 New Course Proposal Form

**Note**: This form should be used for new courses and for changing a special topics course to a regular course.

Use tab to move between fields.

**Instructions:**

1. Complete form.

2. Secure Program Coordinator Approval.

3. Save with document name in this format: prefix \_title\_ year- month-day submitted (ex. BIO\_IntroBiology\_2014-01-08).

4. Submit by sending as an email attachment to [registrar@northland.edu](mailto:registrar@northland.edu). (Please put the new course name in the subject line.)

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| **Proposed Information** | |
| Prefix (ART, BIO, etc.): MTH | Level (100, 200, etc.): 250 |
| Credit(s): 2 | |
| Full Title (Maximum of 35 characters): Communicate with Great Graphs | |
| Short Title (Maximum of 11 characters): Great Graph | |

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| **Term and Year when course will be offered for the first time** |
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| **Past Northland courses that are/may be equivalent to this new course** (i.e. students should not be allowed to take both the past course and this new course) |
| None. | |

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| **Prerequisites** |
| MTH107 or instructor's consent after demonstrating a simple familiarity with the R software (instructor can provide preparatory resources) |

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| **General Information** |
| **Regular Course** (i.e. permanent number)  **Special Topic/Experimental** (i.e. temporary number) | |
| **Session(s) offered** Fall Winter Fall & Winter Spring/May Summer | |
| **Frequency offered** Yearly Alternate Years |
| **Grading Method** Letter Satisfactory/Unsatisfactory |
| **Maximum enrollment for course** 30 **Department** |

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| **Liberal Education Designations** (check all that apply; [criteria](http://bridge.northland.edu/academiccouncil/SiteAssets/SitePages/Home/Criteria_LibEdEnvSocietyCategories.pdf) available on [Academic Council website](http://bridge.northland.edu/academiccouncil/_layouts/15/start.aspx#/SitePages/Home.aspx)) |
| Writing-Intensive Course (**requires special application form**) Foundational Skills in Mathematics  Natural Sciences Disciplinary Learning  Social Sciences Disciplinary Learning  Arts & Humanities Disciplinary Learning  Diversity & Justice  Environmental Narratives  Science of Environmental Issues Communities, Policies, & Management  of Environmental Issues  Environmental Applications |

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| **Course Fees** (Both types may apply to a single course, please break out appropriately if necessary) |
| **Course Materials Fee** (course readers, lab supplies, etc.) No  Yes  If yes, proposed fee |
| **Course Travel Fee** (food, transportation, etc.) No  Yes  If yes, proposed fee |

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| **Sustainability Designation for STARS Reporting**  Northland College routinely completes a Sustainability Tracking, Assessment, & Rating System (STARS) report developed by The Association for the Advancement of Sustainability in Higher Education (AASHE). The results of this report are used by a number of national, environmentally-oriented rating systems (Sierra Magazine, etc.) and are important for maintaining Northland’s visibility and reputation as an environmental liberal arts college.  In the STARS system, courses are classified as “sustainability courses,” as “courses that include sustainability,” or as “non-sustainability courses.” Review the criteria below, and check the appropriate box. **Please check only one box.** |
| This is a **Sustainability Course**  According to STARS, *sustainability courses* are courses in which the primary and explicit focus is on sustainability and/or on understanding or solving one or more major sustainability challenges (i.e. the course contributes to the achievement of the principles identified in the [Earth Charter](http://earthcharter.org/discover/the-earth-charter/)). Sustainability Courses may be:  A) Foundational courses in which the primary and explicit focus is on sustainability as an integrated concept having social, economic, and environmental dimensions. Obvious examples include Introduction to Sustainability, Sustainable Development, and Sustainability Science; however, courses may also count if their course descriptions indicate a primary and explicit focus on sustainability.  B) Courses in which the primary and explicit focus is on the application of sustainability within a field. As sustainability is an interdisciplinary topic, such courses generally incorporate insights from multiple disciplines. Obvious examples include Sustainable Agriculture, Architecture for Sustainability, and Sustainable Business; however, courses may also count if their course descriptions indicate a primary and explicit focus on sustainability within a field.  C) Courses in which the primary focus is on providing skills and/or knowledge directly connected to understanding or solving one or more major sustainability challenges. A course might provide knowledge and understanding of the problem or tools for solving it, for example Climate Change Science, Renewable Energy Policy, Environmental Justice, or Green Chemistry. Such courses do not necessarily cover “sustainability” as a concept, but should address *more than one* of the three dimensions of sustainability (i.e., social wellbeing, economic prosperity, and environmental health).  While a foundational course such as chemistry or sociology might provide knowledge that is useful to practitioners of sustainability, it would not be considered a sustainability course. Likewise, although specific tools or practices such as GIS (Geographical Information Systems) or engineering can be applied towards sustainability, such courses would not count as sustainability courses unless their primary and explicit focus is on sustainable applications. If there is a sustainability unit, module or activity within one of these courses, but it is not the main focus, the course may be counted as a “course that includes sustainability.” |
| Or, this is a **Course that includes Sustainability**  According to STARS, *a course that includes sustainability* is primarily focused on a topic other than sustainability, but incorporates a unit or module on sustainability or a sustainability challenge, includes one or more sustainability-focused activities, or integrates sustainability issues throughout the course. To count, these units/modules, activities or issues should be documented in course descriptions or syllabi.  While a foundational course such as chemistry or sociology might provide knowledge that is useful to practitioners of sustainability, it would not be considered to be inclusive of sustainability unless the concept of sustainability or a sustainability challenge is specifically integrated into the course. Likewise, although specific tools or practices such as GIS (Geographical Information Systems) or engineering can be applied towards sustainability, such courses would not count unless they incorporated a unit on sustainability or a sustainability challenge, included a sustainability-focused activity, or incorporated sustainability issues throughout the course. |
| Or, this is a **non-sustainability course** |

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| Depending on the level of research expected/required of your students for the proposed course, please indicate the adequacy of the following types of library resources that support the course. Please indicate by typing yes or no next to Adequate or Inadequate. | | |
| Book/monograph collection | Adequate: | Inadequate: |
| Journal collection (Print or electronic) | Adequate: | Inadequate: |
| Indexing/abstracting services (print or electronic) | Adequate: | Inadequate: |

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| If you checked *inadequate* for any of the above library resources, please describe what additional resources would bring the library’s collections up to an *adequate* level to meet the course needs and provide an estimate of the cost of purchasing these resources. |

N/A

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| Rationale for adding course to Northland’s curriculum |

Data science is a rapidly expanding field of study and employment (a January 2019 report from Indeed, one of the top job sites, showed a 29% annual increase in demand for data scientists and a 344% increase since 2013). An important part of a data scientist's job is visualzing data (i.e., making graphs). In addition, making elegant graphs for dissemination to scientific or lay audiences is an important final step for most research in the natural and social sciences. Thus, the ability to create quality graphics will help students communicate their research findings and build skills for future employment.

This course teaches the "grammar of graphics" which has matured into a flexible environment for creating nearly any graphic that an individual can imagaine. This course will be taught using the ggplot2 package in R, but the "grammar" can be extended to other softwares (e.g., Tableau, which is currently used in the Center for Rural Communities). Thus, this course is providing a specific and transferable skill.

Additionally, it has been my thought for a while that the MTH program could provide a few one or two credit skill-based courses that could attract students to the major, while also providing a service for other programs. This course would be our initial offering of such a course. Teaching it as a "special couse" will provide an opportunity to see if there is interest among students and programs, and to learn how this course and similar offerings can be imrpoved for possible future regular offerings.

Finally, the college administration has encouraged the faculty to provide courses during May term that can be taught on-line, may help us stay connected with our students, and may generate some revenue. I suspect that this course may be of some interest to some of our studets and I am comfortable that it can be taught well on-line.

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| Proposed learning outcomes for the course (e.g. After completion of the course, students will be able to . . .) For courses that satisfy liberal education requirements, include at least one learning outcome for each liberal education designation, including writing intensive. |

1. Understand the foundational principles of the "grammar of graphics";

2. Use the grammar of graphics to construct traditional graphs such as histograms, barplots, scatterplots, line plots, and time series plots;

3. Use "aesthetics", "scales", "annotations", and "facets" to modify traditional graphs to display multiple levels of information;

4. Understand how colors and typography affect the audience's appreciation of graphical information;

5. Construct composites of multiple graphs to illustrate a complete narrative with data;

6. Become proficient with using the ggplot2 package in the R environment to construct elegant and informative graphs;

7. Understand the importance of "tidy data" with respect to the "grammar of graphics"; and

8. Use some R functions to create "tidy data" from "untidy data."

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| Identify who will be teaching this course and provide an overview of the individual’s two-year course rotation with this course included. (May be submitted as an attachment) |

Derek Ogle

F19 -- MTH107, MTH107

W20 -- MTH107, MTH107, MTH207

M20 -- Course release (per email from then Dean Alldritt on 28-Oct-18)

F20 -- MTH107, MTH107

W21 -- MTH107, MTH107, MTH207

M21 -- Course release (same e-mail)

F21 -- MTH107, MTH107

W22 -- MTH107, MTH207, MTH207

M22 -- ???

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| Please explain any other costs associated with the proposed course, such as faculty development, special equipment needs, etc. |

N/A

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| Course description as it should appear in the Northland College catalog. (65 word maximum, present tense, active voice. e.g. “Students study . . .” or “Students investigate . . .” etc.) |

Student will use the “grammar of graphics” to create elegant and engaging graphs for communicating ideas to scientific and lay audiences. Foundational principles of the grammar of graphics will be emphasized so that students can make any graph they can imagine. Class examples will be drawn from a variety of fields including the environmental, natural resources, and social sciences; business; and sports.

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| Proposal/Review Process | | | |
| Proposed by: Derek Ogle | Date: 6-Apr-20 | | |
| Reviewed by Program Coordinator: Derek Ogle | | Yes: | No: |

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| Approval Process: Please initial and date | | | |
| Received by Registrar’s Office: | | Date: | |
| Reviewed by Registrar: | | Date: | |
| Reviewed by Associate Dean for Academic Affairs: | | Date: | |
| Submitted to Academic Council for review | Approved:  Denied:  Date: | | Tabled:  Date: |
| Jenzabar Processing: Please initial and date when complete | | | |
| Advising requirement created: | | Date: | |
| All required information entered: | | Date: | |
| Sustainability designation entered in EX Catalog User tab: | | Date: | |
| Course has been activated & date approved is entered: | | Date: | |
| Pre/Co-Requisites entered: | | Date: | |
| Confirmed on: | | Date: | |
| All requirement information entered in EX catalog: | | Date: | |
| Advising trees updated as applicable: | | Date: | |
| Updated in Acalog: | | Date: | |