MIS are taught in existing MIS labs using software already owned and used by NSU.

9. Is the University is requesting authorization to provide the minor to students at an off-campus location or by distance delivery? If yes, explain. *If off-campus or distance delivery authorization is not requested, enter "None."*

At this time, we are not. Courses will be taught face-to-face at this time.

10. Costs, Budget & Resources: Explain the amount and source(s) of any one-time and continuing investments in personnel, professional development, release time, instructional technology and software, other O&M, facilities, etc needed to implement the minor.

No initial costs for technology or personnel are needed, as all hardware and software are already owned by NSU and all faculty are already employed by NSU.

11. Additional Information *Additional information is optional. Use this space to provide information not requested above.. Limit the number and length of additional appendices. Identify appendices with capital letters. Letters of support are not necessary and are rarely included with Board materials. This item may be deleted if it is not used.*

Northern State University's Strategic Plan includes priority #4: "***Prepare students for success in an increasingly global culture by coupling a solid foundation in critical thinking and communications with international learning opportunities and up-to-date technologies.***" Geographic Information Sciences (GIS) are an up-to-date technology in a field designated as a growth industry by the US Department of Labor. International students who attend Northern on exchange or as degree seeking students will also benefit from taking courses toward or earning a GIS Minor.